

European Association for Practitioner Research on Improving Learning

EAPRIL 2016 Proceedings

ISSUE 3 – March 2017 ISSN 2406-4653

EAPRIL 2016

Proceedings

November 22-25, 2016 Porto, Portugal

EAPRIL 2016

LOCAL ORGANISING COMMITTEE 2016

CONFERENCE CHAIR

Nuno Escudeiro - University of Porto

MEMBERS

Paula Escudeiro – University of Porto Ricardo Almeida – University of Porto Ana Barata – University of Porto Alexandra Trincão – University of Porto Bertil Marques – University of Porto

> SUPPORT Students University of Porto

CONFERENCE & PROGRAMMING COMMITTEE 2015-2017

Sirpa Laitinen-Väänänen, Finland – Chair of EAPRIL Patrick Belpaire, Belgium Arnoud Evers, the Netherlands Martijn Willemse, the Netherlands Rebecca Eliahoo, United Kingdom Marcelo Giglio, Switzerland Manuel Peixoto, Portugal Inneke Berghmans, Belgium – Project Manager EAPRIL Margaux De Vos, Belgium - Project Manager Ad. Int. EAPRIL Tonia Davison, Belgium (EAPRIL Office) Liesbeth Braem, Belgium (EAPRIL Office)

EAPRIL is ...

EAPRIL is the European Association for Practitioner Research on Improving Learning. The association promotes practice-based and practitioner research on learning issues in the context of formal, informal, non-formal, lifelong learning and professional development with the aim to professionally develop and train educators and, as a result, to enhance practice. Its focus entails learning of individuals (from kindergarten over students in higher education to workers at the workplace), teams, organisations and networks. More specifically

- Promotion and development of learning and instruction practice within Europe, by means of practicebased research.
- To promote the development and distribution of knowledge and methods for practice-based research and the distribution of research results on learning and instruction in specific contexts.
- To promote the exchange of information on learning and instruction practice, obtained by means of practice-based research, among the members of the association and among other associations, by means of an international network for exchange of knowledge and experience in relation to learning and instruction practice.
- To establish an international network and communication forum for practitioners working in the field of learning and instruction in education and corporate contexts and develop knowledge on this issue by means of practically-oriented research methods.
- To encourage collaboration and exchange of expertise between educational practitioners, trainers, policy makers and academic researchers with the intent to support and improve the practice of learning and instruction in education and professional contexts.
- By the aforementioned goals the professional development and traning of practitioners, trainers, educational policy makers, developers, educational researchers and all involved in education and learning in its broad context are stimulated.

Practice based and Practitioner research

Practice-based and practitioner research focuses on research for, with and by professional practice, starting from a need expressed by practice. Academic and practitioner researchers play an equally important role in the process of sharing, constructing and creating knowledge to develop practice and theory. Actors in learning need to be engaged in the multidisciplinary and sometimes trans-disciplinary research process as problem-definers, researchers, data gatherers, interpreters, and implementers.

Practice-based and Practitioner research results in actionable knowledge that leads to evidence-informed practice and knowledge-in-use. Not only the utility of the research for and its impact on practice is a quality standard, but also its contribution to existing theory on what works in practice, its validity and transparency are of utmost importance.

Context

EAPRIL encompasses all contexts where people learn, e.g. schools of various educational levels, general, vocational and professional education; organisations and corporations, and this across fields, such as teacher education, engineering, medicine, nursing, food, agriculture, nature, business, languages, ... All levels, i.e. individual, group, organisation and context, are taken into account.

For whom

Practitioner researchers, academic researchers, teachers, teachers educators, professional trainers, educational technologists, curriculum developers, educational policy makers, school leaders, staff developers, learning consultants, people involved in organisational change and innovation, L&D managers, corporate learning directors, academics in the field of professional learning and all who are interested in improving the learning and development of praxis.

How

Via organising the annual EAPRIL conference where people meet, exchange research, ideas, projects, and experiences, learn and co-create, for example via workshops, training, educational activities, interactive sessions, school or company visits, transformational labs, and other opportunities for cooperation and discussion. Via supporting thematic sub communities 'Clouds', where people find each other because they share the same thematic curiosity. Cloud coordinators facilitate and stimulate activities at the conference and during the year. Activities such as organizing symposia, writing joined projects, speed dating, inviting keynotes and keeping up interest/expertise list of members are organised for cloud participants in order to promote collaboration among European organisations in the field of education or research, including companies, national and international authorities. Via newsletters, access to the EAPRIL conference presentations and papers on the conference website, conference proceedings, regular updates on cloud meetings and activities throughout the year, access to Frontline Learning Research journal, and a discount for EAPRIL members to the annual conference.

More information on the upcoming 2017 Conference as well as some afterglow moments of the 2016 Conference can be found on our conference website http://www.eaprilconference.org.

TABLE OF CONTENTS

TABLE OF CONTENTS
"IS THERE A RELATIONSHIP BETWEEN ATTITUDES TO DEATH WITH A POSITIVE IMAGE OF GOD, AND COPING STRATEGIES?"
Zahra Afkari Shahrestani, Bagher Ghobari Bonab, Seyyed Mahmoud Mirzamani Bafghi, Leila Abbasi, Abdolbasset Mahmoudpour
DESIGNING A CURRICULUM FOR HEALTHCARE PROFESSIONS: EXPLORING THE LEGAL THIRD LEARNING PATHWAY IN VET
Henk Ritzen, Elke Hartman, Eugene van Wijk, Chantal Haarhuis-Ophof
FAMILY - SCHOOL COOPERATION - A TOPIC FOR SWISS TEACHER EDUCATION INSTITUTES?
Jürgen Lehmann
WHERE IS THE LINK BETWEEN DIRECT, MINIMALLY GUIDED AND CONSTRUCTIVIST INSTRUCTION? A NEW INTEGRATED MODEL OF CONSTRUCTIVIST TEACHING
Alexander F. Koch
PROJECT-BASED LEARNING AND PROFESSIONAL IDENTITY CONSTRUCTION
Alexandra Badets
COMBINING VET AND INTEGRATED LANGUAGE LEARNING TO ENHANCE PROFESSIONAL OPPORTUNITIES FOR MIGRANT PUBLIC THE VINTAGE PERSPECTIVE
Bénédicte Halba
ON THE RELATIONSHIP BETWEEN STUDENT WELL-BEING, THEIR LEARNING, AND LEARNING ENVIRONMENTS IN HIGHER EDUCATION
Els Laenens, Ellen Vandervieren, Tom Hofkens, Ann Stes, Peter Van Petegem
BOOSTING EUROPEAN EXCHANGE ON HIGHER VET AND EMPLOYER INVOLVEMENT IN EDUCATION STRUCTURES (BEEHIVES)
Herman Van de Mosselaer, Anna Frankenberg, Anthony F. Camilleri, Raimund Hudak
MULTIDISCIPLINARY COOPERATION BY STUDENTS IN DUTCH HIGHER VOCATIONAL EDUCATION
J. C. (Jan) Kamphorst
MEDIA EDUCATION HABITUS AND THE PRACTICE OF TEACHERS - HOW CAN WE UNDERSTAND AND INFLUENCE IT? FIRST (PRELIMINARY) RESULTS
Jasmin Zimmer, Paula Bleckmann
PILOTING VAKE (VALUES AND KNOWLEDGE EDUCATION) IN THE EDUCATION FOR PRACTICE OF NURSES
Jean-Luc Patry, Mario do Rosário Pinto, Ana Spinola, Alcinda Reis
TRANSITION FROM ACADEMIA TO WORK USING THE DIDACTIC TOOL OF VALUES AND KNOWLEDGE EDUCATION

Jean-Luc Patry, Pedro Costa, Andreia Monteiro

THE POTENTIAL ROLE OF ONLINE PLATFORMS IN PPROCESSES OF DIGITAL SOCIAL INNOVATION. FINDINGS FROM THE PROJECT I-LINC
Jens Maylandt, Bastian Pelka, Eva Wascher,
ART AND MUSIC HELP REFUGEE CHILDREN TO LEARN THE SCHOOL LANGUAGE
Karen Reekmans, Catherine Roden, Kris Nauwelaerts
EDUCATIONAL PEDAGOGY OF PROFESSIONALISM
Loes Houweling, Aziza Mayo
ETUBE AS A DIGI-INTERVENTION IN HIGHER EDUCATION
Mauri Kantola, Marjo Joshi, Minna Scheinin
AN ONLINE JOURNAL PROMOTING DIGITAL COLLABORATION IN FINNISH HIGHER EDUCATION INSTITUTIONS
Lotta Linko, Mauri Kantola, Mervi Frimann
MIND THE GAP! PERCEPTIONS OF TEACHERS, PRINCIPALS AND TEACHER EDUCATORS REGARDING THE PRIMARY-SECONDARY SCHOOL TRANSITION IN FLANDERS
Mieke Goos, Anne Decelle
STIMULATING KNOWLEDGE BUILDING; WHAT WORKS?
Niek van Benthum, Lia Spreeuwenberg
BETTER LEARNING THROUGH RELEVANT WORK EXPERIENCE? PRELIMINARY RESULTS ON THE VALIDITY AND RELIABILITY OF LWWL INVENTORY
Juhani Saari, Liisa Vanhanen-Nuutinen, Kimmo Mäki, Hannu Kotila
SUPPORTING THE DEVELOPMENT OF TEACHER COMPETENCES DURING TEACHER EDUCATION THE NEW CURRICULUM OF PRIMARY-SCHOOL TEACHER EDUCATION IN UPPER AUSTRIA
Karin Busch, Sabine Bruch
MAKE IT FLOAT! TEACHING THE CONCEPT OF RATIO THROUGH COMPUTER SIMULATION
Elena Vysotskaya*, Anastasia Lobanova**, Iya Rekhtman***, Mariya Yanishevskaya****
THE CURSE OF DROPOUT FROM DISTANCE EDUCATION – WHAT IS IT ABOUT? A STUDY OF MOTIVES AND MASTERY AMONG DISTANCE EDUCATION STUDENTS IN NORWAY
Wenche m. Rønning
EVOLVING PARADIGMS: METHODS OF DELIVERY AND TEACHING PHILOSOPHIES FOR A DIGITAL AGE
Zarina M. Charlesworth, Natalie B. Sarrasin, Hilary C. Murphy
THE CARNIVAL OF THE ANIMALS (COA) - IPAD APP AS A TOOL FOR THE STUDENTS' PROFESSIONAL GROWTH VIA PRACTICE ORIENTED RESEARCH ON CULTURE-BASED INTERACTION
Kaarina Marjanen, Markus Cslovjecsek
LOW PERFORMERS IN MATHEMATICS IN PRIMARY TEACHER EDUCATION
Ronald Keijzer, Gerard Boersma

"IS THERE A RELATIONSHIP BETWEEN ATTITUDES TO DEATH WITH A POSITIVE IMAGE OF GOD, AND COPING STRATEGIES?"

Zahra Afkari Shahrestani^{*}, Dr. Bagher Ghobari Bonab^{**}, Dr. Seyyed Mahmoud Mirzamani Bafghi^{***} Leila Abbasi^{****}, Abdolbasset Mahmoudpour^{*****}

*Young Reaserchers and Elite club,Islamshahr Branch,Islamic Azad university,Islamshahr. Iran, afkari_z@yahoo.com, **Bagher Ghobary, Universityof Tehran, Iran, bghobari@ut.ac.ir ***PhD, Baghiyatollah Hospital, Mollasadra Ave, Vanak Sq, Tehran, Iran, Mirzamani2003@yahoo.co.uk ****Phd Family counseller student laylaabbasi@yahoo.com *****MA of Rehabilatation counseling, Allameh Tabatabai university, Tehran, Iran

ABSTRACT

This study aimed to investigate the relationship between attitudes toward death with a positive impression of God and the psychological well-being. The sample consisted of 100 adherents 50 and 50(man and woman), of them have died as a sampling of the citizens of the region 1 Tehran. Using the Lazarus and Folkman's coping strategies questionnaire, questionnaire image of God (RSI) and experimental attitude toward death (DADR) collected from humans is a correlation. The results show that the positive attitude to death, the image of God, there is a significant relationship between coping strategies.

Keywords: positive attitude to death, the image of God, coping with stress

PREFACE

Affect the image of God, is considered as an indicator of spiritual well-being and knowledge and at the same time as the beginning of a spiritual birth, which is in the early stages of understanding the concept of one God manifested, can serve as a predictor of psychological adjustment cognitive. In fact, the way of thinking a religious person to God, affects on his experiences in life, and also on the coping strategies that he picks for everyday life's problems. (Nasirzadeh and Tabatabai, 1388).

One of the important spirituality identifiers is the idea that the person on the basis of previous descriptions of God, formed in his mind. Thus, the importance of people's ideas about God, in relation to psychological and religious, is a major issue. Because, this can be placed in the center of the definition of spirituality and religion. (Aymans and Krymplr, 1999, quoted by Khaksari, 1385).

People's perception of God, whether positive or negative, undoubtedly affects their relationships with God. However, these two interpretations, for a common reason may looks different or even contradictory and against each other, but, for a pious and faithful wisdom, these two, are the sides of a God. In, positive impressions of God, the Lord is supposed to be compassionate, and supportive guidance and the impression can be a comforting role; and, negative image of God, the Lord is with features such as punishment, rejection and inhospitable described, disappointment and distrust in people raises (Grynvy et al., 2003). Belief in God and acceptance a purpose for the life and its events, leads to a mental health and life satisfaction and positive emotions, therefore, however the individual's connection with the universe is deeper, more emotional satisfaction will experience in his life. (Elm, Nusrati, 1380).

In general, the results show a significant association between the image of God and public health, the findings is consistent with results of previous researches (Kirkpatrick, 2005, I, et al., 2008, quoted Haddad dusty mountain and therefore, 2011). Therefore it can be concluded, whatever people in their relationship with God, trust and feel they have more control, the higher will be their mental health; moreover, the findings of this study, not only explains the relationship between mental health and the image of God, but it can also be used in psychological interventions. This means that people with a negative impression of God, can be cured by spiritual intervention and positive image. In modern life, more than ever we are faced with stressful experiences that endanger people's physical and mental health, and are caused mental disorders; in such circumstances, some helping factors, including religion can prevent damage and collapsing under heavy pressure and problems. According to some psychologists and some research in recent decades, the role of religion and its effectiveness in the realm of mental health and also in the treatment of mental illness is proven. (Dust BONAB, 1380, quoted Jamali, 1387).

Coping strategies, is of the variables that are widely studied in the field of health psychology (Habfvl et al., 1998).

In a two-way interaction between mental health and coping strategies, it can be said that mental health on the one hand, is a result of the selection and use of effective coping strategies and in accordance with change and stress, and on the other hand, acts as a ground for healthy psychological environment that in light of it, the correct understanding and correct assessment of the situation of tension is provided to select an effective coping strategy. Studies also show that in explaining the variance in mental health and its subscales, there is a significant difference between coping problem-focused and emoting- focused strategies. So that, each person used more problem-focused coping strategies, is higher in mental health. (Hoseynian and et al., 1385). Research of «Matud» (2004) showed that although both sexes did not differ in the number of experienced stressful events, but women evaluate, compared with men, the life events more negative and more uncontrollable. In addition, women, in emotion-focused avoidance coping styles and psychological disorders and physical symptoms, received higher scores. In other words, women compared with men, receive higher emotional scores.

In today's world, human life with all its bus and features is almost well-known and almost everyone knows that each of childhood, adolescence, youth, the elderly and aging periods are rings of an interconnected chain.

In late adulthood, people think more about death and speak it, because at this age because of increasing evidence of physical changes, higher rates of illness and disability and the loss of relatives and friends, dying to see more closely. (Durres, block, Vbyrn, 1993, Kastnbam, 2007). Having a Positive approach to power beyond the existence, causes anxiety, depression and fear away from the man, and instead, vitality and physical and mental health, happiness and prosperity to sit. (Meyer, 2006, Motahari 1387).

Each person may have his unique interpreted and response to the death, as an inescapable reality. In the meantime, death due to its ambiguous nature, look for many people as a source of threatening and anxiety, which is common among all cultures and different religions and communities collide with it in different ways. (Horta Vyap, 2006)

Van's Studies (2010) shows a negative relationship between religiosity and anxiety of death, which means that, whatever one's religious beliefs is stronger, then his death anxiety is less; and hence, religious people have reported low levels of death anxiety.

Dalman and Dobbs (2010) also believe that spirituality and closeness to God has a reverse correlation with negative beliefs about the death. This means that people who have more spirituality in their life reigns, their negative beliefs about death is also at a lower level.

Kraus (2005) also revealed such belief that God can help in controlling the life has a small correlation with the anxiety of death.

RESEARCH METHOD: THE POPULATION AND SAMPLE

The research was conducted in the winter of 2014, is a cross-correlation and a fundamental research, which examines the relationship between attitudes toward death with a positive impression of God on the one hand and on the other hand deals with coping strategies. The statistical society was the citizens of the region No.1 in Tehran as available population and the sample group as of 100 people was selected from this region, including 50 men and 50 women with two specifications of aged 18 and older and education diploma and higher.

MEASURE METHOD

Test attitudes towards death (DAPR);

A revised profiles attitude to death was prepared in 1994 by "Wang", "Raker" and "Gsr". Then, "Wang" et al. (1998), due to the lack of means of assessing the positive attitudes towards death (acceptance of death), built the original test. This revised version of the study on a sample of 100 young adults 18 to 29 years, 100 adults aged 30 to 59 years and 100 aged 60 to 90 years was developed and standardized. The scale has 32 and measures 5 dimensions concerned to death including: fear of death, avoidance of death, neutral acceptance, reception trend and admission avoidance. These five dimensions, covers attitudes towards death (the scale of acceptance) and also, negative attitudes towards death (fear and avoidance subscales).

The participants, in a 7-point Likert scale (from strongly agree to strongly disagree), rate their agreement or disagreement with any of the terms specified. Expressions relating to each sub-scale scores are added together and divided by the number of sub-scale.

Questionnaire "image of God":

To obtain a positive impression scores of God, God's image questionnaire (RSI) «Grynvy" (2003) was used.

The questionnaire consists of three sub-tests, the presence of God in life, care and positive impression of God is God in this study, and scores were used in tests positive impression of God. The test is scored on Likert, and was adjusted from strongly agree to strongly disagree. The reliability of the test, according to research "Khodayarifard" (1385) by using the "Alpha Alpha" in case of a positive image of God was 0/61. To measure self-esteem scale, "Cooper Smith" was used. The questionnaire contains 58 articles that feelings, opinions or reactions describing the person and participants must answer yes or no to it. Poorshafei (1370) by using the method of making two half, reported 0/87 reliability for the test, and also for evaluating the Validity of "Cooper Smith" test, "Sabet" (1375), evaluated 0/80 the positive validity convergence between this test and Eysenck's self-esteem test.

Coping strategies "Lazarus"

Questionnaire: "Lazarus" Strategies Questionnaire, based on the list of coping strategies by Lazarus and bulk Kaman was built in 1980 and was revised in 1985.

Coping strategies, are a set of cognitive and behavioral efforts that person use them to interpret and modify a stressful situation by which reduces the suffering caused by the stressful situation. These strategies evaluate a range of thoughts and actions that people apply them in dealing with internal or external pressure conditions.

In Iran, the two middle-aged couples and 763 sample consisted of 750 second and third year high school student standardized, Cronbach's alpha coefficient scale also was 61% to 79%. In Lazarus coping strategies the highest score is 100 and it has 8 sub-test as follows:

1. Direct confrontation: a person using problem-focused coping style, uses the cognitive skills to solve a problem.

- 2. Avoid: a person tries to avoid stressful problems without solving them, that this approach in long-term, reproduces stress and worsening public health.
- 3. Self-control: is applied to the methods which use the coping strategies, effective and appropriate with change and stress, and on the other hand, in themselves provide the groundwork for healthy psychological environment and in the light of this, enable person to have a correct understanding and assessment of the stressful situations and select an effective coping strategies.
- 4. Use of social support to ease the tension caused by stress, especially external pressures, provided with self-esteem, the person will be helped.
- 5. Responsibilities when dealing with stressful situations helps a person to have the ability to deal effectively with the problem.
- 6. Avoidant coping, as a short-term strategy, efficient known, but in the long term, compromise the psychological barrier and increase the signs of distress, such as depression.
- 7. Accordingly, Problem planned ways to deal with a problem, directly is checked and usually finding appropriate solutions for a problem, brings psychological satisfaction.
- 8. Positive re-evaluation: Mobility itself puts a person, the necessary facilities to deal with the stressful situation and this situation calls all potential abilities for a person in order to cope and solve a problem positively and increases the likelihood of his success.

FINDINGS

Table 1The mean and standard deviation of variables

Variable	Number	Mean	(SD)
Attitude to death	100	69/57	23/03
Image of GOD	100	91/53	15/74
Coping strategies	100	51/88	11/35

Table 2

The correlation between positive perceptions of God and understanding the relationship between coping strategies

	Coping strategies	Image of GOD
Coping strategies		
The Pearson correlation coefficient	1	0/52
SIG (2-tailed)		0/69
Ν	100	100
Image of GOD		
The Pearson correlation coefficient	0/52	1
SIG (2-tailed)	0/69	
Ν	100	100

Correlation between the idea of God and the coping strategies was 0/52 and smaller due to a significant level, this relationship is significant.

Table 3The correlation between attitude to death and coping strategies

	Coping strategies	Image of GOD
Coping strategies		
The Pearson correlation coefficient	1	-0/253
SIG (2-tailed)		0/11
Ν	100	100
Positive attitude toward Death		
The Pearson correlation coefficient	-0/253	1
SIG (2-tailed)	0/11	
Ν	100	100

Correlation between attitudes towards death and the coping strategies was -0/253 and since it is smaller than significant level, then this relationship is significant.

Table 4

Correlation of the image of God and attitudes to death and coping with stress

	r	r2	f	Sig
The correlation between the predictor variables and coping	0/957	0/916	242/41	000
strategies with stress				

The reported correlation coefficient (r) is 95/0, and it means that the variables attitude to death, positive image of God in dealing with each other, and with the criterion variables (coping strategies) is about equal to 95/0. The value of "f" for this relationship in the $p \le 01/0$ level is significant. This means that the predictor variables, interacting with each other can predict changes in the criterion variable. The coefficient of determination (r2) is equal to 0/916, it means that 91% of the variation in scores of coping strategies using predictive interaction variables (attitudes to death and positive image of God) is predictable.

Discussion and conclusion

Experiencing God with lovely and intimate characters always has had a negative correlation with hostility in interpersonal relationships and the opposite trend is also true. For example, people who have had unpleasant experiences in life or different physical and sexual abuse, feel themselves away from God and a punished person, more than those who knew they had not such experiences. (Broca's and Edwards, 1994).

In a study examining the relationship between the image of God with mental health by Kirk Patrick (2005), is shown that people who consider God as kind, supportive, and intimate creature to themselves have more mental health. To explain these findings, it can be argued that having meaning in life, and knowing it as not absurd, increases mental well-being.

This confirms that belief in God, knowing the life and its events as purposeful phenomena, provides mental health, life satisfaction and positive emotions. On the other hand, the results of this study show that, although, the basic religious principles provides a set of guidelines for how to survive (Golparvar and khaksar, 1386) and causes well-being for each person, but, This transcendental mystical

experiences, such as feelings of deep inner peace, a feeling of oneness with the universe and the belief in a power greater than his own. (Kldr et al., 2004; Hasttlr, 2002).

Some researches in line with the results are as follows: Won (2010), Dalman and Dobbs (2010), desertion and colleagues (1390) and Mid-Gurion and Kvnyk (2005), all of whom, believe spirituality and closeness to God, has negative relationship with negative beliefs about death. According to the results, it is recommended that this research conduct more functional in Cultural Centers on College campuses and even some of its aspects apply in the educational process.

REFERENCES

- Nasirzadeh, R. Rasulzadeh tabatabai ,K (2009). *Study relation between religious believes Stress coping strategies in students*. Ofogh Danesh; Quarterly of Medical Sciences and Health Services city of Gonabad, 15, (2), 36-46.
- Narvani Nosrati, R (2001). Psychology and religion from the perspective of comparison with the Islamic approach, Marefat journal,10,(11),14-24.
- Khaksari,Z (2007). God's image, self-esteem and mental health among students of city Minab, Master's thesis in General Psychology. Faculty of Education and Psychology at the university Azzahra.
- Hosinian,S & colleagues . *study relation mental health and stress coping strategies among students of Tehran university*. Proceedings of the Third Seminar on mental health students at Elmo & Sanat Iran,2001.
- Motahhari, M(2008). Faith and Human, Sadra publications.
- Doolman, T.P, and Dobbs, D (2010). *Religiosity, spirituality and Death Attitudes in chronically Ill older adults*. Research on Aging, 32, 2, 224-243
- Green way, P. A, Lisa. Milnez and veronica Clarke.(2003). *Personality variables, self-esteem and depression and an individuals' perception of God*. Mental Health Religion and culture.61,45-58
- Ghobary Bonab, B, and Haddadi koohsar, A. A (2011). *Relations between quality of image of God and mental health in parents of exceptional children.* Procedia social and Behavioral sciences 29,227-231- Hureta, America and Yip Martin92006). *A study of religious certainty and death anxiety project proposal*, WCP: 262
- Krause, N. (2005). God- Mediated control and psychological well-being in late life. Research on Aging, 27, 2, 136-164
- Mears, D.P., Roman, C.G., Wolff, A., and Buck, J. (2006). *faith-based efforts to improve prisoner reentry: Assessing the logic and evidence.* Journal of criminal Justice, 34,351-367
- Wen, Y., h. (2010). *Religiosity and Death anxiety*. The journal of human Resource and Adult learning, 6, 2, 31-37
- Kirk patrik, L. A. (2005). Attachment evolution , and the psychology of religion.New York,The Guilford Press.
- Hureta, America and Yip Martin(2006). A study of religious certainty and death anxiety project proposal, WCP:262

DESIGNING A CURRICULUM FOR HEALTHCARE PROFESSIONS: EXPLORING THE LEGAL THIRD LEARNING PATHWAY IN VET

Henk Ritzen*, Elke Hartman**, Eugene van Wijk***, Chantal Haarhuis-Ophof***

*Lector Educational arrangements in social context, Saxion University of Applied Sciences, Enschede, Netherlands, h.t.m.ritzen@saxion.nl **Educational policy advisor Healthcare, ROC van Twente, VET, Hengelo, Netherlands, elhartman@rocvantwente.nl ***Program manager, ROC van Twente, VET, Hengelo, Netherlands, evanwijk@rocvantwente.nl, chaarhuis@rocvantwente.nl

ABSTRACT

The health sector is rapidly developing new techniques and procedures having a major effect on the role of the health care professional. This development requires the employees to acquire new competencies. For this reason they need additional education. The VET institutions in the Netherlands perceive the possibility of designing a curriculum called the third learning pathway, which is a legal and shorter adapted version of the traditional program. This study firstly focuses on the design and implementation of this curriculum, and secondly on its evaluation. The design and implementation is conducted by focus groups and the evaluation part is conducted by a questionnaire and focus groups. The students who finished the educational program have acquired the competencies described in the qualification file, which future health care skills related to the 21st century health care practices. The students (adults) learned and acquired additional skills as: taking initiative, being creative, independency and planning skills, caring, self-assertiveness, digital skills and nursing techniques. Results will clarify the impact of the 'third learning pathway' curriculum on the teachers and practitioners and on students' learning outcomes and needs. The teacher team developed professional competencies: design skills, digital skills, knowledge determination, planning, communication skills and creativity by thinking out of the box. In this way the added value of the third learning pathway can be established.

Keywords: Vocational education, third learning pathway in VET, health care, design based research, adult education, teachers' professionalization.

INTRODUCTION

The health care practice is a segment of social services that is subject to major changes. Multiple factors affect the role of healthcare professionals ("Professionals in de gezondheidszorg", 2016). Examples are: aging population, labour shortages in specific regions and specializations, increasing number of chronic patients, increasing costs, increasing demand for health care (van Merwijk, 2012a) and evolving technology (Huston, 2013). Hence, the relationship between the healthcare professional and the patients has fundamentally changed. Information about health and health care is increasingly available to patients contributing to their independence. On top of that, the state has transferred the management of health care for the elderly to the municipalities. They need to ensure that it becomes affordable again. Many elderly complain about the quality of the current care performance as a result of the management-transition to the municipalities. Since January 2015 housing and care are strictly separated in the Netherlands, aiming at the elderly and disabled living independently as long as possible. Logically, this calls for new care services of health care professionals.

According to van Merwijk (2012a) these changes in health care practice require a review of the professional organization structure. This will include the distribution of tasks and responsibilities between professional domains and a different organization of care processes. Consequently the position of the health care professional shifts and requires new skills ("Professionals in de gezondheidszorg", 2016). Consequently some qualifications of healthcare professionals become outdated. As a result current health care professionals should go back to school and be retrained to be able to keep up with the requirements of their profession. A new curriculum for training and retraining health care workers is indispensable. This requires a responsive attitude from vocational education institutions together with the health care organizations in order to react quickly on these changes and needs. This will meet the requirements of the Minister of Education, Culture and Science (2015) who sees a responsive vocational education institution as an organization that quickly responds to developments in society and the labour market in cooperation with companies. To this end the vocational institution ROC van Twente in the Netherlands has designed a new responsive curriculum in which students are educated in a modular and accelerated programme to acquire the new health care qualifications. To make the learning program work, it takes the life style of adult workers into account, meaning that the combination of schooling, job, family and household must be taken into consideration. This learning program is called the Third Learning Pathway (TLP) (Ritzen, 2016). The aim of this study is to evaluate the TLP curriculum.

CONTEXT

The teacher team 'Onderwijs@zorg' at ROC van Twente has taken notice of the need for an accelerated learning program for a health care institution to retrain their employees. The Onderwijs@zorg team has taken this very seriously and has been eager to develop a program that would effectively connect the classroom with the practice of work. The team consists of 12 teachers who collectively share their expertise and knowledge on different fields. The team has been working together for a year to develop the TLP and eventually implement the first TLP class in school year 2016.

The TLP curriculum is based on blended learning and therefore combines online learning with facetoface learning in both school and health care practice. Face-to-face learning is the personalized way of learning in the TLP, with teacher-led learning events where all students participate at the same time. The impact of teacher-led events is increased by the content-rich collaboration opportunities were interaction and discussion between students and teachers is made possible. Online learning enables students to work with tailored learning content at their own pace. This takes place in a learning management system (LMS) called CANVAS, which offers a variety of learning content. In Figure 1 the blended curriculum of TLP is schematically represented. The concept of blended learning stimulates vocational teachers, teacher-trainee-coaches and practice trainers (healthcare institution practice trainers) to support and assess students on the learned content. The school-bound teachers are responsible for the theoretical part of the TLP, as they are in charge of the learning content in CANVAS and the classroom instructions. The practice trainers are responsible for the practical part of the TLP, as they support the students during their work at the health care institutions. The teachertrainee-coaches are teachers acting as trainee coaches in between theory and practice, constituting the linchpin between school and practice. They are responsible for coaching, evaluation and assessment of the students.



Figure 1. Theoretical and pedagogical framework of the Third Learning Pathway curriculum

TLP students can be divided into two groups: the pre-service students and the in-service students. Students applying on their own initiative to participate in the program in order to become qualified are called pre-service students. These students in general want to refresh their health care knowledge or need the qualification because they want to work in health care. In-service students are already employed in health care and are obliged to participate in the program by their employer. In most cases their previously obtained diploma is outdated. In order to be able to continue practising their profession pre-service they need the new qualification.

RESEARCH GOALS AND QUESTIONS

An evaluation study of the stakeholders' (students, teachers and healthcare institution trainers) experience with the TLP has been conducted. The evaluation has been focussing specifically on the value the stakeholders attribute to the TLP in terms of the quality of the learning experience and learning outcomes in the school and in the working context. The study tries to give insight by answering the research question: 'What is the impact of the Third Learning Pathway on students, teachers and the health care practice?' Impact is to be understood in terms of the contribution to the professional attitudes and skills of students in a changing health care practice, the teachers'

understanding of the current requirements of health care and their own role and the guidance system in both school- and health care practice. This research question will be answered by three sub questions:

- 1. How do the in-service students (mandatory participation) differ from the pre-service students (voluntarily participation) in the blended learning environment of the TLP?
- 2. What is the added value of the TLP in developing professional competencies of future health care professionals in adult education?
- 3. To what extent have teachers been developing and/or augmenting professional competencies during the preparation and implementation of the TLP?

THEORETICAL FRAMEWORK

The Third Learning Pathway evaluated in this research was specially designed for adult learners as an accelerated form of education. This accelerated program is based on blended learning. In order to clarify the research questions a literature study has been done to gain insight in the concepts of blended learning, adult education, future health care competencies and teacher competencies.

Blended learning

Because of the rapid emergence of technological innovations, the possibilities to apply blended learning have grown enormously. As mentioned before a blended learning environment is an environment that combines face-to-face instruction and practice with instruction through technology (ICT) (Graham, 2006; Graham, Allen, & Ure, 2003). So blended learning implies a combination of live instruction and distant education (Hummel, Roossink, & Croock, 2006). During live instruction students have the opportunity to direct exchange information with their classmates and their teachers. In the distance learning environment, independent of time and place, educational content is shared online between students and their teachers (Hummel, Roossink, & Croock, 2006). According to previous research, there are three main reasons to apply blended learning:

- 1. it improves learning effectiveness,
- 2. it increases access and convenience, and
- 3. it is more profitable (Graham, 2006).

According to Rosen and Stewart (2015) a specific advantage of blended learning is the immediate digital availability of curriculum content to students for revision and learning. A digital learning environment also makes it possible for students to communicate with each other and with teachers from multiple locations. This mainly involves the digital exchange of experiences, making digital assignments and looking up information so that students can provide themselves with professional information and knowledge (Nederlands Ministerie van Onderwijs, Cultuur en Wetenschap, 2004). Beside advantages, blended learning also has some disadvantages. According to Cross (2006) it can be harmful when the emphasis of blended learning is merely put on the method of instruction, rather than on the holistic nature of learning. Teachers often state that their course consists of x% online and y% face-to-face learning. However, these percentages are meaningless unless the characteristics are known of the distance learning activities and the effectiveness of the blended learning course as a whole (Cross, 2006). Prensky (2001) states that the so-called digital generation has a particular need for the access to technology, collaborative learning, active learning environments, and tailored and effective pedagogy.

Even though Prensky focuses on the digital generation, it seems that blended learning is not only effective for them. Research of Rosen and Stewart (2015) shows that a blended learning environment is also more effective for the older adult students compared to mere face-to-face or online learning.

Blended learning promotes a "joint responsibility for learning, because education is a collaboration between teachers and their adult students" (Bryson, 2003: 27). Blended learning in adult education incorporates principles regarding adult education and constructivism. According to Chickering and Gamson (1987) active learning and social relationships enhance learning. In addition they state that instruction needs to be student-oriented and interactive, because students learn to think critically and acquire problem solving skills by collaborating and communicating with others (Chickering & Gamson, 1987).

Online learning skills are an important part of the 21th century skills that are not taught widely in adult education (Rosen & Stewart, 2015). These skills can be taught in a blended learning environment (Rosen & Stewart, 2015). In adult education and in the professional practice it is increasingly expected from students and employees to be digitally skilled and skilled in problem solving in technology rich environments (Rosen & Stewart, 2015). Many employers expect their employees to manage their own training and education needs and do their training and education online. The need for online learning will increase considerably in the future. Introducing online components thus offers opportunities for adult students to develop their digital skills (Rosen & Stewart, 2015).

Adult education

Adult learning takes place in different ways and contexts (Fenwick, Nesbit, & Bruce, 2006). Contexts in which adult learning occurs are: (1) formal: structured learning in an educational institution, with a set curriculum resulting in a certificate, (2) non-formal: organized learning by an educational institution but without credential. Often non-formal learning occurs in the workplace, and (3) informal education: learning at all times emerging from daily life activities (Bruce, 2006). This article mainly focuses on formal adult education. Adult students go back to school for professionalization or to learn the basic skills for a new and different occupation (Brannon-Hamilton, 2010). Adult students are facing various obstacles when following a training, such as time pressure, childcare, and travel problems (Brannon-Hamilton, 2010). Furthermore these adult students come from different backgrounds, with different capacities. This differentiates educating adults from educating younger students in several ways. Knowles, Holton and Swanson (2015) made fives assumptions about the characteristics of adult students differing from characteristics of younger students:

- *Self-image*: when a person gets older, his or her self-image shifts from dependent to more self-managing.
- *Learning experience:* with the years, a reservoir of knowledge and experience accumulates, making a significant contribution to learning.
- *Willingness to learn:* when a person gets older his/her willingness to learn is more focused on the developmental tasks of his/her social roles.
- *Learning orientation:* as a person ages his/her perspective shifts from postponed application of knowledge to immediate knowledge application. Adults frequently apply their learned knowledge in practice to learn effectively. This changes his/her learning preference from drilling to more problem-oriented learning.
- *Learning motivation:* as a person gets older the motivation to learn becomes more intrinsic, because adult education mostly is voluntary. When adult learners are obliged to participate an educational program by their employer, their motivation seems to be more extrinsically orientated (Knowles, Holton, & Swanson, 2015).

Some adult learners have had negative experiences in their school days and this has multiple consequences for adult education (Knowles, Holton, & Swanson, 2015). Some remember the classroom as a place where they were treated with disrespect. These feelings can be so strong that they become a serious obstacle for them getting involved in adult education. This problem can be slightly

reduced by using different, enjoyable activities in adult education. It may also help to have the meetings on non-school locations (Knowles, Holton, & Swanson, 2015). An effective means to reduce these feelings seems to be an online learning environment (OLE). According to research of Frey, Webreck, and Alman (2003) adult students appreciate the functionalities that an OLE brings. They prefer their expectations and learning goals of the educational program to be unambiguous in terms of planning, assessments, assignments, deadlines, and timetable. In addition, an OLE can give direct and continuous feedback and offers the possibility to regularly communicate with classmates and teachers. An OLE also provides flexibility in the curriculum, which enables students to make their own choices in their curriculum. Knowles, Holton, and Swanson (2015) agree and add that adults have a stronger need than younger students to know why they have to learn specific things. Besides that Knowles, Holton, and Swanson (2015) write that instruction in a blended learning environment for adults needs to be task oriented instead of purely focussed on memorizing learning content. The learning activities therefore need to be connected with the every-day tasks in their working environment.

Health care professional competencies

The demand for care is rising, while the number of professionals working in professional health care will not match this demand for care in the near future. In 2025, 1 out of 5 workers compared to 1 out of 7 in 2010, ("Ruimte voor arbeidsbesparende innovaties in de zorg", advise RVZ to min. VWS, 2010: 20) will be working in the health care sector (Barakat, Woolrych, Sixsmith, Kearns, & Kort, 2013). All health professionals should be educated to deliver patient-oriented care as members of an interdisciplinary team, with the emphasis on quality improvement and prevention approaches, and the application of ehealth-technologies. Table 1 outlines the competencies of health care professionals according to Liefhebber, van de Haterd, and den Hollander, 2012. According to them the future health care professional needs to listen to and have respect for the patient and the patients need to be informed about and involved in their own care (Epstein & Street, 2011). This is to be achieved through attention and dialogue by the health care professionals in mutual collaboration and communication around care. This will enhance professional reliability and by systematical and continuous improvement actions lead to measurable benefits in the patients' health.

Table 1

Attention and dialogue	Is attentively present, builds a relationship with patient, delivers patient-centred care, and communicates with the patients.
Prevention approaches	Indicates changes in the situation of the client and caregiver, provides information, advice and instruction on basic common care and selfreliance
Care and support	Provides personal basic care under different circumstances, supports the patient in social contacts an participation in society, supports in mental wellbeing, provides professional support in household, works self-directed, works together with other HCP's, controls the nursing techniques and acts convincingly on unexpected situations
Dealing with limits	Effectively deals with limits and tensions and knows how to regulate limits and tensions. The HCP also monitors own working conditions and position
Professional work	Works methodically and responsibly, reflects on its own actions and those of others, shows entrepreneurship, works together in multidisciplinary teams and works on own professionalism

Health care competencies (level 3) (Liefhebber, van de Haterd, & den Hollander, 2012)

According to van Merwijk (2012a) and Greiner and Knebel (2003), future health care professionals also have to be able to communicate (patients') information through IT. Barakat, Woolrych, Sixsmith,

et al. (2013) and van Merwijk (2012b) add ICT to the list of future health care professionals' competencies. Basic ICT skills are crucial for having immediate access to patient information, to be able to display and adjust patient information and data, and to guarantee that this information is interpreted accurately (Barakat, Woolrych, Sixsmith, et al., 2013).

Teachers' competencies

Because of the changing competencies of health care professionals, educational health care programs need to be responsive in order to keep the curriculum up-to-date. This research focuses on teachers' competencies in a blended educational program, so besides changes in the learning content, also didactics of how the learning content is being transferred changes (Mortera-Gutierrez, 2006). The teacher role in digital learning is focused on content knowledge, didactics, and student coaching. Content knowledge is necessary for designing digital learning components and in combination with good didactical skills it is possible to design a curriculum via ICT (Vereniging CultuurProfielScholen, 2011). Therefore this research takes a further look at the design skills of teachers (1). This research specifically focuses on adult education. Adult students come from different backgrounds with different experiences (Knowles, Holton, & Swanson, 2015). According to Knowles, Holton, and Swanson (2015) teachers need to take these different backgrounds and experiences into consideration when designing a fitting curriculum.

According to Mortera-Gutierrez (2006) a blended learning class will only be successful when the teachers are well trained pedagogically and didactically knowing how to apply blended learning effectively. Teachers' tasks have broadened with the introduction of digital resources in education, see Figure 1. According to Vereniging CultuurProfielScholen (2011) teachers' digital skills encompass more than being able to use the regular MS Office programs in applying digital didactics. This asks for the ability to articulate a vision and objectives regarding digital didactics (2). Besides design skills and digital didactics, teachers need to know how to use the digital learning environment to extract meaningful information from the ever-changing digital world. When the teacher uses digital resources he or she must be able to produce reliable information (3). Teachers should be able to evaluate digital resources on content quality and to judge whether the digital resources have an added value for student. The impact of digital resources on learning and on how learning should be supported is underestimated in schools. Instead the focus is more instrumental and directed to the choice of resources and subsequently on learning how to use resources, arranging learning activities in the classroom (4) (Vereniging CultuurProfielScholen, 2011).

Teacher			4					Study coach
Writing study material	Arranging learning line	aAssessing resources content	Assessing onfor learning	added ;	value	Producing teaching material	Establishing an OLE	Coaching students through the OLE

Figure 1. Teacher roles and tasks (Vereniging CultuurProfielScholen, 2011)

METHOD

Participants

The participants in this study are the TLP students, teachers and practice trainers. In total 58 students have finished the TLP, from which 36 students participated in the focus groups with 28 students responding to the questionnaire (both in-service and pre-service students). All participating students were female, with an average age of 48.6 year (SD 6 years).

The teacher team Onderwijs@Zorg consists of 12 educational staff, with 8 females and 4 males. The whole team participated in the focus group. Beside the students and the teacher team, two practice trainers of the in-service group were interviewed.

Instruments

A survey has been conducted on how in-service and pre-service students differ from each other and on what the added value of the TLP is on the development of students' professional competencies. Students were asked to share their experiences when performing activities and/or assignments together with the school and the health care institutions. The questionnaire consisted of 6 categories:

- 1. content of the education program,
- 2. learning experiences,
- 3. learning outcomes,
- 4. teachers and work supervisors,
- 5. professional context and
- 6. digital learning environment.

These 6 categories were measured on the basis of 15, 12, 5, 13, 3, and 10 items, respectively. Answering options ranged from 1 'totally disagree' to 4 'totally agree' or from 1 'very dissatisfied' to 4 'very satisfied'. A higher score means a higher value on the categories. According to Field (2009) a Chronbach's alpha (α) between .7 and .8 indicates a good reliability of the instrument. The reliability of the questionnaire used in this study is $\alpha = .87$, implying the questionnaire to be reliable.

The focus group as a tool has been used to yield qualitative data to get a deeper understanding of the research questions. The focus group meetings were attended by the students, teachers and practice trainers. The interview scheme for the focus group with the students has been based on (1) the beginning of the educational program, (2) the content and form of the educational program, (3) teachers, work supervisors and practice trainers, and (4) the results of the educational program. The interview scheme for the focus group with the teachers comprised (1) product evaluation, (2) process evaluation, (3) result evaluation, and (4) the future.

The interview scheme for the focus group of the practice trainers featured the mentoring and program structure.

RESULTS

Research question 1: How do the in-service-students (mandatory participation) differ from the pre-service students (voluntarily participation) in terms of learning experience?

Motivation. The in-service and pre-service students differ in their motivation to start the TLP. The inservice students participate in the educational program because they are obliged to participate by their employer and thus most are extrinsically motivated. According to the practice trainers of the TLP, these in-service students had an attitude characterized by 'I have to', because their job was at stake. These students at first were behaving reluctantly and felt agitation. *"Their motivation is different, because of the pressure that in-service students feel. In the beginning they didn't see the benefit and that ultimately had influence"* the program, because if they did not finish the program, they would also lose their job. This underlying fact caused a lot of stress, the in-service students say.

The pre-service students voluntarily participated in the educational program to enhance their personal competencies or improve their job opportunities. The majority of the interviewed students indicate that the main reason to start with the program was to refresh and structure their knowledge: "My reason to start with the TLP was to update my personal knowledge" a pre-service students says. The pre-service students can be characterized as intrinsically motivated to participate in the TLP.

Admission procedure. The in-service and pre-service students differ regarding the admission procedure. The admission procedure for the pre-service students includes the AMN-test* and establishing the students' prior education level. When the pre-service students have an insufficient AMN-test score, their participation in the TLP can be refused. This is not the case with the in-service students. Despite a negative advice they are obliged to enrol in an educational program (TLP or regular program). This results in a higher dropout percentage within the in-service groups than within the pre-service groups.

The in-service students also have to take a TMA-test** in the first 10 weeks of the program. When scores on both tests are sufficient, students are allowed to start with the educational program (TLP or regular program). According to the practice trainers the high pressure that in-service students felt during the admission period has had a negative influence. In some cases that resulted in a rejection to participate in the TLP, the students indicate.

At the first interim evaluation the practice trainers and the teachers decide which educational program is best for the student taking into account knowledge-demand (students' grades), practice, and personal situation. *"Everything is taken into consideration: theory, practice and personal learning situation of the in-service students, before we decide whether they can participate in the TLP"* the practice trainers says.

Nursing techniques. The in-service students indicate that they acquired sufficient understanding of the nursing techniques and that it met their expectations. The pre-service students on the other hand stated that they wanted to learn more broadly and in-depth about the nursing techniques. The pre-service students say that nursing techniques were poorly addressed in the curriculum and that they did not get the chance to discuss the content with fellow students.

In-school instruction. According to the interviewed in-service and pre-service students it appears that there is a difference between the groups when it comes to the in-school instruction days. The inservice students were instructed by one teacher during the TLP, while the pre-service students were instructed by more teachers. Both the in-service and pre-service students have in-school instruction one day a month. Therefore they do not see their teacher very often. The in-service students therefore preferred having only one teacher to communicate with. After a while the teacher was replaced by another teacher and this caused a lot of frustration and confusion, because the new teacher used different didactics. The pre-service students were satisfied with their teachers in terms of supervision. The only

drawback was that the teachers didn't align their activities sufficiently, causing inconsistency and confusion for the students.

Another difference between the in-service and the pre-service group according to the teacher team was their preparation for the school instruction day. The pre-service group was generally better prepared than the in-service group. It should be taken into consideration that the in-service students had more content to study and therefore had less time to prepare for the next instruction day.

Ready knowledge. According to the teacher team there were differences in ready knowledge between the in-service and the pre-service students. The in-service groups also contained students with a lower prior education (also level 2). Because of this the curriculum of the in-service and pre-service students differs slightly. The pre-service students claim that the level of the TLP fitted well with their existing knowledge. A couple of students state that the first course (personal care) had little added value. This course contained tasks were the students had to make beds and do groceries. They thought this was below their level and could be excluded from the curriculum. On the contrary some other students thought it fitted well in the curriculum, because they possessed few skills on the subject (because they came from another profession) and therefore they found it a useful course: *"It all depends on the people they admit to the program. Some people have a totally different background and therefore they have different needs"*.

In-service students with prior level 2 thought it was a tough transition to go to level 3. In their opinion it was a relative big step and to succeed they had to work really hard. The students who had prior level 3 thought the introduction days were focused too much on the computer. They felt they went through the learning material too slow, because they were relatively fast in working with the computer: "During the introduction days we had a lot of instruction that focused on the computer. After two days I thought I was a waste of my time".

The in-service students were told they would be placed in groups according to their prior education level (level 2 in one group and level 3 in one group). In this way students in the groups would have the same starting level. Ultimately this was not the case and the students were mixed. This caused difference in knowledge at their disposal, where the students with lower prior education were claiming instruction time from the students with higher prior education. "*They constantly asked questions about topics we already understand. We wanted to continue the lesson, but they blocked the whole instruction*" says one student. These blockers ultimately dropped out of the TLP.

	In-service gro	oup (N=8)	Pre-service group (N=16)		T-test (comparing means)	
	М	SD	М	SD	t	р
TLP content	2.94	.26	2.90	.27	.304	.76
Learning experience	3.17	.29	3.23	.22	.252	.62
Learning results	2.49	.38	2.51	.61	112	.91

Table 2Independent t-test in-service and pre-service

Teachers, work supervisors, and practice trainers	3.16	.40	3.06	.30	.667	.51
Professional context	3.48	.42	3.55	.41	375	.71
Digital learning environment	3.22	.28	3.17	.39	.346	.73

An independent t-test was conducted to compare the in-service students with the pre-service students. There was no significant difference found in the scores of the in-service students (M= 2.94, SD= .26) and the pre-service students (M= 2.90, SD= 0.27) on the content of the TLP program, t (22) = 0.304, p = .764. No significant difference was found in the scores of the in-service students (M= 3.17, SD= .29) and the pre-service students (M= 3.23, SD= .22) on learning experiences t (19) = .252, p = .615. No significant difference was found in the scores of the in-service students (M= 2.49, SD= .38) and the pre-service students (M= 2.51, SD= 0.61) on learning results, t (19) = -.112. No significant difference was found in the scores of the in-service students (M= 3.06, SD= 0.30) on teachers, work supervisors, and practice trainers, t (19) = .667, p=.513. No significant difference was found in the scores of the in-service students (M=3.48, SD= .42) and the pre-service students (M= 3.55, SD = .41) on the professional context, t (19) = -.375, p = 0.712. No significant difference was found in the scores of the in-service students (M= 3.22, SD = .28) and the pre-service students (M= 3.17, SD = .39) on digital learning environment, t (24) = .346, p = .733.

Research question 2: What is the added value of the TLP in developing professional competencies of future health care professionals who want to be working in health care institutions?

The TLP is designed to deliver health care professionals suited to work in the 21st century care environments. To make sure the TLP covers all the different health care professional competencies, the qualification file concerning regular health care education has been used. The qualification file is used in vocational education to indicate what a student should know and be able to do at the end of the educational program. *"The competencies stated in the qualification file for the health care programs are determined by knowledge centres for vocational education and health care organizations. When designing the TLP, the qualification file has been our guideline to ensure that all required competencies would be addressed."* a teacher states.

Students who graduate from the TLP have gone through an extensive continuous assessment procedure in order to make sure the required tasks were addressed sufficiently. This has been done with tests and assignments that students needed to pass sufficiently in order to continue the program. The assessments were strict: *"We only got two chances to pass a test. After failing the first tests, we could do a re-test. If you failed to pass the re-test you had to stop the educational program"* the students' say. This strict assessment ensured that only the most suitable students achieved to finish the program.

The students who passed the TLP also learned and developed additional skills taking part in the TLP: taking initiative, being creative, independency, planning skills, caring attitude, self-assertiveness, digital skills, and nursing techniques.

Taking initiative. Students state that they are responsible for their own learning environment. "You need to be the director of your own learning process during internship" a student says. Sometimes students doubted whether they were working on tasks that belonged to their level (level 3). Therefore they did not experience a rich learning environment at all times. Example: sometimes students only had to shower patients or pulling stockings on, which are tasks for level 2. Because they also had to do level 2 tasks, level 3 tasks were left out of their task schedule... To make sure they had a schedule on their level, they needed to take initiative in making agreements with their supervisors, creating a fitting rich learning environment at the internship.

Creativity. Supervisors have been reminding students to work on certain practical assignments, but they did not provide for those assignments... Students had to search for the opportunity themselves. General health care has many interns having to practice certain techniques. Not every patient likes to be treated by the interns and this limits the possibilities for the students to work on those practical assignments. Therefore students had to be resourceful in creating the opportunities for these practical assignments: *"Sometimes it was tough to find an opportunity, but being creative, gave an extra challenge and an extra dimension in our learning process"* a student says.

Independence and planning skills. TLP students are adult women, and also involved in (house-)work and family support. Therefore the TLP students need to learn to be highly independent and to acquire good planning skills. Students claim that it was stressful to combine training with their households. "It takes a lot of self-discipline: when do you start working? That requires a good planning and support from home" a student says. Students state that it is achievable to combine household, job, and education but it is fundamentally important that they have family support is crucial, because 40 weeks long their attention is mostly focussed on their training. This requires a tight schedule and selfdiscipline. Many students combined it by doing schoolwork while their children were at school. "Structure made it possible for me to participate in the TLP" one student says. The E-learning aspect made it possible for the students to be flexible in their planning.

Caring. Students not only gave continuous care to their patients, they also cared for one another. They supported each other throughout the TLP course. When there were problems, the students discussed this together in their special mobile-phone group. Students helped in solving the problem by advising and informing each other: *"When you are feeling left alone, you can call a classmate and she will help you get through it"*. They supported each other emotionally, because they had similar issues in combing the family with work and the TLP. They have been caring to each other and to the caretaker.

Caring techniques. In generally students agree that their caring techniques have been enhanced partaking in the TLP. The practice trainers think it is important to specifically look at the starting position of the students and the situation at the end to determine the degree of development. The TLP is a relative short program, were students have an internship. Besides that they have a job in the health care. According to the practice trainers the students' working place also needs to be taken into consideration in the assessment. Their own working environment and their employer form the designated frame of reference to see whether the student (their employee) has grown on the caring techniques: *"It is important that colleagues on their own workplace see that the students are thinking and acting as care professionals and that they did not linger in how they previously worked,"* a student says.

Digital skills. All students agree that they developed digital skills through the TLP. In the beginning of the program they experienced working digitally as difficult, but pretty soon they mastered the digital skills to work with the digital learning environment CANVAS. Students say that the introduction days worked very well in mastering the digital skills. In these introduction days students receive computer

training. After the introduction days they practice at home and very soon master it: "In the beginning you will make mistakes, but because of the clear instruction during the introduction days we know how to handle it" a student says. According to the students this also has to do with self-discipline, because the bottom line is that eventually you have to do it yourself. Good digital skills are necessary for the future health care practice: "Health care becomes more digital, because we are going to provide digital care. Our employer comes to us with his iPad. It is coming and we need to go with it. It is the future." The students state that they are happy the TLP offered the chance to develop their digital skills. The teachers agree that the students got more digitally skilled throughout the TLP.

Research question 3: How do teachers develop their professional competencies during the preparation and implementation of the TLP?

The teachers of the TLP state that they developed the following professional competencies: design skills, digital skills, knowledge determination, planning, communication skills and creativity (thinking out of the box).

Curriculum designing

At the start of the design process, the teacher team had no particular design experience and skills. During the process they developed design skills in multiple ways. For the team the qualification file and the examination requirements were prominent in designing the TLP. They did research on educational rules determined by law, they made continuous comparisons with the traditional educational nursing programs, and they also researched other educational institutions with similar accelerated programs. At first the team was careful, but after consulting with educational experts their mind-set switched from thinking in restrictions into thinking in possibilities: *"It became clear that we had much more possibilities than we thought. From then on we took our space in setting up the TLP and we learned to think outside the box"*. The team agrees that they got the opportunity to think outside the box, because the management staff gave them that space: *"If you do not have the cooperation of the management staff, you will not get far in developing a totally new educational program"*. In their design process they constantly put the student in the middle: *"We asked ourselves the questions: What does the student want? And what do we want for our students? In this way we could guarantee a good fit between program and student"*.

The establishment of the online learning environment Canvas was done by two members of the teacher team. The content of the learning components in Canvas used in the TLP has been designed by individual members of the teacher team. The components have been assembled into the different competence modules in the curriculum. These modules cover different topics essential in health care and designed by teachers being experts in that particular field. Designing a competence module teachers used continuous feedback to make adjustments in the way they present the content in the online learning environment.

The teachers also learned to substantiate every step and answer every question during the development of the TLP. They claim that it was a lot of work to do so. According to the teacher team it is important that the supervisor offers an open climate. Because of externally imposed limitations the team needed to be creative in designing the curriculum of the TLP. The team learned that a lot is possible when the foundation is good and when you have a shared goal. It also requires positivity and creativity in reaching that shared goal. They learned to think outside of the box, not only by looking at the traditional curriculum, but looking further.

Digital didactics

Teachers state that it has been quite a challenge to offer digital education to the students and strengthening their IT-competencies, while teachers at the same time had to develop themselves in that respect. Two teachers from the team had no experience with digitalization, whereas the other teachers had minimum experience with digital education: "It is easy to make a PowerPoint presentation, but it is different to educate students digitally. We had to make a full turn in our approach to become a team that is digital competent" a teacher says. They had to switch from teaching from the book to teaching with digital programs and equipment and it took time to sufficiently explore the online learning environment and its possibilities. The teachers with no experience got extra help from the school ICTpersonnel in the form of consultations. The purpose of these consultations was to convert teaching material from the book to online teaching material tailor made for the associated classes. The team members helped each other by dividing tasks to support one another in mastering the it-competencies. Eventually all teachers became competent in actively employing digital applications teaching the students online and in school: "We all grew personally in our digital skills. This might be partly due to the fact that we really did our best in finding a shared vision as a team in regard to ICT and digital resources."

Production of teaching content

To be able to produce teaching material fitting the students, teachers have to determine students' ready knowledge. Teachers found it to be difficult to determine students' knowledge level, due to the different backgrounds of the students. "What can we expect from the students? You don't want to set the bar too high, nor too low". To determine their knowledge-level students had to do the AMN-test on learnability, ready knowledge and skills and students had to provide testimony of their prior education. Depending on their prior education students can get exemption on some exam-topics.

Apart from ready knowledge and prior education the TLP makes it possible to differentiate in other aspects between students. Teachers can specify conditions in Canvas, which means that they can oblige students to read particular content or do a particular assignment before they can continue with the next topic. Students who have a higher knowledge-level can decide to only finish what is obliged and skip the voluntary content to pass the test. Students with less knowledge can choose to do all the submitted material in order to pass the end-test. In this way all students possess the same knowledge at the end of the course. "The TLP makes it possible to accommodate for all different students' backgrounds and eventually brings them on the same level. They get the opportunity to compose their own learning track" a teacher says. During the design process they kept a student in mind with the lowest knowledge-level. In this way the designed program is compatible for everyone. The TLP also offers adaptive learning exercises for mathematics and language, which adjusts itself to the students' success and error rates.

The team struggled to mutually align and organize the theoretical content. This was caused by the teachers' different backgrounds and expertise. In order to solve this the teachers agreed on individually designing the modules that fitted their expertise and trusting each other's expertise.

Arrange learning activities

During the implementation process, the TLP the team learned that adjusting curriculum and planning is a permanent process. The results of the formative team evaluations made it possible to discuss this and adjust were needed. Example: when a formal test had been announced for the next instruction day,

it appeared that students were chiefly occupied with the test they had to make. Because of this the homework for the next instruction day had been poorly prepared. To counteract this unwanted effect, the team adjusted the instruction content and learning activities, to coerce the students to pay more attention to the content of the modules. At first the teachers also tried to let students seek for more indepth learning content, but this proved to be a bridge too far.

CONCLUSION AND DISCUSSION

The goal of this research has been to determine:

- how the in-service students differ from the pre-service students in the TLP blended learning environment,
- the added value of the TLP to the development of future health care professionals,
- and to what extent teachers have been developing and/or augmenting professional competencies during the preparation and implementation of the TLP?

The in-service and pre-service students differ at the start, the in-service students being mostly extrinsically motivated and pre-service students mostly intrinsically. During the course of the TLP this differences seems to fade, because this research found no significant differences in the final impact of the TLP between the pre-service and in-service students.

TLP students who finished the educational program have acquired the competencies described in the qualification file and needed for future health care professionals to work in the 21st century health care practice. Additional skills learned and acquired by the TLP are: taking initiative, being creative, independency and planning skills, caring, self-assertiveness, digital skills and nursing techniques. The TLP teacher team as a collective has been able to gain the competencies needed for designing and implementing a blended learning curriculum. They developed the following professional competencies: design skills, digital skills, knowledge determination, planning, communication skills and creativity by thinking out of the box.

Recommendations

The results of this study indicate that the blended learning curriculum is expedient in enabling students acquire the health care competencies fixed in the qualification file. The TLP teacher team created the framework for a blended curriculum that can be further developed; especially in terms of programmatic alignment between education and care practice there is still a lot to be gained. A TLP is not only useful for one particular profession, it can also be implemented in other fields.

This research is part of the 'Innovation of Elderly Care' and is specifically carried out for the Twente region. Repetition of this research in other vocational institutions is necessary in order to draw methodologically viable conclusions from the evaluation of the TLP for health care.

This study only considered graduated TLP students who belong to a socially vulnerable group who have to work hard to keep their jobs in the health care institutions and some of them even left prematurely the school (TLP). To get full insight into the added value of the TLP on health care students, it could be interesting to compare the graduated TLP students and the dropout TLP students with each other. This to establish which key-competencies are indispensable for study success in the TLP for improving the curriculum and enhancing student's learning results.

The success factor seems to be the role of the educational learning goals in the blended learning design. These learning goals guide students' learning activities and distinguish between skills best

taught in school or online. In this way students know very precisely what is expected from them. The curriculum analysis showed that the new developed track creates an inspiring student and teacher working environment, which finally leads to an improved learning performance in a high number of practical care opportunities offered in the blend. Online digital communication is not rich enough to develop complex skills in health care; the reason why students discuss complex care tasks face-to-face during school time. The students are approximately 42+ years old and therefore they possess less computer skills. Extra guidance and user-instruction applying the learning management system CANVAS needs to be part of the curriculum in order to warrant the learning autonomy of the students.

Limitations

This evaluation research is only based on a post-test. Therefore the results cannot be compared to an initial situation set in a pre-test, which means no growth in effect can be determined.

Some students (N=30) have not responded to the questionnaire, because after finishing the TLP, they have not logged into CANVAS anymore and therefore missed the reminder from the researchers to fill in the questionnaire.

Acknowledgments

The study described in this research report was funded by a grant from The Netherlands Organization for Health Research and Development (ZonMw), grant no. 310200010.

REFERENCES

- Barakat, A., Woolrych, R., Sixsmith A., Kearns, W. D., & Kort H. S. M. (2013). eHealth technology competencies for health professionals working in home care to support older adults to age in place:
- outcomes of a two-day collaborative workshop. Medicine 2.0, 2(2). doi: 10.2196/med20.2711
- Brannon-Hamilton, M. (2010). Incorporating Constructivist Elements into an Adult Literacy Classroom. Retrieved from http://www.brannonhamilton.com/wp-

content/uploads/2010/11/Incorporating-Constructivist-Elements-into-an-Adult-LiteracyClassroom.pdf

- Bruce, S. (2006). *The purposes of adult education. A short introduction.* Toronto: Thompson Educational Publishing.
- Bryson, Jim. (2003) Universal instructional design in postsecondary settings: an implementation guide. Toronto: Georgian College.
- Chickering, A.W., & Gamson, Z.F. (1987). Seven principles for good practice in undergraduate education. *American Association for Higher Education Bulletin*, 39(7), 3-7. Retrieved

from http://www.aahea.org/bulletins/articles/sevenprinciples1987.htm

- Cross, J. (2006). *The handbook of blended learning: global perspectives, local designs.* San Fransisco, CA: John Wiley & Sons.
- Epstein, R. M., & Street, R. L. (2011). The values and value of patient-centered care. *Annals of Family Medicine*, 9(2), 100-103. doi: 10.1370/afm.1239
- Fenwick, T., Nesbit, T., & Bruce, S. (2006). Contexts of adult education. Toronto: Thompson educational publishing.

Frey, B. A., & Webreck Alman, S. (2003). Applying adult learning theory to the online classroom. *New Horizons in Adult Education and Human Resource Development, 17*(1), 4-12. doi:

10.1002/nha3.10155

- Graham, C. (2006). Blended learning systems. Definitions, current trends and future direction. In Bonk, C. J. & Graham, C. R. (Eds.). *Handbook of blended learning: Global Perspectives, local designs*. San Francisco, CA: Pfeiffer Publishing.
- Graham, C. R., Allen, S., & Ure, D. (2003). *Blended learning environments: A review of the research literature*. Unpublished manuscript, Provo, UT.
- Greiner, A. C., & Knebel, E. (2003). *Health Professions Education: A Bridge to Quality*. Washington (DC): National Academies Press. doi: 10.17226/10681
- Hummel, H., Roossink, H., & de Croock, M. (2006). Feedback model voor blended learning.
- Retrieved from: http://dspace.ou.nl/bitstream/1820/858/1/Feedbackmodel_DUrapportage260106.pdf
- Huston, C. (2013). The Impact of Emerging Technology on Nursing Care: Warp Speed Ahead. *The* Online Journal of Issues in Nursing 18(2).
- Knowles, M. S., Holton, E. F., & Swanson, R. A. (2015). *The adult learner. The definitive classic in adult education and human resource development.* New York: Routledge.
- Kwaliteitsregister V&V (2016). *Een nieuw gezamenlijk opleidingstraject*. Retrieved from: http://mgz.venvn.nl/LinkClick.aspx?fileticket=NxQ5LtvV4NQ%3d&portalid=30
- Liefhebber, J., van de Haterd, S., & den Hollander, M. (2012). *Beroepscompetentieprofiel Verzorgende IG in de branche VVT*. Utrecht: MOVISIE Effectiviteit en vakmanschap.
- Mortera-Gutierrez, F. (2006). Faculty best practices using blended learning in e-learning and facetoface instruction. *International Journal on E-Learning*, 5(3), 313-337. Retrieved from <u>http://www.editlib.org/f/6079</u>
- Prensky, M. (2001). Digital natives, digital immigrants. On the horizon MCB University Press, 9(5).

Retrieved from http://www.marcprensky.com/writing/Prensky%20-

%20Digital%20Natives,%20Digital%20Immigrants%20-%20Part1.pdf

Ritzen, H. (2016). Derde leerweg: MBO-maatwerk voor volwassenen [Third learning pathway:

- personalised vocational eduction for adults]. Canon beroepsonderwijs. 's-Hertogenbosch: ECBO.
- Rosen, D. & Stewart, J. (2015). Blended Learning for the Adult Education Classroom. Retrieved from http://app.essentialed.com/resources/blended-learning-teachers-guide-web.pdf

van Merwijk, C. (2012a). Country report: Dutch. V&V 2020 Deel 1 Leren van de toekomst. Utrecht:

Verpleegkundigen & Verzorgenden.

van Merwijk, C. (2012b). Country report: Dutch. V&V 2020 Deel 3 Beroepsprofiel verpleegkundige. Utrecht: Verpleegkundigen & Verzorgenden.

Vereniging CultuurProfielScholen (2011). Digitale didactiek. Retrieved from:

http://www.cultuurprofielschool.nl/sites/default/files/cultuurprofelscholen/digitaledidactiek.pdf

FAMILY - SCHOOL COOPERATION - A TOPIC FOR SWISS TEACHER EDUCATION INSTITUTES?

Jürgen Lehmann *

*Professor, Pädagogische Hochschule der Fachhochschule Nordwestschweiz, Institut Vorschul-/Unterstufe, Obere Sternengasse 7, CH – 4502 Solothurn, Switzerland, juergen.lehmann@fhnw.ch

ABSTRACT

This study is the Swiss contribution to the European collaboration project on improving (pre-service) teachers' preparation for Family-School partnerships. It is aimed at investigating, how Swiss Schools of Teacher Education prepare kindergarten-, primary- and secondary I- school teacher candidates for family – school cooperation¹. To meet this objective, the study conducted questionnaire surveys, key-informant interviews and document analysis. Nine Schools of Teacher Education in the German speaking part of Switzerland were surveyed, while one institution was looked upon in depth: In addition, three representatives of the institution were interviewed.

The preliminary findings show that all Schools of Teacher Education, irrespectively of the fact, if they prepare for kindergarten-, primary- or secondary I - school level, give importance to family-school cooperation as an issue for preparing teacher candidates. A broad variety of issues is covered in the curricula of the schools: communication with parents, conflict management and relating to families with special need children are the most prominent ones. A majority of Schools of Teacher Education offer a special course on this subject. Preparing for family – school cooperation is an important issue also during in-field-training. The in-depth-study shows that extent, significance and content of the topic in the courses largely depend on the teacher educator, who is giving the course.

Despite these efforts by the Schools of Teacher Education, no respondent views the teacher candidates really good prepared for Family-school cooperation.

¹ In the survey, we used the term "Zusammenarbeit" ("cooperation"). Respondents were alerted that the term includes all forms of cooperation, collaboration, and partnership between kindergarten/school and the legal representatives of the students as well as the cooperation with representatives and institutions of the community.

INTRODUCTION

A couple of international studies suggest that teacher education institutes pay insufficient or even no attention to the preparation of their students for family-school cooperation (Epstein and Sanders 2006; Denessen et al. 2009; Miller et al. 2013; de Bruine et al. 2014). Evans (2013) acknowledges the increased attention to family-school cooperation issues in teacher education. He points out that despite these improvements novice teachers still do not feel well prepared collaborating with families. He also states that the subject of family-school cooperation is not addressed in a useful way by the Schools of Teacher Education.

One of the reasons might be that there are many different concepts of family-school cooperation competing with each other. There is no uniform understanding of family-school cooperation, neither in the academic community nor in the schools. Stange (2013) lists more than 15 different German and 10 English terms for family-school cooperation, each with a specific concept behind it. Sacher (2014) points out that even if the same term is used the specific activities or practices might differ. He also stresses that the success criteria for family-school cooperation are inconsistent. Given the ambiguity and complexity of the concept of family-school cooperation, it is not surprising that candidates receive mixed messages (de Bruin et al. 2014).

It seems undisputed that practical training in schools is one of the promising opportunities for teacher candidates to develop the needed skills for family-school cooperation (f.e. Epstein and Sanders 2006; Flanigan 2007; Uludag 2008; Bartels and Eskow 2010). However, opportunities for teacher candidates to interact directly with parents are very rare (Evans 2013). But even if they do have such opportunities, they don't necessarily have clear role models: Evans (2013) states that students receive mixed messages during their practical training in schools due to the great variety of definitions and attitudes towards parents. Egger, Lehmann and Straumann (2015) conclude that there is a lack of professionalisation of the teachers' actions in the field of family-school cooperation.

Kroeger and Lash (2011) draw the attention to another important factor: It is not only the content of the curriculum and lectures that influence attitude and practice of novice teachers, but also the language that educators in the Schools of Teacher Education and teachers in the schools use contributes to the students' assumptions and attitudes towards parents.

In Switzerland, there is little research on the preparation of future teachers to work with the families of their students. A regional longitudinal study in the canton of Zurich among 251 novice teachers shows that their *"notion of being judged by parents and not being able to meet their expectations"* ranks as the second highest pressure that these new teachers felt (Zingg and Grob 2002). Another study among teacher candidates in the canton of Thurgau in 2011 reveals that the novice teachers don't feel really confident about their action knowledge and practical knowledge on working with parents or on their ability to communicate with them (PH Thurgau 2011).

FAMILY – SCHOOL COOPERATION IN SWITZERLAND

In the last decade, the roles of teachers and schools in Switzerland are significantly changing, and so are expectations about them: Educators are asked to teach in increasingly multicultural classrooms, integrate students with special needs and those with little or no knowledge of the local language, work in multiprofessional teams, engage in school development and establish regular contacts with parents. National and cantonal policies in Switzerland increasingly promote family-school cooperation.

However, there are only few legal specifications on how teachers have to cooperate with parents: Basically, teachers have to inform parents about the academic performance of the students and about special incidents like mobbing, drugs and general unwanted behavior in one collective and one individual meeting per year.

There is little research on family-school cooperation in Switzerland. Research studies by Egger et al. (2015) and Schüpbach, Slokar and Nieuwenboom (2013) suggest that there is little cooperation between school and home beyond the legal minimum. The interaction of teachers with parents can be described as full of tensions and ambivalence. Despite increasing regulation and formalization, teachers still have a high degree of freedom when it comes to shaping their concrete interactions with the parents. The way, teachers shape their cooperation with the parents in the sense of a stipulated pedagogic and educational cooperation, depends above all on the habitualised background convictions of the teachers towards parents (Egger et al. 2015).

TEACHER EDUCATION IN SWITZERLAND

At the beginning of 21th century "Pädagogische Hochschulen" (Schools of Teacher Education), which are Universities of Applied Sciences, were established in Switzerland. By now, there are 15 Schools of Teacher Education in all Switzerland that provide end-to-end teacher education for kindergarten-², primary and secondary I level teacher education. In some cantons, secondary I teacher education is organized on university level, not by the Schools of Teacher Education. 12 of these Schools of Teacher Education are located in the German speaking, two in the French speaking, and one in the Italian speaking part of Switzerland.

There is no national curriculum for Schools of Teacher Education, and there are only few national guidelines on the curricula. Regulations are just on a formal level. The Association of all Ministers of Education of all Swiss Cantons, the Swiss Conference of Cantonal Secretaries of Education (EDK), reviews and approves the curricula of the Schools of Teacher Education. Curricula are modular and allow a high degree of individualization and flexibility for students.

On kindergarten and primary school level, the curricula are designed as three-years-Bachelor studies. A master diploma is required for teachers on the secondary school level. Students study up to four school subjects; some programs presuppose a relevant bachelor diploma at a classic university.

Four Schools of Teacher Education provide an integral program for the whole primary level teacher education (kindergarten and primary school up to grade 6). Four Schools of Teacher Education offer a separate program for kindergarten, six offer a program for learning cycle 1 (kindergarten plus primary school up to grade 2 or 3), ten offer a separate program for primary school teachers (grade 1 - 6) and seven offer a program for secondary I teacher education.

THE STUDY

The present study is the first one in Switzerland on a national level, respectively across all German speaking cantons of Switzerland on the subject. It was conducted in 2016 in order to get a better understanding, how Swiss teacher candidates are prepared for working with parents and how teacher

 $^{^{2}}$ Two years of kindergarten (or the first two years of a first learning cycle) is included in compulsory education in the majority of the Swiss cantons.

education programs in Switzerland address this topic. In contrary to the former studies, we shifted the perspective from the students' perspective to the perception of teacher education institutes. The main research question of this study is: How are teacher candidates prepared for their work with parents?

Methodology

Preparation for collaboration with parents in Schools of Teacher Education was investigated in this study. To address the research question, we utilized a written questionnaire. This questionnaire was sent to all 12 Schools of Teacher Education in the German speaking part of Switzerland, respectively to the people in charge of the programs. Moreover, we did a document analysis and conducted indepth interviews with lecturers giving courses on or linked to family-school cooperation in one of the Schools of Teacher Education.

With the help of these instruments, we explored the coverage of family-school cooperation in the preservice training of school teachers, the institutional perception of the importance of the issue as well as the preparedness of the students in this area.

Research tools

With the help of a questionnaire we collected data from the Swiss teacher education institutes on how they prepare pre-service teachers for family-school cooperation. The survey questionnaire is based on a US survey by Epstein in 1997 published in 2006 (Epstein, J. & Sanders, M. 2006) and a Dutch adaption of this questionnaire by Willemse et al. (2015).

The survey questionnaire consisted of a mix of closed- and open-ended questions to increase the depth of answers to the research questions. Data was collected on demographic characteristics of the Schools of Teacher Education, on program structure and present course offerings, on the perception of leaders of the programs on teacher candidates' preparedness to work with parents and on prospects of change in present programs.

Sample

Surveys were sent to all 12 Schools of Teacher Education in the German speaking part of Switzerland. In 2015, the total number of students (kindergarten up to secondary I level) enrolled in these 12 Schools of Teacher Education was about 13.500 students. The size of the 12 Schools of Teacher Education varies largely: The smallest one has about 130 students, the biggest about 3500. The addressees were the deans respectively heads of the departments for pre-/primary /secondary I school education programs. Most surveys were passed on to employees of the universities like professors, who are more familiar with the subject. The mailing yielded returns from nine institutions, seven Schools of Teacher Education answered for all their programs, whereas two Schools of Teacher Education responded only for part of their programs.

9 Schools of Teacher Education (75%) with 18 programs (58 %)							
4 teacher	3 teacher education	2 teacher	7 teacher	2 teacher			
education	programs	education	education	education			
programs		programs	programs	programs			
	kindergarten plus						
only for	primary school grade 1,2	kindergarten plus	only for primary	only for			
kindergarten	(& 3)	grade $1-6$	school	secondary I			
	(50%)	(50 %)	(70 %)				
(100%)				(29 %)			

Figure 1. Overview on returns by program

In our sample, we find all kindergarten teacher education programs that exist in the German speaking part of Switzerland, most of the primary school programs, however only two secondary I teacher education programs. Considering the public and academic discourse on family – school relationship, we interpret this difference in the way that the representatives of teacher education programs for kindergarten and primary school level are highly aware of and attuned to the topic of family-school relationship.

87.5% of all kindergarten to secondary I level teacher students in the German speaking part of Switzerland are covered by this survey.

Results

In this article, we present some preliminary results on certain aspects of the study. First of all, all respondents consider family-school cooperation to be an important or at least rather important topic of teachers' preservice training. In all participating institutions and programs, the topic of family-school cooperation is either covered in a full course on this issue, or it is referred to family-school cooperation in other courses. Unlike the findings of Epstein and Sanders (2006) and Willemse et al. (2015), we couldn't see a significant difference in the coverage of family-school cooperation as a subject for teacher education between the programs of the kindergarten, primary school and secondary I school level teacher education. One of the reasons might be that the Schools for Teacher Education that offer programs on the three different levels usually offer the same or at least similar courses in their programs - independently of the level. The significance of the topic of family-school cooperation in the view of a Schools of Teacher Education might be measured from the fact, if there is a full course on the topic offered to the teacher students. Five programs (27,7%) offer a full required course on family-school cooperation, three offer a voluntary course, and ten programs do not have a specific course on family-school cooperation. However, all 18 programs offer at least two education courses that include the topic or that contain subjects linked to family-school cooperation in 2 - 7 sessions. We find an average of 4,6 courses per program, where family-school cooperation is linked to the topic. Almost all of these courses are compulsory. The Schools of Teacher Education with a big number of students offer more courses linked to family-school cooperation than the smaller ones.
Moreover, in all programs family-school cooperation is part of the practical training in school and its accompanying formats like mentoring and reflecting seminars. The practical training should include direct and indirect interactions with parents. If possible, they should be comprehensive and prolonged. Thus, you can conclude that all students of the participating Schools of Teacher Education get into contact with the topic of family-school cooperation during their studies. In the questionnaire, 18 topics concerning family-school cooperation were listed. Most of the respondents consider these topics important, and each program usually covers at least 12 out of the 18 topics. Three programs even cover all topics. Six issues were covered by all programs: "Parental involvement in the transition process of the student", "organizing and conducting a parent-teacher meeting", "involving students in a parent-teacher meeting", "organizing parents' evenings", "written communication with parents", and "heterogeneity of parents" (migrants, social class, less inclined to education). The topics of "family-school cooperation and special need students", "theory of partnership between school, home and community"; and "parents' role in homework" were covered by 16 programs (88,9 %). Only 50 % of the programs cover the topics of "quality and evaluation", "involvement of partners from the community" and "involving parents in teaching activities". The lowest coverage is found with the subject of "multi-professional cooperation in working with parents". It is covered only in seven programs (38,9 %).

You can conclude, that rather complex topics (such as how to evaluate effects of family and community involvement or how to reach out to the community) are less often offered to teacher candidates. We interpret these findings as a hint that part of the Schools of Teacher Education put the focus more on those topics that are relevant for class teachers in their daily practice with parents. Above all, teachers are viewed upon as *«communicators»* with families, but less as *«connectors»* or *«brokers»*, who bring together families and communal agents, or as *«coaches»*, who empower families/parents (cf. Lueder 1993; Lehmann 2012).

All programs offer at least two courses connected to the subject. The Schools for Teacher Education named 11 different courses that make this connection. Of course, the exact wording of these courses is different with every School of Teacher Education. However, we could identify 11 different main focuses.



Figure 2. Courses, connecting subject with family-school cooperation

In all the programs, there are courses on "communication" and all these courses relate to familyschool cooperation, usually with sessions on how to communicate with parents. The subject of "conflict management" is linked to family-school cooperation in 17 programs. In 61 % of the programs family-school cooperation is covered in several sessions of the courses on "educating special needs children", 44,4 % of the courses on "schools as organizations with its external contacts" also connect this subject to family-school cooperation. 38,9 % of the programs offer special courses on "migration/migrant families" with links to family-school cooperation in two or more sessions.

We also wanted to know, how important the Schools of Teacher Education view school teachers ability to work with families. There is no doubt on the importance of knowledge and skills on family-school cooperation for teachers among the respondents: 88,9 % of them strongly agreed that *«it is important for all teachers to be able to conduct practices of working with parents and of school, family and community»*. The rest of them consider this skill rather important.

However, only 16,7 % of the respondents stated that it is very important for students to demonstrate this skill during their practical training in school, whereas 38,9% viewed it as somewhat important. (44,4 % don't have an opinion on this issue.) The representatives of the Schools of Teacher Education were also asked, what they believe is the state of preparedness of teacher candidates.



Figure 3. Importance vs. preparation of graduates to establish family-school cooperation in the view of Schools of Teacher Education

None of the respondents believes that recent graduates are well prepared to work with parents and establish a good Family-school cooperation. At least 77,8 % believe that the students are somewhat good prepared, whereas 22,2 % believe that they are rather insufficiently prepared. Interestingly, the respondents of kindergarten and primary school teacher education institutes with mandatory or elective full courses on family-school cooperation are more skeptical about the preparedness of their students than the representatives of institutes without full courses on family-school cooperation. Addressees were also asked, if the subject of family-school cooperation should be more prominent in their future curricula, either as a full course on the topic, or integrated in courses with other topics, or in any other form.

Only 16,7 % of the respondents agreed, *"that Family-school cooperation should play a more important role in their curriculum*". Only two Schools of Teacher Education state that they have plans to improve the preparation for preparing students for family-school cooperation in the next couple of years and that might be a realistic chance to change the curriculum in the next couple of years. This is surprising, since none of the respondents views recent graduates well prepared for family-school cooperation.

Some respondents argue that *«a three years' teacher training is only an introduction. If future teachers need more skills, they have to participate in specific further education program on this topic».* In the same line, some respondents suggest that the topic should be *«more strongly emphasized in optional courses for interested teachers as part by their ongoing training and should be offered by the Schools for Teacher Education».*

CONCLUSION

In Switzerland, family – school cooperation is a topic in all programs of teacher education. There is no significant difference between the levels of teaching, students are prepared for. Five out of 18 programs offer a full required course on family-school cooperation, three offer a voluntary course. All Schools of Teacher Education offer at least two compulsory courses linked to family-school cooperation. "Communicating with parents" is a topic that is covered in all programs.Content and extent of the linkage largely depend on the individual educator of the Schools of Teacher Education.

All programs offer practical training in school. Contacts with parents are supposed to be part of the training. However: Quality and quantity of the contacts depend on the individual school teacher.

In the view of the respondents, teacher novices do not feel well prepared for family-school cooperation, nevertheless there is great reluctance with to give family-school cooperation more importance in future curricula or to plan other changes in the curricula concerning preparing for family-school cooperation.

REFERENCES

- de Bruïne, E., Willemse, T. M., D'Haem, J., Griswold, P., Vloeberghs, L.,and van Eynde S. (2014). Preparing teacher candidates for family-school partnerships. *European Journal of Teacher Education*, 37: 4, 409 - 425
- Denessen, E., J. Bakker, L. Kloppenburg, and M. Kerkhof. 2009. "Teacher-parent Partnerships: Preservice Teacher Competences and Attitudes during Teacher Training in the Netherlands." *International Journal about Parents in Education*, 3 (1): 29–36.
- Ditton, H. (2009). Familie und Schule eine Bestandesaufnahme der bildungssoziologischen Schuleffektforschung von James S. Coleman bis heute. In R. Becker (Ed.), *Lehrbuch der Bildungssoziologie*, 239-258. Wiesbaden: VS Verlag für Sozialwissenschaften.
- Epstein, J. L., and Sanders, M. (2006). Prospects for change: Preparing educators for school, family, and community partnerships. *Peabody Journal of Education*, 81–120.
- Egger, J., Lehmann, J., and Straumann, M. (2015). "Collaboration with parents isn't a burden. It's just a natural part of my work." - Parental Involvement in Switzerland. – An Analysis of Attitudes and Practices of Swiss Primary School Teachers. *International Journal about Parents in Education*, 9: 1, 119-130

- Egger, J., Lehmann, J., and Straumann, M. (2016). Die Praxis von Lehrpersonen mit Eltern. Eine Analyse der Deutungs- und Praxismuster. In: C. Knapp & M. Bonanati (Eds.), *Eltern. Lehrer. Schüler. Theoretische und qualitativ-empirische Betrachtungen zum Verhältnis von Elternhaus und Schule sowie zu schulischen Gesprächen.* Bad Heilbrunn: Klinkhardt. 47 - 59
- Evans, M. P. 2013. "Educating Pre-service Teachers for Family, School, and Community Engagement." *Teaching Education*, 24 (2), 123–133.
- Flanigan, C. B. (2007). "Preparing Pre-service Teachers to Partner with Parents and Communities: An Analysis of College of Education Faculty Focus Groups." *School Community*
- Journal, 17 (2), 89-109.
- Jeynes, W.H. (2005). A Meta-Analysis of the Relation of Parental Involvement to Urban Elementary School Student Academic Achievement. *Urban Education*, May 2005, 40 (3), 237-269. doi: 10.1177/0042085905274540
- Jeynes, W. H (2011). Family factors and the educational success of children. London: Routledge.
- Kroeger, J., and M. Lash. (2011). "Asking, Listening, and Learning: Toward a More Thorough Method of Inquiry in Home-school Relations." *Teaching and Teacher Education*, 27, 268–277.
- Lehmann, J. (2012). Erziehungs- und Bildungspartnerschaft zwischen Elternhaus und Schule. *die neue schulpraxis*. May 2012, 8 12.
- Lueder, D. (1993). With open arms: Working with hard-to-reach-parents. In: Smit, F./van Esch, W./Walberg, H. W. (eds.). Instituut voor Toegepaste Sociale Wetenschappen. *Parental involvement in Education*. Nijmwegen, 157–165
- Miller, G. E., C. Lines, E. Sullivan, and K. Hermanutz. (2013). "Preparing Educators to Partner
- with Families." Teaching Education, 24 (2), 150-163.
- Neuenschwander, M. P. (2005). Schule und Familie. Was sie zum Schulerfolg beitragen. Bern: Paul Haupt.
- PH Thurgau (2011). Eltern-Kontakte: Information, Kommunikation, Zusammenarbeit. Kreuzlingen
- Sacher, W. (2014). Elternarbeit als Erziehungs- und Bildungspartnerschaft Grundlagen und Gestaltungsvorschläge für alle Schularten (2. ed.). Bad Heilbrunn: Klinkhardt.
- Schüpbach, M., Slokar, A. and Niewuwenboom, W. (eds.) (2013). *Kooperation als Herausforderung in Schule und Tagesschule*. Haupt
- Stange, W. (2013). *Erziehungs- und Bildungspartnerschaften Praxisbuch zur Elternarbeit.* Wiesbaden. Springer VS.
- Uludag, A. (2008). "Elementary Preservice Teachers' Opinions about Parental Involvement in

Elementary Children's Education." Teaching and Teacher Education, 24, 807-817.

- Willemse, T.M., Vloeberghs, L., Bruine, E.J., de, & Van Eynde, S. (2015). Preparing teachers for family-school partnerships: A Dutch and Belgium perspective. *Teaching education*, DOI: 10.1080/10476210.2015.1069264.
- Zingg, C.; Grob, U. (2002). Belastungswahrnehmungen von Primarlehrpersonen im Kanton Zürich beim Berufseinstieg. *Beiträge zur Lehrerbildung*, 20 (2), 2016 226

WHERE IS THE LINK BETWEEN DIRECT, MINIMALLY GUIDED AND CONSTRUCTIVIST INSTRUCTION? A NEW INTEGRATED MODEL OF CONSTRUCTIVIST TEACHING

Alexander F. Koch*

*Researcher, School for Teacher Education, University of Applied Sciences and Arts Northwestern Switzerland FHNW, Centre for Science and Technology Education, Steinentorstrasse 30, 4051 Basel, Switzerland, alexander.koch@fhnw.ch

ABSTRACT

There has been a long debate about learning effects due to minimally guided instruction. Cognitivists claim that constructivism is part of a variety of indirect teaching methods. Based on the dispute on the low efficiency of constructivist instruction that went on between 2006 and 2007 we empirically proved a model that includes constructivism as an incremental attribute to any teaching method. We asked 159 teachers in primary and lower-secondary schools to indicate in how far particular ways of teaching do generally apply to their instruction, e.g. "I usually ask about pupils' ideas and explanations and build upon them." Bi-factor analysis of indicators for teaching resulted in a general factor and three sub-dimensions: establish inter-activity between students, precipitate a crisis for learning, and need-oriented support of learning processes. Further investigation of the statistical model showed that teaching can also be aligned on a continuum between implicit and explicit guidance. As a result we propose a theoretical model and argue that open learning settings may not be seen as minimally, but rather as fully, yet implicitly guided methodologies. We will also discuss our findings in the light of teacher competence demands, because implicit strategies of instruction are based on a student perspective that the teacher has to anticipate and interpret. Explicit strategies can be seen as teacher perspectives on instructional aims and content that has to be taught. With the model, we also propose to re-define constructivism as a learning theory, rather than an instructional method.

INTRODUCTION

When we talk about modern ways of teaching, we usually talk about teacher-induced offers to learn and students that accept the offers. Then - we hope - students build up on their current knowledge, restructure their misconceptions or get new insights and construct new knowledge. And this means they learn. One could also back the fact that learning is best if, given and exemplified with example after example in an ordered way, in order to cognitively store knowledge and adapt it over time. As soon as we have a look at real classroom instruction, it is clear that we see both, cognitive oriented teaching as well as constructivist teaching. In this study we ask, whether instruction has to be either of them or if there is a chance that there can be a strongly guided constructivist instruction or even a minimally guided cognitivist approach.

THEORY

In the cognitivist vs constructivist debate there has been the assumption that direct instructional methods lead to faster learning better outcomes than so-called minimally guided methods, e.g. constructivist instruction, do (Clark, 2009; Kirschner, Sweller, & Clark, 2006). These cognitivists argue that the effect is due to a reduced working memory load in direct instruction. The direct instruction can then be a fruitful path, if there are pre-knowledge deficits or cognitively over demanding contents are taught (Flores, Hinton, & Burton, 2016). Also, the less guidance a student has, the less the teacher can control the learning and has to leave the knowledge increase to the learner. For example, Hill (2014) argues that student teachers need directly instructed methods in combination with time for practice. Otherwise they would not know what to do and how to do it, but rather do what they experienced beforehand, e.g. student teachers would teach as they were taught themselves, rather than teach in the right and effective way (ibid.).

To a certain degree this is goes along with the assumption of constructivists, because they see learning as a student's active construction of knowledge based on pre-knowledge. It is supposed to be embedded in a social experience and realistic contexts, and it ought to provide "experience with the knowledge construction process" (Honebein, 1996, p. 11). Yet, this also includes potential cognitive and/ or social conflicts, but also learning motivation. This is why constructivists stress the fact that the more open learning environments are, the more student self-determination and participation, as well as social learning (Alonso, Manrique, Martinez, & Vines, 2015) increase and constructivist learning environments are more able to support student self-efficacy (Alt, 2015). Therefore, constructivist instruction can fulfill crucial motivational aspects of learning (Bohl & Kucharz, 2010). Additionally, on the long run, direct methods do not support deep knowledge acquisition (Dean & Kuhn, 2007).

Between cognitivism and constructivism - seemingly exclusive views on learning and instruction - one can also follow the idea of Hmelo-Silver, Duncan, and Chinn (2007). The authors propose a model of constructivism as an inherent general factor in the universe of instructional methods (figure 1). Therefore they do not contrast minimal and direct guidance in teaching, but align inquiry-based learning, problem-based learning, discovery learning, and direct instruction on a dimension of generica of teaching approaches and constructivism as a general factor that influences each method that relates to any of the aforementioned instructional generica.



Notes: IBL=Inquiry-based learning, PBL=problem-based learning, DL=discovery learning, DI=direct instruction; m=method of teaching

Figure 1. Constructivism as an ubiquitous factor in all instruction with reference to Hmelo-Silver et al. (2007)

Research question

With reference to the theoretical background two questions arise. First, what is an acceptable model of teaching approaches? Second, how can one reliably measure constructivist instruction? In this study we follow the hypothesis that constructivism can be analytically modelled as a general factor influencing any teaching behaviour by the teacher. The teacher behaviour in general, as well as individual methodological steps to achieve any student learning can be clustered in major approaches. These clusters depict categories like inquiry-based learning, problem-based learning, discovery learning, and direct instruction.

From this perspective the resulting problem is the empirical operationalization of constructivism oriented teaching. The overarching goal is to shed light on the dimensional structure of teaching with reference to constructivism and methodological teaching approaches. In addition to this, we want to give ground for further studies that try to assess teacher behaviour in a quantitative manner.

METHODS

Sample, context of data acquisition, and item operationalization

Sample and context of data acquisition

Altogether 169 German-speaking Swiss teachers with an average practical teaching experience of 15.6 years (SD=10.2) in science subjects on primary and lower-secondary level were asked to respond to items in an online questionnaire. The items were part of a larger school development project and evaluation study in the context of the Swiss Science Education project (SWiSE, see for example: Felchlin, Koch, Stübi, & Labudde, 2015; Koch, Felchlin, & Labudde, 2016; Koch, Stübi, Felchlin, & Labudde, 2015; Stübi et al., 2014).

Thanks to the kind help of Mark Houwelingen at Leiden University the items used in this study were translated, yet not validated. Short versions of the items can be found in table 1 below. In the sample

were 44% female teachers and 42% teach in primary schools, the rest in lower-secondary schools. 161 teachers, i.e. full data sets per person, could be used for the analyses here.

Item operationalization

In order to solve the problem of operationalizing teaching methods this study tries to assess habitual teaching with a closed question format that allows to evaluate teaching on a large-scale dimension. We share this idea with Fishbein and Ajzen (2010) who argue that the best approximation to a person's goal-directed behaviour is to ask the person directly. Although one may discuss this approach in the light of acquiescence and social desirability in item-response, we believe that this is a good method, especially in the context of school, education, and pedagogical praxis. Some argue that students would give more reliable and objective answers to classroom issues, yet we do not primarily focus on the overt structure of events in the classroom. We are rather interested in the underlying structure, which is latent to students, but manifest in the teachers thinking, planning and instructional decisions/ behaviour.

The 13 questionnaire items were based on preliminary research on constructivist teaching and teacher beliefs (Duit & Wodzinski, 2006; Muijs & Reynolds, 2011; Rakoczy, Buff, & Lipowsky, 2005). The basic item pool was then adapted in a behaviour-related manner (Koch, Felchlin, Stübi, & Labudde, 2015; Koch & Labudde, 2014). One example of our questionnaire statement is: *In general I give my students the chance to work on practice-oriented problems in groups*; Short versions of all items can be found in table 1 below. All items were rated on a 4-point Likert scale: 1-totally agree, 2-rather agree, 3-rather not agree, 4-do not agree at all. Quantitative analyses will be used to analyse the data.

Procedure of analysis

We used MPlus 7.11 and IBM SPSS 23 for statistical analyses. Data were analysed using exploratory bi-factor analysis (Holzinger & Swineford, 1937; Jennrich & Bentler, 2011; Jennrich & Bentler, 2012) and principal components analysis (PCA). One difference between the two types of analyses is that bi-factor analysis models the idea that a latent construct determines the response to a statement of an individual, whereas PCA represents the conception that responses to items can be classified in a reduced category (Beavers et al., 2013). For better understanding we show the causal relation in the two strategies in figure 2.



Figure 2. Different asumptions in principal component analysis (PCA) and factor analysis (Beavers et al., 2013, p. 5)

A second difference relates to the fact, that bi-factor analysis extends PCA as it not only separates categories of items, but also models a latent general factor that influences every item in the analysis. As bi-factor analysis uses a general factor and several (orthogonal) sub-factors simultaneously, Omega and omega-hierarchical coefficients are used to calculate reliabilities, because one can evaluate the unique inter-item-correlations of a sub-dimension without the general factor (omega-hierarchical), or one can include the shared variance of a sub-dimension and the general factor (omega) in order to

have a reliability of the whole model (Brunner, Nagy, & Wilhelm, 2012; Reise, Bonifay, & Haviland, 2012).

RESULTS

Bi-factor analysis

Descriptives

The average mean of all 13 items was 3.06 (SD=.37), average kurtosis was .22, and the average skewness was -.49. The data support the adequacy of factor and principal component analyses, because they do not indicate a strong deviation from a normal distribution.

Bi-factor structure and model fit

We performed exploratory bi-factor analyses and the best fitting solution is presented here. The 13 items could well fit a bi-factor structure with one general factor and three sub-dimensions $(X^2(32)=38.311, p=.205, RMSEA=.035, SRMR=.038, CFI=.993, TLI=.982)$. In the figure 3 below, the graphical representation of the resulting bi-factor model is shown. One general factor g and three sub-dimensions F1, F2, and F3 were modelled with 13 indicators.



Notes: Dotted lines= loading p>.05; straight lines= loading p<.05; Item numbers correspond to table 1; Model fit: X²(32)=38.311, p=.205, RMSEA=.035, SRMR=.038, CFI=.993, TLI=.982

Figure 3. Bi-factor model

As one can see in figure 3 above and table 1 below, not all items had a significant loading on the subdimensions, but all loaded significantly on the general factor.

In table 1, also short versions of the items are given and factor loadings are presented. Although some items did not have statistically significant loadings we do use them in the following analyses. Therefore, we will continue further interpretations and later analyses (PCA below) of the sub-dimensions with two indicators in sub-dimension F1, three indicators in F2, and five indicators in F3.

Table 1

Item short-label	g	F1	F2	F3
(02) have pupils explain and discuss their own solutions ¹	.59*	.90*	02	.02
(01) have pupils discover problem solutions themselves ¹	.62*	.38*	.07	17
(04) ask about ideas/ explanations and build upon them ¹	.68*	.14	02	.02
(13) use everyday life to encourage learning processes ¹	.48*	04	03	01
(03) pupils get opportunity to solve problems in small groups ¹	.56*	.07	.49*	.03
(08) support inquiry-based learning ¹	.72*	05	.48*	03
(10) give opportunity to learn from mistakes/misconceptions ¹	.57*	.08	25*	.02
(12) consider pupils' diversity/ herterogeneity ¹	.48*	.00	21	05
(11) connect to phenomena from pupils' everyday experience ¹	.47*	29*	01	.53*
(09) have pupils do experiments ¹	.57*	.02	.25*	.42*
(06) select tasks to expand on existing concepts ¹	.58*	04	05	.29*
(07) support self-confidence in their learning abilities ¹	.63*	05	.01	49*
(05) assess individual abilities and give adequate tasks ¹	.64*	02	07	41*

Item short-labels and geomin-rotated loading in the bi-factor analysis

¹translated with the kind help of Mark Houwelingen, Leiden University; *p<.05 (=loading statistically significant different from zero); bold numbers highlight factor memberships; grey marked items have a significant loading on g only

Statistical reliability

When taking the general factor into consideration, the three sub-dimensions are individually reliable. The Omega coefficient shows values of .91 (factor 1), .77 (factor 2), and .74 (factor 3). In the absence of the general factor, reliabilities plummet to a level of Omega-hierarchical=.51 and lower. The overall internal consistency of constructivism as a scale of the general factor including all items was Cronbach-Alpha=.82, yet one has to keep in mind that the g-model includes three additional indicators, because they had a significant loading on g, but not on either of the sub-dimensions (see table 1 above).

Content validity of the general factor and its sub-dimensions

In table 1 above one can see three sub-dimensions, factors F1, F2, and F3. We will first try to interpret these separately and name them based on their significant indicators. We will then make a suggestion on the general factor g. Scale mean values, standard deviations, and Cronbach-alphas are also stated for statistical and psychometric description.

Factor 1 (AM=3.06, SD=.55, α =.72) includes items that describe teachers' actions to evaluate students' preconceptions by having students' talk to each other and/ or work on problems. As the items do only describe activities, we will call this factor "establish inter-activity".

Factor 2 (AM=3.21, SD=.46, α =.54) comprises pedagogical methods that include students' proactive inquiry and cognitive conflicts. The methods may lead to successful learning or to frustration when failing. With reference to these contents, we propose to name this factor "precipitate a crisis for learning".

Factor 3 (AM=3.08, SD=.42, α =.60) includes statements that describe teacher support of individual learning. With reference to scaffolding and need-oriented, motivating instruction, we suggest to label the factor "need-oriented support of learning processes".

Factor 1= "establish inter-activity" and factor 2= "precipitate a crisis for learning" both represent "cognitive activity and social interactivity of the learner" (Taylor, 1998, p. 1111), which comprises an essential aspect of a constructivist view on learning from a learner perspective. Factor 3 can be interpreted as teacher support, which depicts the role of the teacher as a guide during learning processes and to create a "conducive learning environment" (Yung, Zhu, Wong, Cheng, & Lo, 2013). The three sub-dimensions can be merged and altogether they (and the single items) describe aspects and dimensions of constructivism as was described in the theoretical chapter above. Therefore, the general factor may represent constructivism as the overarching construct (factor g: AM=3.06, SD=.37, α =.82).

Further principal component analyses (PCA)

In table 1 (above) the factor loadings are given and one can find that within factor 2 and factor 3 the loadings alternate between positive and negative values. For further investigation we ran exploratory PCAs on each sub-dimension. The idea was that the initial unidimensionality of a factor can be separated into two separate components of perspectives on teaching. For example in factor 3 the negatively loading items include the idea of learning from a teacher taking a student's perspective. Here the teacher can only support learning, but is not in control of what the student accepts. The second set of positively loading items describes the pro-active perspective of a teacher: He/ She is in control of what phenomena to choose, decides on the experiments to conduct, and selects tasks for students.

Exploratory PCAs with each sub-dimension revealed unidimensional and antinomial structures in each sub-dimension. This means each sub-dimension had some of its items load positively and negatively. In other words, the items of each sub-dimension can be divided into two perspectives that were initially on one sub-dimension. Most strikingly, in the cases of sub-dimension 2 and 3 the loadings were all one-directional when PCA was restricted to one component only.

DISCUSSION

This study is based on the discussion about the efficacy of direct instruction vs constructivism, the latter as a representative of minimal guidance approaches. Here we addressed the question whether the two views on learning have to be seen disjunct. We argued that both views on learning are not as different as they seem, and theory as well as empirical research rather point towards a difference that is determined by the demand and the prequisites of students. Thus, direct instruction can be seen as a

methodological option in a teacher's instructional repertoire, just as are problem-based learning methods, inquiry-based methods or discovery learning. Constructivism then is the theory behind all learning. In line with this view we used the idea of Hmelo-Silver et al. (2007) who share this point of view.

The hypothesis tested in this study was that constructivism cannot be seen as a teaching method, but rather names an underlying philosophy inherent to any method used in the classroom. In order to test this structure we analysed questionnaire data on teacher instruction with a bi-factor model. The bi-factor analysis results supported the assumption of constructivism as a general factor. Additionally, three sub-dimensions were found, which denote a teacher's activities to initiate learning in general. We named the sub-dimensions: *establish inter-activity between students, precipitate a crisis for learning*, and *need-oriented support of learning processes*.

The present study also found that teaching, i.e. the sub-dimensions, does not only vary in the methodological approach, but also in the clarity of guidance. Simultaneously negative and positive loadings in the bi-factor sub-dimensions were found and further inspection using principal component analyses indicates two disjunct aspects of guidance which we want to call "mode" of guidance: explicitness and implicitness.

In figure 4 below, we tried to combine the findings of our analyses with the theoretical assumptions made by Hmelo-Silver et al. (2007) and propose an integrated model of constructivist teaching with a continuum of guidance and theoretically aligned instructional generica.

The continuum of guidance has its endpoints at a totally implicitly guided instructional environment and at a fully and clearly explicitly guided way of teaching. As was shown in the analyses in this study, the results back the idea that constructivism may be seen as a general latent factor that influences any teaching method directly and any instructional genericum indirectly.

In order to allow further hypotheses we aligned major instructional generica along the continuum, which - from our perspective - do vary in the mode of expression. As every instructional genericum is based on the use of certain methods of instruction we exemplified these methods in the figure 4, too. For parsimony we only set single arrows, yet interactions and overlapping are possible as well.



Notes: DL=discovery learning, IBL=Inquiry-based learning, PBL=problem-based learning, DI=direct instruction; m=method of teaching

Figure 4. Integrated model of constructivist teaching with a continuum of guidance and theoretically aligned instructional generica

Figure 4 tries to show that the more implict the teacher's instructional guidance is, the better the arrangement of the learning environment has to be, because students still need to know what to do and where to go. To a degree this is close to what Rousseau stated in educational theory. If not implicitly guided, pure discovery may not result in systematic goal-oriented learning, but rather in random knowledge acquisition. The first may be a good learning procedure in informal settings, the latter may be the more desirable one in formal settings. At the other end of the continuum a teacher needs to explicitly state what to learn and use continuously adapted worked examples to assure the expected learning success. Therefore, the variation of guidance is also relevant in the discussion of teacher professional competences.

Our results can thus be seen as a basis for research on teaching practice, especially in the context of teacher professional education and development. First, when it comes to student teachers' education universities and colleges can make use of our model and offer courses that praxis training for implicit or explicit guidance. At this point our large-scale findings may diffuse into casuistic praxis training. Second, further research may build up on the finding that one can assess habitual teacher behaviour in a questionnaire that replicates a contemporary on modern teaching. So our findings may add to the value of external school evaluation.

Besides all results discussed, we also wish to draw some attention to the limitations of the study. First of all we only had 159 teachers/ data sets in the sample. An increase would be desirable in order to stabilize factor loadings. Second, some sub-dimensions include few indicators. Future studies should try to increase the number of indicators systematically, so one can get a more complete assessment of teaching. This would also increase the reliability of the sub-dimensions. Third and last, we advocate for more research in the evaluation of habitual teaching using self-report indicators. From our perspective, this is needed for more parsimonious research and reduced effort in data collection.

REFERENCES

- Alonso, F., Manrique, D., Martinez, L., & Vines, J. M. (2015). Study of the Influence of Social Relationships Among Students on Knowledge Building Using a Moderately Constructivist Learning Model. *Journal of Educational Computing Research*, 51(4), 417-439.
- Alt, D. (2015). Assessing the contribution of a constructivist learning environment to academic selfefficacy in higher education. *Learning Environments Research*, 18(1), 47–67.
- Beavers, A. S., Lounsbury, J. W., Richards, J. K., Huck, S. W., Skolits, G. J., & Esquivel, S. L. (2013). Practical Considerations for Using Exploratory Factor Analysis in Educational Research. *Practical Assessment, Reserach & Evaluation*, 18(6), 1-13.
- Bohl, T., & Kucharz, D. (2010). Offener Unterricht: Konzeptionelle und didaktische Weiterentwicklung. Weinheim und Basel: Beltz.
- Brunner, M., Nagy, G., & Wilhelm, O. (2012). A tutorial on hierarchically structured constructs. *Journal of Personality*, 80(4), 796-846.
- Clark, R. E. (2009). How Much and What Type of Guidance is Optimal for Learning from Instruction? In S. Tobias & T. M. Duffy (Eds.), *Construcivist Theory Applied to Instruction: Success or Failure*? (pp. 158-183). New York: Routledge, Taylor and Francis.
- Dean, D., Jr., & Kuhn, D. (2007). Direct Instruction vs. Discovery: The Long View. Science Education., 91(3), 384-397.
- Duit, R., & Wodzinski, C. T. (2006). Guten Unterricht planen Kategorien fachdidaktischen Denkens bei der Planung von Unterricht. *Naturwissenschaften im Unterricht Physik*, 92, 9-11.
- Felchlin, I., Koch, A. F., Stübi, C., & Labudde, P. (2015). *Swiss Science Education: Petit à petit, l'oiseau fait son nid.* Paper presented at the COHEP Fachdidaktiken, Bern. Poster retrieved from
- Fishbein, M., & Ajzen, I. (2010). *Predicting and changing behavior : the reasoned action approach*. New York, NY [u.a.]: Psychology Press.
- Flores, M. M., Hinton, V. M., & Burton, M. E. (2016). Teaching Problem Solving to Students Receiving Tiered Interventions Using the Concrete-Representational-Abstract Sequence and Schema-Based Instruction. *Preventing School Failure: Alternative Education for Children and Youth*, 60(4), 345-355.
- Hill, L. H. (2014). Graduate Students' Perspectives on Effective Teaching. *Adult Learning*, 25(2), 57-65.
- Hmelo-Silver, C. E., Duncan, R. G., & Chinn, C. A. (2007). Scaffolding and achievement in problembased and inquiry learning: A response to Kirschner, Sweller, and Clark (2006). *Educational Psychologist*, 42(2), 99-107.
- Holzinger, K., & Swineford, F. (1937). The Bi-Factor Method. Psychometrika, 2(1), 41-54.
- Honebein, P. C. (1996). Seven Goals for the Design of Constructivist Learning Environments. In B.
 Wilson (Ed.), *Constructivist learning environments: Case studies in instructional design* (pp. 11-24). Englewood Cliffs, NJ: Educational Technology Publications.
- Jennrich, R., & Bentler, B. (2011). Exploratory Bi-factor Analysis. Psychometrika, 76(4), 357-549.
- Jennrich, R., & Bentler, P. (2012). Exploratory Bi-Factor Analysis: The Oblique Case. *Psychometrika*, 77(3), 442-454.

- Kirschner, P. A., Sweller, J., & Clark, R. E. (2006). Why minimal guidance during instruction does not work: An analysis of the failure of constructivist, discovery, problem-based, experiential, and inquiry-based teaching. *Educational Psychologist*, 41(2), 75-86.
- Koch, A. F., Felchlin, I., & Labudde, P. (Eds.). (2016). Naturwissenschaftliche Bildung fördern. Indikatoren und Zusammenhänge bei Entwicklungsprozessen in SWiSE. Bern: Haupt.
- Koch, A. F., Felchlin, I., Stübi, C., & Labudde, P. (2015). Handlungsnahe Kognitionen im Naturwissenschaftsunterricht. In S. Bernholt (Ed.), *Heterogenität und Diversität - Vielfalt der Voraussetzungen im naturwissenschaftlichen Unterricht.* (Vol. 35, pp. 411-413). Kiel: Gesellschaft für Didaktik der Chemie und Physik (GDCP).
- Koch, A. F., & Labudde, P. (2014). Strike the iron when it's hot Teacher professionalization in Swiss science education. In C. P. Constantinou, N. Papadouris, & A. Hadjigeorgiou (Eds.), E-Book Proceedings of the ESERA 2013 Conference: Science Education Research For Evidence-based Teaching and Coherence in Learning. (pp. 11). Nicosia, Cyprus: European Science Education Research Association.
- Koch, A. F., Stübi, C., Felchlin, I., & Labudde, P. (2015). SWiSE Research and Development in Practice. *EAPRIL conference proceedings 2014*.(1), 194-208.
- Muijs, D., & Reynolds, D. (2011). Effective teaching : evidence and practice (2. ed.). London: Sage.
- Rakoczy, K., Buff, A., & Lipowsky, F. (2005). Dokumentation der Erhebungs- und Auswertungsinstrumente zur schweizerisch-deutschen Videostudie. "Unterrichtsqualität, Lernverhalten und mathematisches Verständnis". 1. Befragungsinstrumente. Retrieved from Frankfurt/ M.:
- Reise, S., Bonifay, W., & Haviland, M. (2012). Scoring and Modeling Psychological Measures in the Presence of Multidimensionality. *Journal of Personality Assessment*, 1-12.
- Stübi, C., Doring, B., Fischer, C., Koch, A., Rieck, K., Ronnebeck, S., . . . Zehetmeier, S. (2014). How Can Professional Teachers Improve Science And Mathematics Teaching? In C. P. Constantinou, N. Papadouris, & A. Hadjigeorgiou (Eds.), E-Book Proceedings of the ESERA 2013 Conference: Science Education Research For Evidence-based Teaching and Coherence in Learning. (pp. 11). Nicosia, Cyprus: European Science Education Research Association.
- Taylor, P. C. (1998). Constructivism: Value Added. In B. J. Fraser & K. G. Tobin (Eds.), *The international handbook of science education*. (pp. 1111-1123). Dordrecht, The Netherlands: Kluwer Academic Publishers.
- Yung, B., Zhu, Y., Wong, S., Cheng, M., & Lo, F. (2013). Teachers' and Students' Conceptions of Good Science Teaching. *International Journal of Science Education*, 35(14), 2435-2461.

PROJECT-BASED LEARNING AND PROFESSIONAL IDENTITY CONSTRUCTION Alexandra Badets

PhD student, University of Rouen, France, abadets@cesi.fr.

ABSTRACT

CESI, a French school of engineering, has implemented a project-based learning curriculum in its combined work and study engineering degree programme, in October 2015. The new school curriculum is based on multidisciplinary 2 to 5 week projects, carried out in small groups and using loops inspired by the Deming Wheel as a problem solving methodology. A previous research study, led by CESI's Education Research Laboratory, showed that prior to the curricular evolution, key projects in the company played a major role in the construction of the professional identity of CESI's engineering apprentices. A longitudinal study revealed that these milestones of the in-company training allowed identity transitions. The aim of our research is to study the impact on professional identity formation of the shift in the school curriculum of CESI's engineering degree in apprenticeship, from traditional lectures to project-based learning. This research aims at studying if a school curriculum can allow better integration between theory and practice and enhance professional identification and sense of becoming not only during the applied (incompany) parts of the studies but also through school projects. This study should help us understand the interrelations between project-based learning and professional identity construction during a training programme.

CONTEXT

CESI's school of engineering

CESI is a French higher education and vocational training institution created in 1958 that has centres in 25 cities all over the country. It was one of the first French institutions to develop apprenticeship in engineering studies and its school of engineering has thus developed, throughout the years, renowned expertise in the field of combined work and study programmes in higher education. The school has its own Education Research Laboratory, previously called LIEA (Laboratoire d'Ingénierie des Environnements d'Apprentissage), now part of LINEACT (Laboratoire d'Innovation Numérique pour les Entreprises et les Apprentissages au service de la Compétitivité des Territoires). The focus of this Education Research Laboratory is the impact of learning environments on the development of skills and the construction of the professional identity of the students.

Curricular shift to project-based learning

In October 2015, CESI completely changed its curriculum. It used to be a 3 year combined work and study degree in Engineering, leading to the equivalent of a Master in engineering, with a rather classical approach to teaching during the school periods. It is now still a 3 year combined work and study degree, but with a full project-based learning programme at school. In this methodology called A2P2 (Apprentissage Actif Par Projets), the projects are defined as « the implementation of an engineering design process »³, and necessitate specific methodology, inspired by the Deming Wheel, to answer a need. Teachers in the new curriculum have become tutors. Their role corresponds to Wood's description: they ought to "facilitate the proceedings" and "ensure that the group achieves appropriate learning objectives in line with those set by the curriculum design team" (Wood, 2003 p 329). There are no more traditional lectures, but multidisciplinary 2 to 5 week long projects, carried out in teams of six students, who have deliverables to produce, problems to solve and roles to assume. Students are evaluated collectively on the deliverable of each project, and individually through knowledge tests on the main scientific subjects of each project. A student-centred, active learning environment, inspired by Robert J. Beichner's SCALE-UP model, has replaced lecture-oriented classes⁴ : groups of 36 students work in the same room with one tutor. In each room, subgroups of six students work together around a table, with their own whiteboard and screen (all of the course material is available on the web). Research has demonstrated that this type of learning environment, designed

³ Milgrom E., Raucent B., Maufette Y. & Saveuse M. (2015), p5

⁴ See Beichner, R. J. (2014) and Beichner, R. J., Saul, J. M., Abbott, D. S., Morse, J. J., Deardorff, D., Allain, R. J. & Risley, J. S. (2007).

to increase interactions and motivation, has a positive impact on students' learning and attitudes.

RESEARCH GOALS

Previous research

What triggered our research question is that previous studies, led by CESI's Education Research Laboratory, showed that prior to the curricular evolution, key projects carried out during the students' in-company periods played a major role in the professional identity formation of these engineering apprentices. A longitudinal study revealed that in-company projects were milestones in the curriculum that allowed identity transitions. The apprentices interviewed felt they became engineers through successive projects that allowed social and personal recognition of their skills and statuses⁵ and that gave them a sense of becoming engineers, as well as the self-confidence and recognition of their skills as future engineers.

The school curriculum as it was before was not considered a lever to the construction of professional identity. Students only mentioned school as a way to validate acquired skills, and as the provider for scientific knowledge.

Research question

Our research project is based on these previous results. This article will discuss if the new pedagogical approach allows better interplay at school between experience and theory, and prepares students for their future working life as engineers, when prior to the shift the students had to wait for in-company projects to experience this. Our research question is : can this new school curriculum, thanks to its emphasis on experiential learning, interaction with fellow students and teachers and the importance of self-directed learning, better integrate theory and practice, and enhance their sense of becoming engineers at school and not only during the in-company parts of their training? To put it simply: what is the impact of this curricular shift on their professional identity formation?

LITERATURE REVIEW AND CONCEPT CLARIFICATION

Professional identity

Professional identity can be defined as an ongoing process, a social "becoming". This "ongoingness' of developing a professional self" (Scanlon 2011, p13), should

⁵ Blandin, B., Guillot, M.N., Ouarrak, B., Pallado, G., Wiart, C. (2007)

not be reduced to the mere development of work skills: it should also be related to the recognition, by learners, of their abilities, of their sense of belonging, and to the social approval of this belonging. This evolutionary and iterative process is influenced by personal history, by group interactions (Dubar 2000), and by work and training environments. Scanlon defines professional identity formation as "multidimensional", and underlines that it includes "not only individual and collective identity situated in specific professional practices but also provisional identity, a kind of rehearsal for a professional self" (Scanlon 2011, p14). Researchers that studied identity and its formation have indeed described it as a discursive co-construction: it is both a self-definition (Barbier 2006) and a selfprojection (Bourgeois, 2006, p67), intended for oneself as well as for others (Kaddouri 2006). Kaddouri mentions the tensions that may arise between one's definition of oneself, one's ideal identity, and other people labelling one's identity (Kaddouri 2006). In a professional context, this never-ending negotiation, reconstruction aims at "improv[ing] the fit between" oneself and the work environment (Scanlon 2011, p 16). Professional identity construction hence implies interactions between a personal identity, an ideal identity, a collective identity and work representations every learner has when entering a training programme.

Engineering apprentices, when entering the curriculum, have their own beliefs, and expectations about what being an engineer means. Engineers in France are a professional group whose status is related to specific rules (one is an engineer only if one has graduated from one of the certified schools of engineering), and are associated to generic activities that are common to all the school curricula of these schools. Studying the engineering skills framework edited by the French certifying body (Commission des Titres d'Ingénieurs), as well as CESI's engineering skills framework and comparing it to the CDIO syllabus allowed us to gather information on the expected learning outcomes of an engineering programme, from the institution's perspective. Studying what we could call a "prescribed identity" of a professional engineer, i.e. the set of skills they are supposed to possess when they graduate, seemed to be an important element when trying to define what "an engineer" was supposed to be. Comparing it to the work representations as well as the projected-selves of freshmen students⁶ also proved interesting to define common characteristics as well as differences that might arise in these different sides of the same professional group.

The common discourse from the designers of the programme, from the syllabi and from freshmen, describes professional engineers as project designers and team

⁶ During an exploratory survey, based on open-ended questions, carried in october 2015, 822 freshmen answered questions about their school history, professional projects, and definitions of what an engineer is, and when they think they can call themselves or be labelled so. The designers of the new curriculum were also interviewed in 2015 to gather data on the objective of this shift from their perspective (expected improvements).

leaders, who are able to organize, anticipate and innovate thanks to solid technical knowledge, global vision and developed interpersonal skills. CESI engineers are labelled, or project themselves, as adaptable individuals, with developed project and team management skills.

The main differences arise from two levels: the skills projected by the institution include reflexivity and ethics that no students mention, whereas students tend to over-evaluate the problem-solving skills of engineers. They also often define engineers according to their hierarchical relation to technicians, which is interesting as far as the "ideal identity" of these students -who have almost all graduated as technicians before entering this engineering degree- is concerned.

Another major difference in the students' discourse is the scales and tools they use to measure their professional identity: some consider that they will be able to define themselves as such when others state only someone else can label them so and they cannot self-define as an engineer. Some say they will be engineers as soon as they graduate, others, when they have successfully carried out a project as a project leader –which could be during training-, and some students cannot imagine considering themselves as engineers before having a 5 to 10 year experience as such in a company... This preliminary study on being and becoming an engineer has warned us that our first mission, in order to analyse professional identity formation, would be to define a common scale and common measurement indicators to clarify how the professional identity formation of the engineering students can be observed.

Professional identity formation

Many researchers have enquired the interrelation between a curriculum and students' transition to professionals, and several key elements have emerged as conditions that favour professional identity formation in a training environment. Madeleine Abrandt Dahlgren (2011) addresses an essential aspect of the interrelation between professional identity formation and school curricula. She underlines the mutual influences between individuals and a training programme: "the process of becoming professional [...] is not only how education impacts people, but also how people impact education." (Dahlgren, 2011, p78). This concept of student dispositions that have an impact not only on their experience of the curriculum but also on the curriculum itself is key to understanding how different individuals react in a various way to the same circumstances. Valérie Cohen Scali (2003, p238) refers to the students' "attitudes, values, and cognitive capacities" that they have acquired before entering the training programme and working environment, and that she calls "socialization for work". The students' action patterns, their motivation and expectations towards the training programme, their sense of self-efficacy, their ability to self-regulate all influence the way the educational mediations offered by the curriculum will impact their professional identity construction. It will also affect their attitudes during the training programme. As Reid states (Reid 2011, p85): "students' views of their future profession, and their pedagogic experiences in preparing for this profession, have a direct impact on their sense of professional engagement and on their development of a professional identity." Indeed students have their own idea of what being a professional engineer is for them, and how the school should prepare them to reach this "ideal self", and will thus engage differently if the experienced "value" of the training programme does not match their expectancy (Merhan, 2010). A school curriculum that endeavours to develop students' sense of "becoming" a professional should thus consider student dispositions, to maintain their individual engagement, and develop a sense of empowerment of their transition.

Scanlon emphasizes the importance of self-reflexivity in professional identity formation. A training environment that wishes to foster a sense of "becoming" should allow students to "experiment [...] with images that serve as trials for possible, but not yet fully elaborated professional identities" (Scanlon 2011, p16). This can be achieved "through observing successful role models", but this is not enough: students should have the opportunity to experiment roles for themselves, and analyse their actions and postures, either individually, in focus groups or with the help of a tutor (Merhan, Ronveaux & Vanhulle, 2007).

HYPOTHESES

The curriculum was certainly conceived as a missing link, a secure transition between school and company, aiming at integrating disciplinary and professional knowledge. It was conceived as a theatre where students could practice being engineers (team project work, problem-solving loops, project leader role to assume in turns etc.). The aim of our study is to analyse how the students *actually* experience it. Does it integrate theory and practice while allowing students to practice critical reflection -reflexivity- on their personal and professional development? Our first hypothesis is that the students will probably experience actual transition levers, and that these levers may differ from the tools of the curriculum as it was conceived: we want to enquire what the *actual* levers are and are not.

The interrelations between learner dispositions and the curriculum will influence the impact of the curriculum on the learners' construction of their professional identities, so we want to enquire potential transitional profiles that may emerge and the main mutual influences between dispositions and curricular tools. The curriculum should also be questioned as a lever to develop personal identity and learner identity as well as professional identity, as the three seem deeply interconnected.

RESEARCH DESIGN

The study is still ongoing: it is a three-year research project started in October 2015, which will follow a cohort of 900 students over 6 different training centres in France, during the 3 years of their engineering programme. We combine two approaches to discuss our hypotheses. A quantitative approach, based on questionnaires to the 900 students in the curriculum, allows us to gather data on the actual levers of development and the curriculum as experienced. Upon their arrival, all students are asked to answer to a questionnaire, with open-ended questions, about their self-projection as engineers, their definition of what being an engineer is and when and how they will consider themselves so –or be labelled so; about their expectations towards the training programme. Follow up surveys about the same subjects, added with questions on their experience in the programme are carried out on years two and three of the programme, to see the evolution of the "becoming" as future engineers, their experience in the programme as they mature and as the programme itself matures.

A qualitative approach based on interviews with thirty students and ten tutors from six different learning centres in France, combined with the observation of sessions at different steps in the problem solving loops and during different projects, is used to gather data on the interrelation between student dispositions and curricular impact on the students' transitions from student to professional.

The results of the exploratory research work were analysed using lexicometric instruments. This analytical process allowed us to gather data, from the interviews with the designers of the curriculum and from the framework of the curriculum, on the learning outcomes of the programme, from the institution's perspective.

The longitudinal study of the cohort will allow us to analyse the differences and similarities at the group level. The semi-structured interviews with students and tutors will allow us to collect and analyse data at different stages in the students' path from student to professional, and help us have a clearer idea of how, when and where the feeling of becoming an engineer developed over time. The overall aim is to define descriptive categories of how the process of becoming an engineer was conceived, from the students' perspective, and what key elements in the curriculum played a role in this "becoming".

RESULTS

At the end of this first year of research, we have provisional results that can orientate our future enquiries.

Actual levers of transition

We enquired about the steps, the tools, or the «moments», in the training at school that allowed students to practice their skills as future engineers, that made them «feel like» engineers, or that increased their self-confidence as future engineers. Students mentioned, both in interviews and in questionnaires, several elements in the school training. The oral evaluations that the students take at the end of each project are mentioned as very realistic rehearsals of their skills and postures as future engineers: these evaluations are often organised as role-plays. For example, the evaluating jury can play the role of bankers and the project group is a team of young associates looking to buy and improve the viability of a company encountering lean management issues. During such evaluations, students have to prove they have efficiently cooperated, shared information and organized their project and project team. They also have to communicate their results efficiently and professionally.

Other steps that students mention as key to their identification as engineers, are the group problem solving stages that involve calculations, modelling and prototyping. When projects lead to the actual implementation of the solution or to the actual development of a product, students mention the impact on both their motivation and self-confidence. When they start the learning programme, students still consider the company as the main environment to foster their sense of "becoming". However, as we can notice, after a year in this active learning environment, they are able to pinpoint what activities and tools in the curriculum are key to their development. They can even mention the generic skills they feel they have developed thanks to this methodology: communication and organizational skills mostly.

However, not all students are able to see how the school training may help them in their transition, and not all pedagogical tools initially designed to foster professional identity development actually work as such. Indeed, at the end of each two to five week project, a half day is dedicated to debriefing the past project. When initiating this study, we had anticipated this step as a major self-reflective tool, and as an opportunity for students to coevaluate and discuss their roles, attitudes, project management skills. What actually occurs during these sessions is mostly a debriefing of how the project was organised and designed by the school. Reflexivity is, at this early stage of their training –end of the first year out of threea tool that is used by the school and curriculum designers more than by tutors and students.

Role of the tutors

This leads us to the crucial question of the tutor's role: whether they see themselves and position themselves as scientific experts or as guides for the students' professional development, they can change the impact of the school curriculum. Some tutors have expressed their difficulty with this new professional identity they have to develop, as tutoring and teaching are very different activities that require different skills. They too need to adapt to the new curriculum. Some have expressed their choice to act as « professional tutors » during the school projects: they mentor the teams and position themselves as managers. They organize meetings with team leaders and ensure the learning environment has a professional atmosphere. They also encourage students to reflect on their generic skills and potential transfers between school and companies.

Other tutors rather position themselves as scientific experts with the aim of guiding the students along the projects and problem-solving situations. They can be either less familiar with professional tutoring or more willing to focus on the acquisition of scientific knowledge, that some consider being the most important element at this stage of the curriculum –i.e. more important than professional identity development.

One of the major difficulties encountered at this stage is that most students do not relate what they do at school to their missions in their companies. We asked one group of 30 students to answer questions about this topic very early in the training programme (at the end of their second project). The result was that only 35% of them related their interest for the project to their own professional goals. The link and potential transfers were not yet clear for them. The generic skills that might be gained from such project and teamwork was not obvious enough for them to consider the potential gain in professional skills at this stage. They rather focused on the scientific aspect of the project and on whether it was related to their own company or not. This is to be related to the way the tutors position the school projects and atmosphere, but also to the students' expectations towards the school training.

Role of students' expectations

The impact of preconceptions and expectations is strong, as well as the motive of engagement of the students in the training programme. When asked about their career choice, and why they chose this school for their training, 76 % of the freshmen who answered the questionnaire (533 freshmen students answered on the

first day of training, out of about 900 students in the programme in 2016) said they chose this school because it offered a combined work and study programme. Only 10% of them chose the school for its active pedagogy. When asked when or how they could judge they were engineers, 55% of them referred to having experience in a company, 14,5% to getting their degree, and only 20% mentioned the school curriculum and projects as a time and place where they could position and see themselves as engineers. Their main expectation thus lies in the development of professional skills in the company.

However, when asked precisely about their expectations towards the school curriculum, they have more expectations on the development of professional skills (79%) than the acquisition of scientific knowledge (72%). Evn if they anticipate the company as the main lever to develop their professional identity, they still expect the school to give them opportunities to train for their future missions. However, they expect more from the company in terms of professional develop professional skills. 53% expect their company to help them develop professional skills. 53% expect the school to do so. They also expect more from the company in terms of interaction and coconstruction of their professional identity: 60% expect to learn from their colleagues in the company whereas only 35% of them expect to learn from interactions with their peers at school. They have a strong preconception that experiential learning in the company will be more important to learn their future job than the school curriculum.

What is striking in these first results is that at the end of a full year of training, we can relate what they said they expected to the actual satisfaction of these expectations. Only 11% of the students (211 students answered the questionnaire at the beginning of year 2, out of 900 students) expressed that their expectations were not satisfied during the first year of training at school. These students' first expectation was that the school provide them with scientific knowledge. Only 57% of them expected school to help them develop professional skills, while the group of students who considered that their expectations were fully satisfied during the first year of studies at school were 80% to expect the school to help them develop professional skills. These results confirm the importance of working on students' preconceptions before they enter the training programme. It also suggests it might be key to show them the importance of the generic skills they acquire with each school projects as well as the transfers that can exist between their own professional projects and what the curriculum has to offer. Their expectations influence their posture and engagement during the school projects.

Role of group interactions

First year students evoke the importance of group brainstorming and knowledge exchanges when asked about how the school curriculum can help them « become » engineers or « feel like » engineers. They mention the group as a way to acquire knowledge, as well as a way to feel "secure". Indeed when only 40% of the students said they felt confident they could individually succeed in carrying out the (second) project, 50% said they were confident they would succeed as a group.

They are nevertheless less likely to mention the group as a lever to develop their professional identity and position themselves. Very few of them, during the 30 interviews carried out during the first year, mentioned their project group as a professional project team that could allow them to play the role of a professional project leader. Very few of them labelled themselves "professionals": most of the apprentices interviewed labelled themselves "students" at school. This difference in the perspective is also a sign that they do not assign the same goal to the group interactions (professional interactions for few of them, and social interactions, even friendly interactions for most of them). Different identities seem to be at stake. On the one hand, the few apprentices who are very engaged in the process, and who have more self-reflective abilities and assign professional goals to the school projects seem to use the group to develop their professional identity. On the other hand, the majority of the apprentices, who do not -yet? - view the school periods as opportunities to learn their future job, use the school periods to build their social network and personal identity. Most of the time, the self-reflective focus groups that are organized are at the initiative of the few apprentices that want to implement such coconstructive debriefings. Other than that, informal discussions about their group work do occur, but not specifically during the timeslot allotted to this activity at the end of each project, or collectively, but rather between groups of friends.

Both students and tutors evoke group work as a difficulty when one or several group members do not "play along" the project simulation. Conflictual situations arise when group members do not share the same engagement in the school project. 32% of the second year apprentices who had had previous experience of incompany work did have trouble with group work at school. Students expressed that simulated projects at school were more difficult to engage in than real projects and that teamwork at school could be more difficult to handle than teamwork in the company. Why is it so? Working with peers, with trainees who are not their supervisors, can make it difficult for them to play along and actually lead a project and organize work as they would naturally do in their company. Trainees can judge this lack of actual hierarchy demotivating, or sometimes fear the judgement of their peers. Once again, both tutors and students can act on the situation and decide to

set professional rules in the classroom, and encourage professional engagement in the projects.

CONCLUSIONS AND PERSPECTIVES

What we can conclude from these provisional results is that the transition mediations offered by the school curriculum (group work and interactions, reflexive tools, simulated professional situations), can indeed act as transitional levers if both students and tutors transfer the rules and atmosphere of a professional work environment to the training environment and play along with the simulation. For that matter, all preconceptions of the school environment as a provider for scientific and technical knowledge only must be tackled from the start, and all potential transfers and gains in generic skills must be valued, as well as professional behaviour. If trainees and tutors wish the school curriculum to give students opportunities to test their roles as future engineers, to foster the development of identification and differentiation as professional engineers with their own professional identities, trainees should be encouraged to engage in a transitional dynamic by assimilating these tools and making them their own. Professional identity formation cannot be disconnected from social, personal, learner identity development. This tight interconnection may explain why, for some of the students interviewed, the learning environment is not always perceived as a "secure" environment where nothing is really at stake. For sure, their career is not at stake during the school projects, but maybe their social persona is, or their own perception of themselves. Constant group interaction and collaborative activity can be perceived as a risk or a difficulty for students who can initially feel more comfortable with technical problems to be solved on their own...

Every students' engagement in the programme should thus be considered regarding their background, and their ability to self-directedly manage their acquisitions according to their own goals and capacities. The opportunities that the very programme gives students to develop their self-directedness and other metacognitive skills should thus be a central question in our future inquiries on the professionalization of these apprentices.

From its beginning, the school curriculum was designed to be progressive throughout its three-year duration and to allow for more and more autonomy and responsibility from the students' perspective. The projects were designed to be more and more related to generic management and communication skills, and less related to scientific knowledge acquisition in the last year, which should increase student engagement as well as the connections between simulated situations at school and actual company projects. Reid (2011, p86) states, "the *rational generic* aspects allow [students] to experience the nature of the discipline, and thus

contribute to the formation of identity as a professional in the discipline."⁷ She refers to her model of professional identity formation, in which she describes how professional identity is developed through a broadening from knowledge of ritual elements of the profession to generic aspects, combined to another broadening from technical elements that she describes as "extrinsic" to the ability to understand the "intrinsic" meaning of "the artefacts of the profession". Namely, to develop their professional identity, trainee engineers should endeavour to broaden their view on the profession, as well as establish "connection[s] between their personal and professional sel[ves]."



ig. 6.1 Model emphasising identity and engagement

Figure 1, Anna Reid's model of professional learning in Reid, A., Abrandt Dahlgren, M., Dahlgren, L.O. and Petocz, P. (2011), p86

One of our perspectives will be to try to use this model as a framework to analyse student engagement and professional identity development in the curriculum. We shall try to identify the indicators of the broadening in their view of the profession, as well as the signs of increased engagement. This shift from expertise in a very specific discipline to more generic and transferable skills should be seen as a sign of professional development. Expertise, "mastery" as Reid calls it (Reid, 2011, p96) is only a "momentary illusion". In a professional context that is so subjected to technological changes, learning how to learn, learning who you are and such concepts as collective thinking and codesign seem to be key elements to become adaptive as a future professional.

⁷ In Reid, A., Abrandt Dahlgren, M., Dahlgren, L.O. and Petocz, P. (2011)

REFERENCES

- Albero, B. (2010). La formation en tant que dispositif: du terme au concept. In Charlier B. & Henri F. (dir.) Apprendre avec les technologies (pp. 47-59). Paris: PUF.
- Barbier, J.-M. (2006). Problématique identitaire et engagement des sujets dans les activités. In Barbier, J.-M., Bourgeois, E, de Villers, G. & Kaddouri, M. (Eds.), Constructions identitaires et mobilisation des sujets en formation (pp. 15-64). Paris: L'Harmattan.
- Beichner, R. J., Saul, J. M., Abbott, D. S., Morse, J. J., Deardorff, D., Allain, R. J. & Risley, J. S. (2007). The student-centered activities for large enrollment undergraduate programs (SCALE-UP) project. *Research-based reform of university physics*, 1(1), 2-39.
- Beichner, R. J. (2014). History and evolution of active learning spaces. *New Directions for Teaching and Learning*, 2014(137), 9-16.
- Blandin, B., Guillot, M.N., Ouarrak, B., Pallado, G., Wiart, C. (2007, sept) Socialisation et développement des compétences de l'élève ingénieur. Communication présentée au colloque "Compétences et socialisation". Montpellier. En ligne https://halshs.archivesouvertes.fr/halshs-00373604/document
- Cohen-Scali V. (2000). Alternance et identités professionnelles. Paris: PUF
- Cohen-Scali, V. (2003). The influence of family, social, and work socialization on the construction of the professional identity of young adults. *Journal of career development*, 29(4), 237-249.
- Dahlgren, M. A. (2011). Higher Education and Becoming a Professional. In Scanlon L. (Ed) (2011). "Becoming" a Professional (pp. 77-93). Springer Netherlands.
- Dubar, C. (2000). La socialisation, construction des identités sociales et culturelles (3è éd.). Paris: Armand Colin.
- Merhan, F., Ronveaux, C. & Vanhulle, S. (Eds) *Alternances en formation*. Bruxelles: De Boeck.
- Merhan, F. (2010, sept). Alternance et dynamiques identitaires: quels outils théoriques et méthodologiques? In Symposium: Analyser les phénomènes identitaires en formation: questionnement méthodologique. A.R.E.F. Actes du congrès Genève. En ligne http://archiveouverte.unige.ch/unige:76272
- Milgrom E., Raucent B., Maufette Y. & Saveuse M. (2015). Le guide de l'A2P2 en 50 questions. Document non-publié, CESI.

EAPRIL Conference Proceedings 2016

- Reid, A., Abrandt Dahlgren, M., Dahlgren, L.O. and Petocz, P. (2011). From Expert Student to Novice Professional, (Vol. 99). The Netherlands: Springer.
- Scanlon L. (Ed) (2011) "Becoming" a Professional, an Interdisciplinary Analysis of Professional Learning, *Lifelong Learning*, Volume 16, Springer.
- Wood, D. F. (2003). Problem based learning. BMJ: British Medical Journal, 326 (7384), 328.

COMBINING VET AND INTEGRATED LANGUAGE LEARNING TO ENHANCE PROFESSIONAL OPPORTUNITIES FOR MIGRANT PUBLIC THE VINTAGE PERSPECTIVE

dr Bénédicte Halba

Doctor in Economics (University of Pantheon, Paris, 1996), founding president of the Institute for Research and Information on Volunteering (since 1997) and director of iriv Conseil (since 2000), 41 rue Hippolyte Maindron F-75014 Paris, contact@iriv.net, www.iriv.net

ABSTRACT

Migration and mobility of the workers play a fundamental role in fostering a flexible and competitive job market at the European level. The objectives defined by the Europe 2020 Strategy - making social cohesion and an inclusive societyimply for migrants and mobile workers to play their role as additional workforce to be employed according to economic needs, but also main protagonists in the social and professional arena. They must be active European citizens - having equal opportunities of professionalization in the hosting society. Communication and linguistic skills are the basis for mutual understanding and therefore an asset for gaining citizenship rights and professional development. They enable a good integration between local populations and foreign people, letting intercultural dynamics and encounters be elaborated in a balanced way by all components of the society. The Vintage project implemented in the framework of the Erasmus + Programme (2014-2020) has designed a toolkit for VET & Language teachers and trainers to master the local language and develop professional opportunities for migrant public with a linguistic level of A2-B1. Based upon the outputs of this three year project implemented in 4 European countries (Switzerland, France, Germany and France), we intent to explain the usefulness and innovation offered by a combined learning approach that emerged-requiring different kinds of expertise among teachers & trainers who must combine competence in Linguistic learning and in Vocational Education and Training. We will explain how it has to be applied in order to be fully understood and used by teachers & trainers. We will also insist on the main learning outcomes expected for learners- adult migrant: mastering a foreign language is not enough; other key competences are acquired all along the process. Consequently trainers & learners must acquire or develop many of the eight key competences (EC, Brussels, 2006) such as linguistic and digital skills (KC2 & KC4) but also learning to learn (KC5, civic and social competences (KC7) or sense of initiative & entrepreneurship (KC7)...

A RESEARCH & PRACTICE-BASED PRACTITIONER RESEARCH FOCUSED ON LINGUISTIC & OTHER PROFESSIONAL SKILLS

Globalization of migration flows hampers the traditional use of common languages spoken by migrants in order to manage ordinary communication and cooperation at the workplace. New organizational patterns and new technologies determine a parallel increase of linguistic skills required by any kind of workers, even low qualified – both considering understanding, reading and speaking, but also a certain mastery of written communication, related to the use of reporting, data storage, and feed-backs. The Vintage requires taking into account two European frameworks-the CEFR for linguistic level (implemented by the Council of Europe since 1991) and the Key Competences approach (implemented by the European Parliament & European Commission, since 2006).

Language learning, as any human learning activity, clearly depends on diverse dimensions and triggers: from cognitive potentialities and personal learning styles (differentiated raining offers according to divergent needs), from affective dimensions and motivations (proximity of learning achievements to interests and preoccupations of the learners, participation to the definition of achievable and shared learning outcomes), from relational and social enablers of learning (interaction as a main issue in language learning). The idea of the Vintage is to move from a mere "training perspective", implying consolidated didactical strategies, towards a "learner centered" one. This conceptual and practical shifting could enable innovative approaches to language learning, capable of making it more effective and adequate to a rapidly changing context, both considering needs emerging in the companies, and expectations of the learners.

In this spirit, the Vintage project gathers various European countries with a different background both in the linguistic support provided to migrant learners and in the Vocational Education and Training (VET) perspective. We intent to explain the main outputs achieved by the Vintage- a comparative approach of the linguistic and professional approach implemented in 4 European countries; the designing of a Resource Center offering a selection of best practices; the testing of a training combining the Vintage approach in the different countries. We will first detail the content and pedagogical approach used in the designing of the Vintage training combining two different professional profiles. We will then present the testing implemented in France in 2016 and the stakeholders involved for this purpose. On this basis, we will try to answer, in a third part, the critical issue of the combination of various competences - linguistic competences, VET competences and e-learning competences- required for both teachers & trainers and their learners to successfully use the Toolkit and general approach of the Vintage.

A TRAINING PROGRAMME FOR LINGUISTIC TEACHERS & TRAINERS COMBINING THE VET APPROACH AND A E-LEARNING TOOLKIT

Two main strategies are supported in EU countries: justifying first and foremost a linguistic level (Language first) and building a training path integrating Language & professional opportunities (Language with VET approach at the same time). The teachers & trainers must combine two different learning processes - the VET approach based on skills and competences required in the labour market corresponding to a professional profile (position, employment, qualification) and the Linguistic approach based on linguistic skills - referring to the Common European Framework of Reference for Languages (CEFR) which may differ with the professional profile. The Vintage also includes an e-learning approach with a digital platform -a Resource Centre offering a selection of best practices in the field of VET & Language learning freely available for teachers & trainers involved in Linguistic learning & VET.

Combining the language & VET approaches

The first aim of the Vintage approach is to understand the existing European frameworks for linguistic learning & Vocational Education and Training (VET). The first part of the training explains these two main theoretical references both in the field of Linguistic Training & Learning (CEFR, Council of Europe, 1991⁸) and in the field of Vocational Education & Training (the 8 key competences, European Commission & Parliament, 2006⁹).

The CEFR framework is a main reference for trainers & teachers but they usually don't make the bridge between the linguistic levels and the corresponding competences (in terms of professional skills, abilities & responsibilities). They are not enough familiar with the 8 key competences (8KC) approach. They are mainly focused on Key Competence 2- competence in a foreign language but not on the other competences. It is a pity for their learners as the other 7 key competences are worth being explained and detailed in support to the linguistic learning in order to explain the reason for the linguistic requirements asked in a job application. For instance the minimum linguistic level required in a professional context is B1 which corresponds to the average level -3rd level of a grid including 6 levels (from A1 as the minimum level to C2 as the maximum one).

Many linguistic programmes offered to migrants failed because the learners couldn't see the use or practical application of their learning. In order to be

⁸ It is available on - http://www.coe.int/t/dg4/linguistic/cadre1_EN.asp?

⁹ It is available on: http://ec.europa.eu/education/policy/school/competences_en

successful, the training has to be connected with their social and professional reality. A main focus of the Vintage approach is to work on real scenarios- such as the one suggested by the Fide project - the Swiss project which was the main reference to design the Vintage project on a European level. Another key issue is to work with authentic documents such an administrative form to be filled, an application form to be answered or a resume or letter of motivation to be written or updated to apply for a job.

Including the e-learning approach to be successful

In a professional perspective, finding a job or improving one's career requires the access to Internet. Many job applications are available only on line. It is also most recommended to use a social network - such as LinkedIn- to have an access to all the job applications. It is more and more used by professionals in charge of human resources and a kind of selection of the candidates. Moreover an e-mail contact is necessary in any official process. The idea of the Vintage is to offer a Resource Centre for trainers & teachers with a selection of best practises in the four countries (Switzerland, France, Germany and Italy) to support their training or learning.

There are three main parts in the Resource centre freely available for teachers & trainers but also for their learners: how to design a learning path with the Vintage approach, how to implement the course on the ground and how to assess the learning outcomes. Two guidelines were published to support teachers & trainers- a first guideline focussing on the two first points (designing & implementing a course for adult migrants) and a second guideline focussing on assessing with a more detailed reference to the different linguistic levels suggested by the CEFR.

Being able to use this e-learning platform implies for teachers & trainers to be competent in Digital competence (KC 4). Depending on their level of competence they will be able to download the tools & methods from the platform (first level of competence), to explain how the platform works for their learners (second level) or upload any material they would find relevant (third level). It is also for their learners a way to play an active role in the process of learning- making suggestions for other tools & methods available online.

Learning outcomes (LO)

At the end of the Vintage training teachers & trainers have experienced the competence approach implemented by the Lifelong learning perspective. They have enriched their knowledge concerning main European frameworks - in the field of Linguistic learning (CEFR) and in the field of Vocational Education and Training (the 8 KC). They have used them not just as a reference framework but as a real pedagogical support in order to express the meaning of the 6 linguistic levels

(CEFR) and of the 8 key competences (8KC). They are able to identify and select useful and relevant tools & strategies for their learners, taking into account both the expected linguistic level and the requirements of the job they are looking for. They also have identified main obstacles faced by their learners in the labour market – language, non recognition of diploma and experience, competences to be updated. They are able to find alternative solutions and strategies to deal and even overcome them. They are able to build an action plan including the SWOT analysis. They are aware that this is most important to take into account different lengths of time (short, medium and long term perspectives) with the different linguistic levels to be achieved with regards to the professional plans. They have experienced some specific tools available from an e-learning platform. They are ready to contribute actively to its content.

TESTING & PILOTING THE VINTAGE STRATEGY AMONG LEARNERS- FEEDBACK IN FRANCE

The Vintage approach was tested in France respecting the criteria of combining linguistic skills and VET skills among trainers. Therefore the testing gathered an association specialising in linguistic learning- the FISPE (French for social and professional integration in Europe) and another organisation specialising in VET and lifelong learning (iriv conseil)¹⁰.

Networking- a key issue for involving relevant and motivated learners

In a preparatory phase, many associations working on the ground with adult migrants were involved in the process. They were asked to select learners following two criteria: justifying a linguistic level of A2-BI (according to the CEFR) and being in an active process of looking for a job- either training opportunities or employment with relevant professional experience.

After this first step, the experimentation among the target groups- migrants and mobile workers- could take place in Paris (April 2016) and in Seine & Marne (December 2016). In Paris, the location was the Cité des Métiers. It has involved several associations – Kolone and Tremplin migrants (two local associations in Paris), France terre d'Asile (national association), Coallia (regional & national association) both providing a linguistic and/or professional support to migrants. In Seine & Marne, the experimentation took place at the Maison des familles in Montereau, a social centre supported by the City hall to offer trainings to migrant publics both qualified - mainly asylum seekers- and/or low qualified female migrants – mainly arrived in France to join their husbands..

¹⁰ Fispe-www.fispe.fr & iriv conseil-www.iriv.net

Involving relevant profile of the learners- answering the appropriate Vintage target-groups

The profiles of the learners were quite diverse. In both series of sessions held in Paris (April 2016) and Seine & Marne (December 2016) a total of 40 people attended the experimental training. They were mainly aged between 25 and 50 years ; 5 persons were under 20 years (at the Cité des Métiers). They were in France for 6 months to 20 years. Their level of qualification was different: 1/3 were graduate, 2/3 were low qualified or with a qualification not recognised in France or with their present professional plan. The minimum linguistic level was A2 according to the CECR- and up to C2 - for graduate who registered in French University (two Spanish students attended the training at the Cité des Métiers). Their regions of origin were first Africa - mainly Algeria & Morocco mainly in Seine et Marne ; Egypt, Mali, Chad, Mauritania, Senegal in Paris. The second main geographical origin was Europe - non EU members such as Ukraine but also Bulgaria, Poland and Spain. The third origin was Latin America - Cuba & Haïti. The last region of origin was Asia with China & India. The reasons for participating (explicit and implicit needs) were mainly to improve their professional opportunities with new approaches, techniques/methods in seeking a job/a training. They also wanted to be supported to re-engage in their transition in the labour market. Some of them already had a professional plan- such as creating a professional activity and they wanted to have the final support to achieve it. The encounter with the councillors at the Cité des Métiers was a main step in this process. For the learners at the Seine et Marne, a visit at the Cité des Métiers in Paris was a way to test on the ground the efficiency of the Vintage approach: mobility and active research. The needs expressed by the learners in the first session or identified by tutors/ trainers have been updated during the sessions through interviews and questionnaires and a final assessing session dedicated to the SWOT analysis: what can I do, what do I want to do, what are my plans.

Achieving relevant Learning outcomes for the Vintage thanks to an appropriate learning pedagogy

The achieved learning outcomes were also various combining "hard skills"knowledge & competences on the basis of the 8 key competences (8KC) but also "soft skills"- understanding, empowerment & attitudes. Learners have improved knowledge about linguistic & VET issues - both on a national and European level. Most of them didn't know the two EU frameworks- CEFR & 8KC even though the first one was already used. It was known by the trainers/councillors. They were trained to acquire the appropriate skills to play an active role in searching a job and also to change their professional perspectives. They sometimes found new professional opportunities- employment or training. They discovered new pedagogical approaches : the portfolio approach - Migrapass updated since 2012
thanks to the monthly club at the Cité des Métiers ; building an action plan after the SWOT analysis ; a brainstorming allowing all the participants to play an active role and gaining self-confidence. Brainstorming is a usual way to confront different approaches and perspectives and to allow all the participants to express themselves.

To enhance participation & collaboration, didactical strategies combined different methods. The round table- in the beginning of each session - was useful to enhance the empowerment process among the learners. They were asked to make a presentation of their professional profile in a given length of time. Their presentation has been improved between the first and the last session. The pedagogy combined theoretical and practical content with interactive participationparticipants being asked to give concrete examples of situations they are faced to. Work in small groups (2 to 3) gives self-confidence to the participants who can be more active and specific. The collective approach – during the plenary sessions- is the best way to create a real synergy in the group. The face to face sessions (5 sessions of 3 hours each) were followed by the sending of the pedagogical supports in order to check that the participants had an e-mail and could easily have an access to it. It was underlined that all relevant pedagogical tools could be also downloadable from the Resource center¹¹. At the Cité des Métiers, a special area is also dedicated to self-training using a computer with a proposal of tools & strategies to be used.

Applying the SWOT analysis to build a realistic action plan

The "Strength" was the information both on the linguistic reference (CEFR) and the VET approach (8 key competences) and the ways & means to overcome the barriers/obstacles faced in the labour market by using appropriate tools & methods. The "Weakness" was the collective approach as individual support was most necessary after the training in order to adapt the training to specific cases and to offer a personalised support. In this context, a series of interviews were conducted with some participants after the training sessions¹². The financial dimension or the geographical place- such as Montereau (far away from big cities) may be other "weaknesses". The "Opportunities" were clearly new professional perspectives and more self-confidence among the learners. The empowerment process succeeded with very positive feedbacks received from the participants and the concrete professional projects built or the updated resumes. They could be better explained during the face to face interviews. The "Threats" are directly linked to the status of some participants (asylum seeker, migrants in a process of regularisation of their situation or updating of their documents) or the lack of recognition of their diploma/professional experience which may be main barriers on the labour market.

¹¹ Available from the French Weblog implemented in France : <u>www.vintage-language.fr</u>

¹² For instance in the framework of the monthly Club of iriv at the Cité des Métiershttp://club-iriv-paris.blogspot.fr/ or with their trainers

LESSONS LEARNT IN TERMS OF LEARNING STRATEGY FOR ENHANCING PROFESSIONAL OPPORTUNITIES AMONG MIGRANT LEARNERS- COMBINING KEY COMPETENCES

Many questions can be raised on the Vintage approach such as: How is it possible to combine linguistic skills and other skills for trainers & teachers? What are the main obstacles/barriers to be overcome - internal ones (coming from learners) or external ones (access to vocational education and training for migrants)? What should be the balance between the linguistic approach and the VET approach when training migrant adult in the educative/formative systems? On the basis of the testing implemented in France many lessons could be learnt.

The first lesson is to be as clear as possible on the two learning approacheslinguistic & VET. The first one uses a pedagogy which has been tested for a long time among adult migrants- the CEFR (Council of Europe, Strasbourg, 1991). It is fully used and applied by trainers & teachers. The second learning approach-VETis more recent in the support provided to migrants, especially the competence approach. As far as France is concerned, it was for the first time applied in the framework of the so-called CAI (contract of integration to be signed by new migrants since 2006). It is just a basis as only half day (3 hours) support is offered in order to identify and assess skills & competences of migrant to be value in their professional plan. Compare to the 400 hours dedicated to linguistic learning, there is a gap to be bridged in the future.

The second lesson learnt concerns the pedagogical strategy. The Vintage project is a training programme designed in the framework of the lifelong learning perspective – it is human resources oriented. This is different from other programmes where the focus is made on language. Teachers & trainers using the Vintage approach are trained to learning strategies to overcome barriers in the labour market after reminding the general linguistic principles. The Vintage mentoring addresses trainers, tutors, and professionals working with migrants who have to combine two different approaches. This was the main issue and the challenge of the testing to gather teachers & trainers who would be willing to combine these two professional skills & competences. Moreover a third approach had to be included with the e-learning platform. If more and more trainers & teachers have included Information & Communication technology (ICT) in their practice, it is always a challenge to understand and use a new e-learning tool & strategy.

The third lesson learnt is to answer the expectations of the learners- migrants & mobile workers. As far as the training is concerned, migrant learners were interested in knowing the main barriers to be overcome in the national labour market- language is a first "visible" obstacle but is far from being the only one.

They perfectly understood that to apply for specific jobs with responsibility a higher level of language was required. On the one hand even with low qualified jobs- such as in the cleaning sector- basic competences were required : linguistic competence (KC2) for safety reason but also other competences – such as mathematics & scientific competences (KC3) to know the quantity of a product to be used. On the other hand, requirements for a job must be proportionate to the employment- asking for a linguistic level of C2 for a job with very basic content can be considered as an unfair condition and so a kind of discrimination. The pedagogical approach consists in underlying the combination between the different competences and to enhance the critical thinking.

The fourth lesson learnt is to constantly update relevant tool & strategy to enhance the professional opportunities of migrants. The expected outcome of the Vintage training is to open perspectives both for teachers& trainers and their learners taking into account the variety of their profiles and expectations (in terms of linguistic support and/or VET improvement). The resource platform designed for the Vintage is a selection of tools & methods in 4 European countries- France, Germany, Italy and Switzerland and should fulfil these needs. For teachers & trainers, it should open new pedagogical perspectives on the basis of the selected examples of good practices selected in the four countries. Teachers & trainers but also learners are also asked to play an active role by suggesting new tools & approaches to be uploaded to enrich the exiting date basis.

The fifth lesson learnt is that the Vintage training has to be enriched by further feedbacks from participants- both teachers & trainers but also learners. In France, the weblog implemented for the Vintage project presents different key actors in both field of VET & Linguistic learning and the professional opportunities opened for teachers & trainers using the Vintage approach. The experience of practitioners (teachers & trainers) working in both fields will enrich in the future the Vintage approach as the professional requirements to be fulfilled by migrants and mobile workers- as for all the other "national" workers are more and more specific and demanding. This is also the main asset of the Vintage approach- thanks to the eleaning platform, it will be able to update in the future with new guides or new tools & strategies.

CONCLUSION

The Vintage project is an example of applied research in the field of practiceoriented, incorporated and explicit vocational education & training (VET). The activities were designed in the framework of the Lifelong learning programme – on the basis of an Erasmus project. They offered a better support for the transition to the labour market and/or training thanks to a relevant and innovative pedagogical approach. The first public was trainers & teachers; a second public was migrant learners. The Vintage training was supported by two guidelines and an e-learning platform with relevant tools & methods to achieve this goal. Our article was focused on the innovative approach of the Vintage project (theoretical part) together with the feedback received from teachers &trainers but also from leaners – migrants and mobile workers during the testing implemented in France (practical part). We intended to show how far the combination between the linguistic learning & the VET approach could be a main issue in the educational practice and learning in the EU (third part). The Vintage outputs should support any public policy meant to welcome migrants and to enhance their integration in the labour market. It can therefore usually contribute to the international world of Practitioner-based Research especially in a European context characterised by a critical migration issue.

REFERENCES

- Council of Europe, Education and Languages, Language Policy, July 2014, http://www.coe.int/t/dg4/linguistic/cadre1_EN.asp?
- European Commission, Lifelong Learning Programme (LLP), Brussels, 2012.
- European Parliament and of the Council of 15 November 2006, OJ L327 of 24/11/2006 (and amended by the Decision 1357/2008 of the European Parliament and of the Council of 16 December 2008), Decision 1720/2006/EC
- Halba, B. . Enhancing the diversity approach among migrant learners & tutors to struggle against discrimination in the labour market in Europe, Communication & proceedings, EAPRIL conference, Luxembourg, 2015available at https://eaprilconference.files.wordpress.com/2015/11/proceedings-15.pdf
- Halba, B. (ed). Migrapass: a portfolio and a companion for migrants, report of research. Paris . IRIV (2012) available at http://www.irivpublications.net/fichiers/Final%20publication%20-%20iriv-%20Migrapass%20-%20October%202012.pdf
- Halba, B. Intercultural mediation, a "New Deal" for local policymaking of Intercultural, bridging local, national and European levels : IMISCOE Conference, Warsaw, University of Warsaw (2011) available at <u>http://www.iriv-publications.net/fichiers/2011-Imiscoe-</u> %20Warsaw.pdf
- Halba, B. Médiateur interculturel: un métier des compétences, Paris. Iriv (2009)

- Halba, B. Lifelong learning a key issue for Migration, Migrants and professionals working with them: International Journal South Eastern Europe (Brill). Sofia. Cermes. (2008) - available at <u>http://www.iriv-</u> publications.net/fichiers/Article%20Sofia%20TIPS%202008.pdf
- Lord, J. & Hutchison, P. The Process of Empowerment: Implications for Theory and Practice, Canadian Journal of Community Mental Health (1993) Available at: http://www.johnlord.net/web_documents/process_of_empowerment.pdf
- Extramiana, C., Learning the language of the host country for professionalpurposesOutline of issues and educational approaches, Délégationgénérale à la langue française et aux langues de France, Strasbourg: Council of Europe, 2012
- Krumm, H-J. & Plutzar, V. Tailoring language provision and requirements to the needs and capacities of adult migrants, University of Vienna, Strasbourg: Council of Europe, 2008
- Little, D. The linguistic integration of adult migrants and the Common European Framework of Reference for Languages(CEFR), Strasbourg: Council of Europe, 2012
- Rossner, R., Quality assurance in the provision of language education and training for adult migrants- Guidelines and options, The European Association for Quality Language Services (EAQUALS), Strasbourg: Counil of Europe, 2008

Websites:

Project wesite: <u>http://www.vintage-language.eu/news</u> French weblog: "- <u>http://www.vintage-language.fr/</u>

ON THE RELATIONSHIP BETWEEN STUDENT WELL-BEING, THEIR LEARNING, AND LEARNING ENVIRONMENTS IN HIGHER EDUCATION

Els Laenens*, <u>Ellen Vandervieren</u>**, Tom Hofkens***, Ann Stes****, Peter Van Petegem****

 * senior lecturer, University of Antwerp, els.laenens@uantwerpen.be, ** lecturer, University of Antwerp, Venusstraat 35, Antwerp, Belgium, <u>ellen.vandervieren@uantwerpen.be</u>, *** assistant, University of Antwerp, tom.hofkens@uantwerpen.be, **** doctor-assistant, Centre for Excellence in Higher Education, University of Antwerp, ann.stes@uantwerpen.be, ***** full professor, University of Antwerp, peter.vanpetegem@uantwerpen.be

ABSTRACT

In this action research study, we aim at relating student well-being with learning aspects, in a Student-centred and competence-based Learning Environment (SLE) and in a Traditional Learning Environment (TLE), to better understand well-being in education and how it can be enhanced in academic learning settings. 27 students of the Bachelor in Computer Science at the University of Antwerp participated in this study by anonymously completing a questionnaire. Well-being is measured in terms of positive and negative affect. Descriptive statistics and paired t-tests show that well-being (positive affect) is statistically significantly higher in SLE than in TLE, whereas lack of well-being (negative affect) is statistically significantly higher in TLE. Correlation analyses show that student well-being correlates statistically significantly to social learning aspects in SLE, and to regulation strategies and motivation in TLE, whereas lack of well-being correlates statistically significantly and inversely to motivation, enjoyment of studying and academic efficacy in TLE.

INTRODUCTION

Nowadays, we live in a digital society that rapidly changes and that is faced with many challenges (e.g. global warming, growing disparity between rich and poor, extremism). These changes also make new demands on education. How can students learn to process the large daily amount of information? How can we coach them to become critical and creative thinkers that succeed in solving problems? How can we support them to find their own way in a more globalised society? How can we strengthen their communication and collaboration skills? Trilling and Fadel (2009) mention that education should evolve with societal changes. As Richard Riley, Secretary of Education under Clinton, earlier mentioned this is a challenge: "we are currently preparing students for jobs that don't yet exist, using technologies that haven't yet been invented, in order to solve problems we don't even know are problems yet".

It is clear that our global 21st-century problems urge for profound educational innovation, so that learners get the opportunities they need to develop the competences to individually and collectively (1) achieve their highest potential, (2) act from an eco-system awareness caring about the well-being of all, including oneself, (3) sense and shape their lives and future from emerging future possibilities, (4) have access to their best sources of creativity and entrepreneurship, and (5) realise their deepest purpose of life (Scharmer & Kaufer, Leading from the emerging future, 2013).

Student well-being

Evidence in positive psychology suggests that positive affect – the hallmark of well-being - may be the *cause* of many of the desirable characteristics, resources, and successes correlated with well-being (Lyubomirsky, King, & Diener, 2005). Therefore, learner well-being may be an important quality to aim at when trying to accomplish the challenging education task mentioned above. Nevertheless, Hascher (2008, 2010, 2015) states that a better understanding of well-being in education is needed. Earlier educational well-being research focuses on schools; we have not found such studies in academic settings. Our study is in line with Hascher's three strategies of future well-being research in education: it relates student well-being with other relevant educational concepts to better understand well-being in education and how it can be enhanced in academic learning settings.

Traditional learning environments

In traditional learning environments, the focus is on the teacher and the educational process. Learning content is offered in order to acquire knowledge. The role of the teacher mainly consists of offering learning content. He or she decides what and

how to learn and develops assessment of learning instead of assessment for learning. Students passively acquire knowledge and memorize learning content for reproduction.

Student centred learning environments

In social constructivism learning is regarded as a social process in which students actively construct knowledge from experiences, preferably in cooperation and in learning situations as authentic and realistic as possible, in order to facilitate the transfer to vocational environments (Kinnucan-Welsch & Jenlik, 1998). Learning is student centred and the students themselves are responsible for their learning process, which requires the acquisition of self-regulation skills. Students need to reflect on their learning for their further competence based development. The realisation of a competence-based education influences all aspects of the learning and teaching process. The role of the student changes from passively acquiring knowledge to actively constructing knowledge and developing broader competences with complex skills. Students are considered individuals rather than part of the student group. The teacher not only offers learning contents, he becomes a coach of learning processes and designer of powerful learning environments. The student and the learning process are focussed on, not the teacher and the educational process. Through self and peer assessment students get a task in the assessment process (Birenbaum, 1996).

AIM OF THE STUDY, DESIGN AND RESEARCH QUESTION

The aim of this pilot study is twofold; on the one hand we want to examine to what extent student well-being is important with respect to their learning in the context of higher education. On the other hand, our study is an attempt to better understand learner well-being in academic learning settings.

As it was shown in (Laenens, Stes, Hofkens, Vandervieren, & Van Petegem, 2016) that there are significant differences in students' perception of traditional versus student centred and competence based learning environments, we incorporate this factor into our research design. To this end, we have chosen an experimental course (which applies a Student centred and competence based Learning Environment (SLE)) and a control course (which applies a Traditional Learning Environment (TLE)). Both courses are attended by the same student group in the same semester and are as similar as possible with regard to characteristics of study context (class size, level of expertise of the students, time and place). For each course, the participants filled out a questionnaire at the corresponding final exams.

In each of the two learning environments of our study, we measure student wellbeing in terms of positive affect (PA) (Lyubomirsky, King, & Diener, 2005) and negative affect (NA), as well as the following learning aspects (Entwistle & Entwistle, 1991):

- a) Regulation strategies: self-regulation, lack of regulation
- b) Student motivation: autonomous motivation, controlled motivation, amotivation
- c) Self-efficacy
- d) Social attitudes: student cohesiveness, involvement, cooperation
- e) Enjoyment of studying
- f) Academic efficacy

Our research questions are the following:

- 1) For each of the learning environments: are there significant correlations between student well-being and learning aspects?
- 2) What are the similarities and differences in significant correlations between student well-being and learning aspects, when we compare the results for the two learning environments?
- 3) Are there significant differences between the two learning environments in student well-being and in learning aspects?

RESEARCH CONTEXT

The University of Antwerp embraces a teaching concept of student-centred and competence-based teaching, aiming at challenging students to apply knowledge and skills in order to be able to solve problems in complex real-life situations. Of course, the extent to which this teaching concept has been rolled out depends on the course.

In the experimental course (which applies a SLE), the lecturer offers extensive practical assignments that challenge students to take place in the driver's seat and to actualize their best potential in learning opportunities that activate their learning by doing. These assignments require an integrated development of knowledge, skills and attitudes and make it possible to create learning situations that are as realistic and authentic as possible. Students work in group on these practical assignments for a period of 11 weeks, after an initial preparation of 6 weeks of lectures and practical lessons followed by a written midterm exam. The assessment includes self and peer assessment.

The control course applies a traditional learning environment (TLE) with lectures and practical lessons during 13 weeks, followed by a study period and a written exam.

The courses that are involved in this study have different lecturers. However, both lecturers get excellent teacher evaluations. Besides, the lecturer of the control course (which applies a TLE) received an award for best teaching assistant.

METHOD

Participants

This study involves two courses, one with a Student-centred and competence-based Learning Environment (SLE), and another one with a Traditional Learning Environment (TLE). All students who took both courses in the first semester of 2015-2016 were invited to participate. 27 students of the Bachelor in Computer Science at the University of Antwerp participated on a voluntary basis.

Instruments

At the final exams, the participants anonymously completed for SLE as well as for TLE a questionnaire consisting of a combination of (5-point) scales and items (n=90) out of the following instruments. LEMO (Donche, Van Petegem, Van de Mosselaer, & Vermunt, 2010), Modified WIHIC (Afari, Aldridge, Fraser, & Khine, 2013), TOMRA (Spinner & Fraser, 2005) and MJSES (Jinks & Morgan, 1999) for learning aspects; and PANAS (Watson, Clark, & Tellegen, 1988) for student wellbeing in terms of positive and negative affect. An overview of the 13 different scales is shown in Table 1.

Table 1				
Overview of the scales	(and their	· meaning)	used in	the study.

Scale		Meaning			
Deculation	Salf regulation	The extent to which students actively steer			
	Self-regulation	their own learning process.			
stratagias	Lack of	The extent to which students experience a			
strategies	regulation	lack of clarity on how to steer their			
		learning process.			
	Autonomous	The extent to which students are			
	motivation	intrinsically motivated to learn.			
Student	Controlled	The extent to which students are motivated			
motivation	motivation	to learn by a desire to please others.			
	Amotivation	The extent to which students experience			
	Amouvation	problems with motivation.			
		The extent to which students have			
Self-efficacy		confidence in their learning approach and			
		believe in their own ability.			
	Student	The extent to which students are			
	cohesiveness	supportive of one another.			
	Student	The extent to which students have attentive			
Social aspects	involvement	interest, participate in discussions, perform			
of learning		additional work.			
	Student	The extent to which students cooperate			
	cooperation	rather than compete with one another on			
		learning tasks.			
Enjoyment of		The extent to which students enjoy contact			
studying		hours with and without teaching staff.			
Academic		The extent to which students have			
efficacy		confidence in their academic competence.			
Positive affect		The extent to which students experience			
I OSITIVE affect		positive feelings and emotions.			
Negative affect		The extent to which students experience			
		negative feelings and emotions.			

The items on regulation, social attitudes, enjoyment, academic efficacy, positive and negative affect are scored on a five-point Likert scale ranging from 1=almost never, over 2=rarely, 3=sometimes, 4=often to 5=almost always. The items on motivation and self-efficacy are scored on a five-point Likert scale ranging from 1=disagree, over 2=rather disagree, 3=neither agree nor disagree, 4=rather agree to 5=agree.

Data analysis

For the first and second research question, we applied correlation analyses to study the statistically significant correlations between student well-being (positive and negative affect), and learning aspects (a-f) within SLE and TLE.

To answer the third research question we applied descriptive statistics and paired ttests to verify to what extent there is a difference between the respective learning environments regarding student well-being and learning aspects (a-f).

Effect sizes are reported along with p-values in order to distinguish between practically significant results and results being statistically significant (Keselman, et al., 1998).

FINDINGS

Correlations between student well-being and learning aspects

Table 2 and Table 3 present for each scale the correlation coefficient with positive and negative affect as well as the p-value and the effect size of the corresponding hypothesis tests. The number of respondents is equal to n=27.

The stars indicate the statistically significant effects. The marks *, ** and *** denote respectively small (p-value < 0.05), medium (p-value < 0.01) and large (p-value <0.001) effects. In case of statistical significance (at the 5% level), both the corresponding p-value and effect size are in bold. The notations (S), (M) and (L) indicate the practically significant effects. (S), (M) and (L) denote respectively small ($0.2 \le R^2 < 0.5$), medium ($0.5 \le R^2 < 0.8$) and large ($R^2 \ge 0.8$) effect sizes.

Table 2

Correlation analysis for the	experimental course	e (which applies	SLE).
------------------------------	---------------------	------------------	-------

Scale		Posit	tive affect	t score	Negative affect score		
		cor R	p- value	R ²	cor R	p- value	R ²
Regulati	Self-regulation	0.33	0.10.	0.11	0.12	0.52	0.02
on	Lack of	-0.36	0.07.	0.13	0.49	0.01 *	0.24
	Controlled	-0.22	0.27	0.05	0.30	0.12	0.09
Motivati	motivation			(S)			(M)
on	Autonomous	0.58	0.00	0.34	-0.25	0.20	0.06
	motivation	0.00	**	(L)	0.20	0.20	(M)
	Amotivation	-0.22	0.28	0.05	-0.00	1.00	0.00
Self-		0.55	0.00	0.30	-0.44	0.02 *	0.20
efficacy			**	(L)			(L)
Casial	Student	0.67	0.00	0.44	-0.26	0.19	0.07
Social	cohesiveness		***	(L)			(M)
aspects	Student	0.55	0.00	0.31	-0.21	0.30	0.04
01 Joorning	involvement		**	(L)			(S)
learning	Student	0.63	0.00	0.40	-0.33	0.09.	0.11
	cooperation		***	(L)			(M)
Enjoym			0.00	0 4 9			0.01
ent of		0.70	***	а.) Д)	-0.09	0.67	(S)
studying				(1)			(5)
Academ			0.00	0.22			0.06
ic		0.58	v.vv **	U.33	-0.24	0.24	0.00
efficacy				(L)			

Scale		Positive affect score			Negative affect score		
		cor R	p- value	R ²	cor R	p- value	R ²
Regulation	Self-	0.51	0.01	0.26	-0.09	0.65	0.01
strategies	Lack of	-0.67	0.00	0.45	0.47	0.02 *	0.22
Motivation	Controlled motivation	-0.44	0.03 *	0.19 (L)	0.36	0.06 .	0.13 (M)
	Autonomous motivation	0.78	0.00 ***	0.60 (L)	-0.44	0.02 *	0.20 (L)
	Amotivation	-0.42	0.03 *	0.18	0.22	0.27	0.05
Self- efficacy		0.84	0.00 ***	0.70 (L)	-0.65	0.00 ***	0.42 (L)
Social aspects of	Student cohesiveness	0.31	0.12	0.10 (M)	-0.23	0.24	0.06 (M)
learning	Student	0.30	0.13	0.09	-0.23	0.24	0.06
	Student	-0.12	0.55	0.02	0.24	0.22	0.06
Enjoyment of studying		0.85	0.00 ***	0.72 (L)	-0.50	0.01 **	0.24 (L)
Academic efficacy		0.68	0.00 ***	0.46 (L)	-0.59	0.00 **	0.35 (L)

Correlation analysis for the control course (which applies TLE).

In both the Student-centred (SLE) and Traditional Learning Environment (TLE), positive affect correlates positively with autonomous motivation, self-efficacy, enjoyment of studying and academic efficacy, whereas negative affect positively correlates with lack of regulation, and negatively correlates with self-efficacy.

In SLE, positive affect also positively correlates with all social learning-aspects. In TLE, positive affect positively correlates with self-regulation, and negatively correlates with lack of regulation, controlled motivation and amotivation.

In TLE, negative affect negatively correlates with autonomous motivation, enjoyment of studying and academic-efficacy.

Impact of the learning environment

Table 4 presents for each scale the mean and standard deviation of the scores for SLE and TLE as well as the p-value and the effect size of the corresponding paired t-test. The number of respondents is equal to n=27. Some of them did not answer all questions, which results in some small differences in N in the table below.

The stars again indicate the statistically significant effects. The marks *, ** and *** denote respectively small (p-value < 0.05), medium (p-value < 0.01) and large (p-value <0.001) effects. In case of statistical significance (at the 5% level), both the corresponding p-value and effect size are in bold. The notations (S), (M) and (L) indicate the practically significant effects. (S), (M) and (L) denote respectively small ($0.2 \le d < 0.5$), medium ($0.5 \le d < 0.8$) and large ($d \ge 0.8$) effect sizes.

Table 4Paired t-tests (SLE vs. TLE).

Scale		SLE		TLE		t-test (SLE- TLE)	Effect size	N
		Mean	SD	Mean	SD	p-value	Cohen's d	
Regulati on	Self- regulation	3.51	0.69	3.12	0.74	0.00 **	0.63 (M)	27
strategies	Lack of regulation	2.36	0.66	2.69	0.94	0.04 *	-0.44 (S)	25
Madinadi	Controlled motivation	2.51	0.77	2.60	0.92	0.40	-0.16	27
on	Autonomous motivation	3.72	0.51	3.31	0.79	0.01 **	0.59 (M)	27
	Amotivation	1.42	0.60	1.52	0.73	0.30	-0.20 (S)	27
Self- efficacy		3.70	0.56	3.20	0.92	0.00 **	0.67 (M)	27
Social aspects of learning	Student cohesiveness	3.79	0.66	2.67	0.94	0.00 ***	1.21 (L)	27
	Student involvement	3.63	0.65	2.89	0.93	0.00 ***	0.89 (L)	27
	Student cooperation	3.73	0.63	2.26	0.96	0.00 ***	1.20 (L)	27
Enjoyme nt of studying		3.40	0.66	2.94	0.87	0.00 **	0.64 (M)	27
Academi c efficacy		3.06	0.76	2.55	0.88	0.00 **	0.61 (M)	27
Well-	Positive	3.39	0.56	3.02	0.67	0.00	0.76 (M)	26
being	Negative	1./3	0.72	2.02	0.93	0.04 *	-0.42 (8)	27

The results of the paired t-tests show statistically significant effects in 11 out of our 13 scales, all in favour of SLE. More specifically, students' self-regulation, autonomous-motivation, self-efficacy, social learning-aspects, enjoyment-of-studying and academic-efficacy as well as positive affect are all higher in SLE than in TLE, whereas lack-of-regulation and negative affect are lower in SLE than in TLE.

CONCLUSIONS AND DISCUSSION

Conclusion

Our findings suggest that the more students experience positive feelings and emotions while learning, the more they are intrinsically motivated to learn, enjoy learning, and have confidence in their own (academic) ability. The higher students score in negative affect, the more they lack clarity on how to steer their learning process and the less learning confidence they have.

Moreover, students seem to be significantly happier (positive affect) in a studentcentred and competence-based learning environment than in a traditional one. In the former, happier students are more supportive of one another, have more attentive interest, and cooperate rather than compete on learning tasks.

Pathways for future research

To the best of our knowledge, this is the first report of a study focussing on student well-being and learning in an academic setting. This study is limited by the sample and by its correlational method. Broader samples as well as experimental and longitudinal studies are very desirable for future research. We do not know whether student well-being is a cause or a consequence of the desirable learning aspects it significantly correlates with in this study.

Nevertheless, our findings suggest that it is worthwhile to invest in student-centred and competence-based learning environments and to promote social aspects of learning in these settings in order to significantly enhance student well-being along with their intrinsic motivation to learn, their learning enjoyment, their confidence in their own (academic) ability, and their actively steering their own learning process, all desirable qualities when trying to induce a deep learning approach (Gijbels, Donche, Richardson, & Vermunt, 2014).

REFERENCES

- Adorni, G., Battigelli, S., Brondo, D., Capuano, N., Coccoli, M., Miranda, S., et al. (2010). CADDIE and IWT: two different ontology-based approaches to Anytime, Anywhere and Anybody Learning. *e-Learning and Knowledge* Society, 6 (2), 53-65.
- Afari, E., Aldridge, J., Fraser, B., & Khine, M. (2013). Students' perceptions of the learning environment and attitudes in game-based mathematics classrooms. *Learning Environments Research*, 16, 131-150.
- Annetta, L. (2010). The "I's" have it: A framework for serious educational game design. 14 (2), p. 105.
- Bakkenes, I., Vermunt, J., & Wubbels, T. (2010). Teacher learning in the context of educational innovation: Learning activities and learning outcomes of experienced teachers. *Learning and Instruction*, 20 (6), 533-548.
- Ball, D. L., Thames, M., & Phelps, G. (2008). Content knowledge for teaching: What makes it special? *Journal of Teacher Education*, 59, 389-407.
- Birenbaum, M. (1996). Assessment 2000: towards a pluralistic approach to assessment. In M. Birenbaum, & F. Dochy (Eds.), Alternatives in assessment of achievements, learning processes and prior knowledge. Evaluation in education and human services (pp. 3-29). Boston, MA: Kluwer Academic Publishers.
- Bizer, C., Heath, T., & Berners-Lee, T. (2009). Linked data-the story so far. In A. Sheth, Semantic Services, Interoperability and Web Applications: Emerging Concepts (pp. 205 - 227).
- Bransford, J., Brown, A., & Cocking, R. (1999). *How people learn: Brain, mind, experience, and school.* Washington DC: National Academy Press.
- Brew, A. (2001). Conceptions of research: a phenomenographic study. *Studies in Higher Education*, 26 (3), 271-285.
- Brinton, D., Snow, M. A., & Wesche, M. B. (2003). *Content-based second language instruction. Michigan Classics Edition.* Ann Arbor, MI: University of Michigan Press.
- Case, J., & Marshall, D. (2004). Between deep and surface: procedural approaches to learning in engineering education contexts. *Studies in Higher Education*, 29(6), 605-615.
- Cashin, W. E., & Downey, R. G. (1995). Disciplinary differences in 'what is taught' and in students' perceptions of 'what they learn' and 'how they are taught'. *New Directions for Teaching and Learning*, 64, 81-92.
- Chinn, C. A., & Malhotra, B. A. (2002). Epistemologically authentic inquiry in schools. *Science Education*, *86*, 175–219.

- Cornelissen, G., Tamassia, L., Vervaet, S., Depaepe, F., Van De Keere, K., & Simons, M. (2014). Tijd voor onderzoek als authentieke leerinhoud: een verkenning van eindtermen en leerplannen. *Impuls*, 45 (2).
- Csikszentmihalyi, M. (1990). Flow: The psychology of optimal experience. (H. N. York, Ed.)
- Darling-Hammond, L., & Bransford, J. (2007). *Preparing teachers for a changing world: What teachers should learn and be able to do.* John Wiley & Sons.
- de Freitas, S. (2006). *Learning in immersive world*. London: London: Joint Information Systems Committee.
- de Freitas, S., & Oliver, M. (2006). How can exploratory learning with games and simulations within the curriculum be most effectively evaluated? *Computers* & *Education*, 46 (3), 249–264.
- Deterding, S., Dixon, D., Khaled, R., & Nacke, L. (2011). From game design elements to gamefulness: defining gamification. *15th international academic MindTrek conference: Envisioning future media environments.* (pp. 9-15). ACM.
- Dewey, J. (1897). My Pedagogic Creed. The school journal, 77-80.
- Diocesane Pedagogische Begeleidingsdienst SO Mechelen-Brussel. (2010). Werken aan de onderzoekscompetentie in het aso - Hoe (goed) zijn we al bezig? From http://www.vikom.be/sites/default/files/setoc_dpb-mbfollowup-impuls_20100527.pdf
- Donche, V., Van Petegem, P., Van de Mosselaer, H., & Vermunt, J. (2010). Een instrument voor feedback over leren en motivatie. Mechelen: Plantyn.
- Edgar, D. (2012, October 2). Learning Theories and Historical Events Affecting Instructional Design in Education: Recitation Literacy Toward Extraction Literacy Practices. *Sage Open*, *4*.
- Eklund-Myrskog, G. (1998). Students' conceptions of learning in different educational contexts. *Higher Education*, 35, 299-316.
- Entwistle, N. (1991). Approaches to learning and perceptions of the learning environment. Introduction to the special issue. *Higher Education*, 22, 201-204.
- Entwistle, N., & Entwistle, A. (1991). Contrasting forms of understanding for degree examinations: the student experience and its implications. *Higher Education*, 22, 205-227.
- Entwistle, N., & Ramsden, P. (1983). Understanding student learning. London: Croom Helm.

- Entwistle, N., Meyer, J., & Tait, H. (1991). Student failure: disintegrated patterns of study strategies and perceptions of the learning environment. *Higher Education*, 21(2), 249-261.
- European Commission. (2008). *New skills for new jobs. Anticipating and matching labour market needs.* Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions COM (2008) 868 final.
- Fernández-Manjón, B., Moreno Ger, P., Martinez-Ortiz, I., & Freire, M. (n.d.). Challenges of educational games. *EAI Endorsed Transactions on Serious Games*, 2015.
- Fogg, B. (2009). A behavior model for persuasive design. *th international Conference on Persuasive Technology* (pp. 40-47). ACM.
- Freudenthal, H. (1991). *Revisiting Mathematics Education. China Lectures.* Dordrecht: Kluwer Academic Publishers.
- Gartner Says by 2014, 80 Percent of Current Gamified Applications Will Fail to Meet Business Objectives Primarily Due to Poor Design. (n.d.). From Gartner: www.gartner.com.
- Gibbons, P. (2009). *English learners, academic literacy, and thinking*. Portsmouth, NH: Heinemann.
- Gijbels, D., Donche, V., Richardson, J., & Vermunt, J. (2014). Learning patterns in higher education: dimensions and research perspectives.
- Glaser, B. G., & Strauss, A. L. (1967). *The discovery of grounded theory : strategies for qualitative research.* Chicago: Aldine.
- Gravemeijer, K. P. (1994). *Developing realistic mathematics education*. Utrecht: CDB-Press.
- Great Schools Partnership. (2014). 21st century skills. From The glossary of education reform : http://edglossary.org/21st-century-skills/
- Hamari, J., Koivisto, J., & Sarsa, H. (2014). Does Gamification Work? A Literature Review of Empirical Studies on. 47th Hawaii International Conference on System Science (pp. 3025-3034). IEEE.
- Hill, H. C., Rowan, B., & Ball, D. L. (2005). Effects of Teachers' Mathematical Knowledge for Teaching on Student Achievement. *American Educational Research Journal*, 42(2), 371-406.
- Hodson, D. (1998). Science Fiction: the continuing misrepresentation of science in the school curriculum. *Curriculum Studies*, 6(2), , 6 (2), 191-216.
- Hunicke, R., LeBlanc, M., & Zubek, R. (2004). MDA: A formal approach to game design and game research. *AAAI Workshop on Challenges in Game AI*.

- Janzen, J. (2003). Teaching English language learners in the content areas. *Review* of Educational Research, 78 (4), 1010-1038.
- Jinks, J., & Morgan, V. (1999). Children's perceived academic self-efficacy: An inventory scale. *Clearing House*, 72, 224–230.
- Keijzer, R. (2015). Changing the pass mark for the mathematics entrance test. In G. Makrides (Ed.), *EAPRIL Conference Proceedings 2014* (pp. 254-269). Nicosia, Cyprus: EAPRIL.
- Keijzer, R. (2010). Stand van zaken bij rekenen-wiskunde en didactiek op de lerarenopleiding basisonderwijs [State of the art for mathematics in primary teacher education]. *Tijdschrift voor Hoger Onderwijs*, 28 (1), 31-45.
- Keijzer, R. (2013). Wiskunde als educatieve uitdaging [Mathematics as educational challenge]. Amsterdam/Alkmaar: iPabo.
- Keijzer, R., & De Vries, D. (2014). Leren van de toetsing van de kennisbasis rekenen-wiskunde [Learning from testing the mathematics knowledge base]. *Tijdschrift voor Lerarenopleiders*, 35 (2), 5-13.
- Keijzer, R., & Hendrikse, P. (2013). Wiskundetoetsen voor pabo-studenten vergeleken [Comparing mathematics tests for prospective primay teachers]. *Reken-wiskundeonderwijs: onderzoek, ontwikkeling, praktijk*, 32, 41-46.
- Keijzer, R., Garssen, F., & Peijnenburg, A. (2012). Greep krijgen op de toetsing van de Kennisbasis rekenen-wiskunde [Learning from testing for the mathematics knowledge base]. Reken-wiskundeonderwijs: onderzoek, ontwikkeling, praktijk, 31 (1), 14-22.
- Keselman, H. J., Huberty, C. J., Lix, L. M., Olejnik, S., Cribbie, R., Donahue, B., et al. (1998). Statistical practices of educational researchers: An analysis of their ANOVA, MANOVA, and ANCOVA analyses. *Review of Educational Research*, 68, 350-386.
- Khobreh, M., Ansari, F., Fathi, M., Vas, R., Mol, S., Berkers, H., et al. (2016). An Ontology-based Approach for the Semantic Representation of Job Knowledge. *IEEE Transaction on Emerging Topics in Computing*.
- Khobreh, M., Nasiri, S., & Fathi, M. (2014). E-Nursing: Experience Platform for Improving Nursing Performance. *Geoinformatics*, 57 63.
- Kinnucan-Welsch, K., & Jenlik, P. (1998). Challenging assumptions about teaching and learning: three case studies in constructivist pedagogy. *Teaching and Teacher Education*, 14(4), 413-427.
- Kirschner, P., Meester, M., Middelbeek, E., & Hermans, H. (1993). Agreement between student expectations, experiences and actual objectives of practicals in the natural sciences at Open University of the Netherlands. *International Journal of Science Education*, 15(2), 175-197.

- KNAW. (2009). Rekenonderwijs op de basisschool. Analyse en sleutels tot verbetering [Mathematics in primary school. Analysis and keys for improvement]. Amsterdam, The Netherlands: KNAW.
- Kolb, A., & Kolb, D. (2005). Learning Styles and Learning Spaces: Enhancing Experiential Learning in Higher Education. Academy of management learning & education, 4 (2), 193-212.
- Kolb, D. (1984). *Experiential learning: Experience as the source of learning and development*. New Jersey: Prentice-Hall.
- Laenens, E., Stes, A., Hofkens, T., Vandervieren, E., & Van Petegem, P. (2016). Impact of student centred learning environments on students' learning approach in higher education. *EAPRIL*, (pp. 435-452).
- Lamberti, F., Gatteschi, V., Demartini, C., Andrea , A., & Montuschi, P. (2014). Semantics in Education. *Computing*, 7 (4).
- Latour, B. (1987). Science in Action. Harvard University Press.
- Lyubomirsky, S., King, L., & Diener, E. (2005). The Benefits of Frequent Positive Affect: Does Happiness Lead to Success? *Psychological Bulletin*, 131(6), 803-855.
- Mackay, F. (2015). Scaffolding teachers to scaffold students' language for mathematical learning (Unpublished Masterthesis Utrecht University). Utrecht: Utrecht University.
- Maguire, S., Evans, S. E., & Dyas, L. (2001). Approaches to learning: a study of first-year geography undergraduates. *Journal of Geography in Higher Education*, 25(1), 95-107.
- Marshall, D., & Case, J. (2005). 'Approaches to learning' research in higher education: a response to Haggis. British Educational Research Journal, 31(2), 257-267.
- Marton, F., & Säljö, R. (1997). Approaches to learning. In F. Marton, D. Hounsell,
 & N. Entwistle (Eds.), *The experience of learning. Implications for teaching* and studying in higher education (2nd ed.) (pp. 39-59). Edinburgh: Scottish Academic Press.
- Masschelein, J., & Simons, M. (2013). *In defence of the school. A public issue.* From http://ppw.kuleuven.be/ecs/les/in-defence-of-the-school/masscheleinmaarten-simons-in-defence-of-the.html
- Morgan, C. (2007). Who is not multilingual now? *Educational Studies in Mathematics*, 64, 239–242.
- Moschkovich, J. N. (2010). Language and Mathematics Education Multiple Perspectives and Directions for Research. Charlotte, NC: Information Age Publishing.

- Mousley, J., & Marks, G. (1991). *Discourses in mathematics*. Geelong, Australia: Deaking University Press.
- Mullis, I. V., Martin, M. O., Foy, P., & Arora, A. (2012). *TIMSS 2011 International Results in Mathematics*. Boston (MA): TIMSS & PIRLS International Study Center.
- NCTM. (2000). Principles and Standards for School Mathematics. Reston, VA: NCTM.
- Pedagogische Begeleidingsdienst Gemeenschapsonderwijs. (2013). *Onderzoekscompetentie le graad A-stroom, 2e en 3e graad aso.* From http://pro.go.be/blog/Documents/2013040 Brochure Onderzoekscompetentie so.pdf
- Penuel, W. R., Fishman, B. J., Cheng, B. H., & Sabelli, N. (2011). Organizing Research and Development at the Intersection of Learning, Implementation, and Design. *Educational Researcher*, 40 (7), 331–337.
- Robson, K., Plangger, K., Kietzmann, J., McCarthy, I., & Pitt, L. (2015). Is it all a game? Understanding the principles of gamification. *Business Horizons*, 58 (4), 411-420.
- Salen, K., & Zimmerman, E. (2004). *Rules of play: Game design fundamentals.* MIT press.
- Scharmer, O., & Kaufer, K. (2013). Leading from the emerging future. San Francisco: Berrett-Koehler Publishers.
- Scharmer, O., & Kaufer, K. (2013). Leading from the emerging future. Berret-Koehler Publishers.
- SciencesPo médialab. (n.d.). *Controversy Mapping Archive*. From http://controverses.sciences-po.fr/archiveindex/
- Segers, M., Nijhuis, J., & Gijselaers, W. (2006). Redesigning a learning and assessment environment: the influence on students' perceptions of assessment demands and their learning strategies. *Studies in Educational Evaluation*, *32*, 223-242.
- Serres, M. (1997). The troubadour of knowledge. Ann Arbor: The University of Michigan Press.
- Sfard, A. (2008). *Thinking as communicating: Human development, the growth of discourses, and mathematizing.* Cambridge: Cambridge University Press.
- Shulman, L. (1987). Knowledge and Teaching: Foundations of the New Reform. Harvard Educational Review, 57 (1), 1-23.
- Simon, M. A. (1995). Reconstructing Mathematics Pedagogy from a Constructivist Perspective. *Journal for Research in Mathematics Education*, 26 (2), 114-145.

- Sivan, A., Wong Leung, R., Woon, C., & Kember, D. (2000). An implementation of active learning and its effects on the quality of student learning. *Innovations in Education and Training International*, 37(4), 381-389.
- Smit, J. (2013). Scaffolding language in multilingual mathematics classrooms. Utrecht: Universiteit Utrecht.
- Smit, J., Van Eerde, H., & Bakker, A. (2013). A conceptualisation of whole-class scaffolding. *British Educational Research Journal*, 39 (5), 817-834.
- Spinner, H., & Fraser, B. (2005). Evaluation of an innovative mathematics program in terms of classroom environment, student attitude and conceptual development. *International Journal of Science and Mathematics Education*, 3, 267–293.
- Stes, A., Coertjens, L., & Van Petegem, P. (2013). Instructional development in higher education: Impact on teachers' teaching behaviour as perceived by students. *Instructional Science*, 41 (6), 1103-1126.
- Struyven, K., Dochy, F., Janssens, S., & Gielen, S. (2006). On the dynamics of students' approaches to learning: The effects of the teaching/learning environment. *Learning and Instruction*, 16, 279-294.
- Torenbeek, M., Jansen, E., & Hofman, W. (2011). How is the approach to teaching at secondary school related to first-year university achievement? *An International Journal of Research, Policy and Practice*, 22:4, 351-370.
- Treffers, A. (1987). *Three dimensions. A model of goal and theory description in mathematics education: The Wiskobas project.* Dordrecht: Kluwer Academic Publishers.
- Trigwell, K., & Prosser, M. (1991). Improving the quality of student learning: the influence of learning context and student approaches to learning on learning outcomes. *Higher Education*, 22, 251-266.
- Trigwell, K., Prosser, M., & Waterhouse, F. (1999). Relations between teachers' approaches to teaching and students' approaches to learning. *Higher Education*, *37*, 57–70.
- Ute Oelke. (2003). Ausbildungsrichtlinie für staatlich anerkannte Kranken- und Kinderkrankenpflegeschulen in NRW.
- Vakcommissie rekenen-wiskunde. (2013). Toetsgids pabo rekenen-wiskunde [Syllabus primary teacher education mathematics test]. Den Haag: Vereniging Hogescholen.
- Van Eerde, H., Hajer, M., & Prenger, J. (2008). Promoting mathematics and language learning in interaction. In J. Deen, & M. &. Hajer, *Interaction in two multicultural mathematics classrooms. Processes of Inclusion and Exclusion* (pp. 31-68). Amsterdam: Aksant.

- Van Weerden, J., & Hiddink, L. (Eds.). (2013). Balans van het basisonderwijs. PPON: 25 jaar kwaliteit in beeld [Balance sheet of primary education. PPON: an image of 25 years of quality]. Arnhem, The Netherlands: Cito.
- Van Zanten, M. A. (2010). De kennisbasis rekenen-wiskunde voor pabo's ontwikkelingen en overwegingen [The mathematics knowledge base for primary teacher education - developments and considerations]. Rekenwiskundeonderwijs: onderzoek, ontwikkeling, praktijk, 29 (1), 3-16.
- Van Zanten, M. A., Barth, F., Faarts, J., Van Gool, A., & Keijzer, R. (2009). Kennisbasis Rekenen-Wiskunde voor de lerarenopleiding basisonderwijs [Mathematics Knowledge Base for primary teacher education]. Den Haag: HBO-raad.
- Vanden Abeele, V., De Schutter, B., Geurts, L., Desmet, S., Wauters, J., Husson, J., et al. (2012). P-iii: A player-centered, iterative, interdisciplinary and integrated framework for serious game design and development. In S. De Wannemacker, S. Vandercruysse, & G. Clarebout, *Serious games: The challenge* (pp. 82-86). Springer Berlin Heidelberg.
- Venturini, T. (2012). Building on Faults How to represent controversies with digital methods. *Public Understanding of Science*, 21 (7), 796-812.
- Vlaamse Regering. (2004, January 13). Decreet Specifieke Eindtermen ASO. From Vlaanderen - Onderwijs en Vorming: http://dataonderwijs.vlaanderen.be/edulex/document.aspx?docid=13444
- Vygotsky, L. S. (1962). Thought and language. Cambridge, MA: MIT Press.
- Watson, D., Clark, L., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: The PANAS scales. *Journal of Psychology*, 54(6), 1063-1070.
- Welding, N. (2011). Creating a nursing residency: Decrease turnover and increase clinical competence. *Medsurg nursing*, 1, 37.
- Wierstra, R. F., Kanselaar, G., van der Linden, J. L., Lodewijks, H. G., & Vermunt, J. D. (2003). The impact of the university context on European students' learning approaches and learning environment preferences. *Higher Education*, 45(4), 503-523.
- Winn, B. (2008). The design, play, and experience framework. In R. Ferdig, Handbook of research on effective electronic gaming in education (pp. 1010-1024). IGI Global.

BOOSTING EUROPEAN EXCHANGE ON HIGHER VET AND EMPLOYER INVOLVEMENT IN EDUCATION STRUCTURES (BEEHIVES)

<u>Herman Van de Mosselaer *</u>, Anna Frankenberg**, Anthony F. Camilleri***, Raimund Hudak****

*Project manager education research, Artesis Plantijn University College Antwerp, herman.vandemosselaer@ap.be, **Research Fellow, Baden-Wuerttemberg Cooperative State University Heilbronn, anna.frankenberg@heilbronn.dhbw.de, ***Senior partner, Knowledge Innovation Centre, Malta, anthony@camilleri.com, ****Head of Research and Labs, Baden-Wuerttemberg Cooperative State University Heilbronn, raimund.hudak@heilbronn.dhbw.de.

ABSTRACT

The BEEHiVES project (Boosting European Exchange on Higher VET and Employer Involvement in Education Structures) addresses cooperation in the strategic partnership triangle – higher education institutions, employers, students to contribute to the development of skills relevant to labour market needs and equip students with the knowledge and skills relevant for their long-term employability, entrepreneurship and personal development. The main question is: How can a strategic partnership and cooperation between providers of HVET, employers and students be strengthened? The project brings together representatives of the strategic triangle (education institutions, employers and students) to exchange innovative practices and deliver recommendations for improving employer involvement in HVET. In the first year of the project the partners identified how HVET is organized in six European countries (Basque Country/Spain, Czech Republic, Denmark, Flanders/Belgium, Germany and the United Kingdom). Initial results find an increased policy emphasis on VET within all countries to address future skill needs. Despite this, all members of the strategic triangle in all the countries feel that more needs to be done to fully address future skill needs, and that the key to addressing these needs in a timely manner is establishing closer, stronger, more consistent and long-term collaborations between the groups. The study observes what methods are currently used for this collaboration and identifies best practices for future research.

THE STRATEGIC TRIANGLE AND THE EU MODERNISATION AGENDA FOR HIGHER EDUCATION

Supporting growth and jobs

"Higher education enhances individual potential and should equip graduates with the knowledge and core transferable competences they need to succeed in highskill occupations. Yet curricula are often slow to respond to changing needs in the wider economy, and fail to anticipate or help shape the careers of tomorrow; graduates struggle to find quality employment in line with their studies" (European Commission, 2011, p.6). "A particular effort is needed to help bridge the gap between education and training and the labour market. We need to further invest in the modernisation of VET and Higher Education (HE), and fully exploit their potential as drivers for regional development" (European Commission, 2016, p.13). A key part of the EU Modernisation Agenda for Higher Education is the reform of HE to meet the requirements of the labour market with an emphasis on relevant skills, qualifications and graduates' employability (EACEA, 2011). A problem lies in the lack of a strong cooperation, understanding and interaction between HE institutions and professional organisations (employers, businesses, the world of work).

Situating HVET and PHE

HVET describes all VET (Vocational Education and Training) offered at a tertiary level. Thus, it is offered at levels 5-8 of the European Qualifications Framework. A working definition proposed by the project states that HVET is "a study programme (EQF level 5 and higher) that includes periods of work experience, work based assessment, transferable occupational skills, and significant employer involvement offered in any institution or sector". The HAPHE project proposed the following definition of PHE: "Professional Higher Education is a form of Higher Education that offers a particularly intense integration with the world of work in all its aspects, including teaching, learning, research and governance and at all levels of the overarching qualifications framework of the European Higher Education Area" (Camilleri, 2014, p.24). As the project consortium sees little difference between HVET and PHE they suggest a harmonization of the two in order to represent the common distinctiveness towards general Higher Education by a strong systematic engagement and integration with the world of work and its requirements and needs. Academic-oriented institutions who include professional programmes might stick to the term PHE, while professional-oriented institutions offering programmes around the EQF-level 5 might tend to keep the term HVET. Also the programmes used in HVET are mostly completely different to the ones in PHE. This makes it also more difficult to provide a permeability from HVET to HE.

Countries within Europe differ significantly in their HE and VET institutions and organisations and in participation and attainment rates at various levels. The VET systems have not yet been structurally adjusted towards a European VET area with the same qualifications. In HE a single university model no longer exists but rather a complex set of private institutions and public ones. Public universities are in transition from the academic republic to managerial university and struggling with issues of marketization and commercialization. Also, a broad range of VET providers varies from full-time schools to dual system and work-based providers, which finally leads to a diversity of institutions in both HE and VET. This diversity is also characterised by competition for human (best students and teachers) and financial resources (public funds can be spent either for continuing education or R&D activities) (Dunkel et al., 2009, 262). CEDEFOP (2014, 112) sees the EQF Level 5 qualifications as a possible interaction (vertically and horizontally) between HE institutions and VE training institutions. This underlines the possible added value of VET at all qualification levels.

The strategic partnership triangle and the collaboration challenge

The project is addressed to collaboration between the stakeholders of the strategic partnership triangle: HVET/PHE institutions, employers/labour markets and students.



Figure 1. The collaboration between the stakeholders of the strategic partnership triangle.

The BEEHIVES project will address the issue of improving the "(provision of) advanced VET skills and competences, potentially responding quickly to new labour market demands" - identified in CEDEFOP working paper 23 (2014),

focusing also on the benefits of EQF level 5 qualifications - and fundamentally strengthen the role of employers in the development of HVET and PHE courses at level 5 and above; and thereby improve student retention and graduates employability, significant problems in many European countries. So, HVET can take up a significant role in supplying employment-related higher level skills and improving post-graduation employment rates.

PROJECT OUTLINE

The project started September 2015 and will run till September 2018.

Project partners

BEEHiVES is an Erasmus+ project under Key Action 2: Cooperation for Innovation and Exchange of Good Practices, approved by the Deutscher Akademischer Austauschdienst (DAAD, German Academic Exchange Service). As a strategic partnership for higher education, it has as its goal both educational innovation and improvements in the quality of higher education in Europe.

The partners are:

- Duale Hochschule Baden-Württemberg Heilbronn (DE), lead partner
- Artesis Plantijn Hogeschool Antwerpen, Antwerpen (BE)
- Association Of Colleges, London (UK)
- EURASHE; Brussels (BE); research undertaken in Denmark (DE)
- Knowledge Innovation Centre Ltd, Swieqi (MT)
- Sdruzeni Profesniho Terciarniho Vzdelavani, Prag (CZ)
- Tknika, Errenteria (ES)

These seven partners are all active in the field of HVET and PHE in Europe. Each partner has significant expertise in this field: Germany/Stuttgart – an innovative academic/technical dual university; Belgium Flanders/Antwerp – a PHE institution with substantial experience in work-based learning; Spain/Basque – an agency dedicated to H/VET innovation and entrepreneurship; Czech Republic and England – two college and PHE representative bodies with strong policy formulation remits; EURASHE – the EC recognised European-wide body for PHE; Malta – an agency dedicated to innovation and knowledge exchange. All partners have significant and extensive links with employers and employer representative bodies.

It is the belief of the seven partners of the consortium that the project's core aim, Boosting European Exchange on Higher VET and Employer Involvement in Education Structures (BEEHiVES), will develop transferable competencies and practices that will strengthen HVET and improve cooperation between the world of education and training and the world of work.

General aims

The overall aim of the BEEHiVES project is: Boosting European Exchange on Higher VET and Employer Involvement in Education Structures. The expected impact of is therefore to overcome the barriers of cooperation and collaboration between HVET/PHE institutions, students and the world of work/employers during and after the project lifetime. This will, in the long-run, have an impact on employability of post-graduates, on HE curriculum design, on tasks of lecturers, on offerings of the world of work to HE institutions and on students, e.g. apprenticeships, internships, research and development projects, workshops, professionalization of lecturers and of mentors in the field, etc.

The BEEHiVES project intends to inspire HVET and PHE to meet the requirements of the evolving labour market, to improve student retention and to increase post-graduation employability. The project wants to contribute to the development of skills relevant to labour market needs and equip students with the knowledge and skills relevant for their long-term employability, entrepreneurship and personal development. Doing so, the project wants to deliver ideas and practicalities to contribute to the tackling of critical issues of changes in the nature of work, skills supply, labour market gaps and productivity.

Research questions

The main research question of the project is: How can a strategic partnership and cooperation between providers of HVET/PHE, students and employers be strengthened?

Partial research question are:

- How is HVET and PHE organized in Flanders, the Czech Republic, Denmark, Germany, Spain and the UK?
- Why should providers of HVET and PHE, employers/the world of work and students (the stakeholders of the strategic triangle) collaborate?
- In which areas should the stakeholders of the strategic triangle collaborate?
- What are the barriers in the collaboration for the stakeholders of the strategic triangle?
- What are the success factors for collaboration for each member of the strategic triangle?
- What are key performance indicators (KPI's) to improve coordination and collaboration amongst all HVET/PHE actors?
- How can curricula adapt to current and emerging labour market needs?

Methodology

The project uses a peer learning approach which is based on three elements:

- comparison based on qualitative and quantitative information within the strategic triangle;
- stakeholder involvement of students, HVET/PHE institutions, employers/ world of work and students;
- facilitated interaction among project partners as peers and with stakeholders in each stage of the process.

The research design consists of:

- desk research on the organisation of HVET/PHE in 6 European countries, including regulations and good practices of employer and student involvement in HE;
- focus groups with providers of HVET/PHE, employers and students in the six countries;
- a survey of the three stakeholder groups to collect hard data about national collaboration and partnership characteristics.

The descriptive phase will contain the contextualizing of the findings of the three stakeholder groups of the strategic triangle. Those findings are discussed by the consortium in order to develop a strategy matrix. All results will be collected in a web-based "Strategy Matrix Toolbox" with a set of strategic elements of collaboration within the strategic partnership triangle, such as policies and strategical goals, partnership structures, defining competence needs and frameworks, developing programmes and courses and work-based learning, staff exchange and professionalization, research, career guidance and entrepreneurship.

FIRST RESULTS

Information sheets, focus groups and country reports

With a designed template, the so-called Information Sheets were processed for six European countries (*Basque Country/Spain, Czech Republic, Denmark, Flanders/Belgium, Germany and the United Kingdom*) while identifying the HVET/PHE system in these countries. For each qualification programme within HVET/PHE information sheets were prepared with examples of an outstanding programme at the end of the sheet. The examples were focused on the involvement of employers and students in the programme. Hereby it was shown how different HVET and PHE is pursued in the 6 countries of BEEHiVES.

In order to get into more depth in each country, each partner prepared and held three workshops with each stakeholder group of the strategic triangle, –institutions, students/alumni, and employers. The aim was to collect the national stakeholders' views on HVET/PHE, existing collaborations, strategic goals, needs, necessary skills, barriers of collaboration and recommendations for strengthening the strategic partnership alliance. The partners processed the results of the focus groups in reports and presented them to each other.

The first year of the project was completed with the composition of six country reports that give an overview of the organisation of higher education, with an emphasis on HVET and PHE. Reports of the focus groups with the stakeholders were included in the country reports, which are published on the project website: https://beehives.de.

HVET and PHE in Europe

Identifying the organization of HVET and PHE in each of the countries proves challenging. While the European Higher Education has contributed significantly to the harmonization of academic Higher Education in Europe, the 'Higher' Vocational Education and Training sector: (1) is a 'confused policy area' in many member countries – with HVET offered in several structurally separate sectors (HE, PHE, VET, CVET) with limited permeability (vertical and horizontal) and in many countries limited progression opportunities, (2) there are no detailed HVETfocussed country reports explaining the full complexity of this 'sector', and (3) limited attempts have been made to develop innovative and transferable employer engagement HVET practices and tools. In fact, while one can distinguish 'professional' qualifications in each of the countries being studied, these can be located either within the vocational educational system, within the 'academic' university system or within a system of polytechnics/universities of applied sciences.

For our purposes, we can identify that all the countries in the study have qualifications which:

- are mapped to EQF level 5 or higher;
- are oriented towards providing students with specific skills for practicing in a named profession;
- involve apprenticeships or other types of work-based learning as part of their curricula;
- involve the world of work closely in their activities, in particular course design and teaching.

Notably, in each country examined, reforms have been enacted within the last decade with the explicit purpose of increasing the availability of this form of

education, and increasing the employability of students with qualifications at EQF level 5 or more. This prioritization of policies to promote HVET/PHE correlates well with skill forecasts showing that the type of education they offer is increasingly in demand. Specifically skill/job forecasts from CEDEFOP indicate that in the near to mid-term future, the supply of high-skill jobs will increase, and even traditionally low-skills jobs will requiring higher skills than currently.

In search of strengthening the collaboration

Throughout our focus groups, we have found multiple examples of good practice in collaboration in practically every area of HVET. Our research has identified examples of collaboration on identification of skills gaps, design of courses, joint teaching, apprenticeships, quality assurance and career guidance. Amongst the methods of forwarding this cooperation, we have found significant use of:

- surveying techniques such as graduate tracer studies, market-research surveys, skills-gap identification etc., mainly deployed by educational institutions to understand the requirements of the other stakeholders within the knowledge triangle;
- consultative techniques, either in the form of employer or student participation in governing boards of institutions; or through institutional participation in bodies of chambers of commerce or regional development boards; or through independent consultative bodies such as national skills councils;
- knowledge transfer techniques such as dissertation topics set by employers, jointly set topics for internships and placements, involvement of alumni in outreach activities and rotating staff between industry and educational institutions;
- fully joint projects, mainly jointly taught courses by industry and academia together, and joint research & development initiatives.

However, despite significant ongoing collaboration between key stakeholders in all these countries, practically every stakeholder has expressed either a wish for more collaboration or a dissatisfaction with the current levels of collaboration.

While employers see a clear improvement in employability of students from HVET/PHE over students from more academic streams of education, they nevertheless regularly state that students do not have the necessary skills and attitudes to enter the labour market without additional training. This finding, while universal, varies significantly in its intensity between different courses and countries, with graduates of the traditional professional qualifications such as nursing, engineering etc. showing increased employability.

Most frequently, employers highlight that otherwise well-qualified graduates do not have the appropriate soft skills and attitudes to succeed in the labour market. Secondly, they highlight that education often falls behind new developments in technology, requiring companies to supplement training to keep it current, even for fresh graduates. The concern is shared by institutions, who are mission-bound to increase the employability of students, and by students themselves who mainly enroll in HVET/PHE to facilitate their transition to employment.

Critically, all three of these stakeholder groups within the strategic triangle identify a need for closer, stronger, more consistent, long-term collaborations as the key action required to address these challenges. All of the stakeholders also identify a significant difference in cultures between the three groups as the main barrier to collaborate. These cultural differences can be exacerbated by practices such as excessive bureaucracy and lack of flexibility at educational institutions, or excessive focus on short term economic returns (rather than long-term benefits from training) on the side of businesses, especially during economic fluctuations and recessions.

Stakeholders pointed out a number of success factors for successful collaborations:

- establishing regional forums for collaboration, so as to contextualize the collaboration within a wider societal context;
- providing space within collaboration forums to triangulate the requirements and expectations of each stakeholder, and for them to balance these amongst themselves;
- ensuring that any forums for collaboration meet regularly, and have specific objectives and targets;
- ensuring specific persons and/or associations are assigned the role to manage and strengthen collaboration, rather than allowing it to develop purely organically;
- supporting both top-down and bottom-up collaboration methodologies simultaneously;
- integrating criteria on the quality of collaboration into the overall quality management systems of both businesses and educational institutions;
- providing individualized pathways for collaboration, both for individual students as well as for specific businesses, including SMEs.

NEXT STEPS

The next output of the project will be a quantitative field analysis method, where web-based surveys in 6 countries provide hard data about national characteristics, mismatches and good practices of collaboration. The comparative study and analyses contain the contextualizing of the findings within the three stakeholder groups of the strategic triangle. Through the process, individual strengths and weaknesses arise which form the base of the stakeholders' positioning. The consortium meets to discuss and develop the Strategy Matrix on the base of those results.



Figure 2. Draft structure for a strategy matrix on collaboration and partnerships between higher education, employers/world of work and students

The partners of the BEEHiVES project hope to inspire and stimulate HVET/PHE institutions as well as employers and students to use the results of the study to strengthen the strategic partnership between each other and to innovate educational practice and thereby improve student retention and graduates employability. The expected impact of BEEHiVES is to overcome the barriers of cooperation and collaboration between the three stakeholder groups of the strategic triangle (HE institutions, students, employers) during and after the lifetime of the project.

REFERENCES

Camilleri, A.F., Delplace, S., Frankowicz, M., Hudak, R. & Tannhäuser, A. (2014). *Professional Higher Education in Europe Characteristics: Practice examples and National differences.* Malta: EURASHE & HAPHE project.

116p. Also available on <u>http://www.knowledgeinnovation.eu/wp-</u>content/uploads/2015/09/PHE-in-Europe.pdf

Cedefop (2013). Roads to Recovery: three skill and labor market scenarios for 2025. Briefing note available on http://www.cedefop.europa.eu/en/publications-and-resources/publications/9081

- Cedefop (2014). Qualifications at level 5: progressing in a career or to higher education. Luxembourg: Publications office. Cedefop working paper no 23. Retrieved from http://dx.doi.org/10.2 801/77593
- Cedefop (2015a). National qualifications framework developments in Europe Anniversary edition. Luxembourg: Publications office of the European Union. Cedefop information series. Retrieved from http://www.cedefop.europa.eu/files/4137_en.pdf
- Cedefop (2015b). On the way to 2020: data for vocational education and training policies - country statistical overviews. Luxembourg: Publications Office of the European Union. Cedefop research paper 45. 154p. Retrieved from www.cedefop.europa.eu/files/5531_en.pdf
- Dunkel T, Le Mouillour I and Teichler U (2009) 'Through the looking-glass': diversification and differentiation in vocational education and training and higher education. In: *Modernizing Vocational Education and Training: Fourth Report on Vocational Training Reasearch in Europe*. Background Report. Luxembourg, pp. 240–288.
- E.A.C.E.A (Education, Audiovisual and Culture Executive Agency Eurydice) (2011). Modernisation of Higher Education in Europe: Funding and the Social Dimension 2011. Brussels: Eurydice. 116p. Retrieved from ec.europa.eu/education/library/reports/modernisation_en.pdf
- European Commission (2011). Supporting growth and jobs: an agenda for the modernisation of Europe's higher education systems. Luxembourg: Publications Office of the European Union. 32p. Retrieved from http://ec.europa.eu/dgs/education_culture/repository/education/library/policy /modernisation_en.pdf
- European Commission (2016). A New Skills Agenda for Europe: Working together to strengthen human capital, employability and competitiveness.
 Luxembourg: Publications Office of the European Union. 32p. Retrieved from <u>http://ec.europa.eu/social/main.jsp?catId=1223</u>
MULTIDISCIPLINARY COOPERATION BY STUDENTS IN DUTCH HIGHER VOCATIONAL EDUCATION

J.C. (Jan) Kamphorst

Educational advisor and researcher, Staff Office Education and Research, Hanze University of Applied Sciences, Zernikepark 4, 9747 AN Groningen, The Netherlands. J.c.kamphorst@pl.hanze.nl

ABSTRACT

Today, multidisciplinary cooperation (MC) is an important objective of higher vocational education. The aim of this ongoing study was to explore how, and to what extent, fourth year bachelor students at two research centers (Built Environment and Energy, Hanze University of Applied Sciences) develop MC. Data for 71 students were collected with a semi-structured questionnaire, followed by focus group discussions in 14 groups. Results indicate that students accomplished MC to varying degrees, depending on differences in disciplinary program backgrounds, student characteristics, the research center, the thematic group they belonged to, and the quality of the 'graduation research assignment'. For example, students experienced pressure from their training college to conduct their research autonomously, and this affected the degree to which the goal of MC was reached during the final assignment before graduation. The results of this study were used to improve the professional learning environment in which training colleges and research centers cooperate.

INTRODUCTION

Working in multidisciplinary settings and cooperating with other professionals is an increasingly important goal in higher vocational programs. Professionals do not work according to disciplines, institutions or departments. In order to address practical problems, professionals must collaborate with others, and cross the boundaries of their professions and backgrounds of study. The importance of multidisciplinary cooperation is emphasized in the European Qualifications Framework for Lifelong Learning (European Communities, 2008). According to the Dublin descriptors (the descriptors for levels of higher education agreed upon by the members of the European Union, to which the aforementioned framework refers), a professional with a bachelor's degree "can communicate information, ideas, problems and solutions to both specialist and non-specialist audiences" (Bologna Working Group, 2005, p. 66).

The present study was conducted at two research centers at Hanze University. This university emphasizes the importance of multidisciplinary learning environments, also called 'hybrid learning configurations' (HLCs), in which school-based learning and work experience are connected by interweaving learning and work processes (Cremers, 2016). In HLCs, students are provided 'opportunities for transboundary learning and knowledge creation in order to adress complex real-life problems' (Cremers, 2016, p. 15). Important features of HLCs are the provision of authentic and complex problems that enable self-directed learning, authentic learning, the emergence of a strong link between the worlds of work and learning, and knowledge creation across boundaries (Newell, 2001; Van Merriënboer, Kirschner, & Kester, 2003). The research centers, where students, lecturers, researchers and professionals from different fields of work are supposed to merge knowledge, skills and perspectives, are very suitable for designing HLCs and, thus, for the emergence of multidisciplinary cooperation (Bakker & Akkerman, 2014). Students in the final (4th) year of their bachelor degree program are encouraged to cross the borders of their specific discipline, and facilitated to cooperate in teams with their peers, senior researchers and representatives of professions (similar, related, or even dissimilar to their own intended profession).

Our university has further elaborated upon and instantiated the concept of HLCs in the form of innovative workplaces (IWPs). An IWP is 'a social practice, in which partners of education, research, business, (local) government and public organizations work together on complex issues, which ask for solutions based on knowledge which transcends the borders of traditional structures, sectors, disciplines and forms of learning' (Cremers, Wals, Wesselink, & Mulder, 2016). The IWP Workgroup (2016) listed five dimensions on which IWPs can be distinguished. IWPs have different characteristics, which are related to: (1) the degree of complexity of the issues that are addressed (simple or highly complex); (2) how one or more disciplines are involved in the research (mono- or multidisciplinary, for instance); (3) the learning objective (individual or group learning and co-creation); (4) diversity of partners (combination of two or more partners from education, research, professional practice, communities and business); and (5) the positioning and organization (unit of the university, a partnership in which the university is one of the partners, or a public-private cooperation in an autonomous organization).

The focus of the present study was on the degree of cooperation by students in IWPs (dimension 2). We distinguished between multidisciplinary, interdisciplinary and transdisciplinary cooperation. Multidisciplinary cooperation occurs when professionals from several disciplines are involved in a project, but maintain their distinct disciplinary perspectives (Cremers, 2016; Fortuin, 2015; Kamphorst & Nauta, 2015). For example, when IT-professionals develop software for nurses, both groups exchange information from their respective disciplines in order to make the software suitable for use in health care settings. However, their cooperation is restricted to exchange of information from the different disciplines. Multidisciplinary cooperation is distinct from interdisciplinary and transdisciplinary cooperation. Interdisciplinarity occurs when professionals intensively interact, 'resulting in integrating data, methods, tools, concepts and theories' (Fortuin, 2015). An example would be when a psychologist and a nutritionist design an intervention in order to promote healthy eating. Transdiciplinarity goes one step further, when professionals from different disciplines integrate their disciplinary knowledge and skills with non-academic knowledge (Fortuin, 2015). Professionals cross the boundaries of their own discipline, and take up the distinct perspectives of colleagues. For example, this has occurred in a Hanze University project that is aimed at neutral use of energy resources, and in which researchers cooperate with companies, civilians, researchers and local authorites. We assumed that multidisciplinary cooperation is an necessary condition for inter- or trandisiplinary cooperation.

The context of this study was as follows. Students in the fourth year of their bachelor program can choose to do their graduation assignment, a capstone project during the final semester of their bachelor degree program, at a research center. Ideally, the students conduct practice-oriented research that aligns with the requirements they need to meet in order to graduate, the research agenda of the research center, and the demands of an external party. Most of the time, the external party is the owner of a practical problem. The student is supposed to translate this practical problem into a research problem and research questions. Students from different programs of study are organized into thematic groups. The thematic groups are intended to facilitate or promote the students' cooperation, regardless of their different backgrounds, through sharing ideas, providing information or feedback, and motivating and stimulating each other. Once the students are matched one-to-one with a graduation research assignment, they start writing a research proposal. After approval of the graduation research proposal by a lecturer from the program of study, the research center (a lecturer-researcher) and the external party, the student can start on the research assignment.

For good understanding of the context, it is important to notice that other dimensions of the IWP are less evident for students at a research center. Student research is only occasionally part of larger commercial research by the professional research group. As such, the thematic groups of junior researchers do not typically participate in the networks of researchers at the research center (dimension 4). Also, most of the time, students from only a limited number of programs of study are working at each research center. Furthermore, the students are assessed on their individual performance (dimension 3). They have to provide evidence to the lecturers at their program of study of how they conducted their research, and that their work is the result of their individual effort. The degree of complexity of research problems (dimension 1) can differ, though. Preferably, research problems addressed in graduation assignments are authentic, based on a realistic situation in professional practice, and sufficiently complex. This depends on the problems the external partners have brought to the research center, and also whether these problems fit in with, or are more at the fringes of, the research agenda of the center. When a problem is too simple, the research center can decide not to accept it for professional or student research.

RESEARCH GOAL, CENRAL PROBLEM AND RESEARCH QUESTIONS

From the perspectives of learning and professions, IWPs offer attractive solutions for the development of MC by bachelor's programs and allied research centers. However, in practice several problems may arise that thwart this goal. We distinguished between characteristics of students and of learning environments as conditions for multidisciplinary cooperation (cf. Spelt, Biemans, Tobi, Luning, & Mulder, 2009).

Students differ in curiosity, respect and openness towards other disciplines. They also vary in patience, diligence and self-regulation with regard to integrating and processing insights from other disciplines (Spelt et al., 2009). Furthermore, students have different social and educational experiences, which affect their mono- or multidisciplinary attitudes and preferences. In a study by Plumb and Sobek (2007), teachers indicated that the extent of multidisciplinary cooperation by student teams differed according to attributes such as interpersonal communication and cooperation, understanding and communicating disciplinary tradeoffs, and empathy for diverse perspectives.

The conditions of the learning environments, the IWPs provided by bachelor's programs in collaboration with research centers, can also differ. Factors that affect multidisciplinary cooperation include such aspects as tutors' time for mentoring students, the way MC is addressed, the orientation of the program of study towards mono- or multidisciplinary perspectives, the pedagogy aimed at active learning and achieving cooperation, the assessment of multidisciplinary attitudes and skills, and the graduation requirements (Spelt et al., 2009). Some programs of study seem to be strictly monodisciplinary, while others are, by nature, more multidisciplinary and more inclined towards boundary crossing.

The general problem addressed by this study was that, although programs of study programs in Dutch higher vocational institutions are based upon the same European framework in which multidisciplinarity is an important objective, competence regarding MC is not an obvious or necessary outcome of the bachelor-level education provided at these institutions. This also seemed to apply to Hanze University. The IWPs, in which programs of study, researchers and practitioners are working together, are designed to improve opportunities for students to cross boundaries. However, there were signals from the programs as well as the research centers that IWPs do not guarantee the emergence of multidisciplinary cooperation among students. The goal we wanted to achieve with this study was twofold: First, we aimed to develop an instrument for measuring the occurrence of multidisciplinary cooperation among students who are working on an assignment at a research center. Second, we sought to conduct empirical research on the conditions for the realization of MC.

From this general problem, we derived the following research questions for this study: (1) Do students who are working at a research center experience MC? (2) Does their graduation research assignment encourage students to practice MC? and (3) Which factors enable or hinder MC by graduate students in a thematic group at a research center? We expected that the answers to these questions might provide information for research centers and study programs to improve the construction or the adjustment of the IWPs and the ways MC is addressed in these environments.

RESEARCH DESIGN: DATA COLLECTION, INSTRUMENTS AND ANALYSIS

The data for this study were collected among fourth year students from different programs of study who were working on their graduation assignment at two research centers (Table 1). Economic and engineering bachelor degree programs can be more monodisciplinary or more multidisciplinary. *Facility Management* is generally perceived as an economic discipline, but the program distinguishes itself from other economic programs by including a large component of applied

psychology subjects. Likewise, *Human Technology* profiles itself as a program at the intersection of engineering and human behavior, and less as a monodisciplinary engineering program. In Table 1, we distinguished between eco-social and techsocial, in addition to the economic, engineering and social programs of study.

Table 1

	Research Center and year of data collection			
Program of study	Built Environment 2015	Built Environment 2016	Energy 2016	
Economic	13	5	6	
Eco-social	9	9	1	
Engineering	9	1	3	
Tech-social	2	2	8	
Social 1		2	0	
	34	19	18	

Distribution of the participants (N = 71) among different types of programs

Within the two research centers, students are organized in thematic groups. Examples of thematic groups are Health Space Design, Work Space Design and Climate & Environment at the Research Center for Built Environment, and Sustainable Building, Sustainable Households and Sustainable Mobility at the Research Center for Energy. Student research is also linked to the work of researchers and professors in research circles, to some extent. However, most of the time the link seems to be rather loose.

The data for this study were collected among these 71 students during one-hour group-sessions. Data were collected in two ways. Quantitative data were gathered by means of a structured questionnaire, with the possibility of adding explanations of the answers provided. Qualitative data were gathered by means of focus group discussions. The two methods were combined in one session per focus group. The fourteen focus groups were each made up of members of one thematic group, with two to eight members per focus group. The size of the thematic groups varied, and the participation rate for all focus groups was higher than 50 percent. Both types of data addressed the three research questions and provided complementary results. In

particular, the focus group discussions provided explanations and gave more insights into the outcomes from the questionnaire.

In each of the fourteen sessions, the students first completed a semi-structured questionnaire. The questionnaire consisted of 12 five-point Likert-type items on cooperation, 13 Likert-type items on characteristics of the graduation assignment, and 8 yes/no items about factors promoting and hindering MC, with the possibility of giving comments. The session then continued with a focus group discussion. The participants were asked to choose from seven partially overlapping questions (Box 1).

Focus group discussion questions:

- To what degree do junior workers experience multidisciplinary cooperation (MC) at this research center? Are you cooperating with colleagues? Does the research assignment or do contextual factors influence the degree of multidisciplinary cooperation?
- Can you give examples of cooperation with colleagues at this research center? Is it really multidisciplinary cooperation?
- Does multidisciplinary cooperation result in cross-boundary knowledge or skills, which you would not acquire in other settings?
- How could multidisciplinary cooperation of students be improved at this research center?
- Is the degree of multidisciplinary cooperation an issue in the final assessment of the result of your (graduation) assignment by the research center or your program of study?
- Which factors actually promote or impede multidisciplinary cooperation at this research center?
- Were you aware of the possible multidisciplinary setting at this research center when you decided to apply for a graduation assignment at this research center, and did this affect decisions regarding your study, for example, by choosing a minor or certain subjects?

In most discussions, subjects related to MC were sufficiently addressed after two or three questions. Discussions took place in a very good atmosphere. Participants exchanged their ideas concerning MC with their peers/colleagues. This revealed that they experienced MC as a relevant issue. Apparently, the discussions also provided evidence of the need for peer feedback on this subject. The focus group discussion was chaired by an educational researcher. Senior researchers of the research center who supervised the groups also attended the sessions and facilitated the discussions.

For the Likert-type items from the questionnaire, we conducted two factor and reliability analyses (SPSS). The outcome of the first factor analysis, on the 12 information exchange items, indicated the existence of two scales: (Tendency towards MC regarding) Information Exchange (or IE, seven items, Cronbach's alpha of .76), and (Feedback regarding) Research Approach (or RA, three items, Cronbach's alpha of .89). Two items did not fit in a scale. The scale items are presented with one * or two ** in Table 2. In the Results section we will use these scales to give a first impression of the extent to which students in the fourteen thematic groups exchanged information (the IE score) and provided feedback to each other (the RA score). Further, these scale scores will be used to explore differences related to program of study, research center and year of data collection. The 13 graduation assignment items did not constitute a scale. We calculated frequencies for the 8 factors promoting or hindering MC. Individual responses on this final question were used as input for the focus group discussion.

During the focus group discussions, minutes were taken by the educational researcher as well as the senior researcher. The minutes were analysed for broad key concepts, such as 'multidisciplinary orientation' and 'learning environment of the program of study', 'student attitudes and behaviour', 'culture and organization of the research center', 'composition of the thematic group', and 'characteristics of MC'. The qualitative data yielded by this analysis was then merged into four themes (see the section on Results focus group discussions).

RESULTS QUESTIONAIRE

Sharing of information and feedback

With regard to the first research question, students were asked about how and to what extent they share information and feedback with peers in their thematic group about preparation for and completion of the graduation assignment. Vice versa, the respondents were also asked about their perceptions regarding how and to what extent their peers communicate with them. The results concerning these two perspectives, 'me and my colleagues' and 'my colleagues and me', are presented in Table 2. The items for these two perspectives are directly parallel, in most cases.

Table 2 shows that students communicate somewhere between 'sometimes' (= 2) and 'frequently '(= 3) about their research assignments. The item that was rated lowest concerned 'asking for advice', with means of 2.6 and 2.5. The item with the highest mean, 3.2, refers to searching for advice and information that can be used for their graduation assignment.

Table 2		
Sharing of information	and feedback by :	students (N=71)

'Me and my colleagues'	M (SD)	M (SD)	'My colleagues and me'
I ask my colleagues for advice about how to do my graduation assignment *	2.6 (.79)	2.5 (.81)	My colleagues ask me for advice about how they can do their graduation assignment *
I ask my colleagues how they tackle their graduation assignment *	2.8 (.80)	2.8 (.88)	Colleagues ask me how I tackle my graduation assignment *
I profit from the information provided by my colleagues when working on my graduation assignment **	2.8 (.81)	2.6 (.73)	Colleagues profit from the information I provide to them when working on their graduation assignment *
I learn a lot about how my colleagues approach their graduation assignment **	2.9 (.88)	2.7 (.78)	Colleagues find my advice and information useful for their personal approach to their graduation assignment *
I learn a lot from the feedback provided by colleagues **	2.9 (.93)	2.5 (.91)	Colleagues appreciate the feedback I provide to them *
I specifically approach my colleagues for advice and information which I can apply in my graduation assignment	3.2 (.99)	3.2 (.97)	My colleagues specifically approach me for advice and information they can use for their graduation assignment

Notes. Response scale: 1 = never, 2 = sometimes, 3 = frequently, 4 = often, 5 = always. * Items from the scale Tendency towards MC regarding Information Exchange (IE). ** Items from the scale Feedback regarding Research Approach (RA). The IE and RA scores were used for further analysis. Two items did not fall under either of these factors.

Students' opinions about the graduation assignments

In order to get an answer for the second research question concerning the characteristics of the graduation assignment related to MC, the students were asked to give their opinion about 13 aspects. The results for this question are presented below (Table 3).

Table 3

Students' opinions about the graduation assignment (N=71).

Proposition	M (SD)
As far as content, my graduation assignment is a consistent and well-defined whole	
My graduation assignment is a logical continuation of other parts of my program of study (e.g., subjects or minor)	3.6 (0.9)
By doing this graduation assignment I will deliver a product (advice, design, procedure) that contributes to solving practical problems	3.7 (0.8)
My graduation assignment requires a broad orientation transcending my own field of study	3.8 (1.0)
By doing this graduation assignment, I will deliver a professional product which represents well what I can do within my field of study	3.8 (0.9)
I find it interesting to share ideas about my graduation assignment with people from different fields of study	3.9 (0.8)
My graduation assignment is derived from a practical problem	4.1 (0.8)
My graduation assignment is part of a bigger project	4.1 (0.9)
In order to do my graduation assignment I have to go more deeply into some subject matters than I have been used to during my studies so far	4.1 (1.0)
By doing this graduation assignment, I encounter new knowledge and insights that are worthwhile to share with colleagues (e.g., through social media, publication, presentation or workshop)	4.1 (0.8)
As regards complexity, my graduation assignment is sufficiently challenging	4.3 (0.6)
For my graduation assignment, I am expected to think independently about how to conduct it	4.3 (0.7)
The product of my graduation assignment is relevant for different stakeholders (e.g., professionals, researchers, interest groups)	4.4 (0.6)

Note: Response scale: 1 = completely disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = completely agree)

Table 3 shows that students had, on average, positive opinions about the multidisciplinary aspects of their graduation assignment. They agreed least with the proposition that their assignment was a consistent, well-defined entity, but the mean score was still above a neutral rating. Other scores were between 'neutral and 'agree' or between 'agree' and 'completely agree'.

Factors enabling or hindering performance

Concerning the third research question, respondents were asked to indicate whether eight factors promoted or impeded MC during completion of the graduation assignment. The results for this question are presented in Table 4.

Table 4

Factors that promote or hinder MC during the graduation assignment

	Promoting	Hindering
The graduation assignment	85%	18%
Cooperation with my group of junior colleagues	78%	7%
Coaching of the group of junior colleagues by a lecturer	76%	11%
The environment of the research center (social climate and physical environment)	72%	16%
The professional field	68%	14%
The program of study (e.g., the counseling by lecturers, the schedule, time reserved for doing subjects, competition with other subjects)	67%	43%
The composition of the group of junior colleagues	58%	15%
The size of the group of junior colleagues	49%	8%

Note. Factors can be, and in fact are, experienced as stimulating and hindering at the same time. As a result, the percentages per factor need not to sum up to 100%. The answers provided by the respondents formed the starting point for the focus group discussion.

Table 4 shows that students experienced most factors as promoting MC during completion of the graduation assignment; there was no single dominant factor. They perceived MC to be positively affected by factors such as the [type of] assignment, [characteristics of] the group of colleagues, the coaching of the thematic group, the program of study, [characteristics of] the professional field, and the environment of the research center in which students worked on their assignment.

On the other hand, according to the respondents a few of these factors had a detrimental influence on MC. The factor that emerged most strongly was [the characteristics of] the program of study; 43% of the respondents identified the program as an obstacle to MC. The second important thwarting factor was the graduation assignment itself; one out of every five respondents (18%) checked off this factor as inhibitory for MC.

Further analysis of the quantitative data

In addition to the above, we were interested in differences in MC related to the program of study, the research center and changes over two years. For this additional analysis we used the two scale scores for IE and RA (see the paragraph on Research Design).

The results showed that students with a tech-social background had a relatively high IE score (M=2.99, SD=0.63), indicating that they tended to engage in more MC regarding Information Exchange. Also, students in the tech-social as well as the eco-social domains scored higher on RA (M=3.06, SD=0.80; M=3.16, SD=0.55). This could indicate that students from a program of study that claims to be highly multidisciplinary (see section about the Research Design) were more inclined towards MC with regard to IE and RA. The students from the social domain had the lowest scores on IE and RA (M=1.93, SD=0.71, M=2.56, SD=1.07, respectively). However, the differences between programs for both scores were not found to be statistically significant (F = 1.700, df = 4, p = .162, and F = 0.747, df = 4, p = .564, respectively, for IE and RA).

Analysis of the mean for IE and RA for the two research centers showed that students at the Energy Center had a higher score on IE as well as RA(MIE=2.99, SD=0.52; MRA=3.28, SD=0.77) compared to students at Built Environment (MIE=2.64, SD=0.65; MRA=2.90, SD=0.63). The differences were found to be significant (F = 4.159, df = 1, p = 0.046, F = 4.189, df = 1, p = 0.045, respectively).

Based on the results of the first part of the study in 2015, the Center for Built Environment made changes in the design and organization of the graduation assignment in 2016, which may have influenced students' perceptions. The results of the third additional analysis showed slightly higher scores for IE and RA in 2016 (MIE2015=2.62 (SD=0.69; MIE2016=2.68, SD=0.61; MRA2015=2.86, SD=0.66; MRA2016=2.98, SD=0.58). However, the differences between 2015 and 2016 were not found to be statistically significant.

Results focus group discussions

Each focus group discussion was reported and shared with the senior researcher of the thematic group. In this paper we present a selection of the results under four headings: program of study, students, research center, and graduation assignment.

Program of study

The participants in the focus groups reported that programs of study address multidisciplinary cooperation differently in the curriculum. *Law* and *Business Management* paid relatively little attention to MC. On the other hand, they noted that *Communication Systems* was distinguished by a wide range of subjects in the curriculum, derived from several disciplines. The same applied to the program *Built Environment*. Clients of *Built Environment* professionals usually deal with a broader approach than only an engineering framework: 'For example, when a municipality plans for a new residential area, it demands a synthesis of engineering, architecture, building, spatial and social planning.' One student confirmed that *Built Environment* aimed at competence with MC: 'The program stimulates MC by demanding that students address this issue in their graduation assignment plan'. Similarly, a student perceived that *Facility Management* teaches their students to combine technical, managerial and client demands when designing the facility structure in a hospital. 'The facility manager is, by definition, a professional who combines several disciplines.'

Participants noticed differences in the degree of complexity and inclusion of different disciplinary perspectives in assignments provided by their programs of study. Some found that assignments in the first year already prepared them for MC. The Minor, a project in which third-year students from different programs explicitly cross boundaries, was also a good preparation for dealing with MC aspects during the graduation assignment. Other students did not have these positive experiences in their program. Some programs, such as *Law* and *Social Work*, were perceived as strictly mono-disciplinary.

The participants in the discussion also mentioned that the procedures, assignments, assessment criteria and deadlines with regard to graduation differed across programs of study. These differences affected students' time spent on the assignment and cooperation with other students: 'Working together becomes difficult when students from different programs are going faster than others, due to procedural issues. If you are lucky and your graduation proposal is approved soon,

you can start with your graduation assignment at the latest in February, while others could start not before April. This affected working together with others.' Some students had not yet completed all the third year subjects, yet they started on the graduation assignment. This meant that the workload during the graduation assignment became too high, and this also affected the possibilities for MC with students from other programs.

The students frequently complained that it seemed that their colleagues in the thematic groups spoke in different research languages, due to different textbooks on research in their respective programs of study. They suggested a refresher course on research methodology at the start of their work on the assignment. Others replied to this suggestion by saying that there had been such a course, but this was attended by only a few students (probably due to the aforementioned workload).

Students

Generally, students were aware of the necessity for, and had a positive attitude towards, MC. At the same time, many students found it difficult to cooperate. Some students seemed quite passive when it comes to cooperating. The relationship between independent work and cooperation was experienced as a rather tense one. When it comes to completing an assignment, time management is necessary. Choices must be made. Students indicated that they preferred to work on their thesis rather than meet with others to exchange ideas about how they could include alternative disciplinary points of view, especially when they were running short of time. They realized that the way they work is affected by the requirements of their program of study. They were also inclined to look for the safe environment of the program and their fellow students there. Many participants mentioned that they prefer to work in their program's study rooms, or at home, rather than in the office space at the research center. Thus, the possibilities for MC were easily reduced.

One participant mentioned that students were inclined towards strategic behavior: 'When you exchange ideas about how to tackle a problem with fellow students, the chance that they adopt your idea and get the credit for that, you are not doing yourself a favor'. Students wanted to be recognized and wanted to be rewarded for what they do and create. A *Law* student put it even more straightforwardly: 'I concentrate on my assignment, I am not communicating with other students, I just want to finish this assignment as soon as possible, in order to graduate on time within the nominal four years of study'. Other students recognized this and adopted a similar attitude.

On the other hand, several student focus groups mentioned that they organized feedback for each other. Frequent meetings contributed to the quality of their final products, their motivation and perseverance in their tasks. The students with these

positive experiences were aware that their cooperation was strengthened by the match among the individual members of their group.

Research center

The focus groups mentioned that the context in which they were working on their graduation assignment was pivotal for the occurrence of MC. Important factors we distinguished were (a) the culture of the research center, (b) the research circles around professors, consisting of senior researchers, lecturer-researchers, representatives of the profession, and student researchers, and (c) the organization of students in thematic groups.

According to the participants in the focus groups, both research centers in this study were characterized by an open culture. Exchange of information was organized in weekly meetings, at fixed times, for all participants at the research center, or by lectures provided by professors, senior researchers or external guests. At the end of the year or semester, all students presented their final products (i.e., thesis, designs, prototypes) in workshops and poster sessions. The participants noticed that, in practice, they were less involved in general information exchange activities and consultation rounds on strategy and the research agenda of the research center. However, this was also because students preferred to focus on their assignments and not to pay attention to side activities, due to the short period of time reserved for graduation assignments.

In the focus groups the students mentioned that they did not feel that they were really involved in the research conducted in the research circles, they had fewer contacts with senior or lecturer researchers than desired, they occasionally noticed that these organizational units were important for the research program of the center and that the research themes could be linked to their own research, and those who noticed this experienced their contribution to the research as rather fragmented.

Instead, the participants noticed that the thematic groups they all belonged to were involved in and supportive of their research. A major factor in this regard was the positive role of senior researcher and lecturer-researchers in guiding junior researchers. Participants mentioned elements such as listening to problems during the conduct of research ('only listening already helps'), giving suggestions for how to deal with practical problems, protecting the design of the study, reminding them of the relevance of the study, or the structure of the thesis. Frequent meetings with the researcher who fills the role of counselor, with possibilities for the junior researchers to give and receive feedback, were perceived as key. All counselors, to some degree, fulfilled these tasks. Both research centers explicitly and increasingly addressed the composition of the thematic groups. They aimed, as much as possible, at group composition of students from different programs. Within each thematic group, students were allowed to take on larger tasks and were encouraged to think about the frame within which they conducted their research. However, participants from thematic groups, similar to those embedded in research circles, also experienced fragmentation, as well as constraints on their creativity in conducting research. They signaled the existence of an 'island culture'. As a consequence, they were inclined to stick to a limited interpretation of their graduation assignment, not seek out too much MC with their colleagues, and only do the necessary things in order to fulfill the requirements for graduation. Participants at one research center offered suggestions to better facilitate MC, such as listing the names and expertise of junior researchers in a central place, and designating one room at the center for meetings. At the other research center, participants experienced positive effects of these measures on MC. However, at this center there was no central place for drinking coffee and informal consultations.

Graduation assignment and MC

In line with the results of the questionnaire, the participants experienced the type of assignment they received as promoting work with others on the graduation assignment. In most cases, the assignment was challenging, with enough possibilities for the students to include multiple perspectives. Some students complained that they were forced to choose a less attractive assignment, because their preferred assignments had already been awarded to other students. This affected the level of satisfaction with their assignment and the degree of MC. Sometimes, lack of specific knowledge made good execution of the assignment difficult. For example, a *Facility Management* student who completed an assignment in the field of care for mentally disabled people mentioned that he did not know how to address certain issues in his work. Another student mentioned that his assignment was too fragmented, making it difficult for him to embed the work in the right context.

The focus groups proposed several actions to improve the match between students and assignments, such as an application procedure for each assignment, more time for orientation about the assignment, more explicit communication about procedures, and management of expectations by the program of study as well as the research center.

DISCUSSION

This study has several limitations. It is rather exploratory, due to the fact that, to date, only a few studies have been conducted in the field of multidisciplinary education (Lattuca, 2004; Spelt et al., 2009). For practical reasons, the focus of this

study was on multidisciplinary cooperation. We assumed that the occurrence of interdisciplinary or transdisciplinary cooperation implies the occurrence of multidisciplinary cooperation. In a follow-up study, it could be beneficial to explicitly address different degrees of boundary crossing. Also, more attention could be paid to the learning process in multidisciplinary groups (Spelt et al., 2009). Furthermore, the empirical basis of the scales (Tendency towards MC regarding) Information Exchange and (Feedback regarding) Research Approach may need more confirmation and validation before they can be used in other educational practices.

On the other hand, according to the comments of the lecturer-researchers, the results of the present study provide a good opportunity for programs of study and research centers to improve multidisciplinary cooperation, such as by paying more attention to the embedding of the graduation assignment in the program of study and the profession, better organization of the thematic groups, and better guidance and training of students with regard to research issues. The students appreciated the focus group discussion as a means of peer feedback. Instead of talking about the content of their graduation assignments, they exchanged experiences and ideas about multidisciplinary cooperation. Some participants mentioned that this was the first time they had been invited to step aside and look at their work and how they cooperate with others.

CONCLUSIONS

Competence regarding multidisciplinary cooperation is supposed to be an important learning outcome in universities of applied sciences. We conclude, however, that multidisciplinary cooperation is not realized as much as might be expected or desired (e.g., Cuypers-Henderson & Overdieck, 2016). The results from the questionnaire and the focus group discussions point in the same direction. With an average score slightly less than 3 on a 1 - 5 scale, students practice multidisciplinary cooperation somewhere between 'sometimes' and 'frequently' but not 'often' or 'always'. They are inclined to exchange general information about how they work on their assignment and concerning research issues. However, students show considerable variety in their attitudes and behaviours towards multidisciplinary cooperation. Factors that contribute to these differences are related to the program of study, the students, the research center and the graduation assignment.

Programs of study differ in orientation on the continuum between monodisciplinarity (e.g., *Law*) and multidisciplinarity (e.g., *Facility Management*), and this affects the narrow or broad interpretation of cooperation in the curricula (Cuypers-Henderson & Overdieck, 2016; Spelt et al., 2009) and the research language that is in use. Differences between programs of study in procedures, time

tables, deadlines and workload also thwart cooperation. Furthermore, the results of this study indicate that multidisciplinary cooperation is encouraged, but programs of study and research centers where students can do their graduation assignment lack criteria to assess this competence.

Students are aware of the possibilities that the setting of an IWP at a research center offers for MC, but they experience a tension between working independently and working with others. Another obstacle is time management, especially when it comes to MC during more complex and multifaceted assignments. Furthermore, students tend to stay in their comfort zone. They prefer the familiar and safe environment of their school or their private homes, instead of working at the offices in the research center. Students also have a tendency towards strategic behaviour, which means they do not share ideas or outcomes with fellow students. Sometimes, students organize feedback in their thematic group. This self-organized peer feedback supports their motivation and perseverance, and leads to better results on the graduation assignment. An important condition for self-organization was the match between individual members of the groups.

Research centers influence the degree of cooperation between students. Students found that an open culture, with exchange of information about research issues, as well as good facilities, such as a good place for meeting each other and lists with names and available expertise, encourages their cooperation with others. Although research circles should add to the positive impact on the degree of cooperation by students, in practice they do not function optimally and are not perceived as an impetus for students' cooperation. The results of this study show that thematic groups, formed separately from the research circles, are better organized in several respects. However, sudents also experienced fragmentation and loose connection with their fellows in these groups, at the expense of MC.

Finally, the quality of the graduation assignment affects the degree of multidisciplinary cooperation. The higher the challenge offered by the assignment, the more students are inclined to multidisciplinary cooperation. However, an assignment that is too complex, combined with a demand for specific knowledge or skills, is detrimental for multidisciplinary cooperation.

REFERENCES

Bakker, A., & Akkerman, S. F. (2014). Leren door boundary crossing tussen school en werk [Learning by boundary crossing between school and work]. *Pedagogische Studiën*, 91, 8-23.

- Bologna Working Group (2005). Framework for Qualifications of the European Higher Education Area. Report. Copenhagen: Danish Ministry of Science, Technology and Innovation.
- Bulthuis, P. (2013). Het ZelCommodel, grip op competentieniveaus. De samenhang tussen zelfstandigheid en complexiteit [The ZelCommodel, grip on competence levels. The relationship between autonomy and complexity]. *Examens* 2(5), 5-10.
- Cremers, P. H. M. (2016). *Designing hybrid learning configurations at the interface between school and workplace*. PhD thesis. Wageningen: Wageningen University.
- Cremers, P. H. M., Wals, A. E. J., Wesselink, R., & Mulder, M. (2016). Utilizing design principles for hybrid learning configurations. *Instructional Science*. doi:10.1007/s11251-016-9398-5.
- Cuypers-Henderson, M., & Overdieck, A. (2016). Van multidisciplinair samenwerken naar boundary crossing [From multidisciplinary cooperation to boundary crossing]. *Onderwijsinnovatie*, 18(3), 35-37.
- European Communities. (2008). European Qualifications Framework for Lifelong Learning. Luxembourg: European Communities.
- Fortuin, K. P. J. (2015). *Heuristic principles to teach and learn boundary crossing skills in environmental science education*. PhD thesis. Wageningen: Wageningen University.
- IWP Workgroup. (2016). *Innovatieplaatsen in ontwikkeling* [Innovative Work Places in development]. Groningen: Hanze University.
- Kamphorst, J. C., & Nauta, J. (2015). Multidisciplinair werken van juniormedewerkers in Kenniscentrum Noorderruimte [Multidisciplinary cooperation by junior researchers in Research Center Built Environment]. Onderzoeksverslag. Groningen: Hanze University.
- Newell, W. H. (2001). A theory of interdisciplinary studies. *Issues in Integrative Studies*, 19, 1-25.
- Plumb, C., & Sobek, D. (2007). Measuring student ability to work on multidisciplinary teams: building and testing a rubric. Paper presented at 2007 annual conference and exposition of the American Society for Engineering Education, Honolulu, Hawaii.
- Van Merriënboer, J. J. G. (2009). Cognitive load theory in health professional education: design principles and strategies. *Medical Education*, 44, 85-93.
- Van Merriënboer J. J. G., Kirschner, P. A., & Kester, L. (2003). Taking the load off a learner's mind: instructional design for complex learning. *Educational Psychologist*, 38(1), 5-13.

MEDIA EDUCATION HABITUS AND THE PRACTICE OF TEACHERS - HOW CAN WE UNDERSTAND AND INFLUENCE IT? FIRST (PRELIMINARY) RESULTS

Jasmin Zimmer*, Paula Bleckmann**

 * Faculty of Education, Alanus University, Alfter, Germany, and Institut für pädagogische Diagnostik, Siegburg, Germany, jasmin.zimmer@paedagogische-diagnostik.de, ** Faculty of Education, Alanus University, Alfter, Germany, paula.bleckmann@alanus.edu

ABSTRACT

Media education patterns in the family and their impact on problematic or productive use of screen media in the family have been extensively researched in the past decades, and have been shown to be rather immune to interventions if their biographical background and family routine contexts are neglected. Much less is known about media education in kindergartens and schools and how to characterise different types of teachers regarding their cognitions and practice on the subject. How can (1) a complex model of a teacher's theoretical knowledge and assumptions on media effects, (2) own adult and past child media experiences and routines, as well as (3) personal skills in using digital and analogue media explain educational practice? These are the research questions of the study which consists of a quantitative and a qualitative part. First results from a sub-sample of the quantitative survey among educators in practice and in training lead to interesting conclusions, including a rejection of the simple "digital immigrant/fear of the unknown" hypothesis.

INTRODUCTION

Media education patterns

Media education patterns in the family have been characterized in detail in the family setting, and have been categorized into restrictive mediation, active mediation and either co-viewing or laissez-faire styles (Barkin 2006, Livingstone & Helsper 2008, Valkenburg et al. 1999). Parents' own media use patterns and their media biographies dating back to their own childhood influence these parental mediation styles. No comparable data exist for mediation styles among teachers, though a typology of "media habitus" among university students training to become teachers has been described based on qualitative interviews (Kommer 2010). In interventions to change the attitudes and actions of adults in the field of media education, immunity to change is a challenge. This problem has been described and partly explained for media education in the family, where changes in attitudes are difficult to achieve and not necessarily followed by changes in educational practice, as this would imply that adults would need to change their own media use and their established routines in educating their children (Seidel 2013). Interestingly, the predominant goal of interventions in the family setting is the reduction of children's screen time (cf. Schmidt et al. 2012), whereas many teacher trainings on the subject of media education currently tend to focus on how to increase the use of digital media in educational settings, though this has been criticized by other authors (Levin 2013).

The "digital immigrant/fear of the unknown"-hypothesis

According to the "digital immigrant/fear of the unknown"-hypothesis (Six & Gimmler 2007), digitally skilled adults should be more likely to recommend the use of digital media for young children. The evaluation study by Ulrike Six and Roland Gimmler assumes kindergarten teachers to be afraid of using digital technologies because they reported about themselves in interviews that they had no knowledge about the technical items, they had no practice regularly and they felt unsecure in handling the computer. In other cases they stated that they hadn't got enough digital media in their Kindergarten as a reason for not or rarely using digital media in their educational practice.

Six and Gimmler concluded that kindergartens should have more digital media for actual using, i.e., they needed more money to buy the technology, and that kindergarten teachers' digital productive skills should be trained, for which purpose they developed a training course.

A drawback of the study by Six and colleagues is that the researchers didn't ask for possible alternative reasons for not using digital media. These reasons may

comprise, e.g., the personal opinion of kindergarten teachers that the use of digital media in kindergarten was developmentally inappropriate, that the risks outweighed the advantages, that they wanted to compensate rather than add to digital overstimulation in the home, etc. In other words, they concluded that teachers were unable to use digital media in the educational institution, but never bothered to ask did they even want to use them. Therefore, they may have misinterpreted unwillingness for inability.

DESIGN OF THE STUDY AND USED METHODS

Central research questions of this study

Our research was (and still is) driven by the following questions, which, when answered, can contribute substantially to the research of how media education patterns influence the current and future media use of children:

- 1. How do adults develop a media education habitus?
- 2. In what way do the biographical experience with media, their own use patterns, their technical skills, their history of media education practice in the family (when raising their own children) and the educational institutions shape this habitus.
- 3. How does this complex model suggest methods and topics for changing these attitudes and behaviours?

Research design

The complete study will consist of a quantitative and a qualitative subproject. The survey conducted between April and May 2016 is a subsample from the quantitative subproject. A total of 144 questionnaires were handed out to different subgroups of participants, namely persons training as kindergarten teachers both at university and non-university level, both as first training and also as further training for persons already working as kindergarten assistant teachers. Additionally, university students training as high school teachers participated in the survey.

Return rate is currently at 84%. The instrument consists of 25 questions with in total 331 items and takes approximately 60 minutes to complete. One subgroup of 28 students participated in a course on media education and was asked to answer a shorter post-test questionnaire. The post-intervention instrument consists of 17 question with in total 171 items.

Among others, the questionnaire included items on the following:

• personal screen media equipment and use,

- screen equipment and frequency of use in educational institution,
- assumptions on media effects,
- recommended age of starting to use different media (TV, computer, internet)
- favoured approaches toward preventing problematic screen media use,
- technical skills for active/productive screen media education,
- retrospective report on frequency of own screen and non-screen leisure activities during childhood,
- for participants with children: parental mediation of own children's media use.

Figure 1 shows a sample detail of the questionnaire. Analysis of data has so far been limited to a selected number of items and will be completed in the near future.

		Excellent	Above average	Below average	Poor
1.	I am able to write simple word documents.				
2.	I am able to edit video files.				
3.	I can explain different technical terms (e.g. URL, IP-address, Provider)				
4.	I decide before searching whether or not it would be quicker to use books that I already have at home or to use the internet.				
5.	I am familiar with strategies employed by the advertising industry.				
6.	I use e-mails.				
7.	I used clouds (online platforms) to share data with others.				
8.	I know what age ratings movies are in my country and understand why they have been given such ratings.				
9.	I am familiar with my country's copyright laws and therefore know when it is legal to download and copy music, pictures and videos and when it is illegal.				
10.	When I am busy with something else, it does not bother me what is happening on the internet.				

1. Skills in using digital media

Figure 1. Detail of the questionnaire (translated into English, orginal questionnaire in German)

Method of data analysis

In data analysis, we analysed the returned questionnaires question by question, and additionally calculated superordinate scores for answers to sets of related questions according to the following procedure.

First, we calculated for the answers of a set of related questions the average score of each interviewee to determine the respective skill level, mapped to the range 0 to 10. Then we determined the median m and divided the range of skill levels into 4 sections (figure 2):

- Very low, ranging from 0 to m/2
- Low, ranging from m/2 to m
- High, ranging from *m* to m + [(10 m)/2]
- Very high, ranging from m + [(10 m)/2] to 10.

Last, we mapped each interviewee into the respective section.



Figure 2. Partition of average skill level of interviewees into 4 segments, using the thresholds m/2, m, and m+[(10 - m)/2].

(FIRST) RESULTS

General

Participants are frequent media users themselves, the majority using E-Mail, Chat, Social Media, Internet information search, and SMS. A majority reports having basic productive skills (e.g. record audio and video files, use PowerPoint and compile photo books). Almost half report higher-level productive skills.

An addictive Internet use pattern is rare among participants. Screen time is lower than the average of their age group. A majority assumes a predominance of negative screen media effects for the youngest age groups.

Favoured approaches toward preventing problematic screen media use are strongly age-dependent, with a shift from protective/restrictive mediation for young age groups toward active mediation for older children.

Ability to use digital media

Overall ratings and results regarding sub-groups of questions

Looking at the answers to in total 58 questions regarding the ability of the interviewee to use and to handle digital media properly, we learn that on average the N = 129 interviewees have a good and solid knowledge. The overall median *m* is 6.49, which indicates that almost two third of the participants can be assumed to be well or very well skilled. These 58 questions can be clustered into 4 subgroups:

- 1. handling and using digital media,
- 2. gathering information and researching with digital media,
- 3. communicating and co-operating with digital media, and
- 4. questions regarding meta-knowledge, i.e., reflecting on digital media.

With respect to the ability of the participants to handle and use digital media properly, we find that even a higher percentage can be rated as well or very well skilled. The related median is 6.67. Mapped to the segments derived from the overall median (m = 6.49), 55% of the participants can be rated as 'above average'. The same pattern can be seen in the results for the second sub-group "gathering information and researching using digital media", with two slight differences: more interviewees are rated as highly rather than very highly skilled, but no participant was rated as very lowly skilled.

Regarding the ability to communicate and to co-operate using digital media, the interviewees show a slightly lower performance. The respective median is 6.03, i.e., three out of five participants can be rated as highly or very highly skilled.

Regarding the meta-knowledge of digital media, i.e., the ability to reflect on one's own behaviour when using relevant tools, the respective median (6.48) almost matches the overall value of 6.49. It is striking that we cannot find performances here that are rated as very low or very high. The results are visualised in the following figure 3.



Figure 3: Ability to use digital media (d/m). Percentage of skill levels from very low (bottom) to very high (top), rated with respect to the total median m=6.49.

For each category the respective median and average value (a/v) are given. N (total) = 129.

In total 58 questions have been asked regarding digital media skills, grouped into 4 categories:

- 1. handling and using digital media
- 2. gatherin information and researching with digital media
- 3. communicating and co-operating with digital media
- 4. meta-knowledge: reflecting on digital media

Results for different categories of interviewees

Looking at the interviewees, we can find four types and therefore define four categories:

- 1. N=86 prospective kindergarten teachers (incl. 4 working professional educators),
- 2. *N*=27 students of child education at Alanus university,
- 3. *N*=14 master students of mathematics at Bonn university (prospective high school teachers (M.Ed.)), and
- 4. N=2 "other" which we have neglected in the following evaluations.

Our analysis shows that math students show significantly higher skill levels than kindergarten teachers or students of child education. Therefore, we could use the prospective high school teachers as a reference group with high affinity to digital media. The results are visualised in figure 4.



Figure 4. Ability to use digital media (d/m) of different categories of interviewees. Percentage of skill levels from very low (bottom) to very high (top). Rated with respect to the total median m=6.49. For each category the respective number of samples (N), median and average value (a/v) are given. N (total) = 129.

Testing the "digital immigrant/fear of the unknown"-hypothesis

To test the "digital immigrant/fear of the unknown"-hypothesis we compared the answers of both, prospective kindergarten teachers and students of child education with that of the students of mathematics (prospective high school teachers), i.e., our reference group.

We analysed the answers to the question, what the interviewees would think to be an appropriate and adequate starting age for ...

- 1. watching TV,
- 2. using (offline) computers,
- 3. using computers with internet access,
- 4. using smartphones, and
- 5. using tablet computers.

Watching TV is generally seen as suitable for pre-school children, except by the students of child education. The picture changes when we look at the use of *digital* media in kindergartens:

- All three groups of interviewees show high reluctance using these tools with young pre-school children.
- The students of mathematics, who (according to the "digital immigrant/fear of the unknown"-hypothesis) are expected to be more in favour of using digital media, show less affinity to confront young children with computers of all kind than prospective kindergarten teachers.
- Especially, regarding more advanced technologies, i.e., smart phones and tablet computers, the technology-affine control group shows to be even more reluctant to use these tools with children at pre-school age than both other groups.

Figures 5 to 9 show the respective results.

Figure 5. Recommended starting age for watching TV (in percent) by participant category







Figure 7. Recommended starting age for using **computers with internet access** (in percent) per participant category.



Figure 8: Recommended starting age for using **smartphones** (in percent) per participant category.



Figure 9. Recommended starting age for using tablet computers (in percent) per participant category

CONCLUSION / DISCUSSION

Interestingly, first analyses of the collected data are not compatible with the "digital immigrant/fear of the unknown" hypothesis, which assumes that teacher's reluctance to use screen media in educational institutions is caused by a lack of technical receptive and productive use skills. It seems that even though receptive use skills are generally higher than active/productive skills, many participants with high skills in both areas reject the idea of using screen media in kindergarten due to self-reported assumptions of a predominance of negative effects among that age group. The fact that in the sample of university students of child education the recommended starting age for television viewing is later than in the other group of early education professionals could have several reasons. It may be explained by the higher educational background of this subgroup. This would be in line with the findings of Vanderloo (2014): They found a negative association exists between screen-viewing in children and high levels of staff education; that is, children in day care with high educated teachers watch less TV than children in day care with lower educated staff, though then the mathematics students should also recommend a later onset of TV use, which they do not. Another explanation is that the Alanus University child education studies (though open to and attended by students from different backgrounds) have a focus in the progressive education tradition and offer in-depth modules on anthroposophical/Steiner education, which traditionally has a conservative attitude towards exposing children to mass media.

NEXT STEPS

To make our results more reliable, it will be necessary to increase our sample size and to complete the data analysis to include other areas covered in the questionnaire, such as media and general education of the participants.

Furthermore, it would be interesting to explore ways to influence the mind-set of educators and kindergarten teachers regarding (digital) media, i.e., to compare preand post-intervention questionnaires before and after different types of media trainings.

Finally yet importantly, it will make sense to deepen our understanding by an additional qualitative analysis, i.e., to conduct and evaluate interviews with kindergarten teachers. This qualitative approach might prove especially fruitful for a better understanding of the participants' predominant recommendations not to use digital media in kindergartens in spite of their high digital skills. A differentiation between active-productive and passive-receptive use of different analogue as well as digital media might be helpful to understand teachers' subjective reasoning.

REFERENCES

- Barkin, S., Ip, E., Richardson, I., Klinepeter, S., Finch, S., & Krcmar, M. (2006). Parental media mediation styles for children aged 2 to 11 years. Archives of pediatrics & adolescent medicine, 160(4), 395–401.
- Friedrichs, H. & Meister, D. M. (2015): Medienerziehung in Kindertagesstätten. Nachhaltigkeitsüberlegungen im Anschluss an eine Fortbildungsinitiative. *MedienPädagogik* (22), 1–23. Retrieved from http://www.medienpaed.com/ globalassets/medienpaed/22/friedrichs_meister1505.pdf.
- Kommer, Sven (2010): Kompetenter Medienumgang? Eine qualitative Untersuchung zum medialen Habitus und zur Medienkompetenz von SchülerInnen und Lehramtsstudierenden: Opladen: Budrich UniPress.
- Levin, D. E. (2013). *Beyond Remote-Controlled Childhood: Teaching Children in the Media Age*. Washington, D.C.: National Association for the Education of Young Children.
- Livingstone, S. & Helsper, E. J. (2008). Parental mediation of children's internet use. *Journal of broadcasting & electronic media*, 52(4), 581–599.
- Schmidt, M. E., Haines, J., O'Brien, A., McDonald, J., Price, S., Sherry, B., & Taveras, E. M. (2012). Systematic review of effective strategies for reducing screen time among young children. *Obesity* 20(7), 1338–1354.

EAPRIL Conference Proceedings 2016

- Seidel, M. (2013). Evaluation des medienpädagogischen Interventionsprojektes MEDIA PROTECT. Unpublished Master Thesis. University, Alanus, Alfter. Bildungswissenschaften.
- Six, U. & Gimmler, R. (2007). Die Förderung von Medienkompetenz im Kindergarten. Eine empirische Studie zu Bedingungen und Handlungsformen der Medienerziehung. Schriftenreihe Medienforschung der Landesanstalt für Medien Nordrhein-Westfalen, 57. Berlin: Vistas.
- Valkenburg, P. M., Krcmar, M., Peeters, A. L., & Marseille, N. M. (1999).
 Developing a scale to assess three styles of television mediation: "Instructive mediation," restrictive mediation," and "social coviewing". *Journal of broadcasting & electronic media*, 43(1), 52–66.
- Vanderloo, L.M. (2014), Screen-viewing among preschoolers in childcare: a systematic review, *BMC paediatrics*, *14*(1), 1. Retrieved from http://bmcpediatr.biomedcentral.com/articles/10.1186/1471-2431-14-205.

PILOTING VAKE (VALUES AND KNOWLEDGE EDUCATION) IN THE EDUCATION FOR PRACTICE OF NURSES¹³

<u>Jean-Luc Patry*</u>, Maria do Rosário Pinto**, Ana Spínola***, Alcinda Reis****

*Full Prof. emeritus, University of Salzburg, Dep. of Education, Erzabt-Klotz-Strasse 1, 5020 Salzburg, Austria, jean-luc-patry@sbg.ac.at ** Adj. Specialist Prof., Polytechnic Institute of Santarém, Higher School of Health, Quinta do Mergulhão - Sra da Guia, 2005-075 Santarem, Portugal, mrosario.pinto@essaude.ipsantarem.pt,*** Adj. Specialist Prof.,

Polytechnic Institute of Santarém, ana.madeira@essaude.ipsantarem.pt, **** Adj.

Specialist Prof., Polytechnic Institute of Santarém, alcinda.reis@essaude.ipsantarem.pt.

ABSTRACT

Imagine the following situation: You are a nurse for elderly people, going to the homes of your patients. A female patient tells you on our first visit after hospital discharge following a hip fracture surgery that she does not want to be at home, because she is not well enough to be alone and she needs therapy with oxygen in permanent basis until she recovers from a respiratory temporary infection situation. This kind of situations is the starting point for an educational sequence that addresses both values (here: life, human dignity, respect, loneliness) and knowledge (different medical treatments, legal rules, etc.). The example shows how intensely interrelated the values and the facts are. Based on this example we introduce the constructivist didactical tool VaKE (Values and Knowledge Education) that permits to combine both issues, and present a pilot study using this method in the education of nurses. Results underline the significance of a structured discussion of values combined with knowledge integration, by applying VaKE, and emphasize the importance of incorporating personal experience into this reflexive approach. Likewise, motivation inherent to this strategy is highlighted by all participant due to the possibility of argumentation based on theoretical dimensions, but as well in previous life path and experience. The unformal conditions of the process, without an active and constant intervention of the teachers, was seen as a promoter of cooperation among students. Based on these positive experiences, it is suggested that further studies using VaKE in Nursing Applied Fields should be conducted.

¹³ This project has been funded with support from the European Commission, project 543894-TEMPUS-1-2013-1-IL-TEMPUS-JPHES (Lifelong Learning in Applied Fields, LLAF). The Commission cannot be held responsible for any use which may be made of the information contained therein.

INTRODUCTION

Nursing, whether in the hospital or extramural, is a very complex practice. The nature of this profession is marked by its scientific character, autonomous intervention in broad multidisciplinary contexts, in a dynamic of functional complementarity regarding the other healthcare workers and by its level of dignity and professional practice autonomy (PNO, 2009).

Nurses are expected to have health responses which imply interdisciplinary, multiprofessional dynamics and to have an intervention based on proximity, continuity and wholeness, which confers them a role as partners and mediators, when dealing with complex matters helping the individual, the family and the group, around their health project (PNO, 2009).

This requires high responsibility, need for consistent general knowledge about health care, and specialization in some fields. Nurses must deal with many different, very specific patient needs, and for this they must not only have the necessary technical and execution competences within health care, but also relational and social competences, along with a high autonomy and responsibility in the execution of their professional independent and interdependent work functions. Nevertheless, they have to manage the existing dependency on many stakeholders: patients; their families; the physicians they work with; peer nurses, beside the fact they are part of a hierarchical system, involving hospitals, the health care system, etc.

Academic professors of pre-graduation nurses need to take into account all these factors, inasmuch as higher education must maintain dynamics of permanent relevance and adequation to society needs and to the quality control of this offer (PNO, 2009), and these must not be dealt with independently but in relation with each other. How can we teach for such a complex profession?

In this paper we present a teaching method that can account at least for some of these factors simultaneously: Values *and* Knowledge Education (V*a*KE). It is not the only concept to be used in nursing education, but it is one that has been shown to be successful in many studies (see, for instance, Patry, Weinberger, Weyringer & Nussbaumer, 2013; Patry, Reichman & Linortner, in press). The present study is an attempt to see whether V*a*KE can be used in the education of pre-graduate nurses; it is a pilot study which is conceived to make first experiences with V*a*KE in this new area¹⁴.

¹⁴ The pilot study took place in the Higher School of Health of Santarém, from Polytechnic Institute of Santarém, Portugal, one of the Consortium Members of the project LLAF.

THEORETICAL BACKGROUND OF VALUES *AND* KNOWLEDGE EDUCATION (V*A*KE)

In teaching on all levels, from primary school to university, there is a tendency to clearly separate knowledge education from values education. Knowledge education addresses the content, subject matter, etc., while values education deals with the students' moral stance. While occasionally values are addressed in specific disciplines in relation to the content, typically the values issues are taught in special courses or curricular units like "nursing ethics", where, for instance, the fundamental basics of ethics, moral and deontology, professional values, codes of ethics are discussed and ethical-deontological problems associated to nursing care are analysed.

Although it is accepted that nursing is a moral activity and that ethical reflection requires practitioners to think critically about their values and to ensure that these values are integral to the care that they provide in every interaction (Quallington, 2012), the focus of teaching is more on knowing about responsibilities and the codes of ethics, and not so intensely on the nurses' personal values judgments, even if values are viewed as "what is important, worthwhile and worth striving for" (Horton, Tschudin & Forget, 2007, p. 717) and define who we are as individuals, while conversely the society, culture, morals and beliefs impact on how individual personal values are defined (ib.). Personal values are accepted as inherent to human life, seen as attitudes, beliefs and priorities that bind individuals together and guide behaviour (LeDuc & Kotzer, 2009), and some authors acknowledge that personal values can influence the nurses' professional behavior (e. g. Ingersoll, Witzel & Smith, 2005; Hammell & Whalley, 2013).

Given the complexity of the profession and the responsibilities of the nurses, it seems necessary that the pre-graduated nurses are convinced of the appropriateness of the rules and values taught in the courses, through a reflected and discussed process that enables them to rationalize personal and professional values within the process of care, pursuing the achievement of the recognition that they all have similar values and share the same goal of improving patient care, otherwise they will not apply them adequately.

In such a context if makes perfect sense to integrate the VaKE methodology. In VaKE, the knowledge part and the values part of the education are combined and related to each other. It is a constructivist teaching approach based on discussing *moral dilemmas*, i.e., short stories in which a protagonist has to take a decision with opposing values at stake; the values discussions trigger interest in the necessary *knowledge base*, which is then searched by the students (e.g., in the internet). Based on this newly acquired knowledge, the values at stake in this dilemma can be discussed on a higher level. The more knowledge the students have

acquired, the more elaborate their argumentation becomes, and the more the moral discussion is, the more the students need information.

The theoretical base is given in figure 1. The general framework is *constructivist*, which means that all concepts a student learns are considered as being constructed by the learner (e.g., Putnam, 2008) through integration into pre-existing subjective theories (assimilation sensu Piaget, 1976) or, if this does not work (disequilibrium), adaptation of the subjective theories (equilibration through through accommodation, Piaget, 1976). This is done with respect to knowledge acquisition - this is studied, for instance, in the research progams on *conceptual change* (e.g., Vosniadou, 2013). Similarly, moral judgment development occurs through assimilation and accommodation (Kohlberg, 1984): When confronted with moral arguments that do not fit into ones argumentation pattern according to one's respective stage, repeated accommodations lead eventually to the next higher stage. Finally, assimilation and accommodation are socially mediated; this is our interpretation of Vygotsky's (1978) social constructivism. To these fundamental theories, applied theories addressing practical educational strategies have been developed: For knowledge acquisition, one practical application is inquiry learning (see, for instance, Reitinger, 2013; Reitinger, Haberfellner, Brewster & Kramer, 2016). For moral and values education, dilemma discussions (Blatt & Kohlberg, 1975) are a possibility. One practical approach of social constructivism is collaborative learning (e.g., Harding-Smith, 1993). These three practical educational strategies are *combined* in VaKE. In our research on VaKE, we have noticed that there are many other theories that are relevant, although they were not used in developing VaKE.



Figure 1. Theoretical background of VaKE

The results of the many studies using V*a*KE can be summarized as follows (see, for instance, Patry, 2012a; Patry et al., 2013; Patry, Reichman & Linortner, in press; Patry, Weyringer, Aichinger & Weinberger, 2016):

- In control group experiments (typically using the cross-over design) it was consistently shown that the students with VaKE know at least as much as the students of the control group, but often know even more than the teacher had known before the VaKE unit.
- Students' knowledge after VaKE is on a higher level in the Bloom taxonomy than after traditional teaching.
- Students are highly motivated and interested.
- In VaKE, the students address both justice as well as care in their dilemma discussions, in contrast to Kohlberg's (1984) focus uniquely on justice issues.
- VaKE-students' gain in moral competence as well as their gains in discursive problem solving behaviour are much higher than those of students of traditional teaching.

These are just a few of the results found with VaKE. They suggest that VaKE might be an appropriate tool for the education for professions like nursing. In the present pilot study this should be studied in a prototypical context.

PROCEDURE

In the present study, the following moral dilemma was used:

Michael is a nurse taking care for elderly people, going to the home of his patients; on the first visit after her hospital discharge, he is confronted with a female patient, Maria, who doesn't want to be at home, because, as she says, she is not well enough to be alone (she is dependent on other people for doing her life activities due to a hip fracture recovery) and she needs therapy with oxygen in permanent basis until she finishes recovering from a respiratory temporary infection situation, prescribed to be done at home.

In a first meeting, the story was enriched with details suggested by the students so that it became authentic in the sense of being at least partly self-created. The dilemma was constructed with the mobilization of students' previous experience. From this, a dilemma was identified: Should Nurse Michael provide conditions for Maria to stay at home? Or, on the other hand, should he not provide conditions for Maria to stay at home, but should he rather orient her to an institution where she can be cared for?

The participants were seven 3rd year students with five previous moments of clinical interaction for a total of 34 weeks. The practical setting was an internship in Family Health according to the Calgary Model (Wright & Leahey, 1994). One tutor for all students was involved.
In table 1 the minimal steps of a prototypical VaKE process are given. These were applied in the present study as follows: *Preparation and clarification* (0): If it is the students' first experience with VaKE, they need to be prepared since most of them are not familiar with open teaching and the freedom it provides. Thus, they were informed about the principles of VaKE (including the steps it consists of) and the discussion rules. In the second meeting, the final version of the *dilemma was intro-duced* (1), and the students were invited to *vote* (2), resulting in four votes in favour and three against fulfilling Maria's wish to return to an institution. This vote was taken with the students knowing very little and based on their common knowledge; it was the first opportunity to recognize that they should base their decision on more facts. In the following *dilemma discussion* (3; Blatt & Kohlberg, 1975), several values emerged: Family; social interaction and risk of isolation; dependency vs. independency; autonomy; importance of patient safety and personal wishes. As preconized, the discussion led to further questioning.

The following questions were raised (4): How to provide safe oxygen administration at home? Do applicable legislations or guidelines for non-technician home support in home oxygen monitoring exist? If so, what are they? What are the social and economic dimensions like personal costs for the family of the treatment? Is there a possibility to integrate Maria in a Continuous Care facility after discharge from hospital? What does the legislation say? The search for information (5) was conducted individually during one week. Each student agreed to search about all subjects. The leading question for this step was: "What do I need to know to have an effective argumentation of my position?" The teachers shared some information considered crucial, mostly from studies about the practice. The information sources included scientific and non-scientific information, with the obligation to use EBSCO and B-On scientific databases and to validate the information acquired. The information was shared (6), first, within the small group of two or three students. Before the next group meeting, students were asked to elaborate a synthesis of the information that supported each students' perspective. In the group meeting, first, the two respective groups of students who initially had the same opinion exchanged information, then the whole group shared the acquired information.

The *second arguments* (7) started without any teachers' structuration, but spontaneously organized by the students. The professional knowledge mobilization was very preeminent at the start, by means of the normative-legal framework of the nursing profession (Order of Nurses' directives and national legislation). The ethical principles and deontological dimensions were discussed as well. Then the importance of feelings associated with the situation presented and the difficulty students have in separating personal feelings and moral values from professional practice emerged. From this moment on, values discussions dominated the interaction and the students centred themselves on the importance of personal previous experience mobilization into decision making: from the professional point of view (two of the participants), but predominantly from each personal path in life; as students' emphasize, these are moral and values centred perspectives.

In the *synthesis* (8), the importance of an effective global professional assessment as a background for clinical decision making was pointed out, along with the updated knowledge on guidelines and the health care specific legislation. Further, respect for the patient and her family, her autonomy and wishes, the importance of social and personal oriented values were outlined by the students. There was no repetition (9), so no new synthesis (10) was necessary. In the *generalization* (11), the students were asked in a final survey to reflect on the VaKE strategy and give their opinion about the importance for academic and personal skills acquirement and development.

	Step	Action	
0	Preparation and clarifi- cation	Students' understanding of values; abilities in the working techniques; rules of interaction	Class
1	Introduce dilemma Understand dilemma and values at stake		Class
2	First decision Who is in favour, who against?		group
3	First arguments (di- lemma discussion)	Why are you in favour, why against? Do we agree with each other? (moral viability check)	group
4	Exchange experience and missing informationExchange of arguments; what do I need to know further to be able to argue?		class
5	Looking for evidence Get the information, using any source availa- ble!		group
6	Exchange information	Inform the other students about your construc- tions; is the information sufficient? (content re- lated viability check)	class
7	Second arguments (di- lemma discussion)	Why are you in favour, why against? (moral vi- ability check)	group
8	Synthesis of information	Present your conclusions to the whole class (moral and content related viability check)	class
9	Repeat 4 through 8 if necessary		group/cl ass
10	General synthesis	Closing the sequence capitalizing on the whole process	
11	Generalization	neralization Discussion about other but related issues	

Table 1Minimal steps in a VaKE process; italics: values education

RESULTS

The general conditions of the discussions were seen as crucial by the students. They emphasized the importance of incorporating personal experience into the reflexive approach. The opportunity to integrate their personal perspective at the beginning of the discussion, without a previous theoretical background, is pointed out by all the participants as an interesting opening slant, motivating them to continue intervening in the argumentation. This was visible in the first discussion with respect to the patient's autonomy by two students with opposing opinions:

- I agree because my mother always told me: When you were a baby I had to work, so you were at a nursery. When I'm old, it is fair that you put me on a nursing home.
- I disagree because the family is supposed to take care of the elderlies. When my grandmother was sick, everyone joined forces to be present, after work, school, and my father stayed at home.

In a more sophisticated and meta-cognitive way, similar ideas were expressed in the second discussion:

We always take a bit of ourselves when we explain something to people.

The general feeling was summarized by one of the student as follows:

I felt heard. What I was saying meant something, even without mentioning an author to support what I was saying.

Likewise, the importance of confronting themselves with different lived experiences and personal accomplished opportunities was underlined as motivating, with emphasis on the unformal conditions without an active and constant intervention of the teachers. This cooperation among students could also be seen in them recognizing the need for mutual support to find more information. The teachers' roles were seen as different from traditional reaching. They guided the discussion during the first argumentation, but this was not sensed as such traditional teaching by the students. The questions the teachers posed and their comments were seen as pertinent, but not as coming from a *teacher*, but rather from a peer, i.e., from a person of the same level, and the arguments had the same relevance as the remarks from the other students. The method fostered the spontaneous willingness to search for more information, "*so we could prove our perspective*", as on student expressed.

In their search for information, sources were accessible. The acknowledgment of the importance to search for credible sources of information was not a new strategy for the students: "To that, we are already prepared! We already know that every word has to be supported by an author!" Sharing results in the large group made

them read information that supported their perspective. Yet they also read meaningful information that was against their viewpoint.

Moral values are frequently discussed within their regular learning environment, but VaKE gave it a central position throughout the process. This was identified as very important due to the different significations students' acquired during the process, which transcend the theoretical ones, strongly linked to Nurses' Deontological Code. An example is the following statement: "We have the duty to respect one's autonomy and wishes".

According to the teachers at the Higher School of Health, self-learning strategies are current in the professors' daily teaching practice. But those involved appreciated the participation, enthusiasm and interest of the students. The students' characteristics, like socio-cultural background, lived experience, maturity, levels of knowledge and self-confidence, were seen as more important and valued in the VaKE discussions than in the traditional approaches.

The personal and professional gains mentioned by both teachers and students addressed particularly the impact on the future caring perspective and the high relevance to be implemented on learning environment in nursing bachelor degree.

Overall, these findings are in line with the results of previous experiences, conducted in different scientific areas, levels of graduation and students' characteristics. One result, however, confirms informal experiences but has not yet been expressed so explicitly in previous studies: The students underlined that understanding a person's values does not change ones' own values, but allows more empathy to the views and values of others. This is important because it shows that VaKE not necessarily changes the participants' identity but fosters the understanding of the perspective of other people, even if they do not have the same opinion. And it seems to us that this is an important condition for tolerance in general and for patient-specific care in nursing in particular.

DISCUSSION

In a pilot study like the one described here, it is not possible to assess all variables that might be regarded as relevant. It must be underlined, however, that this study was part of a general research program. The TEMPUS project Life-Long Learning in Applied Fields, within which this study was embedded, is part of this research program addressing issues of college learning for professional practice. The other studies within this project (e.g., Linortner & Patry, 2015; Patry, Costa & Monteiro, this volume; Patry, Reichman & Linortner, in press; Pnevmatikos, Patry, Weinberger, Linortner, Weyringer, Eichler-Maron & Gordon-Shaag, 2016) confirm these results and extend them in the sense discussed above. And this project is an

extension of the general research program on V*a*KE, as documented, for instance, in Patry et al. (2013). This means that the results that were reported are a confirmation of previous studies. In other words, they are not unique, but quite representative for results found generally with V*a*KE.

The combination of scientific and personal perspectives and of descriptive and prescriptive issues through VaKE led the students to gain a different look at the patients' situations. They could emphasize with the patients' needs and see that the "technical" issues are not all there is in nursing. The importance of "*talking with the heart*" was recognized, and capitalizing on personal previous experiences "*makes us feel we can be people while caring*".

A second crucial issue was the possibility to express a "non-theoretical" opinion, i.e., one's knowledge even if it is not recognized as scientifically viable. This accounts for the complexity of the nursing situation, in which the scientific theories provide only an insufficient foundation for practical decision-making (see, for instance, Patry, 2012b); instead, the practitioners have to rely strongly on their personal estimation of the requirements of the practical situation. This is the more the case if these situations have an antinomous character (i.e., are moral dilemmas), as in the stories used to start the VaKE processes. And this antinomous character is typical for many nursing situations, for instance when one considers the patients' needs and wishes but cannot comply fully with them because of the medical requirements. Therefore the question arises how much leeway the nurse has with respect to these requirements. The legal regulations underline the importance of the nurses' responsibility and autonomy, with which the nurse can comply only if all available knowledge, including personal perspectives, are taken into account.

The participants' motivation in the VaKE process was particularly notable. This motivation was visible in their engaged participation in the discussion, in their interest in the issues that were addressed, even in their excitement about the story and about the discussion. The glow of the students' eyes was visible.

It seems that on one hand, the approach could indeed address at least some of the issues mentioned in the introduction that characterize the profession of nurses in its complexity, and on the other hand, that the commitment and motivation of the participants was high, thus ascertaining successful learning. Maybe these two features are linked, since learning for a profession is likely to be the main motivation of the students, and VaKE satisfies this need. However, motivation goes beyond the pure professional interest. It seems that the emphasis put on the personal background, including the participants' own biographies as some of the statements suggest when they refer to the experiences in their own family, plays an important role in this regard.

As a pilot study, the experience was encouraging. It is suggested that further attempts using VaKE in teaching prospective nurses should be undertaken, providing opportunities to continue developing a person-centered learning culture. This was highlighted by this experience, focusing on personal growth and enhanced self-awareness, both for students and professors.

REFERENCES

- Blatt, M. M., & Kohlberg, L. (1975). The effects of classroom moral discussion upon children's level of moral judgment. *Journal of Moral Education*, 4(2), 129-161. DOI: 10.1080/0305724750040207
- Hammell, K., & Whalley, R. (2013). Occupation, well-being, and culture: Theory and cultural humility/occupation. *The Canadian Journal of Occupational Therapy*, 80(4), 224-234.
- Horton, K., Tschudin, V., & Forget, A. (2007). The value of nursing: a literature review. *Nursing Ethics*, 14(6), 716-740.
- Ingersoll, G. L., Witzel, P. A., & Smith, T. C. (2005). Using organizational mission, vision, and values to guide professional practice model development and measurement of nurse performance. *Journal of Nursing Administration*, 35(2), 86-93.
- Kohlberg, L. (1984). Essays on moral development: Vol. 2. The psychology of moral development. San Francisco, CA: Harper & Row.
- LeDuc, K., & Kotzer, A. M. (2009). Bridging the gap: A comparison of the professional nursing values of students, new graduates, and seasoned professionals, *Nursing Education Perspectives*, *30*(5), 279-84.
- Linortner, L., & Patry, J.-L. (2015). Teaching manual, module 1: VaKE-Tact Values and Knowledge Education and Agogical Tact. Salzburg, Austria: Unpublished paper, Life-Long Learning in Applied Fields (LLAF), Project 543894 – TEMPUS-1-2013-1-IL-TEMPUS-JPHES, Group 4: Learning to Be.
- Madeira, A.C. (2015). Nursing student in the process of care in clinical education. Saarbrücken, Germany: Novas Edições Acadêmicas.
- Patry, J.-L. (2012a, June). Values and Knowledge Education (VaKE): Experiences with a means to achieve the double assignment. Keynote Presentation at the Third Symposium of the EARLI SIG 13 (Moral and Democratic Education) "Building ethical schools and teaching practices", Bergen (Norway), June 18, 2012.
- Patry, J.-L. (2012b). Der Pädagogische Takt. In C. Nerowski & S. Rahm (Hrsg.), Enzyklopädie Erziehungswissenschaft Online. doi: 10.3262/EEO09120250

- Patry, J.-L., Reichman, R., & Linortner, L. (in press). Values and Knowledge Education (VaKE). To be published in H. Vidergor and O. Sela (Eds.), Innovative teaching strategies and methods promoting lifelong learning in higher education: From theory to practice. Happauge, NY: Nova Science Publishers.
- Patry, J.-L., Weinberger, A., Weyringer, S., & Nussbaumer, M. (2013). Combining values and knowledge education. In B. J. Irby, G. Brown, R. Lara-Alecio & S. Jackson (Eds.) and R. A. Robles-Piña (Sect. Ed.), *The handbook of educational theories* (pp. 565-579). Charlotte, NC: Information Age Publishing.
- Patry, J.-L., Weyringer, S., Aichinger, K., & Weinberger, A. (2016). Integrationsarbeit mit eingewanderten Jugendlichen mit VaKE (Values and Knowledge Education). International Dialogues on Education: Past and Present. IDE Online Journal, 3(3), 123-139. <u>http://www.idejournal.org/article/2016-volume-3-number-3-integrationsarbeit-mit-</u> eingewanderten-jugendlichen-mit-vake-values-and-knowledge-education/
- Piaget, J. (1976). Piaget's theory. In B. Inhelder & H. H. Chipman (eds.), *Piaget and his school: A reader in developmental psychology* (pp. 11-23). New York: Springer.
- Pnevmatikos, D., Patry, J.-L., Weinberger, A., Linortner, L., Weyringer, S., Eichler-Maron, R., & Gordon-Shaag, A. (2016). Combining values and knowledge education for lifelong transformative learning. In E. Panitsides & J. Talbot (Eds.), *Lifelong learning: Concepts, benefits and challenges* (pp. 109-134). New York, NY: Nova Science.
- [PNO] Portuguese Nurses' Order (2009). *Strategic plan for nursing education* 2008/2012. Lisbon, Portugal: DPI Cromotipo. [ISBN: 978-989-96021-5-1]
- Putnam, H. (2008). What makes pragmatism so different? In M. U. Rivas Monroy,
 C. Cancela Silva & C. Martinez-Vidal (Eds.), *Following Putnam's trail: On* realism and other issues (pp. 19-34). Amsterdam, The Netherlands: Rodopi.
- Quallington, J. (2012) Ethics, values and the role of the nursing student. Nursing 2012 and beyond. Available on http://www.rcn.org.uk/_data/assets/ pdf_file //0005/445217/Ethics,_Values_and_the_Role_of_the_Nursing_Student_Jan_Quallington.pdf (accessed January 2017).
- Reitinger, J. (2013). Forschendes Lernen. Theorie, Evaluation und Praxis in naturwissenschaftlichen Lernarrangements. Kassel: Prolog.
- Reitinger, J., Haberfellner, C., Brewster, E., & Kramer, M. (eds.). (2016). *Theory* of inquiry learning arrangements. Research, reflection, and implementation. Kassel: Kassel University Press. http://dx.media.org/10.19211/KUP9783737601450

EAPRIL Conference Proceedings 2016

- Vosniadou, S. (ed.). (2013). International handbook of research on conceptual change, second edition. New York, NY: Routledge.
- Vygotsky, L. S. (1978). *Mind in society*. Cambridge, MA: Harvard University Press.
- Wright, L. M., & Leahey, M. (1994). The Calgary family intervention model. In L.
 M. Wright & M. Leahey (Eds.), Nurses and families, a guide to family assessment and intervention. 2nd ed. (pp. 99-129). Philadelphia, PA: Davis.

TRANSITION FROM ACADEMIA TO WORK USING THE DIDACTIC TOOL OF VALUES AND KNOWLEDGE EDUCATION¹⁵

Jean-Luc Patry*, Pedro Costa**, Andreia Monteiro***

*Full Professor emeritus, University of Salzburg, Department of Education, Erzabt-Klotz-Strasse 1, 5020 Salzburg, Austria, jean-luc-patry@sbg.ac.at, ** Senior consultant, INOVA+, Rua Dr. Afonso-Cordeiro 567, 4450 Matosinhos, Portugal, pedro.costa@inovamais.pt, ***Consultant, INOVA+, Rua Dr. Afonso-Cordeiro 567, 4450 Matosinhos, Portugal, andreia.monteiro@inovamais.pt.

ABSTRACT

Transitions from academia to work are always sensitive. First, key issues of the theory-practice transfer are presented, based on a theoretical model including subjective theories and decision-making based on knowledge and values, some of which acquired in academia. Then the teaching model "VaKE" (Values and Knowledge Education) is presented combining values and knowledge acquisition, and its specific form which address work-place issues. The hypothesis tested relates to the implementation of VaKE in daily decision-making processes for partners' selection to bid in a public procurement call. The hypothesis was tested involving a group of: interns assessing how the model contributed for decision taking; tutors assessing the efficiency of the decision token considering the need deciding in short time, well informed and effectively. Preliminary results show that VaKE was properly implemented, participants were able of transferring their knowledge and values to the real scenario, and that the model is effective for decision-making processes.

¹⁵ This project has been funded with support from the European Commission, project 543894-TEMPUS-1-2013-1-IL-TEMPUS-JPHES (Lifelong Learning in Applied Fields, LLAF). The Commission cannot be held responsible for any use which may be made of the information contained therein.

INTRODUCTION

In the study to be presented, three programs are combined:

- a company, INOVA+, that promotes and manages international projects of innovation, education and training, and of research and technological development;
- a Tempus project, LLAF (Lifelong Learning in Applied Fields) addressing the transition from college learning ("academia") to the workplace;
- a teaching tool, VaKE (Values and Knowledge Education), that permits to combine values education and knowledge education on a constructivist base.

The research question for this study is: To what extent can VaKE contribute to the smooth transition of recent graduated students from the academia to work? A real scenario case (*Applied Field*) is addressed, related to the daily activity within the *Company* and involving both *Values* and *Knowledge*.

Transitions from academia to work are always sensitive: In spite of the theory learnt in universities, interns and young workers frequently face constrains and challenges when integrating a company (see, for instance, Patry, 2012). Reasons are, among others: (1) The theories learnt in college tend to be too general and too abstract when comparing to the reality of daily practice at work. This is due to the generality-concreteness antinomy (see Herrmann, 1979, pp. 160ff.), according to which the more general a statement is, the less concrete it can be, and since theories are required to be fairly general, they cannot be concrete. (2) During their academic studies, the students lack experience and contact with real work contexts. They might be engaged in some internships, but often this is not related with the theories taught in the college (e.g., Schüpbach, 2007). (3) There is lack of instruments and strategies, or these are insufficient, to support intergenerational learning where more experienced workers can foster the integration of interns in the companies' processes and activities. (4) In the work situation, there is usually not sufficient time to think about issue, and errors must be reduced to a minimum, thus learning from mistakes is not possible - this leeway would be important for newcomers.

To take an example: INOVA+ is preparing a bid for a Call for Proposals of the European Commission with a strict deadline. The Call consists of 24 pages written in the language typical for such documents, which is very complex and very technical and which requires specific knowledge about the procedures and decision principles for such projects. (1) These issues could not be discussed in the necessary details (concreteness) in the university. (2) Internships during the studies might not address such problems. (3) The employees of the company lack time and knowledge how to support newcomers when dealing with such problems. (4) Given

the short deadline and the limited personal resources within the company, there is very little leeway for decision making, with high stakes on the line.

It is important to provide strategies, instruments, and time to support companies and experienced workers in the integration and training of new workers and interns. VaKE seems to be a possible strategy to promote the theory-practice knowledge transfer, as developed in the LLAF project (Linortner & Patry, 2015). Thus, INOVA+ considered it important to test its applicability in the company context and to understand its impact on supporting interns in the transition from academia to the labour market.

VALUES AND KNOWLEDGE EDUCATION (VAKE)

The starting point for V*a*KE was the experience in several projects with moral dilemma discussions in the tradition of Blatt and Kohlberg (1975) that the participants at such discussions are usually highly motivated and continued the discussions even after the teaching units and involved peers and other people who had not participated in the classroom process. Further, in such discussions, often questions dealing with contents and not with moral issues were raised. This experience, as well as the reference to classroom-oriented moral dilemmas (Aufenanger, Garz and Zutavern, 1981) and some studies like Bohse (1982, who actually explicitly does not want to do moral education) and Salomon (1992), led to the development of the concept of V*a*KE (Patry, 2000).

The theoretical principles underlying VaKE are as follows (see also fig. 1):

• Constructivism: Every cognitive competence (knowledge, moral judgment competence, social competence) has been constructed by the individual and not conveyed in the sense of forcing it into someone's mind. This has the following consequences (Patry, 2016a): We have subjective theories (Gastager, Patry & Gollackner, 2011), that there is some reality and how it looks like, and these subjective theories have been more or less successful (viable; Putnam, 1990; see also González García & Rivas Monroy, 2008). Learning and development consist in actively changing these subjective theories.



Figure 1. Theoretical background of VaKE

- Actively changing subjective theories follow the principles of assimilation, disequilibrium and accommodation (Piaget, 1976), in which the so-called viability-checks (Patry, 2014) play a crucial role: the control whether the subjective theory that was constructed satisfies its purposes.
- These viability checks can be realized, among others, through social exchange; this is our interpretation of social constructivism (Vygotsky, 1978/1997, p. 34, in the original in italics): "Human learning presupposes a specific social nature and a process by which children grow into the intellectual life of those around them."
- Assimilation, accommodation, and viability checks are basic principles of the development of the moral judgment according to Kohlberg (1984): If someone is confronted with a moral conflict, i.e., with a situation in which he or she has to take a decision, and whatever he or she decides, some moral values will be broken, he or she has to justify his or her moral judgment; if the cognitive structure (in the present terminology: subjective theory) is repeatedly not viable to solve this problem, the subject performs eventually an assimilation. According to Kohlberg, these changes follow stages of development of the moral judgment. One must underline that moral development is not about norms and values per se, but about how people argue in favour or against certain norms and values.
- Assimilation, accommodation, and viability checks are also the basic principles of learning of content, i.e., of the acquisition of knowledge. Accommodation, or in terms of the theory of conceptual change (Vosniadou, 2008), consists in cognitive conflicts, which are necessary but not sufficient (Pintrich, Marx & Boyle, 1993).

On the next level in figure 1, one can find practical applications of the respective theories.

- Collaborative learning (e.g., Harding-Smith, 1993) "is an educational approach to teaching and learning that involves groups of learners working together to solve a problem, complete a task, or create a product. The main characteristics of collaborative learning are: a common task or activity; small group learning, co-operative behaviour; interdependence; and individual responsibility and accountability." (Chandra, 2015, p. 4)
- In moral education, Blatt and Kohlberg (1975) proposed to use dilemma discussions; the moral viability checks trigger disequilibria in the moral judgment which eventually would lead to an accommodation towards a higher stage. This approach has been shown to be successful in moral education (e.g., Lind, 2016).
- With regards to knowledge acquisition, inquiry based learning (e.g., Reitinger, 2013; Reitinger, Haberfellner, Brewster & Kramer, 2016) is one possibility that satisfies the conditions of constructivism as described above (Patry, 2016b): The participants ask questions and seek answers through whatever means are available, such as doing experiments, searching the net, asking experts, etc., and check the viability of the respective answers.
- VaKE, then, is the combination of these three approaches. It starts with a dilemma that is conceived in such a way that moral as well as content-related issues are addressed. A discussion about the moral issues follows (moral education), that spontaneously leads to questions about content, to which the participants seek answers (knowledge education), etc., and this is performed in a collaborative way (collaborative learning).
- In the course of our studies with VaKE it turned up that additional theories were needed to take a more comprehensive perspective on VaKE, like theories of motivation, critical thinking, interaction, etc.; see, for instance, Patry, Weinberger, Weyringer & Nussbaumer, 2013).

In the many studies that we have done with VaKE, this method has been proven to be quite successful (a short account of the results can be found in Patry, do Rosário Pinto, Spinóla & Reis, this volume). However, the application in the context of the transition from academia to a business workplace with its particular conditions as mentioned above has not yet been done. For this reason VaKE was applied with interns as a pilot study to make first experiences.

PROCEDURE

The present pilot study was done with three interns (two females and one male) in the International Cooperation Unit at INOVA+ and 2 tutors from INOVA+. The interns' experiences with INOVA+ were between three months and one year, and they had already worked with senior consultants and experts.

The starting point was a problem the company was currently confronted with: INOVA+ is preparing a bid for the Call for Proposals [here the specific call including URL was given] (...). To achieve this goal, INOVA+ is preparing a proposal involving a considerable number of partners (...). The objective is to *build a consortium* involving partners with relevant competences in the fields related to the call, guaranteeing:

- A high level of expertise of the consortium;
- The involvement of different type of partners with complementary expertize, tools and services;
- Good quality/price ratio, without compromising the necessary expertise and the coverage of the partnership (in terms of fields of intervention), essential for the design and implementation of the project.

Seven partners (plus INOVA+ as coordinator) are interested in joining the consortium, and together, the consortium would be able to cover all the necessary expertise and skills to respond to the call.

Please decide how many partners should be involved in this proposal:

- All the necessary partners, guaranteeing a great coverage of fields of expertise and, consequently, the innovation and quality of the project even considering that the budget will be high and the available budget for each partner reduced?
- Less partners, losing some of the strategic partners with the necessary knowhow and expertise, guaranteeing a higher quality/price ratio and higher budget availability for each partner?
- To be considered:
- The number and expertise of the partners of any consortium is one of the most critical aspects.
- The budget and cost-effectiveness of a proposal are always one of the evaluation criteria.
- The maximum eligible and available budget per proposal is € 225 000; at least three partners have required a budget of around € 40 000 for performing their tasks; INOVA+ as coordinator should get a budget slightly higher than any of the partners.

The values involved in this dilemma were that if all potential partners would be included, there would be a large coverage of the necessary expertise and skills, and there would be a higher geographical coverage; reducing the number of partners would lead to more money for each of them to please them. The knowledge addressed here relates to identifying the most relevant aspects for both a successful bid and in this case a successful achievement of the project goals.

The prototypical steps of V*a*KE are given in Patry et al. (this volume). In the present study, a reduced version was used, as presented in table 1; the original steps 4, 5 and 6 were combined, and the procedure was not repeated (originally step 9). Step 11 (Generalization) was achieved in the subsequent work, individually and in groups; as it was not part of the implementation of the V*a*KE process but was realized spontaneously, no time frame can be indicated.

#	Step	Action	G/I?	Time
1	Introduce dilemma	Understand dilemma and values	G	5 min
2	First decision	Who is in favour of including all nartners?	G	5 min
3	1 st dilemma discussion	Moral viability check	G	10 min
4,	Missing information,	What do I need to continue? Getting	G	15 min
5,	looking for evidence,	information. Inform peers; content		
6	exchange of information	viability check		
7	2 nd dilemma discussion	Moral viability check	I/G	15 min
8	Synthesis of results	Present conclusions	G	15 min
10	General synthesis	Capitalizing on the whole process	G	15 min
11	Generalization	Application in the work place	I/G	

 Table 1

 Achieved VaKE steps; G: Full group; I: individually

During the pilot implementation of V*a*KE, several assessments were performed, as documented in table 2. The three interns answered two sets of questions, one as part of the last step of the group sessions (step 10) and one after the full process, while the two tutors answered one set after the process.

Table 2 Assessments

When?	Who?	How?	What?
At the end of step 3	Interns	Viability Check Sheet	Checking the viability of the solutions:Is the solution viable for me?Do the others have similar or same results?
At the end of step 7	Interns	Viability Check Sheet	Checking the viability of the solutions:Is the solution viable for me?Do the others have similar or same results?
At the end of the group ses- sion	Interns	 Sharing their ex- perience in the session; Providing feedback 	 Two key questions: Are you familiar with this type of learning instrument? Do you think that this methodology is suitable to be implemented in other dilemmas or situations?
After group session	Interns	Written quan- titative and qualitative feedback of participants related to the session	Quantitative evaluation: Relevance of V <i>a</i> KE in different fields (applicable knowledge, concrete situations, autonomous learning, problem solv- ing, team orientation, discussion skills); Qualitative evaluation: Impact of V <i>a</i> KE on tran- sition from academia to labour market, on in- terns' daily work; Reports of the interns' experience with V <i>a</i> KE
After group session Tutors		Oral feedback	About the results achieved by interns, making suggestions of improvement.

RESULTS

One of the three interns reported having had already experiences of this kind. According to the interns, the introduction of the dilemma, including the introduction to values and to the information sources for searching were made appropriately, allowing them to make a decision based on concrete aspects and arguments.

Although the three interns had the same information and sources, their decisions and arguments differed considerably, which created an interesting dynamism and active discussion among them. For sharing their decisions and arguments was particularly important to have access to different information sources and opinions. Based on their starting analysis and decisions (steps 2 and 3) and on the information and opinions exchanged between interns (steps 4, 5 and 6 combined), participants were asked to rethink about their position and arguments, answering to the question "What is my decision now and why?" Then, each one shared his/her position and arguments with the others interns (step 7), followed by another viability check of their position in their own perspective.

The viability check phases (table 2) turned out to be important since they allowed the participants to go deeper in their arguments to justify their decision, identifying possible missing information and data; and to compare their position with the ones of their peers, thus identifying common and distinctive arguments and premises, essential to reinforce or rethink their own position.

The interns kept their decision between both phases, only changing some arguments or justifying their position based on new information and data. Therefore, the results achieved in both viability checks were quite similar. In both moments interns considered that their position was not only viable, but the most suitable for them. In spite of the differences of opinions between the interns, some of the arguments used were similar and, in some cases, were used to justify opposing positions.

The qualitative statements of the interns can be summarized follows:

- Often the theory is not enough to grasp the complexity of (work) reality. The theory does not include unexpected events as in this case.
- VaKE can help to foster the contact with real issues and situations.
- It promotes the reflection about how we make our decisions and allows us to understand the perspective of others.
- It supports problem solving.
- It promotes the working-team and the respect for different opinions as well as the brainstorming between teams.
- There are other benefits potentially not yet explored such as the possibility of supporting knowledge and technology transference from university to the market and recruitment and selection of new employees.
- Participants say they will pay more attention to some aspects in their daily work that do not seem relevant at first sight.
- V*a*KE allowed to understand better the process and challenges related to the building of a consortium for a call or proposal.
- It was recognized that VaKE is also relevant for peer learning and team building, participants now know more about the peers who participated and have learnt a lot with their colleagues and with the tutors.

In the quantitative response, on a scale from 1 to 5, they rated all issues very high, with "Improving critical thinking skills" and "Promoting autonomous learning" highest (4.7 each), followed by "Generating applicable knowledge", "Discussing concrete situations", "Improving problem solving competences", and "Improving discussion and argumentation skills" (4.3 each) and "Improving team-oriented attitude" (4.0). Due to the low number of participants, statistical analyses are not performed.

In conclusion, according to the interns, VaKE is a strategic tool for the transition from academia to work. Further, it could be an important tool for experienced employees as well, particularly when heterogeneous teams are necessary (as in this particular case), and as a possibility to improve performance (to understand needs to improve).

The tutors reported that the participants were able of individually propose reasonable solutions for the dilemma, which were supported by strong and reliable arguments. However, not all the key aspects of the dilemma were analysed with the same level of details and, as a consequence, some of those aspects were not taken into consideration. They say that therefore they have carefully driven the discussions towards some aspects not accounted for before. These interventions were important as they have allowed the participants to discuss new points of view and to review their decisions and arguments.

DISCUSSION

The experience shows that the teaching tool VaKE can address work-place issues and generate applicable knowledge in the real work context. It is possible to implement VaKE in daily decision-making processes, in this particular case for partners' selection to bid in a public procurement call, with interns who have only little experience with the conditions under which such decisions have to be taken, but need a well-informed and effective decision in short time. The results show that VaKE was properly implemented, that the participants were able of transferring their knowledge and values to the real scenario, and that VaKE was effective for decision-making processes.

The feedbacks provided by participants were quite positive. Based on their comments in the group discussion and in the evaluation, VaKE is a teaching tool suitable to be implemented in the transition from academia to the labour market processes, supported by tutors at the work place. One can assume that it can be used for the recruitment and integration of interns and new employees in companies with the support of the human resources manager. The promotion of innovation and creativity in teams of work, based on brainstorming oriented by a facilitator, seems to be an additional asset.

The three interns recognised that their participation in the pilot study was very important on a professional level. Their experience in VaKE allowed them to enlarge their mind and to acquire some important information to approach better similar situations in the future. They estimate participating in VaKE to have been a positive experience through which they could test some aspects that they need to improve, as such as expression skills and to consolidate some personal aspects that are positive when discussing in teams.

VaKE is a useful tool for the transition from Academia to Work, under the condition that some additional guidance is provided. Considering the different obstacles to such a transition discussed in the introduction, one can say that with the support of the peers and the tutors, (1) the participants could narrow down the theories they already had, combined with the new theories they acquired in the process, very precisely to the specific case they were confronted with, but still apply them differently (and maybe using different theories) in situations that might seem similar but are different in important issues. (2) They got an explicit and much differentiated experience with the real work context, including the specific conditions like tough deadlines and the possible emotions other people involved, as, in the given case, of potential partners, and could apply the theories addressed above in this context. (3) VaKE as applied here provides a tool that can be used for the transfer from academia to the work place. As can be seen in table 1, the overall time used for the experience was not even one and a half hours; it seems that this investment is worth given the outcomes which, according to the experiences, seem substantial. (4) Even within this short time creative thinking and trying out new ideas (and possibly rejecting them based on not passing the viability check) were possible. VaKE, hence, provides both the leeway and the necessary feedback mechanisms for assimilation and accommodation.

What could not be assessed in this study is the role of values judgments. On one hand, research shows that dilemma discussions foster the development of moral judgment (Lind, 2016). However, one single such discussion might not be sufficient, hence to really have an impact on the participants' stage of moral judgment, the experience would have to be repeated. On the other hand, it seems important that the participants recognize the role and relevance of values and moral norms in decision making on the work place, and not regard only the "technical" issues of their decisions.

REFERENCES

- Aufenanger, S., Garz, D., & Zutavern, M. (1981). Erziehung zur Gerechtigkeit. Unterrichtspraxis nach Lawrence Kohlberg. München, Germany: Kösel.
- Blatt, M. M., & Kohlberg, L. (1975). The effects of classroom moral discussion upon children's level of moral judgment. *Journal of Moral Education, 4* (2), 129-161. DOI: 10.1080/0305724750040207
- Bohse, J. (1982). Inszenierte Dramenlektüre: Der Prozess gegen Karl von Moor und Moritz Spielberg. Modell für einen "produktions"- und "handlungsorientierten" Literaturunterricht am Beispiel von Schillers "Räubern". In G. Haas (Ed.), *Literatur im Unterricht. Modelle zu erzählerischen und dramati-*

schen Texten in den Sekundarstufen I und II (pp. 205-267). Stuttgart, Germany: Reclam.

- Chandra, R. (2015). Collaborative Learning for Educational Achievement. IOSR Journal of Research & Method in Education, 5(3), 4-7. http://www.iosrjournals.org/iosr-jrme/papers/Vol-5%20Issue-3/Version-1/B05310407.pdf
- Gastager, A., Patry, J.-L., & Gollackner, K. (Eds.). (2011). Subjektive Theorien über das eigene Tun in sozialen Handlungsfeldern. Innsbruck, Austria: StudienVerlag.
- González García, F., & Rivas Monroy, M. U. (2008). The pragmatic realism of Hilary Putnam. In M. U. Rivas Monroy, C. Cancela Silva & C. Martinez Vidal (Eds.), *Following Putnam's trail: On realism and other issues* (pp. 223-242). Amsterdam, The Netherlands: Rodopi.
- Harding-Smith, T. (1993). *Learning together: An introduction to collaborative learning*. New York, NY: Harper Collins College Publishers.
- Herrmann, T. (1979). Psychologie als Problem. Stuttgart, Germany: Klett.
- Kohlberg, L. (1984). Essays on moral development: Vol. 2. The psychology of moral development. San Francisco, CA: Harper & Row.
- Lind, G. (2016). *How to teach morality. Promoting deliberation and discussion, reducing violence and deceit.* Berlin, Germany: Logos.
- Linortner, L., & Patry, J.-L. (2015). *Teaching manual, module 1: VaKE-Tact Values and Knowledge Education and Agogical Tact*. Salzburg, Austria: Unpublished paper, Life-Long Learning in Applied Fields (LLAF), Project 543894 TEMPUS-1-2013-1-IL-TEMPUS-JPHES, Group 4: Learning to Be.
- Patry, J.-L. (2000). Werterziehung und Wissensbildung lässt sich das vereinigen? In C. Metzger, H. Seitz & F. Eberle (Hrsg.), *Impulse für die Wirtschaftspädagogik. Festschrift zum 65. Geburtstag von Prof. Dr. Rolf Dubs* (S. 423-440). Zürich, Switzerland: Verlag des Schweizerischen Kaufmännischen Verbandes.
- Patry, J.-L. (2012). Der Pädagogische Takt. In C. Nerowski & S. Rahm (Eds.), Enzyklopädie Erziehungswissenschaft Online. doi: 10.3262/EEO09120250
- Patry, J.-L. (2014). Die Viabilität und der Viabilitäts-Check von Antworten. In C. Giordano & J.-L. Patry (Eds.), *Fragen! Antworten? Interdisziplinäre Perspektiven* (S. 11-35). Vienna, Austria: Lit.
- Patry, J.-L. (2016a). Thesen zur konstruktivistischen Didaktik. *journal für lehrerInnenbildung*, 16(2), 9-17.
- Patry, J.-L. (2016b) Inquiry learning arrangements from the perspective of critical multiplism and related concepts. In J. Reitinger, C. Haberfellner, E. Brewster

& M. Kramer (Eds.), *Theory of inquiry learning arrangements. Research, reflection, and implementation* (pp. 171-186). Kassel, Germany: Kassel University Press.

- Patry, J.-L., Weinberger, A., Weyringer, S., & Nussbaumer, M. (2013). Combining values and knowledge education. In B. J. Irby, G. Brown, R. Lara-Alecio & S. Jackson (Eds.) and R. A. Robles-Piña (Sect. Ed.), *The handbook of educational theories* (565-579). Charlotte, NC: Information Age Publishing.
- Piaget, J. (1976). Piaget's theory. In B. Inhelder & H. H. Chipman (Eds.), Piaget and his school: A reader in developmental psychology (pp. 11-23). New York, NY: Springer.
- Pintrich, P. R., Marx, R. W., & Boyle, R. A. (1993). Beyond cold conceptual change: The role of motivational beliefs and classroom contextual factors in the process of conceptual change. *Review of Educational Research*, 63(2), 167-199.
- Putnam, H. (1990). *Realism with a human face*. Edited by James Conant. Cambridge, MA, and London, UK: Harvard University Press.
- Reitinger, J. (2013). Forschendes Lernen. Theorie, Evaluation und Praxis in naturwissenschaftlichen Lernarrangements. Kassel, Germany: Prolog.
- Reitinger, J., Haberfellner, C., Brewster, E., & Kramer, M. (eds.). (2016). Theory of inquiry learning arrangements. Research, reflection, and implementation. Kassel, Germany: Kassel University Press. http://dx.media.org/10.19211/KUP9783737601450
- Salomon, G. (1992). The changing role of the teacher: From information transmitter to orchestrator of learning. In F. Oser, A. Dick & J.-L. Patry (Eds.), *Effective and responsible teaching: The New Synthesis* (pp. 35-49). San Francisco CA: Jossey-Bass.
- Schüpbach, J. (2007). Über das Unterrichten reden. Die Unterrichtsnachbesprechung in den Lehrpraktika – Eine Nahtstelle von Theorie und Praktika. Bern, Switzerland: Haupt.
- Vosniadou, S. (ed.). (2013). International handbook of research on conceptual change, second edition. New York, NY: Routledge.
- Vygotsky, L. S. (1978/1997). Interaction between learning and development. From L. S. Vygotsky, *Mind in society* (pp. 79-91). Cambridge, MA: Harvard University Press. Reprinted in M. Gauvain & M. Cole (Eds.). (1997), *Readings on the development of children, second edition* (pp. 29-36). New York, NY: Freeman. http://www.psy.cmu.edu/~siegler/vygotsky78.pdf

THE POTENTIAL ROLE OF ONLINE PLATFORMS IN PPROCESSES OF DIGITAL SOCIAL INNOVATION. FINDINGS FROM THE PROJECT I-LINC

Jens Maylandt *, Bastian Pelka**, Eva Wascher ***, ...

*Researcher, TU Dortmund, Social Research Centre (sfs), Evinger Platz 17, 44339 Dortmund, Germany, Maylandt@sfs-dortmund.de, ** Researcher, TU Dortmund, Social Research Centre (sfs), Evinger Platz 17, 44339 Dortmund, Germany, pelka@sfsdortmund.de, *** Researcher, TU Dortmund, Social Research Centre (sfs), Evinger Platz 17, 44339 Dortmund, Germany, wascher@sfs-dortmund.de.

ABSTRACT

The aim of the I-Linc project (funded by EU's Horizon 2020 research and innovation programme under the grant agreement No 645909: www.i-linc.eu) is to establish an online platform to bring together European stakeholders in the field of ICT for learning and inclusion with regard to youth employability and entrepreneurship. The potential of I-Linc to support processes of Digital Social Innovation is going to be examined in this paper by using the approaches of the quadruple helix of innovation systems, the social innovation pentagon and Digital Social Innovation. I-Linc is as an open access/ awareness network that addresses all actors (types of organisations) of the quadruple helix and fosters the coproduction of knowledge about digital skills (for inclusion), youth employment and entrepreneurship in the areas of society that deal with education and skills as well as with work and employment. Its main strength is the initiation of social learning and coproduction of knowledge. To unfold its potential, I-Linc needs to find ways to raise the activity of the platform users.

INTRODUCTION

To fight youth unemployment is one of the main challenges for the European Union nowadays. On the one hand, companies have to provide more jobs for young people and on the other hand, young people have to provide the skills for vacant jobs. All experts agree that digital skills on a high level are needed to master the digitalisation of work. Working as an employee of a company is one way to get access to the labour market. An alternative pathway is to become an entrepreneur. To motivate and help young people, to gain the skills to become an entrepreneur is an essential part of recent employment politics. At the moment the social subsystems are respecting the communities to deal with "youth employment", "digital skills" and "entrepreneurship" in a nearly disjunctive way. New ways must be found to raise the exchange and collaboration between them. Using die digital infrastructure of modern societies, an online platform could be a place for them to meet.

Creating "platforms" is a typical policy instrument employed (e.g. by the European Commission) in order to support exchange of knowledge or best practice, to assist emerging communities and to better the interrelating activities of different sectors. The research and development project "I-Linc" (http://www.i-linc.eu/), funded by the EU Horizon2020 programme, aims to establish a thematic and regional overarching platform for the exchange of knowledge and good practice in three blending thematic areas: digital skills (for inclusion), youth employability and entrepreneurship.

Beyond the technical meaning of "platform" (in the sense of an online environment for networking, participation and learning), it primarily has the ambition to consolidate a committed and active community of stakeholders working on ICT (for) learning and inclusion to boost young people's employability. Employability, in turn, encompasses the most common modalities that can result in active participation of young people into the economy: employment contracts, internships, apprenticeships, volunteering, self-employment and entrepreneurial activities. Finally, the efforts of all stakeholders will join to achieve maximum relevance for the end users; this is only possible if end users (i.e. the youngsters) are actively involved along the process – from identifying their needs to building appropriate solutions.

Right now the I-Linc project enters its last year. In this article we will present a theoretical frame consisting of the approach of Social Innovation or, more nearer to our subject, Digital Social Innovation. We will use Brias components of Digital Social Innovations (DSI) (Bria, 2015) to describe I-Linc as a Digital Social Innovation respectively to show in which contexts I-Linc could support innovation processes. Then we use the approaches of the quadruple helix innovation system (Carayannis et al., 2012, p. 52) and the social innovation pentagon (Howaldt et al.

2014, p.159) to prove the social innovativeness of the activities in I-Linc. Therefore, we evaluate the several components of the online platform in a critical way and refer to the results of a desk research and an online survey, both undertaken at the beginning of the project. Finally, we are going to draw some conclusions.

SOCIAL INNOVATION AND DIGITALISATION

Since more than ten years, the paradigm of social innovation has taken place in the debates in the fields of social sciences and politics. The new aspect of this approach is its perspective on the development of innovations by keeping the technical standpoint (as far as possible) aside. This emphasis of "the social" with respect to the terminus "innovation" is pointed out by the definition of Howaldt et al.: "[...] social innovation is a new combination of social practices in certain areas of action or social contexts with the goal of better satisfying or answering social needs and problems than is possible on the basis of existing practices" (Howaldt et al. 2014, p.3).

Referring to this definition, much of empirical investigations has been enquired and scholars have discovered numerous social innovations all over the world (e.g. Howaldt et al., 2016, Domanski et al., 2015). We have been reflecting an inventory of more than 1000 cases of social innovations investigated during the SI Drive project, funded by the European Commission's 7th Frame Work Program. The project team draws a huge sum of conclusions in reference to the question of which actors need to develop social innovations, and how actors have to deal with the institutional setting that is framing their field of intervention. At this point we mention, with respect to the issues of this paper, two approaches covering most aspects that are needed to make social innovations come true. Those are namely the approaches of the social innovation pentagon (Howaldt et al., 2014) and the quadruple helix of innovation actors (Carayannis et al., 2012, p.52). Quadruple helix constellations comprise actors from research, economy, civil society and policy. The quadruple helix system of innovation emphasises the interplay of actors from the fields of academia, economy/industry, state and the civil society. In order to develop a sustainable social innovation, the contribution of these four actors exhibits a high necessity. We are going to use this approach later to reflect the results of the surveys done for the I-Linc project.

One main result of the mentioned inventory of social innovations is a pentagon that illustrates the key dimensions of developing, diffusion and maintaining social innovations:

- Actors, networks and governance: Find roles and new concepts
- Concepts: Analysing social practices

- Social needs: Analysing ambivalences of social innovation
- Resources: Capacity building, empowerment & conflict
- Process dynamics: Use different mechanisms of diffusion (Howaldt et al., 2014, p. 159)

We will use this model later when we describe how the I-Linc project can contribute to social innovations by linking the fields of ICT for learning and inclusion, youth employment and entrepreneurship.

DIGITAL SOCIAL INNOVATION

Regarding the quadruple helix innovation system and the social innovation pentagon, it is not surprising that a diversification of the research approaches concerning social innovation has happened. Taking I-Linc's background in consideration, which is providing an online platform in order to link actors from the fields of digital skills, youth employment and entrepreneurship, we now have a closer look on the approach of Digital Social Innovation (DSI).

Howaldt et al pointed out the role of ICT concerning the development, diffusion and maintaining of social innovations: "More recent developments of post development, human development and related theories emphasise the power of ICT to enable instantaneous communication and linking up the global scale between different actors, as well as to empower new actors and to access and better exploit new resources." (Howaldt et al. 2014, p. 50).

In their study on the influence of ICT on the development of an inclusive society, Eckhardt et al. found out that ICT/DSI is a significant component of a sustainable process of inclusion (Eckhardt et al., 2016). They identified a catalyst function of ICT for social innovation. ICT facilitates the interaction of actors concerning the factors time and mobility (Eckhardt et al., 2016, p. 191). Furthermore, they assume "a strong role of digital/social media for today's social innovation empowerment activities: A lot of today's social innovation activities are driven by social entrepreneurs cooperating via social media or addressing digital inclusion" (Eckhardt et al., 2016, p. 181).

The first holistic approach to describe the phenomena of "Digital Social Innovation" was undertook by Francesca Bria and her colleagues (Bria 2015). She defines Digital Social Innovation as "a type of social and collaborative innovation in which innovators, users and communities collaborate using digital technologies to co-create knowledge and solutions for a wide range of social needs and at a scale and speed that was unimaginable before the rise of the internet" (Bria, 2015, p. 9).

To describe Digital Social Innovations systematically, the components "domains of DSI", "involved organisations", "technological trends" and "areas of society" are used.

Six **domains of DSI** were identified: *Collaborate economy* (e.g. sharing economies, crowdfunding, platforms for exchange resources), *new ways of producing* (free 3D manufacturing tools, CAD/CAM software, open source designs; Fab Labs and maker fairs as places of collaborative development), *open democracy* (e.g. transforming the model of representative democracy by collective participation to decision making processes, mass mobilisation by social media), *funding acceleration, incubation* (e.g. seed funds, access to co-working spaces, free business support), *open access* (e.g. open university, in general open access to knowledge, digital rights and so on) and *awareness networks* (e.g. platforms to solve environmental issues and/or to achieve behavioural changes) (Bria, 2015, p. 24).

Five types of **organisations** that could be **involved in DSI** were named: Social enterprise, charity or foundation; Business; Grass roots organisations or community network; Academia and research as well as government and public sector (Bria, 2015, p. 37).

The **technological trends** influencing DSI are *open networks* (e.g. open WiFi internet access, free interoperable network services), *open data* (e.g. open innovation, internet of things, free data provided by cities for everyone/local stakeholders), *open knowledge* (e.g. coproduction of knowledge based on open source and open access) and *open hardware* (e.g. blueprints for technological self-made products) (Bria, 2015, p. 46).

Last but not least, Bria presents the **areas of society** which constitute the several institutional settings for the development, diffusion and maintaining of DSI: *Health and wellbeing, finance and economy, energy and environment, participation and democracy, smart public services, science and technology, education and skills, culture and arts as well as work and employment* (Bria, 2015, p.48).

From our point of view the described criteria could be very useful for the analysis of Digital Social Innovations. However, they have to be combined with more general approaches like the Social Innovation Pentagon to get the whole information about the (social) innovativeness of some social action. We will later try to do so exactly this way to examine the I-Linc project concerning its potential contribution to social innovation processes.

The I-Linc Project

As already mentioned, the main product of the I-Linc project is an online platform that brings together actors/communities operating in the fields of digital skills (for inclusion), youth employment and entrepreneurship. The focus lays on institutional actors (e.g. projects, non-governmental organisations, enterprises, universities, official bodies) and already existing communities, but the platform also addresses end users like for example young people or teachers.

Registered users of the platform are able to use several services concerning information and interaction with other users: A broad collection of articles and tools, which were uploaded by the project team or other registered users, offers information about results of scientific research, position papers and reports on conferences.

Furthermore, a collection of current policies (initiatives, memoranda, position papers, whitebooks), the so-called policy hub, is provided to actors, who need to get an overview of recent political developments to participate in the debates. One important aspect of (even online-) community building is the option to meet

face to face. Mostly this happens via conferences or workshops. Thus the I-Linc platform provides a calendar of events that shows important events in the fields of digital skills, youth employment and entrepreneurship. Users can look up the events and add events by themselves.

Users searching for inspiration in order to develop new projects or initiatives can find ideas by studying the section "Best Practices", which is presented on the platform as well. One section that directs to the end users themselves shows socalled learning opportunities. In this section, teachers and educators find innovative concepts for teaching with digital media and proposals on how to teach the use of digital media.

To gain straight learning input, users can participate to the several webinars that offered on the platform as well. To foster collaboration and network processes, users can find a stakeholder database on the platform, where they can use the searching filters to find potential partners for new collaborative activities, projects or interesting actors for exchange. At the moment, more than 200 stakeholders are listed.

The most interactive chapter of the platform is the Wikinclusion, which is a discussion forum with the option to load up pictures, videos and other media as well as texts. In the Wikinclusion users can discuss several topics or they can collaborate online, for example to develop a common position paper, as it was done by some young people who wrote down policy advices concerning their wishes of support in the digital world.

Actors in the fields of ICT for learning and inclusion, youth employment and entrepreneurship

Referring to Carayannis et al. (2012) a collaboration of research, economy, civil society and policy is needed to build a quadruple helix innovation system. Two surveys, a desk research and an online survey done by the I-Linc team, shed a light on the collaboration between the actors in the fields of digital skills (for inclusion), youth employment and entrepreneurship and showed the chances and barriers actors face in their daily work.

For the desk research report in spring of 2015 the project partners (Telecentre Europe, European Schoolnet, TU Dortmund and Telefónica) provide the most important actors and initiatives from their point of view in the field of I-Linc. They collected 126 cases of actors and initiatives. The following online survey in autumn of 2015 consisted of 24 questions and aimed for an in-depth understanding of the existing platforms. The results are not representative. There is no defined population that includes all organisations, projects and networks that deal with ICT, Learning, Inclusion, Youth, Education and Training, Employability and Entrepreneurship. Thus neither a full survey nor a sampling could be performed. Nevertheless, the I-Linc team is in contact with key players from these areas, which indicate their willingness to distribute as multipliers for the online questionnaire on their networks. The sample was created by key stakeholders on the basis of relevance assessment. The dynamic sampling based on the actors expertise is fundamentally different from the orthodox approach to use existing registers or databases, but offers the option of integrating relevant actors, which are not covered by an ex ante defined population. The retrieved data was used to build a public repository of existing platforms (the stakeholder database mentioned above); this repository allows mapping, external analysis and a tag related as well as a filter-based research. It is also open for entrees by other stakeholders and therefore functions as a meta-platform.

The desk research included 126 organisations, projects, communities or official bodies. Some of them belong to more than one helix strand. 42 actors (somehow) assign to the strand 'civil society and third sector', 37 actors show features of 'academia and education', 71 belong to 'industry' and 39 to the 'state' strand. Discovering the collaboration activities of the actors, we can state that about half of the I-Linc stakeholders within each sector do not cooperate with actors in other sectors. On the other hand, nearly 50 percent of the actors in each sector are part of a cooperation.

We found two collaboration networks that include all four strands of the quadruple helix. Eight cooperation networks comprise of three sectors. The majority of cooperation is double sector collaborations (36 in sum). For example, collaborations between state and civil society actors (3), state actors and actors from academia and education (5) as well as industry actors and civil society actors (15) and at last, the cooperation between industry and academia (6).

Regarding these results, we argue that existing stakeholders (e.g. platforms) are not fully reaching their potential impact, due to the fact that the links between them are low, thus, this prevents them from profiting from each other. If we agree on applying a quadruple helix approach there is a clear need for a better inter-sectorial linkage. The "buying argument" could be the possible higher impact and innovativeness. First of all the actors from the different helix strands need a place, where they can easily meet. The I-Linc platform aims to implement such a meeting place in order to raise quadruple helix cooperation. Nevertheless, we found some collaborations that show a good potential to become social innovations. They could be highlighted as Best Practices.

A common analysis of desk research and online survey shows that most of the existing platforms, networks, communities, organisations and projects have a high thematic focus on ICT, youth, education and employability. Only a few organisations and projects have an important focus on inclusion and entrepreneurship. Most of the organisations and projects belong to the third sector; the majority of the described stakeholders operates on local, regional or national level, but there are a couple of stakeholders, which operate all over Europe or even worldwide. The three most mentioned barriers for success are funding challenges, a lack of personnel and a lack of public awareness.

The answer of the question of which benefit each sector might need requires further investigations. By researching the barriers and success factors for a stronger collaboration of the four strands of the quadruple helix we aim to give recommendations how to strengthen collaboration in the future.

I-Linc: A Digital Social Innovation?

As the results of the desk research show, there is a significant need to raise collaboration between the four helix strands. Now we are going first to characterise the I-Linc platform by using the criteria for Digital Social Innovation introduced by Bria (2015) we have described above. Later on, we will use the social innovation pentagon to check how I-Linc can contribute to social innovation processes.

Characterising I-Linc in terms of Digital Social Innovation

Regarding the six **domains of DSI**, the I-Linc platform characterises itself as a mixture of open access and awareness network; it provides open access to many sources of knowledge and users are able to share their knowledge with each other.

I-Linc points out its mission explicitly: Raising digital skills and the willingness of young people to become entrepreneurs in order to contribute to qualitative and quantitative rise of youth employment.

Due to the fact that the **types of organisations** that contribute to DSI according to Bria (2015) are quite similar to the quadruple helix, we can state that I-Linc addresses all types of organisations Bria mentioned.

In respect to the **technological trends** presented by Bria, we assume that I-Linc matches best with the trend of open knowledge. One main feature of open knowledge is the coproduction of knowledge. Coproduction of knowledge is a genuine goal of I-Linc. The main area on the platform for the co-creation of knowledge is the Wikinclusion, which enables online collaboration between the users.

I-Linc mainly takes place in the **areas of society** that Bria has labeled 'education and skills' as well as 'work and employment'. Regarding the stakeholders it seems clear that they mostly deal with the skills for work and employment.

Finally we can characterise I-Linc as an open access/ awareness network that addresses all actors (types of organisations) of the quadruple helix and fosters the coproduction of knowledge about digital skills (for inclusion), youth employment and entrepreneurship in the areas of society that deal with education and skills as well as with work and employment.

I-Linc and the Social Innovation Pentagon

At the beginning of this paper we referred to the approach of the Social Innovation Pentagon (Howaldt et al., 2014). Howaldt et al. introduced the model of the Social Innovation Pentagon as a theoretical framework to analyse social innovations (Howaldt et al., 2014, pp. 151-159). We shift away from this procedure and try to use the Social Innovation Pentagon for a formative analysis. By considering the description of the I-Linc platform and the results of the surveys, we discussed before, we will try to examine the chance for the I-Linc platform to contribute to sustainable social innovation processes.

Regarding **actors**, **networks and governance** we can recur to our analysis by using the quadruple helix approach. All the strands of the helix are represented by the user respective stakeholders of I-Linc. At this point of time, we have to assume that the main reason for the actors to join the platform is to get more information about recent developments in the fields of digital skills, youth employment and entrepreneurship. Furthermore, they are interested in the way I-Linc tries to link the three mentioned fields. Thus the main challenge is to foster collaboration and exchange on the platform. The stakeholder's membership offers good access to the relevant stakeholders, but it lacks of active participation in the potential activities the platform provides.

The next peak of the Social Innovation Pentagon labels **concepts and understanding**. Indeed, this is a category, which is more fruitful for theoretical ex post analysis than for formative investigation of potentials. However, we can say that I-Linc supports stakeholders by providing collaboration and exchange structures to develop new concepts and later on new social practices (which are only partly result of intended action) in order to link the fields of digital skills, youth employment and entrepreneurship.

Taking in consideration the **addressed societal needs and challenges**, we can state that I-Linc is one consequence of those needs and challenges. The European Commission has detected the issue of the lack of digital skills nearly ten years ago. Now it is up to I-Linc (and other projects and actors) to translate this societal need into the institutional codes and scripts of the addressed actors. The first step should be to raise the actor's awareness of how, for example, digital skills could foster youth employment, or that entrepreneurship is a certain field of work that requires certain digital skills and so on. Thus, the platform needs to implement an exchange about those questions.

The next peak to be examined is called **resources**, **capabilities & constraints**. Using this category requires a running process that needs to be further examined. Thus, we have to leave it aside right now. The function of I-Linc takes place on a lower level; the platform should encourage the actors to extend their view and their fields of intervention. A new process, which requires resources and (sometimes) causes conflicts, is the next step, and it is uncertain if the platform could be the centre of this process.

The last peak of the Social Innovation Pentagon characterises **process dynamics**, which includes mechanisms of diffusion like social learning or imitation. Supporting social learning is one of the main goals of I-Linc. The platform provides Best Practices and Learning Opportunities in order to start processes of imitation on a European level. The targeted processes of social learning shall be raised by the exchange of actors or the common development of new ideas and concepts in the Wikinclusion space of the platform.

Regarding the result of this examination, we can determine that the I-Linc platform has the potential to initiate and develop social innovation processes. As the first two years of the project taught us, the main challenge is to motivate actors to participate to the actions on the platform. Our experiences show that the key could be the combination of live events and the further interaction on the platform. Many sessions at the Eapril Conference 2016 taught us that (learning) platforms need a "real", tangible background. They can help to continue discussions or the development of ideas on the platform, which were started in face to face conversation. Therefore the I-Linc project provides numerous workshops, or sessions at several conferences to build the basis for further collaboration on the I-Linc platform.

After this short formative analysis we can conclude, that an online platform like I-Linc can be an important catalyst for (digital) social innovation processes. The online collaboration of actors can conform all the needs for a social innovation illustrated in the Social Innovation Pentagon.

CONCLUSIONS

To face current social challenges like youth unemployment, social innovations are required. The project I-Linc, funded by the Horizon 2020 program of the European Commission, implemented an online platform that brings together actors from the fields of 'digital skills (for inclusion)', youth employment' and 'entrepreneurship', which mostly operate nearly disjunctive at the moment. Therefore, I-Linc provides, for example, information in different forms like tools, articles and best practices. In addition, the platform includes a database where actors can search for new partners. Finally yet importantly, the Wikinclusion is the most interactive section of the platform where users have the ability to discuss about several issues or develop new ideas (for example policy advices).

The research concerning social innovations provides several approaches to examine social innovations and the conditions that have to be fulfilled for the developing, the diffusion and the maintaining of social innovations. The use of the quadruple helix of innovation systems (Carayannis et al., 2015) helps to analyse if a potential social innovation process includes actors from all helix strands (academia, industry, state, civil society). The model of the social innovation pentagon, which matches best with ex post analyses, can also be used to estimate the potential of projects like I-Linc to support social innovation processes. The concept of Digital Social Innovation that was developed by Bria (2015), helps us to describe and characterise social innovation processes which are based mainly on the interaction via digital media.

By using Bria's criteria for describing Digital Social Innovation, we can characterise I-Linc as an open access/ awareness network that addresses all actors (types of organisations) of the quadruple helix and fosters the coproduction of knowledge about digital skills (for inclusion), youth employment and entrepreneurship in the areas of society that deal with education and skills as well as with work and employment.

A desk research discovering the collaboration between the quadruple helix strands in the fields of digital skills, youth employment and entrepreneurship points out that there is a strong need to foster exchange and collaboration between these actors. Thus, the I-Linc platform could be a low threshold for more interaction.

Regarding the Social Innovation Pentagon (Howaldt et al., 2014) to examine the potential of I-Linc to support Digital Social Innovation processes, we can state that I-Linc addresses all the relevant actors. Furthermore, because of the opportunities of a digital platform, I-Linc is able to get in touch with the actors immediately in different ways. The ongoing debates on the national and the European level about the lack of digital skills and the importance of entrepreneurship for the future economy verify that I-Linc addresses real societal needs and challenges. The main strength of I-Linc is its potential to support processes of social learning and coproduction of knowledge.

However, to unfold its innovative powers I-Linc needs to find a way to reach a higher degree of user participation. One way to reach more interaction on the platform is to exploit offline events like conferences and workshops as starting point for further interaction and collaboration on the platform.

REFERENCES

- Bria, F. (2015): Growing a Digital Social Innovation ecosystem for Europe. DSI final report. Retrieved from: https://www.nesta.org.uk/sites/default/files/dsireport.pdf
- Carayannis, E. G.; Campbell, D. F.J (Eds.) (2012): Mode 3 Knowledge Production in Quadruple Helix Innovation Systems. New York, NY: Springer New York.
- Domanski, D., Howaldt, J., Villalobos, P. & Huenchuleo, Carlos (2015): Social innovation in Latin America. The Chilean case. Santiago, Chile: Cieplan, 2015
- Eckhard, J.; Kalteka, C., Pelka, B. (2016): New Initiatives for the Empowerment of People with Activity Limitations – An Analysis of 1,005 Cases of (Digital) Social Innovation Worldwide. In: M. Antona and C. Stephanidis (Eds.) (2016): UAHCI 2016, Part I, LNCS 9737, pp. 183–193
- Howaldt, J., Schröder, A., Kaletka, C., Rehfeld, D., Terstriep, J. (2016): Comparative Analysis (Mapping 1). Mapping the World of Social Innovation: A Global Comparative Analysis across Sectors and World

EAPRIL Conference Proceedings 2016

Regions. A deliverable of the project: 'Social Innovation: Driving Force of Social Change' (SI-DRIVE); Dortmund: Sozialforschungsstelle

Howaldt, J. Butzin, A., Domanski, D., Kaletka, C. (Eds.) (2014): Theoretical approaches to social innovation - a critical literature review. A of the project: 'Social Innovation: Driving Force of Social Change' (SI-DRIVE); Dortmund: Sozialforschungsstelle

ART AND MUSIC HELP REFUGEE CHILDREN TO LEARN THE SCHOOL LANGUAGE

Karen Reekmans*, Catherine Roden**, dr. Kris Nauwelaerts***

*lecturer and researcher at the University College PXL-Education, Elfde-Liniestraat 24, Hasselt (Belgium), karen.reekmans@pxl.be, ** lecturer and researcher at the University College PXL-Education, Elfde-Liniestraat 24, Hasselt (Belgium), catherine.roden@pxl.be, *** lecturer and researcher at the University College PXL-MAD School of Arts, Elfde-Liniestraat 24, Hasselt (Belgium), christiaan.nauwelaerts@pxl.be

ABSTRACT

This paper reflects on the added value of active learning in artistic workshops to learn the school language Dutch, spoken in the Northern part of Belgium. The purpose of the practice-based research project "taalCULTuur" (time for language & culture) is to develop stimulating and easy-to-implement strategies to guide children in their learning process, in cooperation with experienced teachers and professional practitioners. We are convinced that art and culture encourage refugee children, if not all children, to express themselves and learn the school language in a safe and effective way. Moreover, integrated strategies strengthen the self-image of the children. Here, we present the framework we developed for the acquisition of the school language reinforced with elements of visual art, music, drama and active learning.

INTRODUCTION

Due to the refugee crisis, the number of newly arrived pupils has doubled in the Flemish education system in Flanders and Brussels, Belgium (Crevits, 2016). This has led to a new challenge for teachers in primary schools. The multilingual school environment urges teachers to apply optimal strategies for second language acquisition. To encourage the participation of pupils with a recent migrant background at school, teachers need to invest in the potential of each and every young child. Reinforcing appropriate assistance and welcoming diversity is a collective responsibility of all school actors. The purpose of our research "taalCULTuur" is to help non-native speaking children to acquire the school language in a safe and encouraging multilingual primary school environment. First results indicate that linguistic strategies for second language learning (L2) have much common ground with visual art, music, drama and active learning. This learning process includes cognitive aspects, as well as psychosocial, cultural and musical components. That is why we expect that the integration of various artistic disciplines in combination with active learning makes the language-learning process more attractive and longlasting. The learning curve increases when the children are actively or experimentally involved in a task that includes a real need to communicate.

The research project "taalCULTuur" is developed and implemented in co-design by researchers and students of the PXL University College in Hasselt, Belgium in cooperation with experienced teachers and other professional practitioners of L2 in primary education. Three departments are involved: bachelors of teacher training in primary education, of music performance and of visual arts.

METHODOLOGY

This study is carried out in Flanders, the Dutch speaking part of Belgium. Four primary schools, 37 students, 33 teachers and 15 experts of language and artistic areas are involved. In the first phase, a theoretical framework was designed based on a review of literature on linguistic mechanisms, problem-based learning and multiple literacy skills that influence equity in education. In parallel, professional practitioners are consulted in focus groups to gather good practices and evaluate the feasibility of our theoretical framework and artistic workshops. In a second phase, the context of schools with a multilingual language policy is analysed. In a third phase, the practitioners adopt these effective strategies through educational design research. Finally, a guide with attractive, clear and easy-to-implement strategies and workshop examples is developed in collaboration with students of teacher training in primary education, music performance and visual arts. These
students volunteered to create an artistic based workshop in which refugee children learn the school language.

THE MULTILINGUAL CHILD

Underprivileged children in Flanders, as elsewhere, often lack essential language skills. This has a negative impact on their school results (SALK, 2013). Young children easily learn a new language and do not experience difficulties in adopting a correct pronunciation, even if they do not speak the school language at home. Result-oriented research on teaching methods and didactic techniques used in the teaching of Dutch as a Second Language show that their passive knowledge is bigger than their active language production (Kuiken & Vermeer, 2014). The fact that children struggle to put words together to say things in a meaningful way, does not necessarily mean they do not understand what you say. A poor command of the school language (i.e. Dutch) does not give us information on learning capacities (Gielen & Isci, 2015). That is why teachers need to identify the learning potential of these pupils and challenge them with motivating tasks and individual support, well-adapted to their multiple needs (Verrips & Dekkers, 2002), especially if pupils have a slow rate of subject content coverage due to their past school experience. Although newly arrived pupils often suffer from social and emotional trauma and experience cultural differences, they generally are very motivated to integrate into the new society and make progress at school. Not only the social and cultural background of the child, but also its cognitive and learning potential and affection, the valorisation of school effort and the support of the parents are key elements for school success (Meeus, 2012).

THE FRAMEWORK 'TAALCULTUUR'

If we want newly arrived pupils with a poor command of the school language, but a high learning potential, to acquire the school language in a safe and encouraging multilingual environment, we need to develop easy-to-implement strategies for teachers. We are convinced that the integration of arts and active learning stimulate children to learn the school language and strengthen their self-esteem. Children will not only learn the school language, but also the artistic languages of the artforms involved. Active learning will encourage them to take ownership for their personal development. Communicating in the classroom with respect for each other's cultural background will enrich the perceptions of themselves and others as equal actors in a multilingual society. That is why we choose 'multiple literacies' as a way of education that maximizes children's school success by focusing on their cognitive and creative learning potential, their different learning styles and their cultural identity (Gardner, 1983).



Figure 1. Framework taalCULTuur Reekmans, K., Nauwelaerts, K., Roden, C. (2016)

Here, we discuss the four key elements of our framework: task, interaction, context and attitude.

A meaningful and challenging 'task'

As a result of our literature review, we found that strategies of second language learning (L2) have much in common with strategies for visual art, music, drama and active learning. First of all the teacher needs to prepare a meaningful task in a rich context. A task is meaningful when it meets the learning capacities of the pupil and the teacher clearly communicates the goal of the task. Experience shows that most pupils are eager to learn. Teachers need to give them challenging tasks respecting past school experience, in spite of the language barrier. This means that the teacher has to differentiate his approach in the heterogeneous multilingual class.

To clarify the instruction, the teacher visualizes what he says with illustrations, gestures, sounds and other meaningful material (Van Beek & Verhallen, 2004; Smegen, 2012). He models his thinking and asks the pupils which strategies he could apply. This technique is based on the Gradual Release of Responsibility Instructional Framework (Pearson & Gallagher cited by de With et al., 2013, p. 18) built on the theories of cognitive structures and scheme of Jean Piaget (1989) and research on zones of proximal development of Lev Vygotski (1978). The teacher starts by asking questions to activate the pupil's pre-knowledge and gradually moves towards more independent learning. In our workshops, we started with the observation of real objects, illustrations or other input in a familiar situation rather than abstract information from books (van Silfout, 2015). To explain the learning strategies, the teacher focuses on visual and oral support. This helps the pupils to understand and memorize the concept (Frey & Fisher, 2008; Daems et al., 2004). In addition, research shows that when you stimulate children to convert new information into mental images that constitute a crucial aspect of the creative processes of drama and visual art (Arnheim, 1997; Gombrich, 2002), this leaves a lasting impression (Nuthall cited by Marzano, 2012).

Once the children understand the task, they learn by doing, not only to gain insights into the concept, but also to learn new words. Specifically for vocabulary acquisition, it is important that most of the selected words are new for the pupils (Kuiken & Vermeer, 2014; van den Nulft & Verhallen, 2009), which is not always easy to establish in a heterogeneous multilingual class. When PXL students prepare their workshop, they select frequently used words that pupils can apply in different situations or words that are essential for the given context (de With et al., 2013).

'Interaction' in multilingual groups

Active language learning is more effective when you challenge children with a task that includes a real need to communicate. When children depend on each other to find solutions for a problem, they practise the school language in a functional and meaningful context (Daems et al, 2004). Cooperative learning in small groups gives pupils the opportunity to work together. The children do not only learn the subject matter, but also make progress in problem solving and interpersonal skills.

The teacher guides the instruction by asking questions to prompt the pupil's learning understanding. We call this scaffolding (Beeker et al, 2008). This learning situation encourages the children to interact (van de Keere et al., 2009; Wagensveld et al., 2014). Rich illustrations, gestures, familiar sounds and real materials help children to understand the language. Sensory perceptions improve

the pupil's memory and reinforce passive understanding (Frey & Fisher, 2008). Images, gestures or drawings can help pupils to interact and to explain new insights by means of non-verbal communication in case they do not know the correct words in the school language (Smegen, 2012). It is possible that children make different interpretations of a given reality. It is likely that they make different drawings based on their personal imagination, influenced by their socio-cultural and emotional background (Gardner, 1980). The reflection on this variety in expression also develops their critical thinking skills (Frey & Fisher, 2008). According to Bjørkvold (1992), schools tend to damage creativity and spontaneity by discussing the intended result instead of the rich diversity of interpretations and of the creative process. Of course, verbal interaction and reflection is only possible when children have a sufficient grasp of the school language.

Interaction in multilingual groups also stimulates the intercultural dialogue. Children learn that each culture has its own norms and values (van Keulen & Oosterheert, 2011). They also find out certain conversational taboos. Not all children are allowed to say what they think, give arguments and reflect upon input of others. Respectful interaction between children with different cultural backgrounds reinforces an open mind.

A safe and stimulating 'context'

A rich context has two important elements. On the one hand, the teacher creates a safe learning environment with specific familiar objects, illustrations and sounds in order to make sure children feel at ease and understand the goal of the workshop. On the other hand, he focuses on a stimulating learning environment that motivates pupils to participate e.g. by providing a task with an unexpected outcome.

First of all, children have to feel secure. A pupil's engagement depends on the input he can give depending on his language skills, personal talents and cultural identity (Daems et al, 2004). Children in multilingual classes are usually not able to express their emotions in the school language, but they can show it with gestures (de Nooij, 2004) or by drawing, dancing, moving, singing or making sounds. Teachers should be open to children using their home language once in a while (Van Praag, 2016). If you banish the home language at school, you reject an important part of the identity of the child (Verrips & Dekkers, 2002). This has an impact on their well-being and self-esteem. Research shows that an open-minded school policy has a positive effect on friendship in the classroom (Van der Wildt, 2016).

Children also feel at ease when verbal communication is enriched with non-verbal elements they feel familiar with. That is why we encourage our PXL students to use a wide variety of illustrations and sounds with influences from different

cultures when they give their workshop. They use the technique of modelling when they explain the instruction. They add oral and visual support to enable interaction between pupils.

A positive 'attitude' of the pupils and the teacher

Arts education focuses on the talent of each child to make mental images of their world (Van Hulle, 2008). By its very nature every child is an artist and has an inherent need to create things based on his imagination. If teachers coach and stimulate the pupils with enthusiasm children will implement what they learned using drama, visual art and sounds. The limited vocabulary will not be an obstacle to communication.

Drama and visual art focus mainly on imagination and creativity, but will also have a positive effect on the personal development of a child (de Nooij, 2004; Van Hulle, 2008). Children will discover that there are different ways to draw a same concept and that all drawings are valuable. Thanks to drama children reflect on the impact of their performance and overall behaviour (Smegen, 2012; Van Hulle, 2008; De Nooij, 2004). They also learn to respect and appreciate other children. Drama makes them emotionally stronger (de Nooij, 2004). Marzano (2012) showed that the integration of artistic disciplines reinforces teaching. Children memorize words better on a longer term. In addition, art education and active learning improve critical thinking skills and creative problem solving.

THE STORY OF SAM

Students of PXL-Education, PXL-Music and PXL-MAD School of Arts created artistic based workshops in co-design with the researchers and a music coach. At least one student of every department was involved in each group. Although students tried to focus on all disciplines, one specific artistic domain predominated in each workshop and the others reinforced or supported the main goal.

As an example we will discuss the workshop 'digital storytelling'. In a first phase, the PXL students introduced different emotions with jabbertalk (an invented language to express emotions) in combination with human piano (the body functions as a piano). Then they told a story with rich illustrations. Sam was their main character. They gave him an international name that did not reveal the gender. Children could interact and reinforce the emotions of the character by adding illustrations of faces that expressed various gradations of the same emotion. They were stimulated to use the target words, but the main focus was passive comprehension of the words used to name the emotions. In a second phase, the children created their own story with visual art, drama and music. The pupils were encouraged to use their imagination and creativity. Reflection on their work was an opportunity to use the new words in interaction. During this workshop they did not only learn the words to name emotions, but also words they needed to reflect on the process, for example: 'This sound is 'low'. The rhythm is 'slow'. The music is 'loud'. I am 'scared'. I draw 'big' eyes.' After they had found out the meaning of the new words through active learning, pictograms were introduced to the pupils in combination with these words.

The implementation of the strategies introduced by the theoretical framework 'taalCULTuur' showed an increase of the engagement and interaction of the pupils. The school teacher evaluated the knowledge of the key words the day before and the day after the workshop. This evaluation showed that children had actually learned new words. Each workshop was filmed and analysed by the students and the researchers. This analysis showed that differentiation is important to make sure that all children stay involved. It was remarkable that children of all ages and cultures were incited by the different artistic languages of the artforms involved. As they wanted to share their enthusiasm with their friends, they were stimulated to communicate in the school language in a safe and meaningful environment.

CONCLUSION

The integration of visual art, drama, music and active learning in second language acquisition creates meaningful tasks in a safe and stimulating learning environment. Focusing on creativity and talent in heterogeneous groups enables an equal participation of all pupils and increases the feeling of connection and solidarity. Visuals help children to understand the language and to communicate with each other if they are not able to express the words in the school language. The repetition of the key words in all activities of the workshop helps the pupils to memorize them in a significant way. Mental images reinforce the acquisition of the school language and leave a lasting impression.

In a next phase of the research, all workshops developed in co-design are tested by experienced teachers in multilingual classes. They evaluate if the strategies of our framework are applicable and are asked to give alternatives in order to add possibilities for variation or differentiation of the learning process. Finally, we ask them to give feedback on the added value of artistic workshops to learn the school language.

REFERENCES

- Arnheim, R. (1997). Visual thinking. Berkeley/Los Angelos/London: University of California Press.
- Beeker, A., Canton, J., & Trimboos, B. (2008, September 30). Scaffolding, technieken om MVT leerlingen hoger te laten reiken. Opgehaald van Nationaal expertisecentrum leerplanontwikkeling: http://downloads.slo.nl/Repository/scaffolding.pdf
- Bjørkvold, J. (1992). De Muzische Mens, het kind en het lied-spelen en leren in alle levensfasen. Rotterdam: Ad. Donker.
- Crevits, H. (2016, mei 11). 780 bijkomende leraren in onthaalonderwijs voor anderstaligen in Vlaanderen en Brussel. Opgehaald van hildecrevits.be: http://www.hildecrevits.be/nl/780-bijkomende-leraren-onthaalonderwijsvoor-anderstaligen-vlaanderen-en-brussel
- Daems, F., Van den Branden, K., & Verschaffel, L. (2004). Taal verwerven op school. Leuven: Acco.
- de Nooij, H. (2004). Kijk op spel. Groningen: Wolters-Noordhoff.
- de With, T., Visser, M., & Puper, H. (2013). Woordenschatonderwijs, meer dan woorden leren. Amersfoort: CPS Onderwijsontwikkeling en advies.
- Dewey, J. (2005). Art as experience. New York: Penguin.
- Frey, N., & Fisher, D. (2008). Teaching Visual Literacy. Using comic books, graphic novels, anime, cartoons and more to develop comprehension and thinking skills. Thousand Oaks: Corwin Press.
- Gardner, H. (1980). Artfull Scribbles. New York: Basic Books.
- Gardner, H. (1983). Frames of Mind. the Theory of Multiple Intelligences. London: Harper Collins.
- Gielen, S., & İşçi, A. (2015). Meertaligheid: een troef! Sint-Niklaas: Abimo.
- Gombrich, E. H. (2002). Art and Illusion. Londen/New York: Phaidon.
- Go!Gemeenschapsonderwijs. (2010). Woordenschatontwikkeling anderstalige instappende peuters en kleuters. Brussel: Go!
- Kuiken, F., & Vermeer, A. (2014). Nederlands als tweede taal in het basisonderwijs. Amersfoort: ThiemeMeulenhoff.
- Marzano, R. (2012). De kunst van wetenschap van het lesgeven. Vlissingen: Bazalt.
- Meeus, W. (2012). Didactisch referentiekader, handleiding bij de lesvoorbereiding. Leuven: Acco.
- Piaget, J. (1989). The language and Thought of the Child. London: Routledge.

EAPRIL Conference Proceedings 2016

- SALK. (2013). Strategisch actie-programma Limburg². p. 54: VR2013.1507.DOC.0813/1.
- Smegen, I. (2012). Speel je wijs: theater, drama en spel voor taalontwikkeling op de basisschool. Assen: Van Gorcum.
- van Beek, W., & Verhallen, M. (2004). Taal een zaak van alle vakken. Bussum: Coutinho.
- van de Keere, K., Mestdagh, N., Dejonckheere, P., & Lecluyse, T. (2009). Wetenschap in de basisschool: een didactisch model, praktijkgids voor de basisschool. Antwerpen: Plantyn.
- van den Nulft, D., & Verhallen, M. (2009). Met woorden in de weer. Een praktijkboek voo het basisonderwijs. Bussum: Coutinho.
- Van der Wildt, A. (2016). Een talig divers leerlingenpubliek: het thuisgevoel en de vriendschapsrelaties van leerlingen op diverse scholen. In L. Van Praag, S. Sierens, & M. Van Houtte, Haal meer uit meertaligheid omgaan met talige diversiteit in het basisonderwijs (pp. 95-106). Leuven: Acco.
- Van Hulle, J. e. (2008). Gedeeld Verbeeld. Brussel: Jo De Ro.
- van Keulen, H., & Oosterheert, I. (2011). Wetenschap en techniek op de basisschool. Groningen/Houten: Noordhoff Uitgevers.
- Van Praag, L. S. (2016). Haal meer uit meertaligheid omgaan met talige diversiteit in het basisonderwijs. Leuven: Acco.
- van Silfout, G. (2015). Taal in élk vak. Didactief, 22-23.
- Verrips, M., & Dekkers, R. (2002). Kindertaal in beeld. Bussum: Coutinho.
- Vigotsky, L. (1978). Mind in society. The development of higher psychological processes. Cambridge: Harvard University Press.
- Wagensveld, B., Teunissen, C., & Bruggink, M. (2014). Wetenschap en technologie creëert uitdagende taalsituaties. meer taal, jg1 nr1: 4-9.

EDUCATIONAL PEDAGOGY OF PROFESSIONALISM

Loes Houweling*, Aziza Mayo**

*Researcher, University of Applied Sciences Leiden, Zernikedreef 11, 2333 CK Leiden, The Netherlands, <u>houweling.l@hsleiden.nl</u>, **Professor, University of Applied Sciences Leiden, Zernikedreef 11, 2333 CK Leiden, The Netherlands, <u>mayo.a@hsleiden.nl</u>

ABSTRACT

The Alchemy project of the Centre of Expertise Youth, University of Applied Sciences Leiden studies the (development of) golden professionalism of youth professionals, including teachers. The project findings will be used to improve teacher training and the education of social workers. In this paper, we focus on results of the research and implications for teacher training. Golden professionalism is defined as the practices of teachers who were able to do the right thing at the right time according to youths, parents, colleagues and management. Teachers who were identified as golden professionals were interviewed. These interviews were analysed by students and researchers using narrative analysis, and by researchers through interpretative analysis. Results of both analyses were related to theoretical perspectives in the literature. Main findings point to the strong relationship between practices, personal and professional values and goals, and important learning experiences. The practices can be characterised as: congruent with earlier experiences and values and beliefs; with balanced attention for self and other; being present and allowing others to be seen. Teacher training should enhance the attention for coherence between personal and professional development. This pedagogical aspect of teacher training demands for reconsideration of the forming aspects of the curriculum, organisational structure and culture.

A NARRATIVE TO BEGIN WITH

Today I told my class something about springtime. I talked about the little ducklings that you can find in the ditches that run through the polders. They still have these tiny wings. I told them that although these ducklings can flap their wings, they are still unable to fly. They are simply too small and will simply have to be patient. "Imagine" I said, "how vulnerable they are. There are cars and cyclists and herons and snakes..." And then I pretended that there was a snake slithering through the classroom and I chased after it. I was running around and then, all of a sudden I picked up a piece of chalk and slowly drew a snake on the black board and I said: this snake swallowed the number 304 and also the number 294 and it will go on to swallow ten numbers. At what number will we end up?" And the children were thrilled to go on and solve the problem.

I find maths the toughest subject to teach. It's such a 'thinking' subject and there is so much riding on it because of all the tests and because of how much importance is placed on it by the government and by parents. It is perceived as the most important subject in school. I'm struggling with that, because this does not fit with what I believe education is about. I find it hard to find the right balance, which then makes me feel uncertain and as a result I can't make it work! Sometimes the children pick up on this. They don't ask me "Mister, are you frustrated about something?" No, they are too young for that, but they will say: "Maths is boring". This frustration spurs me on and makes me really want to tackle this subject. So last evening I was thinking about it: how can I find a way in? What appeals to them? Because if they are drawn in they will really start to practice and to learn. And then I realised: animals, they love animals, and humour as well. So I thought up this snake who swallows numbers, ten at a time. And I thought: I'll let them draw, because really, if anything makes them happy it is being allowed to draw! So now I took them from this mental picture of the polders, the ducklings and the snake, which was kind of unexpected and also a bit exciting and funny, to maths and the repetition of subtracting ten from a certain number. If I think back on what I did, I feel that I really tried to place myself in the position of children and of being engaged in such a way that they learn in a joyful way. And that what they learn is challenging, but not too hard and that there is differentiation.

GOLDEN PROFESSIONALS

This is the story of an everyday experience of a young teacher from a Waldorf school in the Netherlands. His name is Richard and his colleagues, the parents and children from his second grade primary class pointed at him when asked who was a great teacher. He was identified as what might be called a golden professional. What makes a professional a *golden professional* is not always clear. His

colleagues may describe him as well-prepared, cooperative, effective and wellliked. Parents might mention how well he knows their child and that they feel free to talk to him if needed. The pupils from his class will probably mention his great story-telling abilities, his cheerfulness and perhaps that he sometimes joins them for a game of soccer during break-time. So, what makes him stand out, depends on who you ask. Although the people that know him are unable to exactly describe what makes him such a special teacher and makes him stand out, they are firmly convinced that he does. In all the answers given, the common thread appears to be that as a professional he somehow manages to *do the right thing at the right time*; no matter what and for whom that might be. Doing the right thing at the right time is never a matter of one-size-fits-all. It differs from one teacher to the next, from subject to subject, from pupil to pupil, from class to class, from school to school and from time to time. Therefore, what makes a professional golden will be hard, if not impossible to capture or determine through standardized tests or checklists. Neither does it make sense to attempt to create a handbook that will lead you on the path to becoming a golden professional. Nonetheless, this ability, or perhaps more accurate, quality, is something that we wish for in all the educational professionals that our children encounter on their journey through the educational system. But the reality is that this quality is not a given for everyone. Why is this? And perhaps more importantly, what might we do so that this quality to do the right thing at the right time becomes a key characteristic for educational professionalism in general, and not just for a particular subset of teachers within the field of education?

BACKGROUND TO THE STUDY

This research project was developed as a collaborative project between departments for teacher training and youth work at the University of Applied Sciences Leiden. These departments both operate in close collaboration with their respective work fields in order to provide students with educational experiences that meet both the demands and needs of these work fields. This collaboration for instance shapes curriculum development and the development of qualification standards at the university. Furthermore, students' practical experiences during work placements in classrooms and in youth welfare organizations form a substantial parts of their educational experiences.

Over the last decades, a substantial shift seems have taken place in the way educational professionals and youth work professionals and their practices are valued and evaluated. It used to be that professionals in these work fields were allowed and expected to operate in a fairly personal and often highly autonomous way. With society's growing orientation on (cost) effectiveness, replicability and objectiveness, the response within these work fields has been to create a shift from focusing on who works to what works (Menger, 2009). When determining how we can provide the best care and education it has become the standard practice to turn to methods, checklists, standardized tests and procedures that might allow us to increase the effectiveness and objectiveness of practices. However, despite this development in the way the quality and effectiveness of professionalism in these work fields are approached, the importance of the professional him or herself can hardly be denied. For it is still the professional as a person that creates a foundational relationship with the child or youngster that is needed for them to participate in any method or test. In the educational practices of our university we therefor aim to create a good balance between what works and who works. Yes, methods, procedures and tests are part of the repertoire of knowledge, skills and competencies that prospective professionals working with youths and school pupils will need to develop. They help them to develop a general understanding of development, abilities and needs of young people in general. They provide them with a basic set of tools and skills to engage in practices with these young people. But they do not suffice to develop the ability to do the right thing at the right time for a particular individual child or a specific class. Because that requires from the professional that they are able and willing to look at the individual child, at themselves and at situation at hand and to shape their practices according to their evaluation of what is necessary, possible and required in that particular instance. In these decisions youth workers and educators need to also consider what is required by external stakeholders, such as state, school, parents and care organizations. This implies that a professional is not someone who simply follows a protocol, a fixed set of rules of a profession or a particular method, but rather a person who is aware of what is needed by all those involved, who takes initiative and shows creativity in creating tailored solutions, who is able to make informed decisions about what action is called for, and who is able to communicate these decisions to others on distinctive levels. How can we create opportunities for new professionals to develop such an understanding of what it means to be a professional and to develop their personal set of values, orientations, knowledge, skills and competencies that will allow them to keep on developing their professionalism?

In this research we focus on professionalism (rather than on the professional as a person with a set of competencies). Our focus on professionalism allows us room to explore its situated and dynamic nature: a professional might show *golden* practices in a particular situation, but not necessarily always, in every encounter or situation. As such, we relate to the idea of 'embodied, situated, relational, and moody nature of practical knowledge' (Manen, 2008, p. 17). Professionalism, as we interpret it, is shown in the practice of professionals in which implicit and explicit knowledge, skills and normative choices, come together in an estimation or valuation of a concrete situation: reflection in action (Schön, 1983). While the phrase *reflection in action* seems to suggest a conscious thought process, this is not what actually occurs. Rather, reflection in action feels highly intuitive. It refers to an intrinsic understanding of knowing what to do which reveals itself while you are

acting. Perhaps the term *embodied knowledge* or *embodied cognition* (Varela, Thompson, & Rosch, 1991), are more appropriate. Embodied knowledge refers to knowledge that has become such an integral part of a person that it is hard to capture this knowledge in words or to share this knowledge with others through words.

In this paper we take the narratives of a number of so called *golden* educational professionals about their everyday experiences in class and in school as a starting point to explore, to question, to analyse and to learn about golden professionalism and the embodied knowledge of these professionals. Our study is aimed to increase our understanding of how and why these particular professionals shape their everyday practices in a way that is effective and appreciated. What are the roots of their understanding of education and of their educational practices? What makes them do what they do? What helps in this process or perhaps makes it more difficult? How did they come to these understandings and practices?

In the narrative at the beginning of this paper, Richard takes us through his struggle to balance the external requirements he perceives (from government, his school and parents) and his personal beliefs (the more internal requirements) about good education. Throughout his narrative he comes to recognize and acknowledge that his struggle is having a negative effect on himself and on his pupils. He accepts and takes on the responsibility to find a way to turn this into a positive learning experience, both for his pupils and for himself as a professional. In the end, he develops a clear sense of what is needed and wanted for the subject at hand, for the children in his class and for himself. As a result of this process he develops and puts into practice an approach to math that is effective and fun and fully engages the children in their learning process. By doing so he is able to meet the requirements from others, the educational needs of the children and his personal needs to teach in an imaginative, inspired and creative way. This ability to reflect in and on everyday experiences in the realm of education - positive and negative-, to distil questions, ideas and actions from these experiences appears to be one distinctive quality of golden professionals in education. This ability appears to help these professionals to further develop their educational practices in such a way that they manage to create an acceptable balance between external and internal requirements.

In this project we explored and analysed similar common themes, common storylines, in the narratives of our educational professionals. We believe that these will provide us with new understandings and practices that as a next step, will allow us to provide the students in our teacher training courses with ways to come to discover, to understand and to develop their personal narratives towards golden professionalism. As such, the data is used to develop a 'grounded' theory about golden professionalism and the processes that contribute to this development that creates a foundation for developing a *pedagogy of professionalism*, in which

notions of personal development of professionals guide us in the education of future professionals.

RESEARCH DESIGN

The research project was designed as collaborative project between researchers from the fields of education and youth care from the Centre of Expertise Youth at the University of Applied Sciences Leiden. The idea behind this collaboration was to create an ongoing dialogue about professionalism between these two disciplines. Because although each discipline deals with the development and well-being of children and youths, we have found that our approaches and understandings of what this requires from a professional are not necessarily similar. We expected that this dialogue would allow us to identify key concepts and practices within each field and to deepen our understanding of these concepts and practices as they could be explored and questioned through different research and practice paradigms. The project team included five senior researchers and a junior researcher. Five students enrolled in the university's honours program participated in part of the analyses of the data from the study.

The research project spanned a period of two years. During this period the full research team met every two to three weeks for dialogue sessions. These sessions each lasted about two hours and were used to discuss, evaluate and readjust theoretical concepts, methodology, data, findings and implications for our teaching programs from the perspectives of education and youth care. As a result our respective approach to research methodology and our understandings of professionalism developed and evolved considerably over the course of these two years. In the periods between these sessions the lead researcher (first author), project leader (second author) and the junior researcher met at least once a week to discuss the practicalities and to work on data analyses.

Data was collected through narrative interviews (Riessman, 2008) with 18 professionals in youth care and education. Using the professional networks of the senior researchers in these fields these professionals had been identified by children, youths, parents, managers and colleagues as golden professionals. These professionals were then approached to be interviewed about their work as a teacher/ youth worker. Interviews took between 60 and 90 minutes and were voice recorded. After the interviews were concluded, professionals were informed that they had been selected because they were regarded as golden professionals by those they encountered in their professional capacity. The current paper discusses the findings from the nine narratives of educational professionals only. Six of these professionals taught in elementary school, one of them also had been principal; three taught in secondary education (one in a special education school). The

majority of these teachers were experienced teachers (n=7; 10 years or more of teaching experience); 1 had been teaching for less than 2 years. The schools at which they taught had educational orientations related to the fields of expertise of the senior researchers, either Waldorf pedagogy or educational settings in which nature and the natural world played a substantial role in educational practices.

The in-depth interviews had two foci. First, we asked them to tell us about their daily work and to explore situations that were typical for their approach. Secondly we asked them to reflect on their professional development and key events in this process. The set of topics addressed during the interviews was developed during the research project dialogue meetings and was both based on the senior researchers' experiences with and understanding of professionalism and its key concepts in their respective work fields, and on a review of international literature from the fields of education, social work, pedagogy to identify general themes. These topics included for instance resilience, agency, bumpy-moments, protective and risk factors.

During the interview we asked these professionals to take us through concrete situations in present and past in which their actions had had a positive impact. By doing so we aimed to develop a sense of their embodied knowledge, rather than of for instance their technical or theoretical knowledge. Embodied knowledge reflects the way a professional in action connects technical knowledge about what works to his or her personal skills, attitude, experiences and value orientation. Brought together they create a foundation on which the professional bases an evaluation of a concrete situation or problem at hand. What do you observe in the person you are engaging with? How do you interpret this observation? What kind of response does this require from you? In every day practices of the professional this whole evaluation process takes place in a split second and will occur many times over the course of a work day. Taking these stories as a starting point we explored with them how and why these stories were exemplary for their practices as professionals; why they chose to act in this particular way; and how previous experiences have impacted on these practices.

Coding and Analysis

Each interview was transcribed verbatim by a researcher or trained research assistant and carefully checked by either the junior researcher or the lead researcher. Using the transcripts, the interviews were analysed in two ways. The lead researcher was fully involved in both types of analyses in order to allow for comparison between the results from these different analytical approaches.

As a first step, a narrative analysis was conducted by the lead researcher and the junior researcher assisted by the students, using the Listening Guide (Bussman,

Kuiper, & Maas, 2015; Gilligan, C., Spencer, R., Weinberg, M.K., & Bertsch, 2006). This analysis focused on the individual stories of the professionals. With the listening guide, different 'voices' or ways of expression someone uses when talking about themselves, their practices, previous experiences et cetera are identified. This analysis might reveal inner tensions, for instance insecure or passive voices in some parts and secure or active voices in other. The students had received training for this type of data analysis as part of their research project. Next to this, a dialogic performance analysis (Reissman, 2008) is done by the main and junior researcher. This analysis is focused on the way the interviewee positions him- or herself towards the interviewer. What does one want to reveal, is one showing off et cetera. These narrative analyses provided us both with stories about professional development and with information on students' constructs of professionalism. Through the analyses we developed a sense of the key themes in these storylines in which these teachers talked about themselves as professionals, the way they perceived their profession and their professional development. This information created a first orientation for our second analysis of what might be found with regard to themes and patterns of professionalism.

As a second strategy, we conducted an interpretative analysis (Boeije, 2010). The interpretative analyses developed over the course of several months as we engaged in what one might call an extended dialogue about the themes and patterns in the narratives. Through this analysis common key themes and patterns throughout the full set of interviews were identified. We applied a 'bottom-up' approach in which coding categories emerged from the analysis of the narratives about their everyday practices as professionals and of how they had come to develop their personal perception and practice of professionalism. The coding was conducted by the first and second author after narrative reading of the transcripts using Atlas-ti; two other researchers independently coded a number of transcripts. Inter-coder reliability, established by visual comparison was satisfactory; any differences were resolved by discussion and applied in subsequent coding. During the research team meetings, findings through both types of analyses were related to each other, discussed by the research team and related to the professional and academic literature on professionalism and its development.

FINDINGS

Stories about the daily practice of professionals were the starting point for the interviews. They talked about everyday events that constituted their experiences as educational professionals, such as how they prepared for their classes and how they solved issues in class or collaborated with colleagues. From these narratives it became apparent that their practices were firmly related to standards they set for themselves and for others regarding a job well done. The standards appeared to

follow from a strong inner compass that helped them to judge and value situations in the moment of action or on a longer term. Clear values about what matters in life calibrated this inner compass. From their narratives we learned that these values about life in general and their lives as professionals had gradually evolved from their personal life experiences. Four distinctive values appeared to play a key role within their inner compass: connectedness, trust or confidence, responsibility and fulfilment. In their practices as professionals they actively, although not always consciously, sought to establish and maintain coherence between their values and their actions.

Without exception, these teachers spoke about the importance of being connected and of forming relationships. The analysis of their practices showed that as a rule the way they conducted their actions was aimed at establishing, maintaining and developing a sense of connectedness with others (e.g. children, clients, individual colleagues); with the content of the curriculum; with themselves as a person and a professional; and with their organisation (e.g. principals, school team and policies).

To establish connectedness they worked hard at developing relationships, especially with children and classes. In order to build relationships they carefully observed these children and they paid close attention to what children had to say; they perceived the other, in this case the child, as a unique individual, respecting their individuality and showing that they were willing to accept responsibility for their own actions. An important aspect of the process of building these relationships was that professionals were not just willing to see and come to know the other, but also were willing to let themselves be seen and known. In the next fragment, Fred tells us about the importance of reciprocity in developing a mutual and not superficial or one-sided connection.

This class said to me: "Fred, it is not an official week of testing, but we have three tests tomorrow. And we have this agreement with you that in a test week, you will take us to the trees [for a specific meditation session]". I said: "Okay, yes, it is not really a test week actually, so we can't do this. I did prepare a lesson". I always play that game, because I want to make sure they really want it. And you'll know soon enough, because you can feel it. Finally I said: "We are going to do what I had prepared and discuss the assignment you made and if we can do that with enough concentration, we will have enough time to go to the trees". (Fred, teacher secondary Waldorf school)

In their classes children could experience their teachers' personal enthusiasm or sense of connection with the content of the lessons. Fred shared with his students the way he dealt with stressful events in life, by teaching them meditation techniques he found helpful. As teachers, our professionals felt that by showing themselves as a person with feelings, emotions and ideas, they were creating an environment in which children could begin to relate to adults, each other and the content being thought with the curriculum. One teacher explicitly said: *They have to see me, they do not want a show from a teacher (Imke, teacher)*.

This willingness of wanting to know the other and letting yourself be known was also seen in the way they approached and shaped their actions within the school community. They talked about building or maintaining their sense of connectedness with their school organisation and the teacher community within these schools. These professionals all aimed to find work environment in which their personal beliefs and values were reflected. Richard's story at the beginning of this paper shows that this is not always easy. Several professionals talked about having gone through an extensive process of trying to find the right fit with an organisation or colleagues; and it was not uncommon for them to have left a school once they had determined that this would not be the case. Others talked about raising issue of inconsistencies between school values and ideals and practices during meetings and discussions. When they did not feel they could support certain school practices and rules, they chose to take a firm stand, rather than complying in word but not in actions. That is not to say that they made an issues about everything they disagreed on. Often they were highly pragmatic and creative in finding ways to fit their practices and what they valued within the demands and limitations of the system.

There are 180 learning goals children in primary school need to learn. In a way it is a convenient system. It makes clear what children need to learn and it helps me keep hold of what I need to do, otherwise I can just think up anything I like. It also gives me ideas. A subject like fossils, I wouldn't have thought of that. We simply added one more goal, because we think awareness of nature is important as well. (Anke, biology teacher primary school)

Their willingness to take a stand for what they felt was important as their willingness to find pragmatic solutions within the system seemed to indicate that the value they placed on connectedness went beyond an instrumental approach. The image of connectedness that emerges from these practices, shows that these professionals do not perceive their relationships with for instance children as purely a mean to a goal, for instance to increase their willingness to pay attention in class, but rather as a core quality of life.

The sense of community, that is what creates value. That you are part of different circles. Your own class is the smallest circle, then the classes around you and the whole primary school. And around that, the children who have been in this primary school before you. It gives you a kind of perspective towards the future. And backwards as well. Sometimes they come to look, secretly, because they are not allowed to come here. And then they look around like: "do you remember", "gosh, yes, we did this as well". So the whole building is full of growing and developing

children, from three to eighteen, and that is what I like about it. (Annelies, teacher Waldorf school)

A second theme that emerged from the analysis of the teaching practices of our professionals was trust or confidence. Trust in others provided the foundation from which they built their actions and interactions with others.

The first boarding schools I have visited was one that was built on distrust, as I call it now. They would not name it like that, but it was all about regulating behaviour. Strict rules, seven o clock in the morning, sunrise; seven twenty behind the desk for study; breakfast at eight; school nine thirty. [...] The other boarding school was built on trust. Again I thought I had to escape, like I had done at the other school, so I went away and didn't return. I rang the bell at four in the night. [...] The group leader just stood there, in his jeans and sweater and said: "I have been waiting for you". That's an example of what formed me in how I deal with rules and trust. (Fred, secondary teacher Waldorf school)

These teachers also built and maintained trust or confidence in themselves as professionals through their actions and interactions. Especially the analysis with the listening guide showed that in all interviews, a confident voice was apparent also when was spoken about questions or difficult situations. In the interpretative analysis, in many fragments self-confidence was visible. We distinguished between trust in oneself, one's abilities, one's judgement of the situation, and one's beliefs.

They could identify and acknowledge their successful and less successful actions and experiences. When things had gone well, they accepted compliments as a sign of trust. When things went wrong, they tried to understand what had happened and took a close look at how they had contributed to the process. Throughout this reflection on situations gone wrong, they showed compassion to others and to themselves: you do not have to succeed in everything right now, you are allowed to learn and develop or ask for help. However, this trust in oneself goes along with trust in the other, the possibilities of children, the abilities of colleagues et cetera. The self-confidence of the professionals, which they are able to preserve and develop, enabled them to let themselves be known by children, classes, colleagues and organisations. As such, these practices guided by the value orientations connectedness and trust reinforced each other.

A further value that emerged through the practices and narratives of the professionals was responsibility. Responsibility as something that they felt and as something that they could extend to others. All teachers felt a great responsibility towards the children as individuals and in creating a classroom atmosphere that was conducive to their well-being and learning. Many also felt responsible on a less personal level in wanting to provide education that could contribute to a better world and life for people in general.

To learn together is very important for me, because by that you hopefully can do something about the individualism. [...] I think that with collaborative work, you also work on this sense of community and social education. I think that that's somehow missing in this society. (Annelies, teacher Waldorf school)

As a result of this strong sense of responsibility, these professionals held the quality of their work and the work of others to high standards. Principal Felice expressed this responsibility for quality of work very clearly when she told about her search for a substitute teacher, rejecting two till she finds one which made her think: yes! Which "[...] has to do with morality", she said: "you cannot fool the children".

A further result seemed to be that their professional work hours often extended way beyond the hours of their professional appointment. Although this is certainly not uncommon among teaching professionals, these particular teachers had become aware that they needed to draw a line in order to take care of themselves and of their families as well.

That's the pitfall, it is never finished. That is something I have to tell myself firmly every now and then: just to do something completely different and be less prepared for one day. [...] It's a bit more chaotic and sometimes after a day I think: a new day tomorrow. But it also brings you something else and I can see the benefits of a weekend filled with other things then school. (Annelies, teacher Waldorf school)

Their sense of connectedness and confidence both seemed to help them to create a healthy balance between their responsibility regarding work commitment and personal well-being. For instance by being able to acknowledging that there were things they were not very good at and their willingness and ability to turn to colleagues for help, without feeling less confident about themselves.

The fourth value that spoke from the practices and narratives of our professionals was a sense of *fulfilment*, both on a personal and on a more general level. These professionals were very proud of their work and of the schools they taught in. They greatly enjoyed telling about their experiences as teachers. Clearly their work was not just about bringing something good to others, but also offered them personal, joy, happiness, growth or a sense of worth; we called this fulfilment. In the data, we saw different examples of how this sense of fulfilment came about. For some it came from their love of children, the joy of working with them, or from experiencing children's joy in learning. For others it arose from their understanding that they were making a valuable contribution to the world, doing something significant.

I have this drive to work with people with whom not everything is going very smoothly, just to discover: what are you good at. And if they tell me "I cannot do

anything right", we will explore that together. (Koen, teacher secondary grade special education)

In every narrative we heard stories of professionals who were seeking to find and maintain a certain balance between what is right for the professional and for the other, the children, class, school, colleagues, or society. This ongoing process of finding balance between what is right for me (and my relatives) and the other or the world is an important aspect of what Biesta (2015) calls maturity (which is not at all attached to one's age). Without this balance the values and beliefs could become selfish or one could lose oneself completely in the role of professional educator.

Learning experiences

In their narratives teachers talked about experiences and moments earlier on in life which shaped their practices as educational professionals. Almost half of our teachers had parent(s) who worked in the field of education and often practices their profession with similar commitment and values. Many of our professionals referred to childhood educational experiences, positive and negative that had had an impact on their professional practices. From the analysis of these narratives it became clear that the experiences they took as formative for their practices as professionals, were experiences that helped them to calibrate their inner compass towards the core values connectedness, trust, responsibility and fulfilment and helped them to develop the conviction and courage to align their practices as a professional with these values.

Well, it's funny because you can take advantage of it as well. I was bullied a lot at primary school and the moment you go to another school, it is inside you, you feel excluded. Eventually, last Friday I talked about it with a child in my class, about how she stood there by herself when groups are formed. [...] She felt excluded, came from another school where she was bullied a lot. I asked her if she had asked if she could participate. "No". I said: "would the children have noticed that you wanted to?" "Probably not." I said: "partly it is something you have to do." And that was something I have learned myself. The first half year, when I was at secondary school, I had something like: let me be, let me deal with myself, and I think that caused me trouble. I realised that I had to take initiative and must not depend on others [...] I realised I do not have to take the first step once, no, I will have to keep on doing that if I want something to change. That was really a lesson for me. (Imke, teacher primary school)

As professionals these teachers talk about the reflective practices they have developed for themselves in which they take their beliefs into account. Although teacher training practices in the Netherlands strongly emphasise the importance of such reflective practices, the stories about how and why our teachers had come to develop these practices did not refer to their teacher training experiences. Most frequently these practices seemed to have been brought about and had developed through experiences during their initial years as a teacher. This seems to indicate that the period right after professional education is an important period for shaping practices, beliefs and values, probably because of another feeling of responsibility then during internship. Professional education is frequently related to gaining important knowledge. Three professionals did mention their professional education in another way. One teacher told that her professional education showed her what she did not want to do, another Waldorf school teacher told about a specific moment with one teacher trainer that was life changing in a positive way. One teacher told how he learned to collaborate and learn during teacher training in the late seventies, in which they were allowed to form their own teacher training. The observation that fewer stories are about experiences during professional education is interesting and raises all kinds of questions. However, we have to bear in mind that most professionals had their professional education long ago.

MAIN CONCLUSIONS AND IMPLICATIONS

To summarise our conclusions we see educational golden professionalism shown in practices in which teachers are both "known" and "knowable" to themselves and to others. We also see effective communication with a wide range of people about personal and professional values, goals and opinions, and about their practices. As a result the teachers are perceived as authentic and typically receive positive feedback on their professional practices. They also experience consistency between their personal and professional values, goals and opinions which makes their professional experiences more meaningful to them as a person.

Congruence, balance between self and other and unicity are three important themes that connect our findings. Perceived congruence between present, history and future relates to strong inner compasses guiding practices in relation to others and in relation with an organisational context. However, not only is professionalism enhanced by these inner compasses, also the drive to relate or connect as aspect of these compasses is: relating to others as a quality of life. Building and maintaining relations is an encounter between the unicity of people. Rodgers & Raider-Roth cite Martin Buber (1970, p.12): 'The present...the real filled present, exists only in so far as actual presentness, meeting and relation exist. The present arises only in virtue of the fact that the 'Thou becomes present'. To which they add: 'Presentness arises when one becomes to see the other and allows one's self to be seen.' (p.284). Golden professionalism shows in enabling this encounter. Autonomy in communion, as Mayo calls this (2015) demands balance between attention for self and other, while this balance-act benefits from knowing and trusting on one's inner

compass. A strong inner compass facilitates one's self to be known and attention for others as well, a mature (Biesta, 2015) professionalism.

Dialogues between what is and what has been, between the present and the desired future, between demands from society and personal values and goals, create personal and professional storylines. Professionals benefit from consistency in these storylines. Educational professionalism expresses itself in the way teachers are able to create a practice based on these dialogues. Therefore, these dialogues should be part of curriculum of teacher training. But they should also be experienced through the example set by teacher trainers in the way they build relationships with their students and colleagues, the way they organize and assess training experiences, and the way they continue to expand their professionalism. So, we, as teacher trainers have to ask ourselves questions like: what is my unique storyline? What do I think is important in the dialogue between me and other? How do I show this dialogue to students? Do I listen to my inner compass? When and why not? The next step is to ask ourselves questions about our teacher training. To what extend is our organizational structure helpful? For instance: to what extend does our way of grading helps students develop their dialogue between themselves and the world? To what extend is our culture helpful? For instance: do we encounter our students as individuals or as groups? How much influence on the curriculum do we allow from students?

Each one of these themes withholds an ongoing dialogue between the professional and the world. Engaging in this dialogue is the assignment to us all.

REFERENCES

Bakker, C. (2013). *Het goede leren; Leraarschap als normatieve professie*. Utrecht: Hogeschool Utrecht.

Biesta, G. (2015). *Het prachtige risico van onderwijs*. Culemborg: Uitgeverij Phronese.

Boeije, H. (2010). *Analysis in qualitative research*. Thousand Oaks (CA): Sage Publications.

Bussman, M., Kuiper, C., & Maas, A. (2015). Klinkende meerstemmige verhalen, deel III: De analysemethodiek. *Kwalon*, 40-52.

Freidson, E. (2001). *Professionalism: The third logic.* Cambridge: Polity Press.

Gilligan, C., Spencer, R., Weinberg, M.K., & Bertsch, H. (2006). On the listening guide: A voice-centered relational method. In S. Hesse-Biber, & P.

Leavy, *Emergent methods in social science* (pp. 253-272). Thousand Oaks, CA: Sage Publications.

Jonge, E. d. (2015). Beelden van de professional, Inspiratiebronnen voor professionalisering. Delft: Eburon.

Kunneman, H. (2013). Kleine waarden en grote waarden - Normatieve professionalisering als politiek perspectief. Amsterdam: SWP.

Manen, v. M. (2008). Pedagogical sensitivity and teachers practical knowing-in-action. *Peking University Education Review*, 1-23.

Mayo, A. (2015). Autonomie in verbondenheid, Lectorale rede. Leiden: Hogeschool Leiden.

Menger, A. (2009). *Wie werkt? Over het vakmanschap van de reclasseringswerker*. Proces, 155-165.

Riessman, C. K. (2008). *Narrative methods for the human sciences*. Thousand Oaks (CA): Sage Publications.

Rodgers, C., & Raider-Roth, M. (2006). Presence in teaching. *Teachers and Teaching*, 265-287.

Schön, D. (1983). The reflective Practitioner. How professionals think in action. New York: Basic Books.

Varela, F. J., Thompson, E. T., & Rosch, E. (1991). *The Embodied Mind: Cognitive Science and Human Experience*. Cambridge, MA: The MIT Press.

ETUBE AS A DIGI-INTERVENTION IN HIGHER EDUCATION

Mauri Kantola, Marjo Joshi, Minna Scheinin

*Senior Advisor, Turku University of Applied Sciences, Joukahaisenkatu 3, 20520 Turku, Finland, mauri.kantola@turkuamk.fi**Senior Lecturer, Joukahaisenkatu 3, 20520 Turku, Finland, marjo.joshi@turkuamk.fi***Head of Education development Unit, 20520 Turku, Finland, minna.scheinin@turkuamk.fi

ABSTRACT

Our study focusses on the eTUBE continuing professional development (CPD) programme at the Turku University of Applied Sciences (TUAS). The purpose is to bridge Innovation pedagogy, the use of information and communication technologies (ICT) for education and action research (AR). The goal has been to use AR in order to develop e-learning and e-teaching or digitalisation, in the practical oriented higher education. the eTUBE programme is parallel with the international, national and local strategies considering the debate about digitalisation and the needs of the education sector to support the general development and guidelines of it in the knowledge society. The action research seems to be a relevant method for the study. The intervention succeeded, but many development steps remained to take in the future.

INTRODUCTION

This paper focusses on the study of the eTUBE continuing professional development (CPD) programme at the Turku University of Applied Sciences (TUAS). The purpose is to bridge Innovation pedagogy, the use of information and communication technologies (ICT) for education and action research (AR). In general, we are interested in promoting teachers' use of ICT, i.e. online teaching or digitalisation, with the help of Innovation pedagogy and a willingness to change experiences internationally around the issue. In terms of action research, the eTUBE programme can be seen as a single intervention or, alternatively, as a combination of several interventions in order to further develop teachers' work and digitalisation in higher education (Scheinin 2016). The first three professional training implementations of the CDP have been carried out with the research enquiries based on the main elements of innovation pedagogy developed by the TUAS. The programme and studies of it will be continued. However, in the present paper, we analyse the experiences reached so far.

On the background of the study, we have been interested in the possibilities of the action research (AR), more precisely, practice based inquiry (Kantola et al. 2014). As such, the AR is not a single theory, but rather a framework for dealing with situations where the researchers are inside of the research subject as a part of it (Kuula 2001). Because of the umbrella type nature of the AR approach, other frameworks for the study are also needed.

As another framework, combined with the AR, we use the concept of Innovation pedagogy. Innovation pedagogy is a model based on the socio-cultural perception of learning that supports the work of universities as a part of regional competence and innovation networks. Applied research and development that support regional development and the production of innovations in working life are integrated into multidisciplinary teaching in accordance with the principles of Innovation pedagogy. The education offered by the university promotes entrepreneurship and includes service activities while taking into account both the needs of the region as a whole on the constantly changing working life turbulence (Kettunen 2009, Lehto et al. 2011).

In our study process described in this paper, the goal has been to use AR in order to develop e-learning and e-teaching or digitalisation, in the practical oriented higher education. The writers of this paper are a manager, teachers and developers of the unit of the Future Learning Design (FLD) of the TUAS and the eTUBE programme.

The paper is organised as follows. First, in the second chapter, the strategic background to the digitalisation in higher education is introduced. Next, the framework of action research of the networked activities is presented in the third

chapter. In the fourth chapter, Innovation pedagogy is presented. In the fifth chapter, the empirical case, the eTUBE intervention, is introduced. The results of the study are discussed and summarised in the sixth and seventh sections.

BACKGROUND STRATEGIES

In the European Union, national governments are responsible for their education and training systems and individual universities organise their own curricula (European Union 2009). In addition, the EU member states are encouraged to develop comprehensive national digital skills strategies by mid-2017 on the basis of the targets set at the end of 2016 by establishing national digital skills coalitions connecting public authorities, business, education, training and labour market stakeholders and developing measures to bring digital skills and competences to education and training, supporting teachers and educators and promoting the active involvement of business and other organisations (European Commission 2016).

National strategies

In Finland, like many other European countries, the interconnection between the education and the ICT can be retrieved from several sources. For example, the latest Finnish government platform of the Prime Minister makes several references to digitalisation. One of the top initiatives of the government platform is the digitalisation of the public services. This is going to be implemented by formulating the principles of digitalisation of the public services, digitalising the internal processes of the public sector administration and dissolving former procedures, reasserting the rights of the citizen to supervise and decide on information use themselves. At the same time, the purpose of government is to ensure the fluent transfer of information between different administrative authors, and to help citizens who are not used to or capable of using digitalised services. Furthermore, the Finnish Government promises to build new digitalised environments in order to support the growth of digitalised business in the markets where the public sector has some role in securing the functionality of the market, such as traffic services, health care, learning and industrial Internet. Higher education is also tied to the general framework of the economic growth of the Finnish national economy (Prime Minister's Office 2015, p.26 - 27).

Derived from the Government Platform, the Finnish Ministry of Education and Culture (MinEdu), in its Development Plan (2012) of Education and Research for the years 2011–2016, referring to the education development of the knowledge society, emphasises the important role of the ICT to the life of work and to the society as a whole. According to the MinEdu, by utilising the information and communication technology, it is possible to offer new kinds of flexible and

individualised studies for students and to modernise the curricula and didactics on all levels, including higher education. Thus, care will be taken by the ministry for both initial and continuing teacher training to ensure that teachers are able to use ICT. Furthermore, measures will be taken to develop the information management and the information architectures of the educational administration and supporting the harmonisation of the information systems (Ministry of Education 2012, pp 18-19).

International higher education corporate strategies

Compared to the local and regional level of university collaboration, we subsequently introduce the Consortium on Applied Research and Professional Education (CARPE) consisting of some European universities that have been brought together by the common themes of applied research, professional education and a focus on their students' future working life. In 2011, CARPE was launched in Utrecht, by Hamburg University of Applied Sciences, HU University of Applied Sciences and Universitat Polytècnica de València. Manchester Metropolitan University joined in 2012.

The CARPE partners have decided to collaborate on conducting research and providing education that is demand-driven and which also contributes to innovation in industry. They also maintain links with small and medium enterprises (SMEs), large enterprises, the public sector and local and regional governments. The themes of entrepreneurship, social responsibility, sustainability, digitalisation and *internationalisation* have been on the agenda (http://husite.nl/carpenetwork/). In order to enhance the quality of the research and the contribution of the CARPE universities to regional and international entrepreneurship and innovation, CARPE-partners collaborate in European research projects and programmes.

Strategies of the local authorities

In terms of the strategic statements on local levels, referring to the utilisation of the ICT in order to promote the regional development and impact of the higher education, in the following we present some ideas and statements of the strategic documents of Turku City located in Southwest Finland. The process is named Turku Strategy 2029.

On the visionary section of the Turku strategy (Turku Strategy 2029 p. 4/7), the city authorities state that the city has created for its inhabitants and customers new possibilities to use services independent of time and place by digitalising former face-to-face activities and by combining the service operations. Moreover, the local authorities are going to open their databases in order to promote businesses of a new kind and networked collaboration. Moreover, the new innovations of

intelligent digital, traffic and energy solutions will be supported and combined to other more traditional services (s.6/7).

University strategy

How is the strong belief in digitalisation, expressed in the strategies hereinabove, mirrored in the higher education agendas? In order to answer that question, we need to introduce the TUAS Strategic plan for the period 2015–2025 which states that the mission of TUAS is to improve the working life, well-being and competitiveness of Southwest Finland. The primary task, according to the strategy, is to produce competent professionals for the development of working life in the region. TUAS sees its role as an important actor in building the competitiveness and vitality of the region. The personnel of TUAS are active in establishing Southwest Finland as a region of cooperation and partnership, where the quality of life is the best in Finland.

The strategy of TUAS is built through four intertwined strategic programmes, the first two defining the content areas in focus and the latter two focussing on operations. First, in cooperation with partners, TUAS is building a technical innovation university of the future creating international competitiveness for Southwest Finland and being practice-oriented. The competence spearheads are a multi technological marine cluster, circular economy, sales and digitalisation. Furthermore, the quality of life is based on the opportunity for a good and healthy life for each resident of the region. To support this, developing well-being is at the core of the university activities. With the scientific and artistic expertise and, in cooperation with different partners, TUAS aims to produce user-oriented and productised well-being solutions with the following competence spearheads: health promotion, art as a part of good life, increasing inclusion, renewing social and health care services and well-being tourism.

In order to operate towards the vision of this strategy, the operational method is to create an innopeda®-based learning continuum which combines learning and applied research, development and innovation activities with the development needs of the working life in the region. In addition to competence-based degree education, the learning continuum of TUAS includes development targeted at working life and services for lifelong learning. TUAS learning environments consist of the working life partners, the state-of-the-art laboratories and exercise premises which act as students' workplaces and are used and developed in cooperation with working life, and virtual environments. Traditional, lecture-based classroom teaching will be renounced. Furthermore, the Excellence in Action principle is created by empowering leadership and an inspiring operational supports creativity environment which and joint competence (http://www.tuas.fi/en/about-us/operations-and-organisation/values-and-strategy/).

ACTION RESEARCH

Our research approach, Action research (AR), can be defined to be a flexible approach which allows change, improvement understanding and knowledge to be achieved simultaneously (Alara, 2016). The purpose of the AR is to change current practices and solve different kinds of technical, social and ethical problems (Kuula 2001, 9). The goal is said to be the change of the real life studied, such as social habits, by activating the target subjects of the research to become active partners to the study. The researchers can. Therefore, be seen as a part of the research subject taking part in the change processes and procedures of the research subject. The researchers will go to the field in order to intervene in the activities of the target community. Thus, the interventions and their evaluation and the results are at the centre of the approach (Kuula 2001, 9; West 2011,90-91). Action research can be engaged in by an expert, a collaborative team or an entire institution or network (Riel, 2016).

The methodological background of the action research, as the use of the term itself, can be traced to the work of Kurt Lewin who based his approach, in the late 1940s, on the view that social reality may be better understood if the research will be connected with the change of real life and to the research processes of it. Lewin saw that the research subjects may not only be passive but also active partners of the change processes. Because the researcher also takes part in the change process as an active partner or stakeholder, the foundation for the research relationship is based on the collaboration. The research becomes a process where the phases of planning, implementation and evaluation alternate. The problem and practice orientation and the change or, at least, trying out the change, are at the centre of the action research (Kuula 2001, Riel 2016).

In this study, we have carried out interventions targeted at developing the educational higher education networks in TUAS. Our purpose has been to combine AR, the innovation pedagogy and the use of information and communication technologies (ICT), i.e. digitalisation. In terms of AR, the eTUBE programme can be seen as a single intervention, or alternatively, as a combination of several interventions. The first three professional training implementations of the CDP have been carried out with the research enquiries based on the main elements of Innovation pedagogy developed by the TUAS. The AR may be implemented, in addition to single and restricted work processes and procedures, also to wider social situations, such as to organisations and networks in order to support strategic development work, the development of practices and to raise knowledge of each time current circumstances (Kuula 2001). In this sense, we interpret the AR to be a suitable instrument to support the activities and operations of HEIs, as the everyday practices of higher education are usually cross border type, interdisciplinary and networked.

The research problems of our paper have been raised mainly from e-learning and online teaching, not from a certain discipline or research tradition. Applying Mutanen (2009), we can say that different theories have worked for us as an additional information source for the problem solving, separating our practical oriented inquiry -approach from the more theory-based research. Thus, the needed skills and knowledge to carry out a practice-based inquiry are connected with the general sensitivity and ability of the research practice to sense different common conditions and circumstances. Particularly, Mutanen emphasises the sensitivity and ability as an essential part of the methodological skills, which help researchers to analyse and understand both usual and specific problematic situations in order to sketch the possible and impossible solutions. In our study, we have classified the practical problems into different activities, processes or, perhaps, networks or parts of the networks. For the action research, it seems to be typical that the stakeholders of the research are well aware of being both part of the research and part of the practical problems to be solved (Zeni 1998). For this reason, we have also tried to inform all the possible stakeholders about our research and development activities.

INNOVATION PEDAGOGY

The Innovation pedagogy developed in TUAS has been focused on the development of innovation competences, including how knowledge is assimilated, produced and used (Kettunen 2011). Thus, the innovation competences refer to the learning outcomes which are related to the knowledge, skills and attitudes needed for the innovation activities (Kantola & Kettunen 2012). On the European level, this dimension can be derived from the use of the term - knowledge triangle - linking education, research and innovation (European Union 2009).

The philosophical foundations of innovation pedagogy come from the humanistic understanding of people as creators of their own future (Kettunen et al. 2013). According to Kettunen (2009), the concept of Innovation pedagogy may also be described as being a didactic operational model based on the sociocultural perception of learning that supports the work of educational institutions as a part of regional competence and innovation networks. Applied research and development activities that support regional development and the production of innovations in working life are integrated into multidisciplinary teaching in accordance with the principles of innovation pedagogy. The education offered by the university promotes entrepreneurship and includes service activities while taking into account both the needs of the region as a whole as well as the constantly changing trends of working life (Kettunen 2009). Moreover, the export of education can also be analysed by taking the innovation pedagogy as a starting point (Kantola & Kettunen 2012).

The changes in the global business and other working environments necessitate the skills and attitudes to match these changing requirements and continuous development along with the knowledge bases of the whole learning community: social and interactive skills, cultural abilities, understanding the prerequisites for working with customers, preparedness for entrepreneurship, creativity and problem solving skills and tolerance for difference and uncertainty. Learning environments where students from different fields of study are in contact with each other, offer interfaces for testing new methods for learning and working in order to open new possibilities for innovations which can be seen as an integral part of the process of constantly improving skills as well as generating ideas and practices applicable in the life of work (Kairisto-Mertanen et al. 2011.) A fruitful platform for innovations consists of experts and novices with different backgrounds working together on shared problems. This kind of communities of innovation can be dream teams interacting daily face-to-face or via broader networks of which success is based on skills, know-how and knowledge sharing and on the ability to cross-pollinate different problem solving approaches from several fields (Penttilä et al. 2013).

Thus, according to Penttilä et al. (2015), the aim of innovation pedagogy is to establish and maintain environments where a know-how inspired competitive advantage can be created by combining different kinds of know-how which provides success for the whole society, as innovation skills sharpened by innovation pedagogy are the key in introducing new competitive advantages. This kind of multidisciplinary or multi-skills environment may include possibilities to evoke regional innovations and also to increase entrepreneurship through research and development. Thus, the innovation pedagogy confesses the societal needs as the basis for the work done at HEIs.

In figure 1 we illustrate the main elements of Innovation pedagogy based on the teaching methods and tools, learning process and outcomes.



Figure 1. Main elements of the Innovation pedagogy

The tools of innovation pedagogy (figure 1), which aims at educating graduates who can succeed in their future work positions, are presented to the left. *Activating learning and teaching methods* mean that educational methods are applied value-added so that the students take responsibility for their learning and actively strive to reach their learning goals. *Flexible curriculum* makes optional study paths possible and is able to react on the changes of the society. The *multidisciplinary* learning environments enable people with different talents and competencies to meet and collaborate for knowledge-building. An *international* learning environment gives readiness for intercultural communication and operations and encourages and enhances *entrepreneurship*. All of this means that the *assessment* methods become more *versatile*, e.g. continuous and do not only focus on learning outcomes, and *development-oriented*, i.e. students are able to assess their own competences and know-how to develop them. And this also means that the teacher role is changing (Konst et al. 2015).

The Flexible curricula are an important cornerstone, in which the design is based on the strategic goals and secured by the quality system of the HEI. Internationalisation refers to the purpose of the studies to offer competencies for the export activities and working on multicultural environments. Finally, with the entrepreneurship and service activities, we refer to the operations supported by teaching in line with the needs of the business life of the region (Penttilä et al. 2015).

THE INTERVENTION

In this chapter, the eTUBE programme as an innovation-pedagogic digiintervention in higher education is analysed. The eTUBE programme was started with an aim to react to the national and local educational and digitalisation strategies, including the new strategy and the latest organisational changes at TUAS. Each training course of the whole eTUBE programme has been carried out as a one semester implementation. The course was marketed internally at TUAS for all personnel. The course extent is 5ECTS, which the participants are awarded after completing all the assignments and designing an online module for their own teaching. eTUBE was set up as a further education programme for all subject teachers in higher education, and its origins are in a similar programme, Eurolta-Eurovolt, which is aimed at promoting foreign language teachers' online teaching skills (<u>http://www.icc-languages.eu/accreditation/eurovolt;</u> www.eurovolt.fi). Before being established as a professional development course, the Eurolta-Eurovolt programme started as a project which was funded with support from the European Commission, Leonardo-da-Vinci Programme and the project partners (2005-2007).

The Eurolta-Eurovolt teacher training framework contains the basic guidelines for becoming proficient in the use of the new media in vocationally oriented language teaching. eTUBE programme has adopted the learning-by-doing approach of Eurolta-Eurovolt, but expanding the focus to online learning in higher education and applying additional elements from the concept of innovation pedagogy of TUAS.

The pedagogical approach of eTUBE focuses on the role of guidance in online learning, giving up the lecture-based learning and looking into the ways of supporting student learning with activating and motivating methods in various virtual environments. The adoption of online learning means a change in the role of teachers and students in the learning process. Using the eTUBE programme as an instrument, we have been interested to study the impacts of the training programme on the teachers' capacity to adopt the new virtual approaches and environments, as well as investigate their attitude towards the ongoing pedagogical change. The basic elements of eTUBE are described in Figure 2.



Figure 2. The eTUBE concept

As Figure 2 shows, online pedagogy is at the heart of the eTUBE programme. Surrounding the central theme of pedagogical approaches are the various subthemes of the course, which are then further supported with different technical solutions. Thus, guidance for using those technical tools is also offered as part of the course, although the main focus is on the pedagogy rather than technology. The Finnish virtual learning platform OPTIMA has been used as the eTUBE course learning environment in TUAS. However, for the development of their own online implementation, the eTUBE participants were also free to choose other environments, such as Moodle or Eliademy, or utilise other technical solutions for the production of their material and learning solutions. The eTUBE is a continuous and ongoing programme with new training groups at the moment and in the future at TUAS.

The pedagogic framework of the eTUBE has been derived from the innovation pedagogy of TUAS. In addition, the TPACK framework (Koehler & Mishra 2009), which extends Shulman's (1986) idea of Pedagogical Content Knowledge, is used as the framework for online design. Furthermore, Salmon's (2013) e-tivities are used as practical models for designing e-learning courses. During the design of eTUBE programme, the concept of TUAS innovation pedagogy was discussed with one of the original authors (Penttilä, T., later Konst, T.) in order to ensure that

the eTUBE approach was sufficiently in line with the ideas in innovation pedagogy.

Two units at TUAS, Future Learning Design and Learning Environment Services, are responsible for carrying out the eTUBE programme with the main trainers, of which Joshi, M. is one of the authors of this paper. Course themes were constructed by several TUAS internal and external experts. As a result of collaborative design, a new concept for eTUBE online expert lecture series was introduced, and the series was started by an expert workshop lead by an international CARPE partner of TUAS.

We worked with three training groups during spring 2015: eTUBE1, which was a multidisciplinary group consisting of teachers from several faculties of TUAS, eTUBE2, consisting of teachers who teach in English and, therefore, the training of this group was carried out in English and, finally, eTUBE3, with participating teachers from the Educational unit of Technology, Environment and Business of TUAS.

The first two groups were chosen through an open application from all the TUAS faculties. The third group was nominated by an RDI manager of a degree programme with the participating teachers from the only one degree programme. Each training consisted of five whole day workshops, and during the periods between the workshops, the trainees produced and developed their own online implementations based on the subjects and courses they were carrying out in their degree programmes. All the trainees had a possibility to get technical and pedagogical support and consultation, both face-to-face and over the Internet.

INTERVENTION EVALUATED

Before the study period of each eTUBE group began, we asked the group members to write into the used virtual learning environment Optima about their anticipations of the training and of their own personal development goals. On the basis of these personal documents, we opened the first contact sessions with the discussions of the present state of higher educational digitalisation, as well as present and future needs of students and teachers. These discussions were analysed together with the query we carried out at the end of each of our training group implementation.

Our basic research question for this study has been: has the eTUBE -programme, as an AR intervention, succeeded in supporting the development of teachers virtual teaching competences. For this purpose, we carried out an enquiry which we distributed during the last course day of each group using webropol (http://www.webropol.com/). Most of the query questions were multiple-choice questions, on the basis of the competence concept of the innovation pedagogy
(Räsänen, 2014) with a scale: 1 = do not agree at all to 5 = totally agree. The main questions of our Webropol enquiry are listed in Appendix 1.

Fifteen female and seven male participants completed our Webropol questionnaire. All the training programme participants were between 31 and 60 years old. The respondents were equally distributed between all three training implementations in question. Their online teaching experience varied. Most of them had only occasionally taught online and only a few had carried out 100% online courses. Three participants did not finish our training because of a lack of time or did not specify the reason.

RESULTS

In this chapter, we introduce the main results of our query and compare them to the discussions and observations made before and during the interventions. As an orientation, and to serve the background information, we asked the trainees to define how much they have taught online before attending to the eTUBE training. Most of the trainees indicated to have carried out online teaching. Everyone seemed to use virtual possibilities, but only 5 of them had carried 100% online courses before. This same type of situation seems to prevail throughout the university. The TUAS has not been particularly active to offer 100% online courses without any contact lessons or workshops. The role of online teaching skills seems to be important to the trainees. They strongly agreed to the statement: "Developing online teaching skills is an essential element and important part of my professional development at the moment". The possible reasons for that, according to discussions, seemed to vary: such as the observed behaviour of latest student generations, the digi-positive content of national and local strategies, teachers who so far have participated in the training are those who mainly are supporters of digitalisation and also the latest active public discussion of digitalisation in the printed and digitalised press has affected.

According to innovation pedagogy framework, co-teaching (intensive collaboration in planning, implementing and evaluating courses) develops education and function as a model for students. Thus, we set the coal to add the virtual networking elements to our programme by encouraging trainees to collaborate with each other over the net, with the hope that they also will continue to collaborate afterwards. Moreover, we have been interested in the awareness side of the story by observing and collaborating with the trainees over the Web. We also asked in the beginning of our query if eTUBE helped trainees to see the possibilities for coteaching online. The result (22 respondents) is described in figure 3.



Figure 3. the course helped me see the possibilities of co-teaching online.

As shown in figure 3, we succeeded quite well in supporting teacher awareness of collaboration and networking possibilities online, but some disagreements also occurred. As we will carry out the programme in the future, our purpose is to continue the collaboration with those teachers who indicated having been helped. The trainees also responded regarding the collaboration and especially the feedback collected as well as the attitudes about the colleague feedback. The trainees seemed to collect and use feedback from their colleagues about their online projects, although some opposite cases were also observed.

Our next question continued with this very same networking/collaboration theme more detailed way. We asked more concretely if they actually shared ideas and materials with others *During the course I openly gave new ideas and online teaching materials for others to use.* The result of how we managed to raise sharing among the higher education teachers with our training intervention was somewhat polarised. A higher number of group members seemed to share, but obviously there were experts who did not share and, therefore, they did not change their working habits. Of course, part of the sharers, may also have been those who did not their working habits in a sense that they might be sharers already before the training. We should be asked more directly if the training caused them to give new ideas and online teaching materials for others to use. This remains to be corrected in next queries.

To go on towards a more technical side of the story, we were then interested if our trainees were, due to intervention, more able than before to utilise technical tools and applications which were available to them during the training (figure 4).The number of respondents was once again the same 22.



Figure 4. I am now able to better utilise those technical tools and applications available to me

The reaction for the technical side of the training was surprisingly positive. It seems that it is easier to learn technical know-how than to know where and when use it, both on the basis of our query and our observations and experiences. This issue also started a lot of discussions during the training among the trainees and instructors during the trainings.

According to innovation pedagogy concept, innovation competences will develop depending on whether individuals have been out of their own comfort zone or not. We discussed the importance of this element with the trainees and became curious about whether we managed to also cause the same kind of situation in our training. Asking this was also a way to try to find out if only digi-positivists had chosen the eTUBE training or not. The respondents seemed to be quite out of their comfort zone at least occasionally during their training which indicates an ongoing learning process, but also perhaps that they had processed this element of innovation competences. We would also like to interpret the result in telling us that not only the digi-believers were taking part in the training, although this is not totally proved.

One of the most important dimensions of the training eTUBE which has been considered by TUAS leaders is the focus on the development of teachers' professional development. This dimension has also been brought up by the MinEdu on the national level, stating that by utilising the information and communication technology, it is possible to offer new kinds of flexible and individualised studies for students and to modernise the curriculums and didactics and thus care will be taken by the ministry for both initial and continuing teacher education to ensure that teachers are able to use ICT (Ministry of Education 2012, 18). Asking this, the 22 respondents of our query reacted as shown in figure 5.



Figure 5. The course supported my professional development overall

Figure 5 shows that the intervention by the eTUBE programme has succeeded in supporting trainees rather well in general on this score. Only three persons seemed to not get help for their professional endeavour from the eTUBE.

Not only domestic collaboration and networking have been on the agenda both in general and in local need indications, but also the international side of the coin. In eTUBE, we offered contacts and a webinar generated by our international CARPE network partner and kept the international dimension on the air through the training. Our success in this matter was also measured by our query. At some point we succeeded, but not all the respondents agreed regarding this. The distribution of the answers was more even compared to the support for their professional development in general.

Although the practical oriented higher education in Finland is by legislation, by Finnish UAS practices and as elemental part of the innovation pedagogy of TUAS, tied to the working life and regional development, this dimension was not extensively at centre of eTUBE even though some of the virtual material offered discussed how the collaboration between business and education could be supported by educational digitalisation. The results of the query, as described in figure 6, also indicate the same.



Figure 6. The course strengthened my view on the importance of the work-life connection to teaching

As figure 6 shows with its 22 respondents, if we want to raise business collaboration to a greater role, we should put more effort into this dimension during the next training rounds in the future. As a control question, by asking almost the same thing just with different words, we tried to map and reassert the respondents' view if eTUBE intervention has helped to see new possibilities of educational online activities for higher education. In addition, here, the strongly agree - section seemed to be rather concretised, so the intervention seems to have succeeded in opening new online possibilities for the higher education teachers taking part.

In the same manner, as in the previous question, the next figure 8 illustrates that online pedagogy succeeded in a versatile way. The training courses handled online pedagogy from multiple aspects rather well.



Figure 8. The course handled online pedagogy from multiple aspects

One particular instance of valuable feedback we received, as developers, was the response illustrated in figure 9. The respondent quite agreed that the pure technical training should be more offered than we did. This result indicates the general uncertainty of higher education teachers facing the rapid technological development of a modern knowledge society.



Figure 9. The course should have included more technical training sessions

The result of figure 9 should be analysed with care in order to continue with the eTUBE programme in the future, although our respondents also indicated that the skills in online pedagogy are equally important to technical skills.

The peer collaboration between expert colleagues in higher education and the business life of different industries emphasises an important role. This is also something we have tried, by our actions, in terms of action research, in pointing it out in discussions and in common ongoing projects with the eTUBE trainees. With many of the trainees, we have a rather long common history of online teaching development work which is one of the reasons we also have become interested in AR approach in order to get some more understanding of what we are struggling together with.

Not only the pure online teaching, but also the combination with other kinds of applications of the innovation pedagogy has played an important role in our development work. That is why we also asked about the blended learning, as figure 10 represents, with its 22 respondents.



Figure 10. The course got me enthusiastic about using blended teaching methods

The result of our query (figure 10), with our observations and discussions, indicate that a significant part of the eTUBE trainees were even more interested about the blended teaching methods than the pure online solutions. This was something we did not weight by ourselves but which was raised by the training teachers. Some of the trainees also pointed out that blended learning and blended teaching also suits the picture when the university vision includes the strong abandonment of the traditional classroom teaching, as is the case of TUAS pronounced by the rector.

The content of our next question, illustrated in figure 11, was also concerned regarding the same subject hereinabove and the relationship between online teaching and contact teaching. We turned the picture upside down and asked what our trainees thought about of the possibilities of a variety of online methods compared to the versatility of face-to-face teaching. They agreed that versatility is great in both of the cases, but still the popularity of blended learning was obvious.



Figure 11. It is possible to use the same amount of variety of methods online as there is face-to-face

Furthermore, we raised this very same theme while also considering the implemented eTUBE trainings by asking if they should be offered completely online. The response to this was in line with their view about the balance of different approaches: the blended learning implementation was somewhat more popular than complete virtual version.

We also asked about the attitude of higher education management towards the development of teaching. In general, line managers of teachers seem to have a positive attitude to the learning efforts of their teacher, as anticipated. In order to process the workload situation of trainees and, at the same time, their readiness to

actually learn and collaborate online by themselves during the distance work periods of the eTUBE, we posed a question in our query. On the whole, trainees seemed to be both motivated and used to working online. Some of them, however, stated that they had also organised some face-to-face sessions with each other. Moreover, we also observed that in some cases the circle of working contacts spread to persons in the faculties so that some colleagues outside of the actual eTUBE groups were involved in the development projects. On the other hand, we also observed some persons just working alone.

CONCLUSIONS

Our paper studied the eTUBE continuing professional development programme of Turku University of Applied sciences. Our purpose has been to bridge the innovation pedagogy, the use of ICT and action research. In general, we have been interested in promoting higher education teachers' use of ICT with the aid or eTUBE in a framework of innovation pedagogy and to develop the eTUBE programme itself. The first three professional training implementations of the programme have been carried out with the research enquiries, discussions and observations based on the main elements of innovation pedagogy developed by the TUAS. The programme and study of it will be continued, but in this paper we change the experiences reached so far. In general, the eTUBE programme seems to be parallel with the European, national and even local strategies considering the late debate about digitalisation and the needs of the education sector to support the general development and guidelines of it in the knowledge society.

Furthermore, the action research seems to be a relevant method for this kind of study we have carried out. Our research supports higher education teachers' online activities and provides motivation for further research. The action research approach has helped us, as developers and researchers, to focus on development interventions in otherwise chaotic environments. The action research approach opened processes to be more understandable and guided us to make conscious development actions and, above all, enabled us to study actions made in the light of measurable or observable results. As action research can be conducted on wide social situations, such as organisations and networks in order to support strategic development work, the development of practices and raising the knowledge of the current circumstances, we see it as a suitable instrument to support the activities and operations of HEIs including in more complicated situations, of which everyday practices are usually the cross border type, interdisciplinary and networked.

In addition, the academically rather well known idea of knowledge triangle, linking together education, research and innovation, seems to permeate all the strategic levels from EU to single universities nowadays. From the strategies of the different

national levels, and by combining our empirical analysis of the implemented intervention, the most obvious outcome of our actions in the eTUBE training process may be that the number of teachers collaborating online with each other seemed to increase. Thus, the first preconditions for the triangle seem to already exist. Furthermore, the eTUBE trainees were interested in having and using feedback from their colleagues about their online projects, although some opposite cases were also observed. Naturally, this is something which still needs further investigation in our future studies: how do they do it and how permanent will the change be?

The other purpose of our study has been to apply the concept of innovation pedagogy, which has been developed at TUAS. Pedagogical development is an essential element in order to apply the institutional and organisational strategies to higher education. While pedagogic development work should be taken into account as the main goals of strategies, these strategies should also offer a flexible framework that can be used in various situations in turbulent academic life. Flexible multi-field and networked pedagogic collaboration responds to the development needs of the globe and regions. The eTUBE programme can be seen as one of those models developed to be instruments for the purpose.

The role of online teaching skills seemed to be important to eTUBE trainees because of the observed behaviour of the latest student generations, the digipositive content of national and local strategies, but perhaps many teachers who have been selected for the training are those who are already supporters of digitalisation. In general, the public discussion of digitalisation as well as the inherent discussions in universities has been active.

The respondents to our query signalled that technical training should be offered more compared to what we did during the trainings so far. In general, these results may also indicate a common uncertainty of higher education teachers in a fast changing technical development of the modern knowledge society.

A significant part of the eTUBE trainees were more interested about the blended teaching methods than the pure online solutions. This was something we did not weight by ourselves but which was raised by the training teachers. Some of the trainees also pointed out that blended learning and blended teaching also suits the picture when the university vision includes the strong abandonment of the traditional classroom teaching, as is the case of TUAS.

REFERENCES

- Alara 2016. Action Research. Action Learning, Action Research Association Inc network. <u>http://www.alarassociation.org/pages/al-and-ar/action-research</u>. Retrieved 15/10/2016.
- Anttila 1996, P. (1996). Tutkimuksen taito ja tiedon hankinta. Helsinki: Akatiimi.
- City of Turku, 2015. Turku 2029 Kaupunkistrategia. <u>http://www.turku.fi/strategia</u>. Retrieved 22/10/2016.
- European Commission 2016. Digital Single market digital economy & society: Digital Skills and Jobs Coalition. <u>https://ec.europa.eu/digital-single-</u> market/en/digital-skills-jobs-coalition. Retrieved 13/01/2017
- European Union 2009. Education and training 2020 (ET 2020). <u>http://eur-lex.europa.eu/legal-</u> content/EN/TXT/PDF/?uri=CELEX:52009XG0528(01)&from=EN Retrieved 16/3/2016.
- Kairisto-Mertanen L., Penttilä T. & Lappalainen H. (2012). Fostering Capabilities for Continuous Innovation in University Education. Proceedings of 13th International CINet Conference 16–18 September 2012.
- Kantola, M. and Kettunen, J. 2012. Integration of education with research and development and the export of higher education. On the Horizon, Vol 20, 1/2012, pp 7-16. Emerald Group Publishing Limited. ISSN: 1074-8121.
- Kantola, M. & Linko, L. 2014. Ammattikorkeakoulujen yhteiseen verkkolehteen kohdistuva toimintatutkimus. Ammattikasvatuksen aikakauskirja 3/2014. OKKA-säätiö. Tampere. ISSN 1456-7989.
- Kettunen, J. 2009. Innovaatiopedagogiikka. Kever-verkkolehti. Vol.8, no 3. http://ojs.seamk. fi /index.php/kever/issue/view/68.
- Kettunen, J. 2011. Innovation pedagogy for universities of applied sciences, Creative Education, 2(1), 56-62. Scientific Research. DOI:10.4236/ce.2011.21008
- Kettunen, J., Kairisto-Mertanen, L. and Penttilä, T. 2013. Innovation pedagogy and desired learning outcomes in higher education. On the Horizon Vol.21 No. 4/2013. Emerald Publishing Limited, ISSN 1074-8121 page 333-342. DOI: 10.1108/OTH-08-2011-0024
- Koehler, M. J., & Mishra, P. (2009). What is technological pedagogical content knowledge? Contemporary Issues in Technology and Teacher Education, 9(1), 60-70.
- Kuula, A. 2001. Toimintatutkimus. Kenttätyötä ja muutospyrkimyksiä. 2. painos. Tampere: Vastapaino. ISBN 951-768-062-7.
- Lehto, A., Kairisto-Mertanen, L. & Penttilä, T. 2011. Towards innovation pedagogy A new approach to teaching and learning for universities of

applied sciences. Reports from Turku University of Applied Sciences 100. Tampere: Juvenes Print Oy. ISBN 978-952-216-168-0.

- Ministry of Education and Culture, Finland (2012). Education and Research 2011– 2016 A development plan Reports of the Ministry of Education and Culture, Finland 2012:3. http://minedu.fi/export/sites/default/OPM/Julkaisut/2012/liitteet/okm03.pdf? lang=en
- Mutanen, A. 2009. Käytäntölähtöinen tutkimus. Kever-lehti 3/3009. <u>https://arkisto.uasjournal.fi/kever_2009-3/referee_MutanenValmis.pdf</u> Referred 17/01/2017.
- Prime Minister's Office 2015. Ratkaisujen Suomi. Pääministeri Juha Sipilän hallituksen strateginen ohjelma. Hallituksen julkaisusarja 10/2015. Helsinki: Edita Prima. ISBN Nid. 978-952-287-182-4.
- Riel, M. 2016. Understanding Action Research. Center for collaborative action research. <u>http://cadres.pepperdine.edu/ccar/define.html</u>. Retrieved 19/01/2017
- Räsänen, M.(Toim.) 2014. Innovaatiokompetensseja mittaamassa. Turun ammattikorkeakoulun oppimateriaaleja 10. Turku. ISBN 978-952-216-497-1.
- Salmon, G. 2013. E-Tivities. The Key to Active Online Learning. Second edition. New York: Taylor & Francis. ISBN: 978-0-203-07464 (ebk).
- Scheinin, M. (2016). Introduction Future Learning Design. In Tanskanen, I. & Rännäli, M. (eds). Spinning e-pedagogical Nets. Pedagogical development and experiments in higher education. Reports from Turku University of Applied Sciences. Tampere: Suomen yliopistopaino. Available at:

http://julkaisut.turkuamk.fi/isbn9789522166371.pdf

- Shulman, L.S. (1986). Those who understand: Knowledge growth in teaching. *Educational Researcher*, 15(2), 4-14.
- Tpack-org 2012. TPACK Explained. http://www.tpack.org/ Referenced 10/01/2016.
- Turku University of Applied Sciences 2015. Values and strategy. http://www.tuas.fi/en/about-us/operations-and-organisation/values-and-strategy/
- West, C. 2011. Action Research as a Professional Development Activity. Arts education policy review, 112: 89-94. Routledge, Taylor & Francis Group. ISSN: 1063-2913. DOI:10.1080/10632913.2011.546697.
- Zeni, J. 1998. A guide to ethical issues and action research. Educational Action Research, 1, 9-19, DOI: 10.1080/0965799800200053.

APPENDIX 1.

Webpol questionnaire:

- 1. Background questions: gender, age, how much have taught online, which eTUBE training group, why did not finish the course
- 2. The course helped me see the possibilities for co-teaching online.
- 3. During the course, I openly gave new ideas and online teaching materials for others to use.
- 4. During the course, I was able to utilise the hours available to me in order to reach my objectives.
- 5. I am now able to better utilise those technical tools and applications available to me.
- 6. Developing online teaching skills is an essential and important part of my professional development at the moment.
- 7. During the course, I had to go outside my comfort zone.
- 8. The course supported my professional development overall.
- 9. The course opened up new opportunities for internationalisation in my teaching.
- 10. The course strengthened my view on the importance of work-life connection to teaching.
- 11. This course enabled me to better see the possibilities of online teaching in the future.
- 12. The course handled online pedagogy from multiple aspects.
- 13. The topics covered on the course were useful in terms of developing my own online implementation.
- 14. The course should have included more technical training sessions.
- 15. Skills in online pedagogy are equally important to technical skills.
- 16. The length of the course was suitable.
- 17. The extent of the course was sufficient for reaching my objectives.
- 18. The course made me enthusiastic about using blended teaching methods.
- 19. It is possible to use the same amount of variety of methods online as it is face-to-face.
- 20. The methods used in the course were suitable.
- 21. The course should be offered completely online.
- 22. My line manager has been supportive of the development of my online teaching skills.

- 23. I actively developed my own online implementation during the distance work periods of the course.
- 24. The feedback of my colleagues for the development of my own online implementation was important.
- 25. I would recommend my colleagues to take part in this course.
- 26. Receiving a badge (digital certificate) for the course is important to me.
- 27. Open remarks of the trainee.

AN ONLINE JOURNAL PROMOTING DIGITAL COLLABORATION IN FINNISH HIGHER EDUCATION INSTITUTIONS

Lotta Linko*, Mauri Kantola**, Mervi Friman***

* MA, Häme University of Applied Sciences, Finland, lotta.linko@hamk.fi, ** MA, Turku University of Applied Sciences, Finland, mauri.kantola@turkuamk.fi, ***PhD (Ed.), Häme University of Applied Sciences, Finland, mervi.friman@hamk.fi.

ABSTRACT

The article deals with the role of digitalisation in the Finnish educational sector, discussing the case of the online UAS Journal (Journal of Finnish Universities of Applied Sciences) as a promoter of collaboration and a national project. In this article, we look at the interventions aimed at promoting collaboration and analyse them through interviews with on-theme editors and board members, a user survey and user data (Google Analytics). As a background, we have taken a wider frame to our activities, namely the European framework for digitally-competent educational organisations (DigCompOrg). Although the UAS Journal is a national project, it has no steering role over the universities of applied sciences. DigCompOrg provides us with a holistic and systemic yet flexible model to look at the joint actions of independent institutions, at the same time binding us to the European context and promoting transparency, comparability and peer-learning. Keywords: digitalisation, higher education, evaluation, development

DIGITALISATION IN FINLAND'S EDUCATIONAL SECTOR

Digital technologies today have a vast effect on the processes and practices of all educational sectors over Europe, and the impact can be seen throughout the educational value chain and in all educational actors (Kampylis et al. 2015).

The Europe 2020 strategy states that education and training play a vital role in the development of the continent, and the digitalisation of education and training systems is present in several initiatives internationally (Kampylis et al. 2015). In Finland digitalisation is emphasised strongly in national policy. In the current government programme (Finnish Government 2015) digitalisation can be seen as one of the six most important areas of development during the next four years. Digitalisation has the potential to be used as a tool and solution to the most problems, from local health care to global economic competitiveness. In the five-point action plan, the government will be created for digital business operations, legal provisions will be improved, a culture of experimentation will be introduced, and management and implementation will be improved. Regarding the administrative sector of education and culture it mentions that the new learning environments and digital materials have to exist in all comprehensive schools.

The concern of the Finnish government is understandable when exploring some recent reports. According to the reports, Finland has good possibilities to utilize digitalisation but the Finns seem to be too device-oriented, instead of concentrating on applications and innovations (DIGILE 2016). The European Research Group reports that there is growth potential in the Finnish economy and that digitalisation promises to boost productivity and enable the creation of new digital service production and workplaces. This, however, means ensuring that there is sufficient educational supply and putting the whole of the labour reserve into full use (*The Europe 2020 Competitiveness Report* 2014).

On the basis of the surveys mentioned above, the duty of higher education in the digitalisation process is wide and deep. The Ministry of Education and Culture (MoEC) has not manifested any official paper about digitalisation but in the seminar of spring 2016 the following topics were highlighted: the implementation of digitalisation in all teaching and learning; the utilization of digital databases; co-operation between universities, universities of applied sciences (UASs) and research centres; and international co-operation with open science, global data, MOOCs etc. (MoEC 2016). In the action plan "Growth in competencies for Finland – Proposed objectives for degrees and qualifications for the 2020s" the MoEC underlines digital competences as general skills that include all higher education and, beyond this, special competences linked to different professions (MoEC 2015).

"Window of possibilities" is a current article (2016) written by rector Tapio Huttula of Humak University of Applied Sciences. The basic idea regards the role of UASs in the new production of knowledge, so-called mode 2 knowledge (Gibbons et al. 1994). In this situation Huttula proposes that higher education institutions are the birthplaces of new knowledge and know-how by having a wide and cellular relation to society locally, regionally and globally. In this process digitalisation offers facilities and platforms for fruitful networking. The role of higher education institutions is to strongly prioritize and manage data and information so it is both in a usable form and at a usable level. Huttula reminds us of the importance of the self-evident profile that universities have in the society: the responsibility for education and civilisation (Huttula 2016).

THE UAS JOURNAL AS A NATIONAL PROJECT

The aim of the UAS Journal (Journal of Finnish Universities of Applied Sciences) is according to the Rector's Conference to be "a window to the Finnish universities of applied sciences". Its mission is to 1) provide information on the education, research and development activities in practice-oriented higher education to the stakeholders and general public, and 2) provide a network for UASs and the business and industry. The online journal is published by the Finnish UAS Rectors' Conference and jointly financed by the 25 UASs in Finland. The UAS Journal is open access and free of charge with four issues a year since 2011. The articles of the journal are mainly published in Finnish with summaries in English.

Higher education institutions are significant regional actors and the UAS Journal has partly had a role in carrying out the third task of the Finnish universities (MoEC 2010, Arene 2013) focusing on education and research and development activities in the Finnish UASs. The editorial board consists of twelve experts of different faculties of different UASs from different parts of the country. The main target groups of the UAS Journal are the staff members of Finnish higher education institutions, their interest groups and actors in the related world of work. Lately, the journal aims to attract contributors and readers from outside Finland, especially from European countries (Kantola & Friman, 2012).

The roots of the UAS eJournal are in the KeVer network (2000–2009) and the *KeVer eJournal*. The KeVer eJournal was published as one part of networking activities and the purpose of the KeVer network was to develop and strengthen pedagogical, methodological and RDI actions in UASs, which began as a part of higher education in Finland in 1991. The method of working in KeVer was to combine research and practice, researchers and practitioners. The network members were researchers working in the universities and research institutions and teachers, as well as researchers and developers working in UASs. When KeVer

network activities finished, the ejournal transformed from a research-based journal to a magazine format.

The UAS Journal has been studied and developed since it was founded in 2011, based on the framework of action research. In this framework, the researchers are part of the research process planning and documenting both self-evaluation and other data. This approach has provided the developers with a routine for planning, performing and analysing systematic, data-driven and measurable interventions (Friman et al. 2015, Kantola & Friman 2012). The focus has, over the years, quite naturally shifted from examining and developing editorial and marketing processes to the networking and collaboration (Kantola & Linko 2014) aspects of the journal.

DIGCOMPORG FRAMEWORK

DigCompOrg (Kampylis & al. 2015, the European framework for digitallycompetent educational organisations) can be seen as a generic model and thus adaptable to many different contexts. It can be used as a flexible way to approach organisational self-reflection and self-assessment. The UAS Journal, of course, is not an educational institution nor are its goals and functions directly comparable to any single UAS. The strength of DigCompOrg for our purposes is that, in addition to the pedagogical and technological dimension, it provides an organisational viewpoint on digitalisation. Thus, we interpret the UAS Journal to be one form of the loose and informal organisations within the field of Finnish higher education.



Figure 1. DigCompOrg framework

Figure one illustrates how DigCompOrg framework comprises of seven key elements and fifteen sub-elements, each with a number of descriptors (74 in total). Additionally, in the model there is space for adding more detailed sector-specific elements, sub-elements and descriptors.

The use of the educational DigCompOrg framework supports our prior action research, targeted at the activities of the *UAS Journal*.

We have identified several aspects of the *UAS Journal* activities and functions that can be evaluated using all the main elements of the model above. As to **leadership and governance practices**, the rectors' conference owns, funds and follows the activities of the journal, has a representative on the board, receives annual reports and initiates developments. In **teaching and learning practices**, a new approach has been taken to co-writing, co-producing and co-publishing. The roles of readers, writers and theme editors promotes **professional development**. Assessment practices are realised as reviews made by the editorial board, theme editors and cowriters: also, user data on use is constantly followed. All **content** is open access and digital, and multimedia productions are encouraged. The activity is based on volunteer **collaboration and networking**, and online presence is developed through the participants' networks. New partnerships have emerged thanks to the publication. As for **infrastructure**, sufficient resources have been allocated, and responsive implementation was realised with the platform change in 2016.

INTERVENTIONS FOR DIGITALISATION AND THEIR IMPACTS ON NETWORKING AND COMMUNICATION

The most relevant sector of DigCompOrg to the *UAS Journal* seems to be the collaboration and networking. The suitable sub-elements are the promotion of networking, sharing and collaboration, the strategic approach to communication and partnership development.

The descriptors include pooling expertise, sharing contents, exchanging knowledge, engaging students, and forming partnerships and online presence. These demands are quite generic and as such merely indicate the direction of desired interventions. For the purposes of deeper insight, we have gathered both qualitative and quantitative data: theme editors' interviews, user surveys and user statistics.

Interviews of the theme editors and board members

We conducted an e-mail interview sent to the whole editorial board of the UAS Journal (12 recipients) and to the theme editors from the past two years (9 recipients). The main question was whether the UAS Journal had had any effect on networking activities or research work. We received eight answers, the responses being positive. The respondents stated that through their activity in the journal they had received new information and new viewpoints on their work, they had learned about new practices, and found new colleagues and new partners, which had resulted in increased networking. Other recognized benefits included the increased public visibility of UAS research activities in general and, at a personal level, it was easier to publish research results and the respondents had improved reviewing and writing skills.

The user survey

The uasjournal.fi website was renewed in the spring of 2016. A user survey was available on the new site from 23 May to 10 June for the site visitors, and it gathered 296 answers altogether, although not all respondents answered all the questions. Of the respondents, 85% were students or staff members of UASs

(unfortunately we do not have the division between these two groups). Questions included opinions on the user interface and the platform and the contents.

We asked if the respondents agreed on the following fours statements: 1) The contents are relevant. 2) The articles indicate expertise. 3) The themes/articles are current. 4) I would share the articles. As seen in Figure 2, the users of the *UAS Journal* seem to be rather satisfied with the relevance of the online journal content.



Figure 2. The results of the user survey regarding the contents

As Figure 3 shows, the users have been mainly satisfied with the new visuals and the interface of the online journal. The editorial board had earlier received some critical feedback on the content management system and the look and feel of the journal, and as a consequence a new platform with a modernised look was introduced.



Figure 3. The results of the user survey regarding the visuals and interface

Overall, 91% of the respondents indicated that their expectations about the *UAS Journal* were met. There was also a free comments field in the survey, and some useful ideas for development came up.

User statistics

We have gathered user statistics through Google Analytics from the very beginning of the *UAS Journal*. Figure 4 shows that the number of page views, visits and unique visitors has risen steadily over the years.



Page views, visits and unique visitors

The change of the platform in spring 2016 caused a discontinuation of the comparability. The figures from 2016 are not comparable to those of previous years as older issues are no longer available on the new platform. Page views at the end of 2016 were 47,081, visits 21,148 and unique visitors 15,433. A new data period was naturally started with the new platform.

CONCLUSIONS

We have been able to identify several aspects of UAS Journal activities and functions that can be evaluated using all the main elements of the DigCompOrg model. We could raise fresh questions on the basis of the model. As DigCompOrg is a generic tool for self-assessment by nature, it can be used to support the development organisational activities, at least from the point of view of a single organisation or an institution. In addition, we are interested if the model could also be used for the purposes of more loose networks and communities as well. On the one hand, the model requires a specific local application as educational and other practices vary in different organisations and countries. On the other hand, the model works better as an umbrella-type framework for the purposes of the networks between higher education organisations. Obviously, the value of the model can be seen in the overall, holistic approach: using DigCompOrg may help in taking a broader view of common digital capacity, including aspects ranging from infrastructure to leadership. DigCompOrg as a whole is a welcome attempt at offering a mutual framework for contemplating digitalisation and digital competence from a shared and holistic perspective, while being flexible and applicable to the different needs of different regions, levels or institutions.

Figure 4. User data 2011–2015

There are two evident uses for DigCompOrg in the context of the UAS Journal: the sector of R&D and the internationalisation activities of UASs. Firstly, DigCompOrg could be completed as a joint effort to define the digital competence in the sector of research, development and innovation activities, which are the tasks of UASs, in addition to providing education and training. Secondly, DigCompOrg could act as a common base for possible pan-European cooperation or benchmarking. The UAS Journal could be used more efficiently as a joint tool for the internationalization of Finnish UASs (Linko & Kantola 2015). Within UASs, according to the discussions with the UAS' PR managers in October 2016, the tendency seems to be that printed magazines are being replaced by online newsletters. In this field, the role and focus of the UAS Journal as a joint, thematic and current journal is different from that of universities' own publications.

The UAS Journal has established its position and role in Finnish universities of applied sciences as a tool for communication and platform for networking. In our mind, now would be a good time to bind together and formulate the development work that has been consistently carried out since the beginning of the UAS Journal. One possible further development for the journal could be a quality management system, which would align the journal with its funding organisations (quality management systems are present in all Finnish higher education institutions). The aim of the quality management system for the uasjournal.fi is to ensure consistent actions at the same time leaving room for flexibility in changing environment and ultimately resulting in improved performance - and quality.

REFERENCES

- Finnish Government (2015). <u>http://valtioneuvosto.fi/documents/10184/1427398/Ratkaisujen+Suoi_EN_Y</u> <u>HDISTETTY_netti.pdf/8d2e1a66-e24a-4073-8303-ee3127fbfcac</u>, Accessed 3 May 2016.
- DIGILE, Ministry of Transport and Communications, Tekes, Technology Industries of Finland, Verkkoteollisuus. Digibarometri (2015). Helsinki: Taloustieto Oy. <u>http://www.digibarometri.fi</u>.
- Friman, M., Kantola, M. & Linko, L. (2014). Network interventions on the processes of the e-journal of the Finnish universities of applied sciences. EAPRIL conference proceedings / no. 1, pp. 270–282.
- Gibbons, M., Limoges, C., Nowotny, H., Schwarzman, S., Scott, P. & Trow, M. (1994). The New Production of Knowledge. The Dynamics of Science and Research in Contemporary Societies. London, Thousand Oaks & New Delhi: SAGE Publications.

- Huttula, T. (2016). Digitalisaatio ja uusi korkeakoulu. (*Digitalisation and new higher education*.) In Määttä, J., Pohjanmäki, T., Timonen, P. (eds.) Kohti digikampusta. (*Towards a digital campus*.) Humanistinen ammattikorkeakoulu, julkaisuja 22. Helsinki: Humanistinen ammattikorkeakoulu. ISBN 978-952-456-242-3 (printed), ISSN 2343-0664 (printed), ISBM 978-952-243-0 (online publication), ISSN 2343-0672 (online publication), pp. 12–23.
- Kampylis, P., Punie, Y. & Devine, J. (2015). Promoting Effective Digital-Age Learning – A European Framework for Digitally-Competent Educational Organisations, EUR 27599 EN, doi:10.2791/54070
- http://publications.jrc.ec.europa.eu/repository/bitstream/JRC98209/jrc98209 r digcomporg final.pdf Accessed 3 May 2016.
- Kantola M. & Friman M. (2012). The Kever e-journal in Finnish practical oriented higher education 2002-2009. Egitânia Sciencia. Guarda: Instituto Politécnico da Guarda, pp. 1646–8848, no. 10/2012, pp. 41–62.
- Kantola, M. & Linko, L. (2014). Ammattikorkeakoulujen yhteiseen verkkolehteen kohdistuva toimintatutkimus (*Action research performed on the online journal of Finnish universities of applied sciences.*) Ammattikasvatuksen aikakauskirja 3/2014, 53-64. Okka-säätiö 2014.
- Linko, L. & Kantola, M. (2015). AMK-verkkolehden kansainvälistyminen (*The internationalisation of the* UAS Journal.) In Mutka U., Laitinen-Väänänen, S. & Virolainen, M. (eds.), Monimuotoisuus haastaa koulutuksen.
 Uudistuvaa pedagogiikkaa ja TKI-toimintaa. Jyväskylä: Jyväskylän ammattikorkeakoulu JAMK.
- Ministry of Education and Culture (MoEC 2015). Suomi osaamisen kasvu-uralle. (Growth in competencies for Finland. Proposed objectives for degrees and qualifications for the 2020s.)
- http://www.minedu.fi/export/sites/default/OPM/Julkaisut/2015/liitteet/tr14.pdf?lan g=en
- World Economic Forum (2014). The Europe 2020 Competitiveness Report (2014). http://www3.weforum.org/docs/WEF_Europe2020_CompetitivenessReport_2014.pdf, access 3.5.2016.

MIND THE GAP! PERCEPTIONS OF TEACHERS, PRINCIPALS AND TEACHER EDUCATORS REGARDING THE PRIMARY-SECONDARY SCHOOL TRANSITION IN FLANDERS

Mieke Goos *, Anne Decelle **

 * PhD, teacher educator, University College Leuven – Limburg, Hertogstraat 178, 3001 Heverlee, Belgium, <u>mieke.goos@ucll.be</u>
 ** PhD, teacher educator, University College Leuven – Limburg, Hertogstraat 178, 3001 Heverlee, Belgium, <u>anne.decelle@ucll.be</u>

ABSTRACT

Students' transition from primary to secondary education has been a research topic for decades and previous studies have unravelled a multitude of factors influencing this transition process. Yet, so far, little attention has been paid to didactics, though the transition from primary to secondary school also entails a transition from one main teacher to a variety of subject-specialist teachers, with consequently a potential switch in didactical approach. This study aims to assess (1) transition activities currently undertaken, (2) teachers', principals' and teacher educators' perceptions regarding the primary-secondary school transition (non-) smoothness, (3) differences in didactical approach as perceived by primary and secondary school teachers, and (4) teachers', principals' and teacher educators' perceptions pertaining to the appointment of subject-specialist teachers in Grade 5 and 6. For these purposes, a survey study was carried out in Flanders. Results reveal that Flemish primary and secondary schools already undertake many activities smoothening their students' transition, with a large focus, however, on organizational matters. In case students transition less smoothly to secondary education than hoped for, differences in didactical approach between primary and secondary school teachers are often named. Such differences in didactical approach seem both general and course-specific based on comparisons of primary and secondary school teachers' answers to questions regarding didactics. The possibility of appointing subject-specialist teachers in primary education is received with mixed feelings. Suggestions for educational practice, policy and research are discussed.

INTRODUCTION

Throughout the world, most students transition from primary to secondary education at some point during early adolescence, though the exact timing of transition can differ per country (OECD, 2016). This primary-secondary school transition is widely recognized as being challenging for many reasons (Hanewald, 2013). First, students enter puberty and undergo important physical and cognitive changes (e.g., development of hypothetical thinking skills and abstract reasoning skills). Second, students need to switch to another, larger school building in which they need to find their way around. Third, due to their school change, students need to build new social networks in their new school environment, while at the same time their existing friendships might become under pressure and be disrupted. Fourth and finally, students' learning environment changes as they switch from one classroom with one main teacher in primary school to several classrooms and a variety of subject-specialist teachers in secondary school. Therefore, it is not surprising that most students need some time to tackle these important challenges.

Unfortunately, for some students, this adjustment process proceeds less smoothly: their achievement in several subject domains falls dramatically during the first months in secondary education, leading to school disengagement, grade retention and eventually dropout (for reviews, see Hanewald, 2013 and Korpershoek et al., 2016). Previous studies have detected several factors leading to adjustment difficulties during the primary-secondary school transition (e.g., Evangelou et al., 2008; Hanewald, 2013; Korpershoek et al., 2016; Rice et al., 2015; Uvaas & McKevitt, 2013). In this regard, the recent work of Korpershoek et al. (2016) is especially worth mentioning, as Korpershoek et al. have summarized all student-level, school-level and broader environment factors related to primary-secondary school transitional difficulties in one overarching conceptual model, briefly presented in Figure 1.



Figure 1. Conceptual model of factors influencing students' primary-secondary school transition, by Korpershoek et al. (2016, p.14).

What is present in the model of Korpershoek et al. (2016) but largely neglected in research so far is a focus on didactics. This didactical perspective on the primarysecondary school transition is particularly relevant in Flanders, the context of this study. In Flanders, due to a recently adopted school reform (Vlaams Parlement, 2013), primary schools are now allowed to hire subject-specialist teachers for the subjects of French, Science, Technology and Arts in Grade 5 and 6. It is unclear from research so far to which extent differences exist in didactical approach between primary and secondary school teachers and what effect the appointment of subject-specialist teachers in primary school might have upon students' transitional process.

It is the aim of this study to provide insights on this matter. More specifically, this study will address the following four research questions:

- 1. Which activities do Flemish primary and secondary schools currently undertake in order to smoothen their students' primary-secondary school transition?
- 2. What are the perceptions of Flemish primary school teachers, primary school principals, secondary school teachers, secondary school principals and teacher educators regarding the primary-secondary school transition (non-) smoothness of students?

- 3. Which differences exist in self-perceived didactical approach between Flemish primary school teachers and secondary school teachers?
- 4. What are the perceptions of Flemish primary school teachers, primary school principals, secondary school teachers, secondary school principals and teacher educators pertaining to the appointment of subject-specialist teachers in Grade and 6?

METHOD

Study design

In order to answer the research questions, a survey study was conducted, as part of a larger study on the primary-secondary school transition at University College Leuven – Limburg (so-called 'Mind the gap!' project). Surveys were developed based on the work of Hopwood (2014), Pelgrims (2012), Vandenberghe, Cortois, de Bilde, Van Peteghem, and Van Damme (2011) and Vlaams Ministerie van Onderwijs en Vorming (2008, 2009, 2011), covering several content areas (see measures section). A pilot study was conducted among 3 teachers and 5 teacher educators to gain feedback regarding the comprehensibility of the questions and the feasibility of completion time. Based on this pilot study, the survey questions were slightly shortened/adapted and digitalised in 7 separate Google Forms (available from the authors upon request).

Participants

The primary school surveys were sent to all principals of the 106 partner schools of the primary school teacher training program of University College Leuven – Limburg, in the period January – February 2016. In total, 34 Grade 6 teachers (% female = 70,59; $M_{age} = 40,15$; $M_{experience (years)} = 16,53$; $M_{teaching time (hours/week)} = 23,29$) and 45 principals (% female = 82,22; $M_{age} = 47,07$; $M_{experience (years)} = 22,24$) filled in the online survey.

The secondary school surveys were sent to all principals of the 168 secondary schools in the region of University College Leuven – Limburg, in the period February - March 2016. In total, 26 Grade 7 teachers (% female = 57,69; $M_{age} = 40,62$; $M_{experience (years)} = 15,23$; $M_{teaching time (hours/week)} = 19,92$) and 12 principals (% female = 33,33; $M_{age} = 46,08$; $M_{experience (years)} = 21,75$) filled in the online survey.

The tertiary school survey was sent to all deans of the 24 Flemish university college campuses offering a primary or secondary school teacher training program, in the period February – March 2016. In total, 41 teacher educators (% female = 60,98; $M_{age} = 43,29$; $M_{experience (years)} = 11,82$) filled in the online survey.

Measures

Our survey was especially designed for use in this study but most questions were derived from existing surveys (Hopwood, 2014; Pelgrims, 2012; Vandenberghe, Cortois, de Bilde, Van Peteghem, and Van Damme, 2011; Vlaams Ministerie van Onderwijs en Vorming, 2008, 2009, 2011). A combination of closed and openended questions was used, allowing both quantitative and qualitative analyses to be performed (see data analysis procedure section).

Our survey covered three different content areas, spread over three survey parts:

- 1. The first part of our survey assessed primary-secondary school transition activities and perceptions (research question 1 and 2). All participants (except the teacher educators) were presented a list of 33 (literaturederived) activities that one can undertake in order to ease students' primary-secondary school transition process. They were asked to tick the activities applying to them. Answers were scored as 0 (not applicable) or 1 (applicable). Next, all participants (including the teacher educators) were raised closed and open-ended questions regarding their perceptions of the primary-secondary school transition (non-) smoothness. Answers on the closed perceptions question were scored as 0 (generally non-smooth) or 1 (generally smooth). Answers on the open perceptions question were coded in a thematic analysis (see data analysis procedure section). Furthermore, all participants (including the teacher educators) were asked to tick their perceived reasons for transitional (non-) smoothness from al list of 6 (literature-derived) reasons. Answers were scored as 0 (not applicable) or 1 (applicable).
- 2. The second part of our survey assessed perceptions regarding didactics (research question 3), generally as well as course-specifically. Primary school teachers and secondary school teachers were raised closed questions regarding learning goals, educational values, differentiation, handbook and textbook usage, teaching approaches (general didactics), the amount of time spent on various French subdomains, the balance Dutch French as instruction language in French courses, assessments French (didactics French), the extent of subject discipline integration, problem-based learning and assessments Geography, History, Science and Technology (GHST) (didactics GHST). Answers were scored in a variety of ways, depending on the particular question (e.g., 0 or 1, 0-100 scale).
- 3. Finally, the third and last part of our survey assessed support for subjectspecialist teachers in Grade 5 and 6 (research question 4). All participants were raised a closed question on this matter. Answers were scored as 0 to 10.

Data analysis procedure

As for the closed questions (research question 1, 2, 3 and 4), percentages were calculated (whenever possible) and averages were computed and compared by educational level, by means of a series of analyses of variance. Analyses were conducted in R.3.3.2.

As for the open-ended questions regarding perceived reasons for the primarysecondary school transition (non-) smoothness of students (research question 2), a thematic analysis approach was used. In a first step, a categorization framework was built up by the authors, based on Cauley and Jovanovich (2006). The following coding categories were constructed: (1) transition activities undertaken by the school and teachers, (1a) related to organization, (1b) related to management of the social environment or (1c) related to curriculum / pedagogy / didactics, (2) feedback by parents, students or teachers, and (3) other including (3a) student development and (3b) transition activities undertaken by parents. In a second step, all participants' answers were coded and categorized. Coding and categorization was done by both authors separately. In a third and final step, coding and categorization was compared across the authors. Agreement was reached in most cases and can thus be considered as satisfactory.

RESULTS

Research question 1: Which activities do Flemish primary and secondary schools currently undertake in order to smoothen their students' primary-secondary school transition?

Overall, most primary school teachers, primary school principals, secondary school teachers and secondary school principals participating in this survey study indicated to currently undertake a multitude of activities smoothening students' primary-secondary school transition.

Of all 33 transition activities surveyed, the following 9 activities were undertaken by at least 70% of the teachers/schools (in order of popularity): (1) open day (S 100%); (2) information sharing about SEN, talents etc. of students via student document (P 91,11% + S 100%); (3) information sharing about secondary school structure and organisation via Grade 6 teacher talks (P 97,06%); (4) information sharing about secondary school structure and organisation via brochures (P 82,22% + S 100%); (5) information sharing about secondary school didactical approach via Grade 6 teacher talks (P 97,06%); (6) learning skills trainings (P 94,12% + S 73,08%); (7) visits to secondary schools (P 80,00% + S 91,67%); (8) team discussion regarding SEN-students (S 83,33%); and (9) reception days (S 75,00%). The following 6 activities were seldom undertaken: (1) regional deals regarding a primary-secondary-broad assessment policy (P 0% + S 0%); (2) joint social activities by primary and secondary schools (S 0%); (3) usage of the same handbooks and textbooks (P 4,44% + S 4,35%); (4) information sharing about secondary school didactical approach via Grade 7 teacher talks in Grade 6 (P 6,67%); (5) a buddy system (S 8,33%); and (6) (encouragement of Grade 7 students for) information sharing about secondary school didactical approach via student talks in Grade 6 (P 8,33%).

When reclustering answers according to Cauley and Jovanovich (2006), organization-related transition activities were ticked most often (58,94% on average) and transition activities related to management of the social environment and curriculum / pedagogy / didactics least often (29,44% and 39,74% respectively).

Research question 2: What are the perceptions of Flemish primary school teachers, primary school principals, secondary school teachers, secondary school principals and teacher educators regarding the primary-secondary school transition (non-)smoothness of students?

Overall, most teachers, principals and teacher educators participating in this survey study (77,85%) perceived the primary-secondary school transition among students as generally smooth. The perception of the primary-secondary school transition smoothness varied according to the participants' educational level, with teacher educators perceiving the transition as least smooth, F(156, 1) = 15,28, p < .01.

When asked to explain their answer of general smoothness, the teachers, principals and teacher educators participating in this survey study often named reasons linked to transition activities undertaken by the school and teachers related to curriculum / pedagogy / didactics (category 1c; 38,65%; e.g. "We use a P-S [primary-secondary] document. This document contains student information that is shared between schools upon request.", with the most popular reasons being P-S document usage, school visits and learning skills trainings) or transition activities undertaken by the school and teachers related to organization (category 1a; 33,33%; e.g. "At our school, students are satisfactorily informed about secondary school possibilities, structure, differences, demands...").

When asked to explain their answer of general non-smoothness or (after probing) non-smoothness for some students or some courses, the teachers, principals and teacher educators participating in this survey study almost exclusively named reasons linked to (lack of) transition activities undertaken by the school and teachers related to curriculum / pedagogy / didactics (category 1c; 71,27%; e.g. *"Especially French (in general) and Dutch (linguistics) are responsible for*

transition difficulties.", Differences in teaching approaches ... are an obstacle for some students.", "Our [secondary school] teachers have experienced that, if they follow the learning goals set out for primary education, students are not always equally well prepared for secondary education.").

In case of primary-secondary school transition difficulties (be it in general or (after probing) for some students or some courses), most teachers, principals and teacher educators participating in this survey study ticked differences in didactical approach between primary and secondary education as a plausible cause of these difficulties (50,00%). Other causes ticked (in terms of plausibility) were differences in primary and secondary school structure and organization (41,14%), the limited connection between primary-secondary education learning goals set out by the government (24,68%) or educational network (22,78%), the limited connections between primary-secondary education handbooks (22,15%), and the lack of information students receive (11,39%). Reasons ticked for primary-secondary school transition non-smoothness varied slightly according to the participants' educational level, with primary school teachers and principals ticking lack of information sharing less frequently, F(156, 1) = 23,48, p < .01, and limited connection of primary-secondary education learning goals set out by the government more frequently, F(156, 1) = 4.26, p = .04.

Research question 3: Which differences exist in self-perceived didactical approach between Flemish primary school teachers and secondary school teachers?

General didactics

Learning goals. In terms of self-perceived knowledge of the learning goals set out by the government and the educational network, the teachers participating in this survey study overall rated themselves higher for knowledge of learning goals of their own educational level, with average scores of 7,71 for governmental goals and 7,97 for educational network goals (on a 0-10 scale), and lower for knowledge of learning goals of the other educational level (e.g., goals of Grade 7/8 when teaching in Grade 6), with average scores of 3,24 for governmental goals and 3,32 for educational network goals. Self-perceived learning goals knowledge varied slightly according to the participants' educational level, with secondary school teachers rating themselves higher than primary school teachers for knowledge of learning goals of the other educational level, for both governmental goals, F(58, 1)= 4,65, p = .04, and educational network goals, F(58, 1) = 4,82, p = .03. As for learning goals perceptions, most teachers participating in this survey study indicated the expected level to be okay (not too difficult, not too easy; 73,76% as for governmental goals and 72,29% as for educational network goals), with no significant differences between primary and secondary school teachers.

Education values. Educational goals most frequently chosen by the teachers participating in this survey study (from a list of 14 educational goals) as 'top 3 goals' were independent behaviour (61,67%), self-confidence and positive self-esteem (46,67%), a positive work attitude (46,67%), and learning skills (43,33%). Educational goals barely ticked were creativity (6,67%), citizenship (6,67%), and talent excellence (6,67%). Educational values varied somewhat according to the participants' educational level, with secondary school teachers valuing reading, writing and math skills, F(58, 1) = 4,97, p = .03, cooperative behaviour, F(58, 1) = 5,41, p = .02, critical thinking, F(58, 1) = 24,10, p < .01, and talent excellence, F(58, 1) = 5,98, p = .02, more than primary school teachers.

Differentiation. Almost all teachers participating in this survey study stated having access to and using their students' files (which, in Flanders, contain relevant student information such as students' previous school career, SEN, TIER 3 measures, etc.), with no significant differences between primary and secondary school teachers. Overall, differentiation methods were mostly used in order to account for differences in students' cognitive skills (83,33%), preknowledge (61,67%), and interests (55,00%). Student characterics accounted for varied barely according to the participants' educational level, with the one exception of primary school teachers differentiating more in terms of students' cognitive skills than secondary school teachers, F(58, 1) = 7,13, p = .01. The teachers participating in this survey study used a variety of differentiation methods, with the most frequently used methods being peer tutoring (78,33%), more assignments of the same difficulty level for fast working students (76,67%), usage of visual, auditive and tactile learning materials (73,33%), less assignments for slower working students (68,33%), prolonged instruction for weaker performing students in a mini class (65,00%), no instruction but extended learning content and assignments for gifted students (61,67%), and usage of supportive materials (61,67%). Different assignments with different subjects to choose from were seldom used to differentiate (16,67%). Differentiation methods used varied to a large extent according to the participants' educational level, with primary school teachers using more differentiation methods than secondary school teachers, and more specifically mini class, F(58, 1) = 37,69, p < .01, extended learning content, F(58, 1) = 17,99, p < .01, less assignments, F(58, 1) = 38,95, p < .01, different assignments of different difficulty level, F(58, 1) = 5,82, p = .02, peer tutoring, F(58, 1) = 4,74, p = .03, usage of supportive materials, F(58, 1) = 17,99, p < .01

Handbook and textbook usage. Most teachers participating in this survey study indicated that they use 'fixed' handbooks and textbooks but with own supplemental material and/or material omissions (61,31%), with secondary school teachers adapting their material to a higher extent than primary school teachers, F(58, 1) = 6,64, p = .01.

Teaching approaches. Overall, the teachers participating in this survey study spent most time on assignments (42,07%), followed by class conversations (32,08%) and presentations (24,85%). Teaching approaches, however, varied to a large extent according to the participants' educational level, with primary school teachers using more time for assignments, F(58, 1) = 13,01, p < .01, and secondary school teachers using more time for class conversations, F(58, 1) = 4,19, p = .05.

Didactics French

Amount of time spent on various French subdomains. During French courses, the teachers participating in this survey study, on average, paid most attention to vocabulary (2,43 on a 0-3 scale), followed by oral interaction (2,22), grammar (2,19), and listening comprehension (2,14), and least attention to writing (1,71). Attention for these various subdomains did not differ significantly between primary and secondary school teachers.

Balance Dutch – French as instruction language in French courses. Most teachers participating in this survey study indicated to talk primarily French (59,15%) or French as much as Dutch (32,02%) during French courses. Teachers in secondary school indicated to use French more often as language of instruction in French courses than their colleagues in primary school, F(41, 1) = 5,17, p = .03.

Assessments French. As for French courses, most participating teachers indicated to assess their students once a week (75,00%), with secondary school teachers using assessments French more often than primary school teachers, F(41, 1) = 8,58, p = .01. Most teachers indicated to use method-bound assessment materials (86,05%) and self-designed assessment materials (81,40%). Existing, method-independent assessment materials were barely used (4,65%). No differences existed between primary and secondary school teachers in types of assessment materials used for French courses. Assessment questions were almost equally split in knowledge questions (35,25%), comprehension questions (24,39%), and application questions (36,92%), with no significant differences according to the participants' educational level. Assessment results were always communicated to students via numbers (100%), and in many cases supplemented with written feedback (60,47%). Codes were seldom used (2,33%). No significant differences existed in communication of assessment results according to the participants' educational level.

Didactics Geography, History, Science and Technology (GHST)

Extent of subject discipline integration. Most teachers participating in this survey study indicated to teach GHST courses separately (62,50%), or at best to integrate these subject courses to some extent (26,84%), but certainly not to integrate them

with other subject courses such as Languages, Math, and Arts (10,66%). No significant differences were found between primary and secondary school teachers in extent of subject discipline integration.

Problem-based learning. Most teachers participating in this survey study indicated to predominantly choose real world issues to build their GHST courses upon (71,20%). Subject course specific problems (20,05%) or problems experienced by students (8,76%) were far less frequently chosen as a starting point for learning. Again no significant differences were found according to the participants' educational level.

Assessments GHST. As for GHST courses, overall, most participating teachers indicated to assess their students once a month (46,08%), with primary school teachers assessing their students as frequently as secondary school teachers. Most teachers used self-designed assessment materials (96,00%). Method-bound assessment materials (26,00%) or existing, method-independent assessment materials (0,00%) were barely used. No differences were found between primary and secondary school teachers in types of assessment materials used for GHST courses. The teachers participating in this survey study indicated to use knowledge questions (47,39%) to a larger extent than comprehension questions (24,94%) and application questions (29,67%) in assessments GHST. Significant differences were found, however, according to the participants' educational level, with primary school teachers focusing more on knowledge questions, F(48, 1) = 8,76, p < .01, and less on application questions, F(48, 1) = 6,10, p < .02. Assessment results were mostly communicated to students via numbers (96,00%), and in half of the cases supplemented with written feedback (54,00%). Codes were seldom used (12,00%). Primary school teachers used numbers more frequently, F(48, 1) = 4,66, p = .04, and codes less frequently, F(48, 1) = 6,40, p = .01, than their secondary school colleagues.

Research question 4: What are the perceptions of Flemish primary school teachers, primary school principals, secondary school teachers, secondary school principals and teacher educators pertaining to the appointment of subject-specialist teachers in Grade and 6?

Overall, the teachers, principals and teacher educators participating in this survey study rated their support for subject-specialist teachers in primary school as 6,35 on a 0-10 scale. Support for subject-specialist teachers did not vary according to the participants' educational level. Within each educational level, however, teachers, principals and teacher educators differed a lot $(SD_{primary} = 2,15; SD_{secondary} = 2,77; SD_{tertiary} = 2,81)$.

CONCLUSION AND DISCUSSION

Main study findings

In sum, four major findings emerged from this study. First, we found that most Flemish primary and secondary schools seem to already undertake a multitude of activities in order to smoothen the primary-secondary school transition among their students. As such, we were not surprised to find that students' primary-secondary school transition generally seems to be perceived as a rather smooth process, especially by teachers and principals in primary and secondary schools undertaking all these activities. This finding of perceived general transition smoothness is in line with previous international studies indicating that the transition from primary to secondary school overall equals an adaptation period that most students (given some time) end successfully (e.g., Evangelou et al., 2008).

Second, when exploring the type of currently undertaken transition activities in more depth, we found that Flemish primary and secondary schools most often seem to focus on activities smoothening their students' transitional process from an organizational perspective. Examples of such transition activities are the organization of open days, information sharing about secondary school structure and organization via brochures or talks given by the Grade 6 teachers and school visits. Though important, Cauley and Jovanovich (2006) have clearly shown the added value of transition activities linked to management of the social environment and transition activities linked to curriculum / pedagogy / didactics in order to create an effective primary-secondary school transition policy. Especially the latter (i.e., transition activities linked to curriculum / pedagogy / didactics) is worth stressing in this regard, as differences in didactical approach were often named as plausible reasons for transitional difficulties in general or (when probing) for some students or some courses in particular, with both closed- and open-ended questions.

Third, focusing on didactics, we indeed found some interesting differences between Flemish primary and secondary school teachers, both generally and course-specifically. Flemish primary school teachers seemingly (1) differentiate more in terms of students' cognitive skills, (2) use more differentiation methods, (3) give more assignments during courses, (4) use more knowledge questions during GHST assessments, and (5) use numbers more frequently to communicate GHST assessment results, while Flemish secondary school teachers seemingly (1) rate themselves higher for knowledge of learning goals of primary education (than vice versa), (2) value reading, writing and math skills, cooperative behaviour, critical thinking, and talent excellence among their students to a larger extent, (3) adapt their handbooks and textbooks more often with own material, (4) use more conversations during courses, (5) speak more French during French courses, (6) assess students more often during French courses, (7) use more application

questions during GHST assessments, and (8) use codes more frequently to communicate GHST assessment results. This finding of differences in selfperceived didactical approach between Flemish primary and secondary school teachers adds to the extant literature on primary-secondary school transitions, as this perspective has largely been neglected in research so far.

Fourth and finally, we found that Flemish teachers, principals and teacher educators seemingly have mixed feelings about the possibility of appointing subject-specialist teachers in Grade 5 and 6. Many advantages as well as disadvantages were named *(not analyzed in this study)* and the possibility of more work opportunities for secondary school teachers apparently did not convince them enough to support this school reform measure more than their primary school colleagues. This finding, just like the previous one on differences in didactics, extends current knowledge, as research on subject-specialist teachers in primary education so far remains scarce (for a recent literature review, see Pollock & Mindzak, 2015).

Suggestions for educational practice, policy and research

With the four aforementioned main study findings in mind, we want to conclude by providing some suggestions for educational practice, policy and research. First, we strongly believe that it would improve Flemish educational practice if primary and secondary school teachers and principals would meet on a more regular basis, in order to jointly bridge the didactical gap that seemingly exists between primary and secondary education, hindering the transition process of some students or for some courses. In fact, this is exactly the aim of the next phase in the 'Mind the gap!' project at University College Leuven – Limburg (of which this survey study was a part of). In school years 2016-2017 and 2017-2018, four professional learning communities of teachers and principals from both primary and secondary education will be set up, with the goal of observing each other's classroom practice, discussing differences in (perceptions regarding) didactical approach, deepening their knowledge of some didactical aspects (via group sessions as well as via input offered on our online learning platform http://pwomindthegap.weebly.com/) and co-teaching some courses in each other's classroom.

Second, following recommendations of the Flemish Universities and University Colleges Council (Vlaamse Universiteiten en Hogescholen Raad, 2014), we believe educational practice might benefit from a closer cooperation between the teacher training programs of primary school and secondary school offered at our Flemish university colleges. These teacher training programs currently are often two separate worlds with separate teacher trainers and very few joint courses for students in either program. A joint course on the primary-secondary school transition for students from both teacher training programs, given by teacher trainers with expertise in both educational levels, including student internships in
both educational levels, might be a way to bridge the gap already apparent before students enter the 'real' educational practice.

Third, we believe Flemish educational policy makers should encourage and await results of high quality effectiveness studies on appointing subject-specialist teachers in Grade 5 and 6 before proceeding to legislation. Appointing subject-specialists may have clear advantages for students' learning, yet, at the same time disadvantages can be foreseen as well (Pollock & Mindzak, 2015). More research on this matter is needed in order to take sound policy decisions.

Fourth and finally, we believe educational research on the primary-secondary school transition would benefit from an upscaling of our study. It would be interesting to administer our surveys among (1) teachers from other regions besides the region of University College Leuven – Limburg, (2) secondary school teachers with a different subject background than French or GHST, (3) students in Grade 6 and 7, and (4) parents from students in Grade 6 and 7, to gather a more complete picture. Furthermore, future studies should also explore potential differences in didactical approach between primary and secondary school teachers via observations. Our study findings on didactical differences are based on teacher perceptions only, and observations would allow an across-method comparison to be made.

REFERENCES

- Cauley, K. M., & Jovanovich, D. (2006). Developing an effective transition program for students entering middle school or high school. *The Clearing House: A Journal of Educational Strategies, Issues and Ideas, 80*, 15-25. doi:10.3200/TCHS.80.1.15-25
- Evangelou, M., Taggart, B., Sylva, K., Melhuish, E., Sammons, P., & Siraj-Blatchford, I. (2008). *What makes a successful transition from primary to secondary school?* Retrieved from <u>http://webarchive.nationalarchives.gov.uk/20130401151715/http://www.edu</u> cation.gov.uk/publications/eOrderingDownload/DCSF-RR019.pdf
- Hanewald, R. (2013). Transition between primary and secondary school: Why it is important and how it can be supported. *Australian Journal of Teacher Education*, *38*, 62-74. doi:10.14221/ajte.2013v38n1.7
- Hopwood, B. (2014). *Transition to secondary school: Student achievement and teacher practice* (Doctoral dissertation, University of Tasmania). Retrieved from http://eprints.utas.edu.au/18671/3/whole-Hopwood-thesis-ex-pubmat.pdf

- Korpershoek, H., Beijer, C., Spithoff, M., Naaijer, H. M., Timmermans, A. C., van Rooijen, M., ... & Opdenakker, M.-C. (2016). Overgangen en aansluitingen in het onderwijs: Deelrapportage 1: Reviewstudie naar de po-vo en de vmbo-mbo overgang [Transitions and connections in education: Report 1: Review study on the transition from primary to middle school and middle school to high school]. Retrieved from http://www.rug.nl/research/portal/publications/overgangen-en-aansluitingen-in-het-onderwijs(f9477df4-e358-400b-bab7-9c989536825e).html
- OECD (2016). Education at a Glance 2016: OECD indicators. Paris: OECD Publishing. doi:10.1787/eag-2016-en
- Pelgrims, L. (2012). Continuiteit of kloof tussen het basisonderwijs en het secundair onderwijs? Een sprong in het ongekende [Continuity or gap between primary and secondary education? A leap into the unknown (Bachelor thesis, Katholieke Hogeschool Leuven). Retrieved from https://doks.khleuven.be/doks/do/files/FiSe413e0adb3452e4b001345aa87cc 53672/Pelgrims_Lien_scriptie.pdf;jsessionid=C3E28D0B5808FF5D24A24 A4CD53FE850?recordId=SKHL413e0adb3452e4b001345aa87cc53671
- Pollock, K., & Mindzak, M. (2015). Specialist teachers: A review of the literature. Retrieved from http://www.etfo.ca/IssuesinEducation/SpecialistTeachers/Documents/REVIE WLITERATURE.pdf
- Rice, F., Frederickson, N., Shelton, K. H., McManus, I. C., Riglin, L., & Ng-Knight, T. (2015). *Identifying factors that predict successful and difficult transitions to secondary school.* Retrieved from <u>http://www.nuffieldfoundation.org/sites/default/files/files/STARS_report.pdf</u>
- Uvaas, T., & McKevitt, B. C. (2013). Improving transitions to high school: A review of current research and practice. *Preventing School Failure: Alternative Education for Children and Youth*, 57, 70-76. doi:10.1080/1045988X.2012.664580
- Vandenberghe, N., de Bilde, J., & Van Damme, J. (2011). Longitudinaal onderzoek in het basisonderwijs: Basisrapportage leerkrachtvragenlijst zesde leerjaar (schooljaar 2008-2009) [A longitudinal study in elementary education: General report teacher questionnaire sixth grade (school year 2008-2009)] (SSL/OD1/2011.42). Retrieved from http://docplayer.nl/10524019-Basisrapportage-leerkrachtvragenlijst-zesdeleerjaar-schooljaar-2008-2009.html
- Vlaams Ministerie van Onderwijs en Vorming (2008). Peiling Frans in de eerste graad secundair onderwijs (A-stroom) [National assessment French in Grade 8 (A-track)]. Retrieved from http://www.ond.vlaanderen.be/curriculum/peilingen/secundaironderwijs/brochure_peiling_FransSO.pdf

- Vlaams Ministerie van Onderwijs en Vorming (2009). *Peiling Frans in het basisonderwijs* [National assessment French in Grade 6]. Retrieved from <u>http://www.ond.vlaanderen.be/curriculum/peilingen/basisonderwijs/brochure s/peiling frans.pdf</u>
- Vlaams Ministerie van Onderwijs en Vorming (2011). Peiling wereldoriëntatie (domeinen tijd, ruimte, maatschappij en brongebruik) in het basisonderwijs [National assessment GHST in Grade 6]. Retrieved from http://www.ond.vlaanderen.be/curriculum/peilingen/basisonderwijs/peilinge n/peil WO web.pdf
- Vlaams Parlement (2013). *Masterplan hervorming S.O* [Masterplan reform secondary education]. Retrieved from <u>http://www.vlaamsparlement.be/vp/pdf/20122013/masterplan_hervorming_so.pdf</u>
- Vlaamse Universiteiten en Hogescholen Raad (2014). *De onderwijsvisitatie Bachelor Lager Onderwijs* [Visitation report Bachelor program primary education]. Retrieved from <u>http://www.vluhr.be/media/docs/Visitatierapporten/VLUHR_Lager%20onde</u> <u>rwijs2014_boek1.pdf</u>

STIMULATING KNOWLEDGE BUILDING; WHAT WORKS?

Niek van Benthum*, Lia Spreeuwenberg**

*Lecturer/researcher, Aeres University of Applied Sciences, Wageningen The Netherlands, <u>n.van.benthum@aeres.nl</u>, **Program manager/researcher, Aeres University of Applied Sciences, Wageningen, The Netherlands, <u>l.spreeuwenberg@aeres.nl</u>

ABSTRACT

This study aims to improve conceptual understanding on the knowledge building concept in practice and to give more insight in how specific design elements in the master programme 'Innovation and Learning' of Aeres University of Applied Sciences in Wageningen, the Netherlands stimulate knowledge building. This study focuses on how students perceive the integration on knowledge building into the master programme and how knowledge creation is stimulated. This is studied by using a questionnaire and semi-structured interviews. Results show that students perceive the integration of knowledge building as adeguate to good. Furthermore, knowledge building is stimulated by a design in which: 1) students can start with their own authentic ideas, 2) students can work collaboratively in dialogue, 3) literature, peers and teachers provide different perspectives, 4) students work in a collective on collective knowledge and in which 5) a continuous iterative process of theory in relation to the own context is passed.

INTRODUCTION

In education, the knowledge building approach focuses on collective cognitive responsibility, involves students in idea improvement and engages students in a community to create new knowledge (Chan & Chan, 2011). Over the years, empirical research has demonstrated the positive effects of the 'knowledge-building' approach on literacy, depth of inquiry, collaboration, and knowledge-creation processes (Chan & Chan, 2011). However, although the concept 'knowledge building' is often used, the concept is confused with 'constructivism' and its uses are far from consistent (Scardamalia & Bereiter, 2010).

The knowledge building educational model is designed by Carl Bereiter and Marlene Scardamalia. With the model they intended to emphasize that the learning itself needs to be an important goal in working on a task in education or work setting and that knowledge is the product of a constructivist process (Van Aalst, 2009). Thus, the interpretation of 'learning' in knowledge building is fundamentally different from the old paradigm of learning as knowledge transfer (De Jong, 2015). Knowledge building is an interactive learning model, mediated by shared objects, aiming to advance the state of knowledge within a community over time by applying a set of social practices like talk, discussion, writing, dialogue (Paavola et al, 2004).

Scardamalia and Bereiter also use the term 'knowledge creation' as an alternative for 'knowledge building' (Van Aalst, 2009). Knowledge building and knowledge creation concern the same processes (De Jong, 2015). Knowledge building however, is more education related and encompasses a greater range of concerns, where knowledge creation is more related to a company setting (De Jong, 2015; Scardamalia & Bereiter, 2014). Knowledge creation requires discourse (talk, writing and other actions) to set goals, investigate problems, promote the impact of new ideas, and evaluate whether the state of knowledge in the community is advancing (Van Aalst, 2009). Although, Bereiter and Scardamalia use the terms 'knowledge building' and 'knowledge creation' alternately, we use the term 'knowledge building' because this paper deals with an educational context.

Scardamalia and Bereiter stress the difference between knowledge building and cooperative or collaborative learning (De Jong, 2015). Where collaborative learning is more related to school tasks, knowledge building puts students in a role as collaborative knowledge creators with the aim to improve ideas (De Jong, 2015; Scardamalia & Bereiter, 2014). Knowledge building is an idea improvement centred process in which knowledge is used as a conceptual artefact where can be worked on to advance the community work as the basis of education (De Jong, 2015).

To help characterize the complex socio-cognitive and technological dynamics involved in the knowledge building educational model, Scardamalia (2002) has elaborated a set of twelve principles: improvable ideas; community knowledge; rise above; diversity of ideas; democratizing knowledge; epistemic agency; knowledge-building discourse; concurrent assessment; symmetrical advances; constructive uses of information; authentic problem; and pervasive knowledge building.

The principles, which have attracted considerable research attention, are intended to help researchers and teachers identify and examine knowledge building and to support the design of classroomwork (Chan & Chan, 2011).

While the set of principles may seem to represent different socio-cognitive dynamics, Scardamalia (2002) argues that it constitutes a cohesive system of intertwining principles, each providing a specific lens for examining knowledge building. Those principles however, form a complex interactive system and are so intertwined that it is not possible to simply operationalise each principle in educational design (Chan & Chan, 2011).

Knowledge building is the key concept in the master programme 'Learning and Innovation' of Aeres University of Applied Sciences in Wageningen, The Netherlands. Although students appreciation of the master programme is high, the team is continuously looking for an optimal and consistent integration of knowledge building in the master programme to further stimulate students' knowledge creation. Consistent with the actual use of the knowledge building concept, less is known about students' perceptions to what extent the design of specific curriculum parts stimulate knowledge building and what the elements have been that had positive or negative effects on knowledge building.

Research goal and questions

This study focuses on two courses in year 1 of the master programme: 'Innovation in teams' and 'Learning'. Each course has its own specific design and less is known about how students perceive knowledge creation in relation to the design of the two specific courses. Therefore this study aims to give more insight in how the specific design elements in each course stimulate knowledge building. More information on the relation between course design and knowledge creation will certainly help to further improve the two specific courses.

Moreover, this study aims to improve conceptual understanding on the knowledge building concept in practice. This will help prevent the actual inconsistent uses and scientific misinterpretations of the knowbuilding concept in education (Scardamalia & Bereiter, 2010). More conceptual understanding will help other educational institutes and practitioners to better integrate knowledge creation in their programme. Therefore this research focusus on two research questions: 1) How do students perceive the integration of knowledge creation in the design of the master courses 'Innovation in teams' and 'Learning'? and 2) How to stimulate knowledge creation in the design of the courses 'Innovation in teams' and 'Learning'?

METHODOLOGY

Context

The study is conducted in the professional parttime master programme 'Learning and Innovation' of Aeres University of applied sciences in Wageningen, The Netherlands. The two-year-programme of 60ec aims to educate students as change agents in their own working context. All students have in common that they work on the realisation of an innovation during their study. In the context of their innovation, students perform a research of which they report in their master thesis. The knowledge base to help students to become succesful change agents, is provided in six courses in the two years of their study. Each course compells 5 ec. For each course, students work on an assignment which relates to their innovation and the course content. For each course, students are expected to be present at four working days at the institute and to perform self study. Two courses are subject of this study: 'Innovation in teams' and 'Learning'.

Course 'Innovation in teams'

'Innovation in Teams' aims to help students deal with the complex process of initiating and implementing innovations with colleagues in their professional context. Assignment of the course is to write a text of three parts on their innovation in relation to theory. Textpart 1 is a description of their innovation context. Textpart 2 is an analysis of their innovation context on theory on 'Learning organisation', 'Leadership' or 'Motivation for innovation'. Textpart 3 (written in groups by 3 to 4 students) describes how a theoretical innovation strategy ('community learning', 'appreciative inquiry' or 'inquiry approach') could result in innovative behaviour.

Course 'Learning'

The course 'Learning' deals with the question what type of learning is expected from the stakeholders to realise the innovation. Assignment of the course is to write a collective underpinned text on how the stakeholders in the innovation learn. The text needs to be supported by a visual model which represents the intended learning. On top of that, each student needs to reflect on how the collective model contributes to the learning of the stakeholders in their own context.

Participants

Participants in this study are first-year part-time students in the academic year 2015/2016. All students work as change agents in educational settings, in business and in care. All students have at least two years of working experience.

Questionnaire

For research question 1, students' perceptions on the integration of knowledge building in the courses 'Innovation in teams' and 'Learning' is studied using a questionnaire with 10 items on a 5-point likert scale. Students were asked to score each item for the two designated courses. The questionnaire is based on a questionnaire on collaborative knowledge building (Chan & Chan, 2011) with good scale reliability (.85). Each item was translated and made comprehensible to the students' reality to stimulate the reliability of their scores.

Student interview

After the questionnaire, 6 selected students are interviewed in a semi-structured interview, aiming 1) to get more insight in what design elements stimulated knowledge creation in the courses for the first reserach question and to get more insight in how to stimulate knowledge building in the courses for the second research question.

Students were purposefully selected after filling in the questionnaire. Two criteria were used for selecting the students: assumed high-level-students were selected of which could be expected that they would be able to provide useful information in the interview and striking differences and similarities in the item-scores on the two courses in the questionnaire.

The interview started with the scores on the questionnaire to give the students the opportunity to take account for their scores and to underpin their scores. Students were invited to reflect on the design and the process of the courses in relation to knowledge building. After checking whether the students had been complete in their answers, the students were presented teachers' designprinciples. The principles were checked for students' recognition of the courses.

The parts of the interviews where each student remarked meaningful elements in relation to knowledge building were transcribed. These elements were summarized per student for each course. This summary was sent to the students as member check. Following, for each student a narrative was made in which was described what designelements the students perceived as stimulating for knowledge building. Eventually, the narratives were processed in an overall summary for each course of

what design elements the students perceived as stimulating for knowledge building as result for research question 2.

RESULTS

Questionnaire

25 Of the 28 master students have filled in the questionnaire. The 10 questionnaire items for each of the courses 'Innovation in teams' and 'Learning' are regarded as one scale for each course. The distinguished scales showed good scale reliability; Innovation in teams .82 and 'Learning' .75. Because of the small population, this factor-analysis was not further explored.

The sum of the 10 scores is the score on how student perceive integration of knowledge building for each of the two courses 'Innovation in teams' and 'Learning' with a possible minimum of 10 and a possible maximum of 50. The mean score on 'Innovation in teams' is 37.5 (sd 5,2) and the mean score on 'Learning' is 42.7 (sd 4.3). The descriptive statistics are listed in table 1, perceiving integration of knowledge creation.

Table 1Perceiving integration of knowledge creation

		Inovation in teams			Learning		
		Mean Standard N deviation		Mean	Standard deviation	N	
	Perceiving integration of knowledge creation.	37.5	5.2	23	42.7	4.3	24
1	During the course, I continually worked on improving my ideas.	3.61	.839	23	4.38	.711	24
2	My views and knowledge broadened through working with others.	4.17	.576	23	4.58	.654	24
3	Ideas from different students are synthesized into new knowledge.	3.57	.843	23	4.33	.761	24
4	Fellow students have posed different ideas with diverse perspectives.	3.87	.815	23	4.54	.509	24
5	Ideas from other students were equally valuable.	4.04	.976	23	4.33	.761	24
6	To improve own and shared knowledge, ideas were exchanged.	3.78	.850	23	4.33	.637	24
7	We reflect on and assess the progress of our understanding continually.	3.17	.937	23	3.63	.824	24
8	I noticed that it was beneficial to exchange ideas with other studentgroups to make progress together.	3.52	1.039	23	4.17	1.007	24
9	Different sources of reference information are examined for building knowledge.	4.26	.541	23	4.63	.495	24
1 0	The knowledge we work on arises from and is relevant to real-life-problems.	3.91	.900	23	4.08	.717	24

Following, a paired-samples t-test was conducted to evaluate student opinions on perceived integration of knowledge creation in the courses 'Innovation in teams' and 'Learning'. There was a statistically significant difference between 'Innovation in teams' and 'Learning' (M = -5.2, SD = 5.7), t (24) = -4.6, p < .001 (two-tailed). The eta squared statistic (.47) indicated a large effect size.

Student interview

In this section, the summary of students' answers is presented for each course in relation to the knowledge creation principles.

In the course 'Innovating in teams', the students perceived that the principle 'constructive use of authorative sources was addressed by external lecturers who inspired and offered alternative perspectives on several issues. Students noted that the course was very helpful because the third part of the course assignment in which they had to cooperate, helped them to learn to listen to each other, to start a dialogue and to work as a group. The principle 'Idea diversity' was stimulated because students had to transfer the theory to their practices for which the context of all students needed to be understood. The relation between theory and practice and the search for similarities and discrepancies helped them to understand theory but also helped them to understand practice better. One student remarked:

"The iterative process of clarifying own ideas in relation to theory helped to understand theory and practice"

In the end, students perceived the integration of knowledge creation to a limited extent. Students noted that this was due to the assignment which was to ill-defined to stimulate knowledge creation to the utmost.

In the course 'Learning' the principle 'constructive use of authorative sources' was addressed as well. However, students noted above all that this was due to the set course book¹⁶ which was that hard to understand that dialogue was needed to get a grip on the content. In the dialogue, the interpretation of the content was discussed and finetuned. The book and the course-assignment thus stimulated the 'knowledge building discourse' in their student community and stimulated the improvement of ideas ('improvable ideas') for which students couldn't do without each other ('democratizing knowledge'). One student said:

"The literature was that hard and confusing, I really needed the others, also because the interpretation was up to us."

On top of that, as part of the course assignment students were expected to transfer their designed model of learning to their own practice which stimulated 'real ideas' and 'idea diversity'. This also forced them into a dialogue with their fellow students to check whether their understanding really was correct. One student remarked:

"Checking whether the collective idea/theory on learning applies to your own context, forces you into a dialogue to really grasp the idea/theory."

¹⁶ The used book in the course: Illeris (2009). Contemporary theories of learning. Routledge, London, New York.

In working on the course assessment, students noted that it was impossible to not reflect on the relation between the learning model and own learning perceptions, which impacted on own thinking and acting in practice ('pervasive knowledge building'). During the course, students were asked to share their perspectives with other groups which stimulated 'symmetric knowledge advancement'. In the end, students were very positive on how knowledge creation was stimulated.

CONCLUSION AND DISCUSSION

The study aim was to get more information and understanding on the integration of knowledge building in the courses 'Innovation in teams' and 'Learning'. This information is helpful for improving the courses and for the international discourse on knowledge building and knowledge creation.

The questionnaire and student interviews showed that the students perceived the integration of knowledge building in the course 'Innovation in teams' as adequate and in the course 'Learning' as good. Analysis of the questionnaire showed that the higher score on 'Learning' is significant from the score on 'Innovation in teams'. The results of the interviews supported this analysis.

More interesting however, is the question how knowledge building can be integrated in education. Analysis of the results showed that knowledge building is stimulated by a design in which 1) students can start with their own authentic ideas. Students bring their experience and their questions out of practice and work on an authentic ambition. To work on realization of that ambition and to get a grip on the 'wicked' and authentic problem they are working on during the course really helped them to deeply trying to understand theory and practice. Knowledge building is also stimulated by a design in which 2) students can work collaboratively in dialogue. Students really needed each other in their dialogue to understand theory and practice and to create knowledge. Also helpful for knowledge building is when 3) literature, peers and teachers provide different perspectives. This is helpful because it helps students to get alternate ideas and to help them to get out of their own way of thinking. Knowledge building is also stimulated when 4) students work in a collective on collective knowledge. It's needed that there is joined goal to be able to really work as a collective. The joined goal needs to be more than a simple one-sided product, it needs to be an assignment which results in a knowledge product. Last design principle which stimulates knowledge building is 5) the continuous iterative process of theory in relation to the own context. Students were urged to have an internal dialogue of theory and practice. "Is what I see in practice supported by the theory and vice versa?" This critical thinking helped to grasp literature, analyse practice and to work successfully on their innovation ambition.

In relation to Van Aalst's (2009) theory on knowledge building, it might be the case that in the course 'Innovation in Teams' students worked on 'knowledge sharing' which refers to the transmission of knowledge between people (Van Aalst, 2009). While in the course 'Learning', students were really creating knowledge. Further study is needed to understand this hypothesis and it is worthwhile to relate the outcome of students' opinions to the lecturers' intentions in designing the courses.

REFERENCES

- Chan, C.K.K. & Chan, Y. (2011). Students' views of collaboration and online participation in Knowledge Forum. *Computers & Education 57*, 1445-1457.
- De Jong, F.P.C.M. (2015). Understanding the difference. Public lesson for the professorships: 'Responsive education' and 'Knowledge creation and ecological intelligent thinking'. Stoas Wageningen Vilentum University of Applied Sciences and Teacher education.
- Paavola, S., Lipponen, L., & Hakkarainen, K. (2004). Models of innovative knowledge communities and three metaphors of learning. *Review of educational research* 74 (4), 557-576. doi:10.3102/00346543074004557.
- Scardamalia, M. (2002). Collective Cognitive Responsibility for the Advancement of Knowledge. In B. Smith (Ed.), *Liberal Education in a knowledge society* (pp. 67-98). Chicago: Open court. Retrieved from <u>http://ikit.org/fulltext/inpressCollectiveCog.pdf</u>.
- Scaramalia, M. & Bereiter, C. (2010). A brief history of knowledge building Une breve histoire de la coelaboration de connaissances. *Society*, 36 (1), 1-16. Retrieved from <u>http://www.cjlt.ca/index.php/cjlt/article/view/574</u>.
- Van Aalst, J. (2009). Distinguishing knowledge-sharing, knowledge-construction and knowledge-creation discourses. International Journal of computersupported collaborative learning, 4 (3), 259-287. doi:10.1007/s11412-009-9069-5.
- Scardamalia, M. & Bereiter, C. (2014). Knowledge building and knowledge creation: theory, pedagogy, and technology. In R.K. Sawyer (Ed.), *The Cambridge Handbook of the learning sciences* (pp. 397-417). New York: Cambridge University Press.

BETTER LEARNING THROUGH RELEVANT WORK EXPERIENCE? PRELIMINARY RESULTS ON THE VALIDITY AND RELIABILITY OF LWWL INVENTORY17

<u>Juhani Saari *</u>, Liisa Vanhanen-Nuutinen**, Kimmo Mäki ***, Hannu Kotila****

*PhD Candidate, University of Helsinki / Otus Research Foundation, Lapinrinne 2 00180 Helsinki Finland, juhani.saari@otus.fi, **Principal lecturer, PhD, Haaga-Helia University of Applied Sciences, School of Vocational Teacher education, Ratapihantie 13, 00520 Helsinki, Finland, <u>liisa.vanhanen-nuutinen@haaga-helia.fi</u>, *** Principal lecturer, PhD, Haaga-Helia University of Applied Sciences, School of Vocational Teacher education, Ratapihantie 13, 00520 Helsinki, Finland, kimmo.maki@haaga-helia.fi, **** Principal lecturer, PhD, Haaga-Helia University of Applied Sciences, School of Vocational Teacher education, Ratapihantie 13, 00520 Helsinki, Finland, kimmo.maki@haaga-helia.fi

ABSTRACT

The LWWL (Learning at Work & Work and Learning) inventory was developed to explore the work-life related synergy and institutional practices contributing to both student motivation and learning outcomes in higher education. In this paper we seek to assess the construct validity of the measurement instrument which is still somewhat work in progress. Using SEM and Cronbach's alpha we are able to confirm good overall fit of 5 out of 6 subscales with few individual item wordings requiring further attention. This analysis suggests ways in which the LWWL could be improved. Inventory responses from around 350 Finnish UAS students working alongside with their studies were used as the sample.

¹⁷ The authors also wish to convey their thanks to Leo Aarnio for his contribution in development and implementation of the measurement scale as well as methodological insight which helped us through the statistical analysis.

INTRODUCTION

Student employment, engaging to part-time employment alongside with studies, is a complex challenge in higher education. Student employment has traditionally been attributed to be a problem in academic studies, though learning at work can offer authentic and sustainable learning experiences, which benefit meeting the challenges of changing world of work.

According to EUROSTUDENT 2012-2015 -results, student employment is common among European higher education students. At least 40 % of the students not living with parents work alongside studies. Finnish higher education students do not work during term more or less than their European colleagues. However, more than 50 % of the Finnish higher education students, who work alongside studies, are employed in the field of their studies. This is more often than higher education students in other European countries. (Hauschildt et al 2015.)

The reasons for employment during study terms are multifold and vary (e.g. Robotham 2011). The most important reasons for working are financing living, improving standard of living and gaining work experience (Hauschildt et al 2015). Changes in study support affect especially those students' employment who do not get financial support from their parents (Avdic & Gartell 2015).

Different combinations of work and study have different consequences on study success and efficiency (Stinebrickner & Stinebrickner 2003). Employment has often been attributed to suspending studies (Kalima 2011, 6-7) or as a reason for low study achievement (Riggert et al. 2006). Working alongside studies does affect study efficiency only to a limited extent. If the student works more than 15-20 hours during week, the affect is negative. (Claessens et al. 2007; Hauschildt et al 2015.) However, employment increases students' abilities to time management, which is needed both in studies and at work. Even though employment might prolong study time, it has positive effect on employment after graduation.

No support is, however, found to the hypothesis that the younger and faster the student gets the degree, it would make their work careers more productive. The working life relevance should be studied critically and support student employment during studies. (Kivinen & Nurmi 2011, 687 – 691; Cinamon 2015).

The theoretical background of this study is in learning at work. Workplace learning is defined as possibility to develop professional and generic competencies, and support e.g. transition from higher education to work. Integrating formal (in education) and informal (at work) learning is essential in understanding the changes taking place in world of work. (e.g. Tynjälä 2008; 2013.)

Employment creates possibilities to career guidance, where formal and informal learning are acknowledged. The aim in career guidance is to improve student's employability, which is one of the most important quality factors in higher education. Within higher education it has been criticized, whether this leads to one-sided meeting of the working life needs, and general academic competencies will not be achieved. (Puhakka et al. 2010.)

The questions of student employment, time management, self-regulation, standard of living and study schedule are important from the viewpoint of higher education. The interest in this article is in those students, who work alongside studies, and at the same time progress in their studies. Our objective in this paper is to provide and assess a measurement framework for capturing relevant student experience on institutional practices, study guidance and other support services and problems arising from working and studying simultaniously as well as the proposed synergy and motivational learning outcomes. Thus, affirming the construct validity of the scale is very important before it is used for any further investigation.

Data and methods

The sample of our study came from a large representative national panel study of students in Finnish Higher Education who first began their studies during Fall 2012 and were issued the LWWL module. Statistical analysis reported here was performed with SPSS version 23 and AMOS 23 for the Structural Equation Model (Arbuckle 2010). In the CFA of our measurement model, we assess goodness of fit of both individual measurement constructs (subscales) and the complete measurement model by the Comparative Fit Index (CFI), Tucker-Lewis Index (TLI), the RMSEA and the SRMR. (Anderson & Gerbing 1988; Chou& Bentler 1995; Hu & Bentler 1999; Hooper et al. 2008).

Our survey data was unfortunately subject to both unit and item level nonresponse due to panel attrition and low response rates especially for younger age cohorts and male respondents as with so many other surveys (for example Tolonen et a. 2006). After two waves of data collection, out of our initial subsample of 6273 UAS students a total of 1783 usable response were obtained from the first and 928 from the second wave of the survey. The questionnaire was administered in May at the end of Spring term and again the same time one year after. From this pool of respondents a total of 357 second year students met the criteria of working alongside with their studies and were administered the LWWL inventory as part of the survey. The initial piloting stage of the instrument consisted of 30 items intended to cover a total of 5-6 subscales tapped by 6 items each. Seven point Likert scales were used and the survey wordings (see Appendix A) were translated both into Swedish and English from the original Finnish version. We also assessed the item-level nonresponse by conducting the Little's MCAR test to our data, yielding a non-significant result of $\chi^2=2663,15$; Df = 2591; p~0,158. For the subsequent analysis we then omitted all rows with missingness in three items or more and applied a simple mean imputation for rows with only one or two missing values, thus maximizing our sample N in order for better convergence (Curran et al. 1996; MacCallum et al. 1996; Gagné & Hancock 2006) without losing too much item level variance of our indicators or risking a heteroscedastic error (Schumaker & Lomax 1996).

Assessing construct validity through CFA

Our present investigation seeks to both assess the validity of the measurement construct, which is still somewhat work in progress, and to provide data for further questionnaire development. Assessing the construct validity and item-level reliability of the initial measurement instrument is conducted with two separate techniques: Cronbach's alpha and a confirmatory factor analysis (CFA) using SEM. We start by evaluating individual subscales and after which the complete measurement model stripped of those individual measurement items found not functioning well and identified in need for further attention by the questionnaire development team. Cronbach's alpha is used as a measure of internal consistency whereas CFA is better suited for assessing which variables function well in each of our theoretisized subsets of latent constructs in terms of assessing measurement error and unidimensionality of the construct (Tarkkonen & Vehkalahti 2005; Schreiber et al. 2006). Unlike Cronbach's alpha, the SEM technique allows us to assess the unique measurement error in each survey item. Measurement error occurs in every survey can affect the overall reliability of measurement if there is systematic error in the way individual items contribute to the overall error of the total scale. As part of the validation process we need to assess how well or poorly each item fares in the subscale. Modification indices (MI) of the SEM procedure can be helpful in identifying individual error terms in the latent measurement model yielding systematic error. Second, the SEM technique can be used to assess the assumed unidimensionality of each latent factor construct. As part of our assessment process, factor loadings, unique variances and modification indexes are estimated for each subscale for the purpose of determining the best indicators of our latent measurement constructs (Schreiber et al. 2006).

The hypothesized structure of our measurement instrument is next examined at the level of individual sub-scales. Here we aim to identify poorly performing item wordings and to validate the hypothesized unidimensionality and construct validity of our measurement constructs. We compare both factor loadings and model fit indices of the original measurement construct to modified ones where items deemed inappropriate or loading properly to the hypothesized factor are removed or where model constrains are identified to be needed.

Subscale validation

The original dual sub-scale of *Institutional Practices* comprised of two sets of variables, the first ones assessing the overall institutional climate, and the second the appropriateness of teaching practices in helping student combine their work experience and adjust their studies. Wordings were aimed to cover both the degree to which students were able to schedule lectures and other teaching activities according to their work shifts as well as the appreciation and the overall flexibility of their degree programme at the level of the institution, which can be seen in contributing students' ability of gaining work life experience.

The two subscales were initially hypothesized to capture a single dimension or factor of how well the institution fared as a whole in terms of enabling a balance between work life and studies. However, our initial findings did not support a single factor solution as this singular factor structure did not seem to fit our data. This was indicated by a very high $\chi^2 = 193,7$; p < 0,01 and $\chi^2/df = 9,77$ which is well above any traditional cutoff criteria (recommendations typically range between 2 and 5, see Hooper et al. 2008). The alpha coefficient was found high, but this does not in itself establish unidimensionality (the alpha coefficient is based on this assumption of tau-equivalence but does not in itself test for this). The overall fit to data was found unacceptable (CFI=0,775; $\chi^2/df = 17,7$), implicating a multidimensional structure of the 12-item subscale. An alternative two correlated factors solution was also attempted, but this solution did not fit data well (CFI = 0,861; SRMR = 0,0902; TLI = 0,827; RMSEA = 0,130).

A second attempt was made to analyze the two scales separately as shown in table 1. For this solution the factor loading of item K4 was omitted due to a low factor loading (0,491) followed by a subsequent constraint on the error terms of items K5 and 6 as suggested by an inspection of modification indices. Even with these modifications the CFA resulted in an unfitting solution with a χ^2 / df = 12,2 indicating a rejection of the model. Due to these concerns we decided to omit this latent factor from the subsequent measurement model as this particular subscale is in need of a restructuring (back to the drawing board).

The second subscale however proved both stable in terms of internal consistency and a good model fit. The χ^2 test yields a non-significant result with the CFI = 0,988 indicating a very good fit. In light of these results it would seem that the students are better capable of assessing the overall teaching practices through personal experiance than what their institution is doing as a whole. This makes sense due to the fact that it is much easier for the student to grasp practices that they can clearly attribute to individual teachers and their effort through work-life relevant pedagogic approach and flexibility. The high observed Cronbach alpha (0,855) also supports these conclusions. Since the cognitive burden of assessing the former is lighter than to evaluate the overall institutional climate and practices, our findings would imply concentrating measurement efforts to cover the direct experience of students rather than the indirect one.

Table 1

Dimensionality and reliability of the Institutional and teaching practices scales, original 12 items and splitted 2 factors by 6 items subscales.

Item code	Item wording	Mean	St.Dev	One factor	Institutional	Teaching practises
	There is flexibility so that I can		~			
K1	work alongside my studies	3.50	1.586	0.520	0.812	_
	There are effective measures		,	,	,	
K2	aimed at enabling students to	~				
	work alongside their studies	3,44	1,607	0,527	0,799	-
	Students are encouraged to					
K3	pursue studies also in working		1 (22	0.600	0.00	
	life (not internship)	3,14	1,622	0,628	0,697	-
K4	The professional experience of		1 (2 5		0.404	
	the students is appreciated	4,24	1,625	0,703	0,491	-
	Possibilities for students to					
K5	balance work and study are being	2.12	1 202	0.000	0.702	
	developed	3,12	1,392	0,664	0,783	-
K6	There is an attempt to utilise the					
	professional experience of the	2.02	1 602	0.652	0.500	
	students in their studies	3,82	1,583	0,653	0,589	-
0.01	They (teachers) encourage me to					
OPI	gain work experience during the	2.7	1 ((0	0.001		0.000
	course of my studies	3,1	1,668	0,691	-	0,688
0.02	They take into account my					
OP2	professional experience and	2.25	1.525	0.751		0.702
	know-how in their teaching	3,35	1,535	0,/51	-	0,793
OP3	They encourage me to pursue my	2.27	1 (22	0 741		0.740
	studies also in working life	3,27	1,632	0,/41	-	0,748
	They give me constructive					
OP4	criticism on the know-how I have					
	acquired through my job and on	2.16	1 522	0.700		0.720
	now to develop it further	3,10	1,522	0,708	-	0,738
OP5	If required, they propose flexible					
	solutions in order to speed up my					
	studies on account of know-now	2.01	1 (27	0.605		0.720
	The acquired through my job	3,01	1,027	0,695	-	0,729
OP6	I ney encourage me to apply my	2.02	1 (52	0.701		0.011
010	work experience in my studies	3,82	1,653	0,781	-	0,811

EAPRIL Conference Proceedings 2016

Cronbach alpha	0,91	0,885
Eigenvalue	6,04	3,82
Variance explained	50,3	63,7
Twelve item factor:		

 $(\chi^2 = 193,7; p < 0,01; CFI = 0,775; TLI = 0,725; RMSEA = 0,165; SRMR = 0,0967)$ Institutional six factor: $(\chi^2 = 122,4; p < 0,01; CFI = 0,889; TLI = 0,731; RMSEA = 0,192; SRMR = 0,0802)$ Teaching practices six item factor: $(\chi^2 = 18,8; p \sim 0,02; CFI = 0,988; TLI = 0,978; RMSEA = 0,065; SRMR = 0,0237)$

Our second subscale presented in table 2 assesses the level of stress and experienced difficulties of combining work and studies. Our preliminary results do not seem to support the unidimensionality of our scale with two of the items T4 and T5 having poor loadings on the hypothesized factor. Removing these two items from the model and re-estimating proved better for model fit, $\chi^2 = 13,3$; p < 0,01. Interestingly, these items differ from the rest by indicating more severe types of problems arising from work through contemplation to refuse work shifts or quitting their jobs in favor of studying. The coefficient alpha would remain virtually unaffected by omitting these items.

Table 2

Dimensionality and reliability of stress and experienced difficulties of combining work and studying -subscale, six and four item variants

				Loadings (ML)		
Item code	Item wording	Mean	St.Dev	Six items	Four items	
T1	Combining work and study has caused me stress	4,46	1,552	0,532	0,469	
Т2	I have contemplated interrupting or withdrawing from my studies because of work	2,04	1,542	0,693	0,761	
Т3	The pace at which my studies are progressing causes me stress	3,50	1,804	0,648	0,618	
T4	I have contemplated quitting my job because of my studies	2,96	1,990	0,336		
Т5	I have turned down offers of working hours because of my studies	3,53	2,139	0,389		
Т6	I have turned down courses because of work	2,65	1,896	0,630	0,639	
	Cronbach alpha			0,710	0,712	
	Eigenvalue			2,43	2,17	
	Variance explained			41,5	54,2	
Civ it	am factor:					

Six item factor:

 $(\chi^2 = 41,0; p < 0,01; CFI = 0,901; TLI = 0,835; RMSEA = 0,106; SRMR = 0,0552)$ Four item factor:

 $(\chi^2 = 13,3; p < 0,01; CFI = 0,951; TLI = 0,862; RMSEA = 0,133; SRMR = 0,0416)$

Our third subscale of Motivation presented in table 3 does not seem to fit the data as a single factor construct as indicated by high $\chi^2 = 189,7$; p < 0,001, CFI and RMSEA. Here we find the two negatively worded items, which have been found to provide somewhat different factor structures than do positively worded ones in terms of internal consistency (Barnette 2000; Schriesheim & Eisenbach 1996; Woods 2006). A second explanation arises with the fact that these two items are framed around timing and time-budgeting studies and work, which together provide a reasonable explanation for poor model fit. An inspection of modification indices would imply a need for constraining the error terms of these two items, and an additional one between the error terms for items M1 and M2. According to Byrne the error covariances would imply a "perceived redundancy in item content" (Byrne 2013, 134). This would signify that the response to as item M3 implies that the student does not have enough time for studies in general, and it would be hard to imagine that this would not strongly condition response to item M4 with an almost identical wording. With these constrains the six item model achieves a good fit to the data (indices in parcels).

Again removal of these two items significantly improves model fit (CFI = 0,940) although poor RMSEA would indicate a poor fit, though its use is somewhat subject to the low degrees of freedom, a reason for which some have argued the RMSEA should not be calculated for low Df models (Kenny et al. 2014). The SRMR measure of latent factor overall fit significantly improves after the omission of the two negatively worded items, though the alpha remains on the lower end of what can be deemed acceptable.

Table 3

				Loadings (ML)		
Item code	Item wording	Mean	St.Dev	Six item	Four item	
M1	My rate of study increases considerably	2,83	1,429	0,549	0,613	
M2	I have selected courses that are more meaningful with regard to my studies	3,34	1,518	0,520	0,605	
M2	I don't have the time to focus enough on my studies	4,33	1,859	0,405		
M3	I concentrate better on my studies	3,10	1,403	0,815	0,740	
М5	I don't have the time to take as many courses as I should	5,32	1,729	0,232		
M6	My study motivation increases	3,92	1,689	0,603	0,597	
	Cronbach alpha			0,680	0,710	
	Eigenvalue			2,43	2,24	
	Variance explained (%)			40,4	55,6	
Six item factor:						

Dimensionality and reliability of the Motivation subscale

 $(\chi^2 = 189,7; p < 0,01; CFI = 0,616; TLI = 0,360; RMSEA = 0,250; SRMR = 0,136)$ Six item factor with constrains:

 $(\chi^2 = 20,0; p < 0,01; CFI = 0,973; TLI = 0,941; RMSEA = 0,0,76; SRMR = 0,051)$ Four item factor:

 $(\chi^2 = 17.8; p < 0.01; CFI = 0.940; TLI = 0.821; RMSEA = 0.157; SRMR = 0.0462)$

Given these restrictions and item omissions were clearly linked to the conditionality implying and negatively framed wording of these items, we believe that further content and wording development of these items is of importance.

Finally in table 4 we present the results describing the dimensionality and measurement properties of *Work-life synergy*, which seems to yield a coherent unidimensional construct with good model fit (CFI = 0.958; TLI = 0.928; SRMR = 0.044) and very good alpha values. Our only concern was with the item SY4 "I put more effort in my studies" which yielded a low factor loading of 0.374. With respect to its omission, the 5 indicator construct would further improve our model fit, but this does not seem substantial. Again the wording of the item itself may be a cause of confusion for some respondents as its original form would indicate that students are able to put more effort into their studies despite the fact that work in itself is obviously a time-budgeting constrain, which some of the respondents may have taken into account in their response, assessing the proportional increase in study effort. This item would clearly use some further clarification, but otherwise this subscale seems to perform very well at this stage and is included in the subsequent preliminary measurement model.

Table 4

Dimensionality and reliability of the Synergy -subscale (six and five item constructs)

				Factor loading	ngs (ML)
Item code	Item wording	Mean	St.Dev	6 Indicators	5 Indicators
SY1	I often apply my work experience in my studies	4,60	1,691	0,872	0,876
SY2	Know-how I have acquired through work has affected my grades positively	4,03	1,713	0,833	0,827
SY3	I understand my studies better thanks to my work experience	4,65	1,763	0,886	0,887
SY4	I put more effort in my studies	3,98	1,535	0,374	-
SY5	I have more courage to participate more actively during class thanks to my work experience	4,03	1,801	0,588	0,582
SY6	My work experience enables me to recognize relevant aspects of my own field that have not been discussed in the course of my studies	4,49	1,810	0,847	0,850
	Cronbach alpha			0,878	0,900
	Eigenvalue			3,79	3,61
	Variance explained			63,2	72,2

Six item factor: ($\chi^2 = 58,8$; p < 0,01; CFI = 0,958; TLI = 0,929; RMSEA = 0,129; SRMR = 0,0445)

Five item factor: ($\chi^2 = 26,1$; p < 0,01; CFI = 0,980; TLI = 0,960; RMSEA = 0,115; SRMR = 0,0265)

Figure 1 presents the results of our modified measurement model, where we have omitted three items. The analysis showed good unidimensionality for each of our subscales with Cronbach's alpha ranging from very good (0,902) to acceptable (0,712) levels. The high correlation between two subsets of our *Institutional Practices* construct would suggest that a two scale solution would be more justifiable, though this solution seemed also not to fit the data well. We thus opt for a more simplified version focusing on the perceived flexibility and work-life orientated practices of teaching as here the cognitive burden to the respondent is also more tolerable (as students are overall better at evaluating teaching than counselling as they have more and better self-hand experience of the former).

The analysis at individual item level revealed that four out of five subscales of our inventory show good unidimensionality, with the exception of the scale Motivation, which also after modifications and restrictions showed acceptable

alpha reliability. The appropriateness of teaching approaches to work life are better assessed through the students' direct experience rather than their indirect view of institutional practices. In overall our analysis seems to confirm the intended structure of the inventory with the exception to this particular subscale of our inventory.



Figure 1. Measurement model and latent structure of hypothesized four factor model of WS. Variables in circles are latent constructs and variables in squares are observed variables. ($\chi^2/df = 2,02$; CFI = 0,933; TLI = 0,923; SRMR = 0,062; RMSEA = 0,056)

CONCLUSIONS

Although we find support for our four scale measurement model, our analysis was also able to identify clear issues that call for further development. The analysis at the individual item level showed that two negatively worded items of the Motivation subscale call for further attention and a possible reframing with a less severe worded anchoring. The item SY4 "More effort in studies" was also found to have a lower than acceptable factor loading. Closer inspection of the Modification Indices however did not reveal any substantial problems related to the error terms. The highest modification indice was found between two of the work-life stress subscales, namely between error terms of items T1 (overall stress) and T2 (contemplation of quitting one's job), yielding a value 12,6. This might suggest that the item measuring overall stress is not the best starting item for the subscale, and that the model might benefit from it being moved further from the start of the subscale. Hopefully, future development of our measurement instrument will provide researchers with an appropriate and useful tool to capture many of the interesting aspects of this pedagogically relevant aspect of work-life utilizing learning in higher education.

APPENDIX A QUESTIONNAIRE AND ITEM WORDING

Items noted by * were subject to omission in the preliminary measurement model.

Institutional practices A: Teaching practices

In your experience, how often has a majority of your teachers acted in the following ways? You may choose as many alternatives as you need in order to describe your experience.

They encourage me to gain work experience during the course of my studies

They take into account my professional experience and know-how in their teaching

They encourage me to pursue my studies also in working life

They give me constructive criticism on the know-how I have acquired through my job and on how to develop it further

If required, they propose flexible solutions in order to speed up my studies on account of know-how I have acquired through my job

They encourage me to apply my work experience in my studies

They take into account the know-how I have acquired through my job when evaluating me

Institutional practices B: General practises (omitted)*

How satisfied are you with the following practices on balancing work and study in your education programme?

There is flexibility so that I can work alongside my studies

There are effective measures aimed at enabling students to work alongside their studies

Students are encouraged to pursue studies also in working life (not internship)

The professional experience of the students is appreciated

Possibilities for students to balance work and study are being developed

There is an attempt to utilise the professional experience of the students in their studies

Motivation

In your own experience, how have your studies been influenced by your work? Please indicate the extent to which you agree with the following statements about the effect of work on your studies.

My rate of study increases considerably

I have selected courses that are more meaningful with regard to my studies

I don't have the time to focus enough on my studies*

I concentrate better on my studies

I don't have the time to take as many courses as I should*

My study motivation increases

Synergy

And in what ways have you noticed that your work experience has influenced your studies?

I often apply my work experience into my studies

Know-how I have acquired through work has affected my grades positively

I understand my studies better thanks to my work experience

I put more effort into my studies*

I dare to participate more actively during class thanks to my work experience

My work experience enables me to recognize relevant aspects of my own field that have not been discussed in the course of my studies

Work related stress

Please indicate the extent to which you agree with the following statements about combining work and study.

Combining work and study has caused me stress

I have contemplated interrupting or withdrawing from my studies because of work

The pace at which my studies are progressing causes me stress

I have contemplated quitting my job because of my studies

I have turned down offers of working hours because of my studies

I have turned down courses because of work

REFERENCES

- Anderson, J. C., & Gerbing, D. W. (1988). Structural equation modeling in practice: A review and recommended two-step approach. Psychological bulletin, 103(3), 411.
- Arbuckle, J. L. (2010). IBM SPSS Amos 19 user's guide. Crawfordville, FL: Amos Development Corporation, 635.
- Avdic, D & Gartell, M. 2015. Working while studying? Student aid design and socioeconomic achievement disparities in higher education. Labour Economics, Vol 33, pp. 26-40.
- Barnette, J. J. (2000). Effects of stem and Likert response option reversals on survey internal consistency: If you feel the need, there is a better alternative to using those negatively worded stems. Educational and Psychological Measurement, 60(3), 361-370.
- Byrne, B. M. (2013). Structural equation modeling with AMOS: Basic concepts, applications, and programming. Routledge.
- Chou, C.-P., & Bentler, P. M. (1995). Estimation and tests in structural equation modeling. In R. H. Hoyle (Ed.), Structural equation modeling: Concepts, issues, and applications (pp. 37–55). Thousand Oaks, CA: Sage.
- Cinamon, R. G. 2015. Integrating Work and Study among Young Adults. Testing an Empirical Model. *Journal of Career Assessment*. August: 1-16.
- Claessens, B. J., Van Eerde, W., Rutte, C. G., & Roe, R. A. (2007). A review of the time management literature. *Personnel review*, 36(2), 255-276.
- Curran, P. J., West, S. G, & Finch, J. F. (1996). The robustness of test statistics to nonnormality and specification error in confirmatory factor analysis. Psychological Methods, 1, 16–29.
- Gagné P, Hancock GR. Measurement model quality, sample size, and solution propriety in confirmatory factor models. Multivariate Behavioral Research. 2006;41:65–83.
- Hauschildt, K., Gwosć,C., Netz, N. & Mishra, S. 2015. Social and Economic Conditions of Student Life in Europe. EUROSTUDENT V 2012–2015, Synopsis of Indicators. W. Bertelsmann Verlag GmbH & Co. KG. <u>http://www.eurostudent.eu/</u>
- Hooper, D., Coughlan, J., & Mullen, M. (2008). Structural equation modelling: Guidelines for determining model fit. Articles, 2.
- Hu, L. & Bentler, P. M. 1999. 'Cutoff Criteria for Fit Indexes in Covariance Structure Analysis: Conventional Criteria Versus New Alternatives', Structural Equation Modeling: A Multidisciplinary Journal 6, 1–55.

- Kenny, D. A., Kaniskan, B., & McCoach, D. B. (2014). The performance of RMSEA in models with small degrees of freedom. Sociological Methods & Resarch, in press.
- Kalima, R. 2011. Opintojen pitkittyminen ja keskeyttäminen ammattikorkeakoulussa. Suomalaiset oikeusjulkaisut SOJ Oy. Saarijärvi. (English abstract: Prolonged studies and dropping out in universities of applied sciences. A study of the reasons for prolonged studies and dropping out in the Helsinki University of Applied Sciences in 2002 – 2007 and the means of influencing them).
- Kivinen, O. & Nurmi, J. 2011. Opiskelun nopeus ja työmarkkinarelevanssi korkeakoulupolitiikan dilemma? *Yhteiskuntapolitiikka* 76:5, 687-691.
- MacCallum, R. C., Browne, M. W., & Sugawara, H. M. (1996). Power analysis and determination of sample size for covariance structure modeling. *Psychological methods*, 1(2), 130.
- Puhakka, A., Rautopuro, J. & Tuominen, V. 2010. Employability and Finnish University Graduates. European Educational Research Journal. Vol. 9, No 1, pp. 45-56. http://dx.doi.org/10.2304/eerj.2010.9.1.45
- Riggert, S.C., Boyle, M., Petrosko, J.M., Ash, D., & Rude-Parkins, C. 2006. Student Employment and Higher Education: Empiricism and Contradiction. Review of Educational Research. Vol. 76, No 1, pp. 63-92.
- Robotham, D. 2011. Student part-time employment: characteristics and consequences. *Education* + *Training*, Vol. 54 No. 1, pp.65-75. http://dx.doi.org/10.1108/00400911211198904
- Schreiber, J. B., Nora, A., Stage, F. K., Barlow, E. A., & King, J. (2006). Reporting structural equation modeling and confirmatory factor analysis results: A review. *The Journal of educational research*, 99(6), 323-338.
- Schumacker, R. E., & Lomax, R. G. (2004). *A beginner's guide to structural equation modeling*. Psychology Press.
- Stinebrickner, R., & Stinebrickner, T. R. (2003). Working during school and academic performance. *Journal of labor Economics*, 21(2), 473-491.
- Tarkkonen, L., & Vehkalahti, K. (2005). Measurement errors in multivariate measurement scales. *Journal of Multivariate Analysis*, 96(1), 172-189.
- Tolonen, H., Helakorpi, S., Talala, K., Helasoja, V., Martelin, T., & Prättälä, R. (2006). 25-year trends and socio-demographic differences in response rates: Finnish adult health behaviour survey. *European journal of epidemiology*, 21(6), 409-415.
- Tynjälä, P. (2013). Toward a Three-P- Model of Workplace Learning: A literature review. Vocations and Learning 6 (1), 11-36.

EAPRIL Conference Proceedings 2016

- Tynjälä, P. (2008) Perspectives into learning at the workplace. Educational Research Review 3; 130-154. doi:10.1016/j.edurev.2007.12.001
- Woods, C. M. (2006). Careless responding to reverse-worded items: Implications for confirmatory factor analysis. Journal of Psychopathology and Behavioral Assessment, 28(3), 186-191.

SUPPORTING THE DEVELOPMENT OF TEACHER COMPETENCES DURING TEACHER EDUCATION THE NEW CURRICULUM OF PRIMARY-SCHOOL TEACHER EDUCATION IN UPPER AUSTRIA

KARIN BUSCH*, SABINE BRUCH**

*Teacher educator, Specialist in Gifted Education, Institute of Sekundary Education, University of Education, Kaplanhofstraße 40, 4020 Linz, Austria, <u>karin.busch@ph-ooe.at</u>, **Teacher educator, Assistant at the department for research & development, Institute of Elementary and Primary Education, University of Education, Kaplanhofstraße 40, 4020 Linz, Austria, <u>sabine.bruch@ph-ooe.at</u>.

ABSTRACT

An educational core project of recent years in Austria concerns the reorganization of teacher training. This reform aims at professionalization and turning the teacher education programme more into a graduate study as well as a competenceoriented teacher education training. The curriculum of the primary level of the University of Teacher Education in Upper Austria (PH OÖ) was created on the basis of a model of competences (based on the model of Habitus, Bourdieu, 1982, the concept of competence according to Weinert, 2001a, SAK & Weiser, 2002, among others). The development of teacher competence and professionalism is considered to be a "biographical career development problem" (Terhart, 2002) and requires structures in which these competences can emerge and evolve. The aim of this new teacher education programme is to prepare prospective teachers for the complexity of educational practices in schools, including reflections on possible purposes of education and professional learning (professional identity development) and to support them to develop competences for innovative teaching practice including to meet the challenges and chances of the digital era. We will report first data or rather statements from an ongoing study (n=14) piloting large scale longitudinal qualitative student interviews between 2015–2019. We will also find answers if our model of competences covers the essential aspects of teacher professionality and how students experience teacher education concerning these aspects.

INTRODUCTION

Teacher education in Austria concerns the reorganization of teacher training. This reform aims at professionalization and turning the teacher education programme more into a graduate study as well as a competence-oriented teacher education training. The curriculum of the primary level of the University of Teacher Education in Upper Austria (PH OÖ) was created on the basis of a model of competences (based on the model of Habitus, Bourdieu, 1982, the concept of competence according to Weinert, 2001a, SAK & Weiser, 2002, among others).

The study we would like to describe is called "ELLIS". ELLIS is a part of a major evaluation project of the University of Teacher Education in Upper Austria (PH OÖ). The figure below shows the three main projects in this case. The three evaluation projects of the PH OÖ cover the entire duration of the Bachelor-course as long-term studies:

- The results of an **online survey** (based on the PaLea study, Bauer et al., 2010) of all students of one year who either study according to the old or the new curriculum are compared. The survey is conducted every semester.
- In a **qualitative research project (ELLIS)** narrative interviews are conducted with 14 students per semester and evaluated with computer-aided content analysis (MAXQDA).
- Another qualitative research project examines the professionalization process of students with support of the concept of **learning journals and portfolios**. Documents of 25 students are evaluated by means of content-analysis at four points in time, 15 students were selected for a series of interviews.

All three evaluation projects deal with the question of how the new curriculum for primary education in Austria promotes the development of teacher competences. A goal of this new teacher training programme is to prepare future teachers and educators for the complexity in educational practice and to give them the possibility of reflection about the purpose of education and professional learning, but also to support the development of innovative teaching and learning methods. New elements included in this process are, for example, the company of mentors during the entire undergraduate education, as well as tools to reflect: In the learning diary intuitive handwriting close to a significant event (critical incident) will visualize subjective attitudes and negative professional beliefs (Blömeke, 2004). Thus, the theoretical and scientific background of the process portfolio provides the basis for connection (development) and change.

Primary Teacher Education						
CURRICULUM Teacher Education NEW						
Se	elf-development, Mentorin	lg 🔰				
	Portfolio, Lesson-Studies					
EVALUATION (2015-2019)						
Online Survey	ELLIS	Learning Diary & Process-				
<i>Quantitative</i> Questionnaire Survey n=80	<i>Qualitative</i> Narrative Interviews n=14	Portfolio <i>Qualitative</i> Content Analysis: <u>n=25</u>				
Conclusion						

Figure 1. Evaluation Projects teacher education PH OOE 2015

Based on the currently being re-designed teacher education in Austria and the modified new curriculum, ELLIS tries to investigate "how the study helps developing the competencies to improve the professional identity development for student teachers?". The aim of the teacher education programme is to prepare prospectice teachers for the complexity of educational practice in schools including to reflect on multiple purposes of education and professional learning (professional identity development). Based on our preliminary results, students highlight the use of a diverse range of teaching methods and the considering the individual needs of learners. On this basis we will discuss how teacher education could facilitate reflection on personal beliefs in developing teacher competences.

Research results show which professional knowledge and what abilities and skills should be acquired for a successful education. There is no empirical model, which serves as a basis for teacher training (Bromme & Haag, 2008, p.785). Also Cramer (2012, p. 11) determines that it is unclear, how the institutionalized education can contribute to the development of professionalism. His question, how to grasp theoretically and empirically the individual starting conditions of student teachers

in ongoing professional development and the experiences with the institutionalized education, is also the desideratum of our research study. The focus is the perspective of students, their "individual starting conditions of professional development (...), the process characteristics of the development of professional competence as well as with teaching education and training experiences" (Cramer, 2012, p. 12).

The collected data can be a basis for optimization and improvement of the quality of teacher training, especially in the highly competence in the acquisition of knowledge but also skills and the ability to flexibly apply acquired knowledge and soft skills as shown in team and communication skills as well as beliefs. Cramer (2012, p. 23) defines the process of acquiring competence of teachers as development of professionalism or interchangeably as professional development. Although professional teacher competence is no stable size, which is developing proceeding not easily measured or always positive, vocational skills of teachers, teacher education research sees a decisive indication of the effectiveness of teacher education (Terhart, 2007).

FOUNDATION – DEVELOPMENT OF PROFESSIONAL TEACHER COMPETENCES

The new Austrian primary teacher education programme, which, while complying with the Bologna Criteria, aims at harmonizing teacher education for different school levels. The new curriculum is competence-oriented in accordance with the definition provided by Weinert (2001a), in the sense of a holistic concept that integrates and connects external demands, individual attributes and contexts as essential elements of competent performance. "Competence is a roughly specialized system of abilities, proficiencies, or individual dispositions to learn something successfully, to do something successfully, or to reach a specific goal" (Weinert, 2001b, pp. 27-28). The competence-model also encompasses Polanyi's tacit knowledge (Neuweg, 2006) and Bourdieu's concept of habitus (Bourdieu, 1982) in order to both visualize students' biographic identity and to prepare students for new experiences in learning. Further in the model is illustrated that professional-educational action exists of different fields of knowledge of values, convictions, motivational orientations as well as selfregulative abilities (Baumert & Kunter, 2006). In support of it Cramer (2011, p. 42) created the model of professionalism in teaching profession. He outlines in addition to the educational (specialist) knowledge particularly the subjective components motivational orientations, self regulator skills, beliefs and values as well as starting conditions and training experiences as essential aspects of a professional development in teaching.

This model forms the basis to the analysis and interpretation of the narrative interviews, while the aspects of teacher professionality with the competences of teaching practice are connected.

Subsequently the concepts "Model of Professional Teacher Competences" and "Aspects of Teacher Professionality" will be more detailed defined.

Model of Professional Teacher Competences

The model of Professional Teacher Competences was developed by a committee consisting of experts who are involved in teacher education in Upper Austria. It based on several concepts of standards in teacher education (Oser &Oelkers, 2001; Terhart, 2001; Tenorth, 2006; Fend, 2008; Kraler 2012) and in a common understanding of educational quality and professionalism. Three essential springs from which the quality of teacher activities arises, form the basis of all other considerations - educational basic position, educational specialist knowledge, searching position and reflected practise action (Shulman, 2004; Polanyi zit. n. Neuweg, 2006; Blömeke et al., 2004; Combe & Kolbe; 2008). The essential competences of educational activities are formulated and divided in activity areas of educational activities.

Competence-Model PH OOE	(Pedagogical) content knowledge	Social, emotional, moral development	Educational diagnosis, consulting, assessment	School development, innovation, networking		
Educational knowledge	 Student teachers ' have content and didactical knowledge and skills know and use different media and learning places create learning environments 	 meet individual and collective needs have methods that allow autonomy and learner participation 	 organize offers for learners with different starting points and needs (Lesson-Studies) use heterogeneity as a development potential assess competence- orientated learning processes and learning outcomes 	 understand development as a task that is achieved together with colleagues, parents, students are open to new forms of school and the design of learning environments 		
Educational attitude	see themselves as reare aware of their ovare willing to acknow	 see themselves as representatives of a highly qualified profession are aware of their own values, of concepts of man, child, society, world and ready to challenge them are willing to acknowledge diversity and to use it as a resource in the sense of an inclusive school 				
Research attitude	show openness to neanalyze and reflect s	new approaches by an explorative learning attitude situations of their own professional practice				

Figure 2. Model of Professional Teacher Competences (Examples from the Curriculum PH OÖ, 2014)
In the competence-model competence is defined as a performance potential which raises the probability to master complicated demands productively and to be able to use problem solutions in variable situations successfully (Grob & Maag Merki, 2001; Klieme & Leutner, 2006; Weinert, 2001a). Competence also exists in this concept always as an insoluble connection of knowledge, skill and positions and refers to the fact that this teacher education must integrate different knowledge forms. A central theme is also the "gap" and the "crossings" between cognition and action, between implied and explicit knowledge constantly (Polanyi zit. n. Neuweg, 2006; Blömeke et al., 2004).

The University of Education in Upper Austria stresses on a one side on a functional, knowledge-orientated, reflexive access which is aimed at the systematic development and extensive measurement of competence, and on the other side, a rather cultural-academically-sociological access as well as a habitual, implied learning. Deep structures of the percipience, thinking, feeling and action are acquired implicitly by biographic-social conditions which show an "incorporated biography and learning history" (Nairz-Wirth, 2011, p. 171), but also explicitly consciously made and for new learning experiences open.

In the model demands are formulated for the defined activity areas in which teaching activities become visible. Activity is understood in this connection as an important, sense-related interaction between person and the learning surroundings. The cited activity areas enclose the challenges to the professional personality and to the competence of teachers. Besides, one must light up both poles – structure and person – in a dynamic interaction process. Competence acquisition is not a purely individual process, but as an interaction process to be thought by personality, educational activity and structural learning circumstances (Giddens, 1998).

In the single activity areas competence is communicated which focuses to prepare student teachers for a school of the future, the heterogeneity and inclusion, creation responsibility and interdependence, to bring aim vision and future uncertainty in a succeeding cultural form of scholastically formed education (http://www.european-agency.org 4.11.2013). The cited competence aims show orientation brands. They name exactly, understandably and focus the desired learning results of the student teachers and concretize the educational order to be fulfilled (Weisser, 2012, S. 54; Klieme & Leutner, 2006).

Aspects of Teacher Professionality

Cramer (2012, p. 41) has traced the professional development of students in an expanded understanding of competence, based on the heuristic model of competence by Baumert and & Kunter (2006). Knowledge, beliefs and attitudes,

self-regulatory properties and motivational factors are considered properties of a professional teacher. These are complemented by two further aspects such as starting conditions and training experiences, which are most likely a central role for the development of professionalism (Cramer, 2012 S. 41).



Figure 3. Model of Aspects of Teacher Professionality (Cramer, 2012, p. 42)

In the following the two aspects starting conditions and training experiences are described. Conditions of the (Professional) biography have a significant role in the professional development in relation to the school career, prior knowledge and prior experiences, social origins, personality traits and critical life events or the financial situations of student teachers. Process characteristics and training experiences will influence their respective professional development, these will constantly change and adapt the progressive development (Cramer, 2012, p. 42).

Rather what professional skills develop in the training and be used like the institutional learning opportunities is highly individual. For teacher education, the responsibility to provide a good framework for the knowledge and competence acquisition arises once more. (Cramer, 2012, p. 59)

RESEARCH DESIGN – "ELLIS"

Our study is part of a longitudinal study that will accompany a pilot group of students throughout their entire teacher studies (2015-2019). The data consists of qualitative narrative student interviews (vgl. Riessman, 2008) with 14 Austrian primary-school student teachers (Mayring, 2015). The first interviews were conducted in December 2015 at the beginning of their first academic year (2015-2016). The students represent the diversity of primary-school student teachers in Austria with regard to age, gender, national background, and previous teaching experience. The majority of them are women (n = 11), which is common in Austrian primary schools. The duration of the interviews varied between 35 and 60 minutes. During the first interviews, the student teachers were asked to relate how they became interested in teaching and to describe their first introduction to teacher education. They were also asked to explain their views on good teaching and good teachers, as well as their expectations for their studies and their future work as teachers. The aim was to listen to the student teachers' "voices" (Elbaz-Luwisch, 2005) through their stories of personal experience. Therefore, we can identify the following research questions:

- Does our model of competeces cover the essential aspects of teacher professionality?
- How do **students experience** teacher education concerning these aspects?

The data will be evaluated with computer-aided content analysis (MAXQDA) and narrative analysis. Skills as a latent, individual dispositions manifested in concrete situations and are often only about this. This would mean that performance would equated with competence. The challenge of assessment is to note the personal as also the situational page in their interdependence in the collection and assessment of competences. Thereby a one-dimensional analysis of individual skills will be avoided (Maag Merki & Werner, 2009).

The empirical acquisition of skills by teaching staff (student teachers) must be multidimensional, by not only professional knowledge, but also other dimensions such as attitudes, motivations etc. as content dimensions are involved in the evaluation process. Teacher education have to "train creativity and flexibility, to prepare teachers for the new challenges of everyday - for teaching as a complex event is characterized by multidimensionality, not predictability, immediacy and simultaneous running of multiple processes." (Cramer, 2012, p. 32)

Narrative interviews as a method are suitable to get as a result a narrative of "the social process of development and transformation of a biographical identity constantly (...) presents and explains" (Schütze,1983). In the study, the stages are important from creating the idea to become a teacher until the end of the professional teacher education.

DISCUSSION AND SUMMARY

An Attempt of a first Analysis of teacher student experiences

The competence-orientated curriculum describes the support of students' selfresponsibility to make experience develops in self-efficacy and professional selfesteem. Professional teacher-competences depends on early experiences (Terhart, 2002), students get the opportunities to realize their personal beliefs concerning practice of teaching and reflecting their strengths and limitations. Different environments, situations and multiple contents provide the exploative learning to extend their strengths and personality development.

Studies show that prospective teachers' beliefs influence what is learned during their studies, but also that teacher education programs have an impact on students' beliefs about the qualities of teaching (Levin & He, 2008). More research is needed, in particular on teachers' beliefs and previous experiences, which are considered essential influential factors in satisfaction, motivation and self-efficacy (Körkkö et al., 2016). In the process of telling their stories, students reinterpret and make sense of their lives and past events, thereby constructing the meaning of experiences.

In our research project "ELLIS" we are now able to describe first impressions and statements from the student interviews. We have to say, that there are no results yet, but we can already give a description of the starting process of the development of professional competences. In the interviews some aspects of teacher professionality can be already connected to our model of competences. Some of them we describe now:

Starting-conditions

The student teachers begin to see themselves as representatives of a highly qualified profession which is obliged to observe and develop the quality of their actions. They are aware of their own values, of concepts of man, child, society, world and ready to challenge them.

Training experience

Training experience is a very important part fort he student teachers. They begin to analyze and reflect situations of their professional practice.

Educational (specialist) knowledge

During their first academic year, student teachers have some ideas of content knowledge, didactical knowledge and skills. Because oft he training experience, they notice the individual and collective needs oft he pupils. Further they are motivated to acquire additional (content) knowledge independently and critically assess.

Beliefs/ attitudes

In relation to the values and concepts they are willing to acknowledge diversity. Student teachers show openess to new approaches by an explorative learning attitude. They have concepts and methods to challenge people to learn and to make their own educational processes as well as developing for using their skills.

The development process of professionalization of teacher education is often bound to competence models. Must particularly be noted, that this is not a simple and linear professional development and therefore teacher professionalism can't simply follow the models (Herzog, 2013).

For Herzog (2013) the process of professional competence is rather a learning process than a development process.

Not the primal pedagogical competence leads to adaptive expertise in the teaching profession, but the reflection-based integration of those forms of knowledge which we have recognized as the basis of teacher professionalism. Everyday knowledge, observational knowledge, professional knowledge and scientific knowledge. And as target can be teacher training:,... helping teachers become professionals who are adaptive experts' (Herzog, 2013, S. 68)

Professionally, a teacher is when they can flexibly use the complex knowledge base of their profession, situational condense, and continuously expand the reflection of their experiences. This requires learning situations, where future teachers have the opportunity, the different forms of knowledge giving rise to their professional actions, to reflect and to network. The experiential knowledge and the starting conditions must be worked up in a way to connect it with the professional knowledge of teacher profession and the scientific knowledge of the related disciplines of teacher education to serve the professional acting as a flexible basis. The task of science teacher training is not to provide prospective teachers with extensive knowledge and to guide their actions, to convey scientific thinking and research logic, allowing them to learn from their professional experiences as them. (Herzog, 2013, S. 72)

REFERENCES

- Bauer, J., Drechsel, B., Retelsdorf, J., Sporer, T., Rösler, L., Prenzel, M., &
 Möller, J. (2010). Panel zum Lehramtsstudium-PaLea: Entwicklungsverläufe
 zukünftiger Lehrkräfte im Kontext der Reform der Lehrerbildung. Beiträge zur
 Hochschulforschung, 32(2).
- Baumert, J., & Kunter, M. (2006). Stichwort: Professionelle Kompetenz von Lehrkräften. Zeitschrift für Erziehungswissenschaft, 9(4), p. 469-520.
- Blömeke, S. (2004): Empirische Forschung zur Wirksamkeit der Lehrerbildung. In:
- Blömeke, S., Reinhold, P., Tulodziecki, G. & Wildt, J. (Hrsg.) (2004). Handbuch Lehrerausbildung (p. 59 -91). Bad Heilbrunn/ Braunschweig: Klinkhardt/Westermann.
- Bourdieu, Pierre (1982). Die feinen Unterschiede Kritik der gesellschaftlichen Urteilskraft. Suhrkamp Taschenbuch Wissenschaft.
- Bromme, R. & Haag, L. (2008). Forschung zur Lehrerpersönlichkeit. In: W.
- Helsper & J. Böhme (Hrsg.). Handbuch der Schulforschung. Wiesbaden: VS
- Verlag für Sozialwissenschaften.
- Combe, A. & Kolbe, F. U. (2008). Lehrerprofessionalität: Wissen, Können,
- Handeln. In W. Helsper & J. Böhme (Hrsg.). Handbuch der Schulforschung. Wiesbaden: VS Verlag für Sozialwissenschaften.
- Cramer, Colin. (2012). Entwicklung von Professionalität in der Lehrerbildung.

Empirische Befunde zu Eingangsbedingungen, Prozessmerkmalen und

- Ausbildungserfahrungen Lehramtsstudierender. Bad Heilbrunn: Klinkhardt.
- Curriculum Primarstufe (2015). Bachelor- und Masterstudium. Linz: Pädagogische Hochschule Oberösterreich.
- Elbaz-Luwisch, F. (2005). Teachers' voices: storytelling and possibility.

Greenwich, CT: Information Age.

Fend, H. (2008). Neue Theorie der Schule: Einführung in das Verstehen von Bildungssystemen. Wiesbaden: VS Verlag für Sozialwissenschaften.

Fry, A. & Jung, C. (2011). Kompetenzmodelle und Standards in

Lehrerbildung und Lehrerberuf. In: Terhart, E., Bennetz, H. & Rothland, M. (Hrsg.): Handbuch der Forschung im Lehrberuf. Münster: Waxmann.

Grob, U. & Maag Merki, K. (2001) Überfachliche Kompetenzen: theoretische

Grundlegung und empirische Erprobung eines Indikatorensystems. P. Lang. Zürich.

Giddens, A. (1998). Die Konstitution der Gesellschaft. Grundzüge einer Theorie

der Strukturierung. Frankfurt am Main: Campus.

Hargeaves, A. & Fullan, M. (2012). Professional capital: transforming teaching in every school. Columbia University, New York, NY: Teachers College.

Herzog, W. (2013). Professionalität im Beruf von Lehrerinnen und Lehrer. In H.

Berner & R. Isler (Hrsg.) Lehrer-Identität, Lehrer-Rolle, Lehrer-Handeln

(p. 49–77). Professionswissen für Lehrerinnen und Lehrer Band 8. Baltmansweiler: Schneider Verlag Hohengehren.

Herzog, W. (2007). Einmal Lehrer, immer Lehrer?: eine vergleichende

Untersuchung der Berufskarrieren von (ehemaligen) Lehrpersonen

- Band 5 von Prisma : Beiträge zur Erziehungswissenschaft aus historischer, psychologischer und soziologischer Perspektive. Haupt Verlag AG.
- Klieme, E. & Leutner, D. (2006). Kompetenzmodelle zur Erfassung individueller
- Lernergebnisse und zur Bilanzierung von Bildungsprozessen. Beschreibung eines neu eingerichteten Schwerpunktprogramms der DFG. Zeitschrift für Pädagogik 52 (6), p. 876-903.
- Körkkö, M., Kyrö-Ämmälä, O. & Turunen, T. (2016). Professional Development
- through reflection in teacher education. Teaching an Teacher Education 55 (2016), p. 198-206.
- Kraler, Ch. (2012). Professionsspezifische Entwicklungsaufgaben (in) der

Universitären Lehrer/innenbildung. Sammelhabilitationsschrift.

- Institut für LeherInnenbildung und Schulforschung. Faktultät für Bildungswissenschaften, Universität Innsbruck.
- Levin, B. & He, Y. (2008). Investigating the content and sources of teacher
- candidates`personal practical theories (ppts). Journal of Teacher Education, 59 (1), p. 55-68.

Maag Merki, K. & Werner, S. (2014). Erfassung und Bewertung professioneller

- Kompetenz von Lehrpersonen, p. 745-763. In E. Terhart, H., Bennewitz, M., Rothland (Hrsg.) (2014). Handbuch der Forschung zum Lehrerberuf. Münster, New York: Waxmann.
- Mayring, P. (2015). Qualitative Inhaltsanalyse: Grundlagen und Techniken.12.

Auflage. Weinheim & Basel: Beltz Verlag.

Neuweg, Georg Hans (2006). Könnerschaft und implizites Wissen. Zur lehr-lern-

theoretischen Bedeutung der Erkenntnis- und Wissenstheorie Michael Polanyis.

4. Auflage. Münster: Waxmann.

- Oser, F. & Oelkers, J. (Hrsg.) (2001). Die Wirksamkeit der Lehrerbildungssysteme.
- Von der Allrounderbildung zur Ausbildung professioneller Standards. Zürich: Ruegger Verlag.
- Riessman, C. K. (2008). Narrative methods for the human sciences. Thousand Oaks, CA: Sage.
- Schratz M. & Weiser B., (2002). Effizientes Lernen, Innsbruck, Wien, München: Studienverlag.
- Schütze, F. (1987). Das narrative Interview. Interaktionsfeldstudie:
- erzähltheoretische Grundlagen. Teil I: Merkmale von Alltagserzählungen und was wir mit ihrer Hilfe erkennen können. Hagen: Studienbrief der Fernuniversität Hagen.
- Shulman, (2004). The wisdom of praxis. San Francisco: Jossey Bass.
- Tenorth, H.-E. (2006). Professionalität im Lehrberuf. Ratlosigkeit der Theorie,
- gelingende Praxis. In Zeitschrift für Erziehungswissenschaft 9 (4), p. 580-597.

Terhart, E., Bennewitz, H., Rothland, M. (Hrsg.) (2014). Handbuch der Forschung

zum Lehrerberuf. Münster, New York: Waxmann.

Terhart, Ewald (2007). Standards in der Lehrerbildung - eine Einführung. In

Unterrichtswissenschaft 35 (2007), Aufsatz (Zeitschrift), Peer-Review, Bildungsorganisation, Bildungsplanung und Bildungsrecht, Erwachsenenbildung / Weiterbildung.

Terhart, Ewald (2002): Standards für die Lehrerbildung. Eine Expertise für die Kultusministerkonferenz.

Terhart, Ewald (2001): Lehrberuf und Lehrerbildung. Forschungsbefunde,

Problemanalysen, Reformkonzepte. Weinheim: Beltz.

Weinert, Franz E. (2001a): Vergleichende Leistungsmessung in Schulen - Eine

umstrittene Selbstverständlichkeit. In: Weinert, Franz E. (Hrsg.): Leistungsmessungen in Schulen. Weinheim & Basel, p. 27-28.

Weinert, Franz E. (2001b). Concept of competence: A Conceptual clarification. In,D. S. Rychen and L. H. Salganik (eds.) Definition and selection of key

competences (p. 45-65). Germany, Göttingen: Hogrefe.

Weisser, Jan (2012). Kompetenzziele im Bereich der Sonderpädagogik an

Pädagogischen Hochschulen. Professionalisierung, Innovation, und die Demokratisierung gesellschaftlicher Verhältnisse. Entwicklung und weiterführenden Überlegungen an der Pädagogischen Hochschule FHNW. Workingpaper 3.

MAKE IT FLOAT! TEACHING THE CONCEPT OF RATIO THROUGH COMPUTER SIMULATION

<u>Elena Vysotskaya*</u>, Anastasia Lobanova**, Iya Rekhtman***, Mariya Yanishevskaya****

*PhD, leading researcher at the Psychological Institute of the Russian Academy of Education, Moscow, h_vysotskaya@mail.ru ** PhD student, Moscow, Moscow State University, nastya-lobanova@yandex.ru *** PhD, Coordinator, Introchemist association, Morrisville, NC, USA, iyar@introchemist.org ****PhD, senior researcher at the Psychological Institute of the Russian Academy of Education, Moscow, y maria@mail.ru

ABSTRACT

We discuss the potential of computer simulation of the problem of flotation control for teaching ratio-based concepts (density) in middle school. Our previous studies that were based on Activity Approach (Leontiev, 1978) and Developmental Instruction (Davydov, 2008) have yielded an effective instructional strategy for early stages of the concept formation (Vysotskaya et al., 2015). The current study focuses on the further development of the concept of density towards students' mental tool for solving various problems that don't directly appeal to it. The total of 229 students participated in the study that used a pre- and post-test design. Replacing time- and resource-consuming experimental part of our course with computer program proved to be not only equally efficient in reconstructing the meaningful context for students but also more rewarding in terms of mastering the target concept and students' confidence in the solutions.

INTRODUCTION

The concept of ratio is extensively used in school physics (density, speed, pressure, etc.) and chemistry (concentration); it is related directly to very important mathematical concepts such as fractions and proportions (Sophian 2007). However, studies have repeatedly shown that most middle- and high-school students, and even pre-service teachers, have difficulties with these concepts, especially density and concentration (Hecht et al. 2007; Kloosterman 2010; Dawkins et al. 2008, etc.).

Misconceptions in this domain are a popular subject to study (e.g. Ünal & Coştu 2005; Shaker 2012). To overcome them, researchers suggest various instructional strategies; each focuses on a couple of facets involved: from guided-inquiry based teaching (Almuntasheri et al. 2016; Moli et al. 2016) to development of students' argumentation (Chen et al. 2014). Several studies has shown that teaching children to differentiate clearly between two parameters (mass and volume) improved their ability to solve problems in the domain, and the idea that all material objects have weight, no matter how small or light the object is, benefitted differentiation between weight and density (e.g. Maclin et al. 1997, Seigler & Chen, 2008; Smith & Brown 2014). Our previous research in teaching ratio-based concepts such as concentration and density (Vysotskaya et al. 2010, 2011, 2015) has yielded an effective instructional strategy for early stages of the concept formation. This strategy is based on the Activity Approach (Leontiev, 1978) and Developmental Instruction (Davydov, 2008). In this article we focus on the further development of the concept of density and the role of computer simulation in it.

New opportunities offered by digital era have found their way into this part of curriculum (Wiser & Amin, 2002; Smith & Unger, 1997; Zhang et al., 2004). Researchers have designed various software tools to support students' learning in the area: from computer animation for middle school students (e.g. Çepni & Şahin, 2012) to an e-tutor for preservice teachers (Stott & Hattingh, 2015). Several groups have suggested more integrated approaches that support different facets of learning, such as knowledge access, experimental activities, reflection and integration of knowledge (e.g. Zhang et al., 2004; Reid et al., 2003). Different levels of guidance have been explored (Moli et al. 2016), and various activities for primary students to differentiate the target concepts (mass, volume, and density) have been provided at both macroscopic and microscopic levels (Stavridou & Grammenos, 2009). Efficiency of computer technologies in education is itself a subject of active studies (Merchant et al., 2014; Schwarz et al., 2007). Our computer simulation aims mainly to organize students' actions during their experimentation in the domain, as well as record and support all related operations.

"MAKE IT FLOAT!" – A TRAIL TO THE CONCEPT OF DENSITY

This course was designed to help 6-graders build the concept of density as a tool for solving problems that include this concept both directly and indirectly. The course starts "from scratch", i.e., from very early stages of ratio-based concept formation and progresses to advanced ones (Table 1).

Table 1

The structure of the course

Part	Problem examples	Actions to master	Concept gained	
1 st part	"Balance the	Co-measuring weights	The smallest balanced	
(basic)	vessel" in a given	and volumes	vessel as a necessary feature	
	"sea"		of a given "sea"	
			(=compound unit)	
Transfer	"Compensate the	Measuring weight of	Density as a mass of a unit	
	leak"	"water" in a certain	volume $=$ b condition to	
		volume	build a balanced vessel	
2 nd part	"Calculate an	Co-measuring water and	Buoyancy is determined by	
(advanced)	unknown weight in	vessel densities	the relation between	
	a given vessel"		densities.	

Relying on the Activity Theory and Developmental Instruction approach, we consider the person's actions as a driving force for concept origin and development. Two parts of our course scaffold two levels of student's actions. First part presents the compound unit as a tool that children have to master. In order to balance vessels in "sea water" children are coordinating their actions using the smallest unit: a set of volumes and weights in the smallest balanced vessel. The smallest unit is repeatedly brought into use by the problem solving practice. It is only when our students can operate mass and volume proportionally and provide a rational explanation of what they are doing that we qualify them as "having acquired the density concept" (1st stage). The first part of the course ends with the task of measuring the weight of water in a unit volume, which is the most common definition of density. It is however not a starting point for our students, and when they eventually arrive at this topic, the above construct has a meaning beyond a mere fraction with mass and volume as numerator and denominator, respectively. Still, this is only the preliminary part of the course because the concept of density is mastered only when it can itself mediate other solutions to other problems. This is when we transfer to the second part of the course.

The second part presents a series of problems that test the student's concept of density. They cannot be solved without previously learned operations, but they do not address them directly. The problem solving practice is supported by custom educational software described below.

Computer Simulation

"Make it float!" simulation is designed to serve several major purposes:

- 1. It is a diagnostic tool as well as educational software. It enables logging of all actions done by students such that they can be later analyzed quantitatively and qualitatively. As a teacher's tool it allows setting up new problems with different density values.
- 2. It supports working in pairs because joint actions are vital for formation of a ratio-based concept (Vysotskaya et al., 2010). One student is given control of only one parameter (either mass or volume) at a time, thus cooperation within the pair is essential.
- 3. A great variety of problems ensure that students always deal with new conditions (for example, limited number of trials, the feature of adding volumes disabled, a balanced sample vessel already given) so they again and again have to refer to the basic principles and models instead of working out algorithms that would spare them some mental job.

"Make it float!" was designed for a course lasting 34 class-hours due to the available formats of elective classes in Russian schools; however, it can be shortened or extended using a large pool of backup problems. Typically, students solve from 6 to 10 problems per class. Besides computer simulation that replaces the most time-consuming experimental part, a lot of paper-and-pencil work was done and discussions were held. Around the middle of the course, children start paying more attention to their notes and to discussions about different topics rather than playing with vessels; for us, this indicates their progress in learning.

Sample tasks

The problems supported by the program fall into two categories that roughly correspond to two parts of the course as outlined in Table 1. The first category deals with the concept of density itself as the ratio between mass and volume, while the second addresses the concept of density as a tool to solve other types of problems. Students cannot solve the problems from the second category unless they have mastered the concept to a certain degree. In what follows we provide examples from both categories.

Balance the vessel

Figure 1 demonstrates one of the tasks from the first part of the course. The assignment is to make the vessel balanced with 12 trials or less. After the first trial, the program shows a diagram where the students organize the results of their trials.

Students are working in pairs, each in charge of one parameter. They have to cooperate, and as they have only 12 probes, their trials are to provide maximum of information possible. We expect their actions to be as follows¹⁸:



Figure 1. The task is to balance the vessel with the limited number of trials.

- 1. Students argue what would be the first attempt, but it does not take long before they decide that the best first trial is 1 weight and 1 volume. So they build the first trial vessel.
- 2. They see the result: the vessel goes up (i.e., floats). This result has to be marked on diagram where they have to coordinate two cursors (one for volume and one for mass) to find the right place for the first trial.
- 3. After that, they decide what trials make no sense. For example, the one in charge of volumes can say that adding volumes to the vessel would be silly as it would only add buoyancy to the vessel that is already floating. Accordingly, they fill in the results for all such configurations. Accordingly, it will be suggested that a weight (i.e., a unit of mass) should be added.
- 4. Excluding another useless kind of trials would require joint actions. Doubling, tripling, etc. the vessel will not change the result, so students work together to mark 2:2, 3:3 and other vessels as "floating". Next, all configurations to the left of these will be marked as floating because they weigh less with the same volume. The same applies to the configurations that have bigger volume with the same mass (i.e., above the vessel that is

¹⁸ What we describe here is the ideal variant of students' actions. We emphasize that students work together during class discussions. It is not often that students can figure out all of these steps independently from the beginning, but we observe more and more of it towards the end of the course.



already marked as floating). The diagram after all known vessels are marked is shown in Fig. 2.



- 1. After the configuration with 1 volume and 2 weighs has been tried and found to be floating and the one with 1 volume and 3 weighs sinking, there comes the crucial part. Simply adding weighs OR volumes won't help, which can be seen on the diagram. Students should switch from operating weights and volumes separately to manipulating entire configurations; in particular, they have to add the last obtained floating vessel to the first sinking vessel. So their next trial is 2 volumes and 5 weighs.
- 2. The work continues until the balance is found.

Weighing water

Figure 3 demonstrates one of the last tasks in the first part of the course.



Figure 3. The task is to balance the vessel with the "leak"

After the vessel is balanced one of the volumes is filled with water - i.e. has a "leak". Students have to think of a way to balance the vessel again, taking in account that no volumes can be added as their submarine is already in the ocean, or just because the simulation does not allow having more than 8 volumes. Students' actions are:

- 1. They guess, that the vessel is now sinking, as the water in the volume added its weight. So they have to either add volumes, or take off weighs.
- 2. They take away one weight the ship is still sinking, they take away another the vessel starts to float up. However, this is not what they want as a submarine must be balanced under water.
- 3. The question is: what is the weight of water in the leaking volume that we have now to compensate? It is obvious that mere adding or taking away weights won't help. As our students have already encountered this problem (see task 1, #5), they are capable of operating combinations of weights and volumes. So they make the vessel balanced again by taking away weights and filling some other volumes with water. As a result they have a vessel containing several compound units and some volumes filled with water instead of weights. Thus, we have measured water weight. Now students can load volumes with fractional weight, and they can replace water in their models with equivalent number of weights, or they can pose a question how to calculate water weight in one volume it is a bridge to learning fractions.
- 4. Students come to the conclusion that the balanced vessel and water must be of the same compound measure.



Figure 4. Problem solution: in the first vessel three weights are taken away, and then the second volume is filled with water - thus, bringing back the way of three weights per 2 volumes that equals to the same compound unit as found previously.

Unknown weights.

This is one of the most challenging problems in the second part of the course. There are two vessels: one is for testing only, and the second should be balanced at the first attempt. The testing vessel here contains two unit volumes filled with unknown weight each, and they cannot be removed. The main vessel contains three of these new weights that cannot be removed.



Figure 5. This complicated problem implies calculation of the mass of the new weight that can be found only through the compound unit value.

Students' actions to solve the problem should be:

- 1. Balance the testing vessel.
- 2. Find one more balanced testing vessel. It is not trivial for students that they need to have one more balanced vessel to figure out what is the smallest balanced one (=compound unit) it can be found as a difference. At this point students have a tremendous temptation to pass to the main vessel, which leads to a mistake, as they still don't know the density of that "sea water".
- 3. As students learn the proportion of weights and volumes, or in other words they know "water weight in a unit volume" or density, they figure out the proportion between regular weights and unknown new ones.

4. At last, they pass to the second vessel with three new weights, which they now can also count as weights needed to balance volumes19.

The values for such problems have to be carefully chosen – otherwise the problem cannot be solved in the computer simulation because weights and volumes cannot be divided. However, facing such a problem provokes students to analyze it further and switch to paper-and-pencil calculations that make a direct link to fractions and proportions.

EXPIREMENT

The total of 229 students 6th and 7th-graders (11-13-year-olds) participated in the present research (Fig. 6). After passing a pre-test assignment 139 6-graders took our "Make it float!" course and 90 7-graders took their Physics class. Among 6-graders 49 students did hands-on experiments and 90 learned through our computer simulation. At the end of the year each group solved similar problems as the post-test²⁰. The teaching experiment took place in an urban school (school #91, Moscow) and we present data, collected during 2 years. During the experiment we monitored and analyzed students' learning: (a) common mistakes; (b) strategies used; (c) explanations given; (d) motivation; (e) communication patterns in pairs.

¹⁹ In the algebraic terms, this would be equivalent to building and solving a system of two linear equations with two unknowns. Our students successfully deal with such a task during teaching experiment and end-of-course assessment (internal). This type of problems was not included in pre- and post-tests because students who did not deal with the computer simulation are unfamiliar with it.

²⁰ There was no discussion, nor any feedback concerning students' pre-test answers during the year.



Figure 6. Research design

Assessment

The pre- and post-tests included three types of problems; the total is 12; all tasks are open-ended, paper-and-pencil problems, and students were asked to show their work.

1. First type tasks aimed at "formal knowledge", i.e. the students' ability to use the taught formulas and laws directly. *Two cubes of the same size are held in water undersurface: a wooden and a metal one. Which of them is pushed up harder?*

To answer this question, students need to remember that buoyancy force (if we compare objects that immersed in the same liquid) depends on the volume solely. That is what the Archimedes law is about.

- 2. Second type tested how well students deal with ratio-based concepts. Students have to consider, whether and how the ratio changes when both – mass and volume – are changed. A log is floating in the water. Then it is cut in two pieces. One of the pieces is 10 times heavier, than the other. Which piece will float and which will sink?
- 3. Third type of tasks presented "real-life" situations that required students to apply the ratio-based concept indirectly. In addition, these problems provoked students to appeal to their everyday experience and common sense that would cause mistakes. *A wooden boat is floating. Then it is filled with water. Will the boat sink?*

RESULTS AND DISCUSSION

The results of the pre- and post-test assessments are presented in Table 2. On the pre-test there was no significant difference between these three groups, so we united their results in the first column.

Table 2

Percent of tasks that students solved correctly

	Pre-test, %	6 grade (hands-on experiments), %	6 grade (computer), %	7 grade, %
1st type tasks	48	62	84	40
2nd type tasks	42	60	65	48
3rd type tasks	20	64	78	51

The suggested teaching strategy proved to be effective with all three types of problems compared to the traditional curricula – that only reconfirms results we have received in earlier studies.²¹





²¹ In Russian schools children first encounter Physics in the 7th grade. According to the traditional curricula, 18 hours are given to study the concepts of density and the Archimedes Law. Our course takes 34 hours. Thus, an alternative explanation of our results is obvious, as children have almost two times more time to study density in our course. But the duration of our course may be shortened – the first part can take 10 hours (for example when it is integrated in Math curricula). Either way, the comparison of traditional program and our course was not our main goal as we did that before.

The post-test results showed some significant differences between our two experimental groups – the students who passed computer simulation and hands-on experiments – in terms of "formal knowledge" and "real-life situations" problems. These differences can be better understood when taking qualitative analysis in account, and we discuss them below.

At first, pre-test data revealed some interesting facts:

- 1. Students tended to use commonsense in argumentation. "The boat won't sink, if there are no leaks", "will sink, if the waves are strong", "won't sink as wood has got air inside".
- 2. Many students confuse the "result" whether vessel sinks or floats and the buoyant force itself. For example, they say that the wooden cube is pushed up harder.
- In the 2nd type tasks students consider only one parameter (mass or volume): "the heavier part of log will sink", or "big objects float better so the bigger part will float".

After the course we observed that students' argumentation changed significantly. On the post-test the commonsense argumentation was almost gone (while in the 7th grade it was still popular). The 6th-graders started to ground their reasoning with models and calculations. Though the Archimedes law was never directly named in our course, the idea that "pushing up" relies on volume solely and does not depend on weight was adopted by majority of children (84 % in computer simulation and 62 % in hands-on experiments).

This coincides with the teacher's observations that in the non-computer group students had a lack of confidence in separating two parameters – mass and volume. It seems the computer simulation helps students to distinguish them better because it doesn't look realistic, and it was made on purpose, – it is symbolic as it models the parameters in their purified form.

The 2nd type tasks results were equally good with both our experimental groups: for example, students thought of cutting log as of dividing a vessel into a number of small vessels with the same proportion, which means their buoyancy does not change (Fig.8). This type of tasks corresponded to the first part of the course which was supported with the hands-on experiments. The "paper-and-pencil" work was very similar in the both experimental groups. We assume that is why the differences were not significant though the results were not as high as we would like to see. We believe integration with math class would be of help, if the approach is accepted by Math teachers.



Figure 8. "Cutting" any balanced part off the vessel won't change its buoyancy

At last, the students who passed the computer simulation version of the course solved the 3rd-type problems better – and that may seem a contradictory result as they are better in solving "real-life tasks" than students who did "real-life", hands-on experiments. Two ideas come to mind:

- 1. The 3rd type of questions refers to density concept indirectly, which corresponds to the second stage of concept development and to the second part of our course. The second part is much more difficult to supply with hands-on experiments. And at the same time there is a lot of thinking and modeling to do besides experimental part so troubles with experiments cause needless distraction. Computer simulation handles this part and proves to be indispensable.
- 2. It looks as a paradox though it is not. Observation of real-life situations does not lead directly to comprehension and to adopting true concepts. Applying a concept every time means exploiting a scientific model that stands behind it (Van Der Valk et al. 2007). Such a model is abstract and purified from real-life inaccuracy; it was built to predict real objects' behavior. Hands-on experiments in buoyancy domain left students unsure of the results they received, as the balance is very hard to achieve.

Teaching the concept of density through our "Make it float!" course provides a robust basis for understanding the corresponding physical laws and underlying mathematical relationships. During the course the concept of density develops from a compound unit of weights and volumes as a mean to balance the vessel to a measure of the "water" special property to pull out an immersed object as a mean to solve more complicated tasks. Such challenging problems as to balance a vessel with unknown weights, to draw a waterline on a ship, to predict buoyancy in a reallife situation, and so on can be solved by our students. Our computer simulation scaffolds both stages of concept development, while hands-on experiments fail to provide the necessary support for the second part of the course though it still produces higher results than traditional curricula. Based on the results we assume that our computer simulation – compared to hands-on experimental course (1) is able to deliver the meaningful context and thus maintain the level of students' comprehension; (2) provides an advanced level in mastering the concept and increases students' confidence in their knowledge by allowing more tasks to be solved during classes; (3) boosts core understanding because it is not contaminated by real-life perturbations.

REFERENCES

- Almuntasheri, S., Gillies, R.M. & Wright, T. (2016) The Effectiveness of a Guided Inquiry-based, Teachers' Professional Development Programme on Saudi Students' Understanding of Density. Science Education International, 27 (1), 16-39.
- Chen, Y-C., Lin, J-L. & Chen, Y-T. (2014) Teaching Scientific Core Ideas through Immersing Students in Argument: Using Density as an Example. Science Activities: Classroom Projects and Curriculum Ideas, 51 (3), 78-88.
- Çepni, S., & Şahin, Ç. (2012). Effect of different teaching methods and techniques embedded in the 5E instructional model on students' learning about buoyancy force. Eurasian Journal of Physics and Chemistry Education, 4(2), 97-127.
- Davydov, V.V. (2008/1986). Problems of developmental instruction: a theoretical and experimental psychological study. Nova Science Publishers (Original published in Russian in 1986).
- Dawkins, K.R., Dickerson, D.L., McKinney, S.E. & Butler, S. (2008) Teaching Density to Middle School Students: Preservice Science Teachers' Content Knowledge and Pedagogical Practices. The Clearing House: A Journal of Educational Strategies, Issues and Ideas, 82 (1), 21-26.
- Hecht, S.A., Vagi, K.J., & Torgesen, J.K. (2007). Fraction skills and proportional reasoning. Why is math so hard for some children? The nature and origins of mathematical learning difficulties and disabilities. By D.B. Berch, & M.M.M. Mazzocco (Eds.). Baltimore, MD: Paul H. Brookes Publishing Co. pp. 121-132.
- Kloosterman, P. (2010) Mathematics Skills of 17-Year-Olds in the United States: 1978 to 2004. *Journal for Research in Mathematics Education 41*, pp.20-51.
- Leontiev, A.N. (1978). Activity, consciousness, and personality. Englewood Cliffs, NJ:Prentice Hall. (Original work published 1975).
- Maclin, D., Grosslight, L. & Davis, H. (1997) Teaching for Understanding: A Study of Students' Preinstruction Theories of Matter and a Comparison of the Effectiveness of Two Approaches to Teaching About Matter and Density. Cognition and Instruction, 15 (3), 317-393.
- Merchant, Z., Goetz, E. T., Cifuentes, L., Keeney-Kennicutt, W., & Davis, T. J. (2014). Effectiveness of virtual reality-based instruction on students' learning outcomes in K-12 and higher education: A meta-analysis. *Computers & Education*, 70, 29-40.
- Moli, L., Delserieys, A.P., Impedovo, M.A. & Castera, J. (2016) Learning density in Vanuatu high school with computer simulation: Influence of different levels of guidance. Education and Information Technologies, 1–18.

- Reid, D. J., Zhang, J., & Chen, Q. (2003). Supporting scientific discovery learning in a simulation environment. *Journal of Computer Assisted Learning*, 19(1), 9-20.
- Schwarz, C. V., Meyer, J., & Sharma, A. (2007). Technology, pedagogy, and epistemology: Opportunities and challenges of using computer modeling and simulation tools in elementary science methods. *Journal of Science Teacher Education*, 18(2), 243-269.
- Shaker, Z. (2012) The Use of Concept Maps as a Tool for Understanding Conceptual Change in Preservice Elementary Teachers on the Concept of Density. International Review of Contemporary Learning Research, 1 (1), 9-22.
- Siegler, R.S., Chen, Z. (2008). Differentiation and integration: Guiding principles for analyzing cognitive change. *Developmental Science*, *11*, 433-448.
- Smith, C.L. & Brown, N.J.S. (2014) The affordances and challenges of using comparative longitudinal designs in matter LP research: Lessons from the Inquiry Project. Paper presented at NARST Symposium: Methodological Trade-offs in LP Work, April 2, 2014. Retrieved from https://inquiryproject.terc.edu/about/presentationsreports/Affordances_ChallengesofComparative_longitudinal_designs_NAR ST2014.pdf on Sept 25, 2016
- Smith, C., & Unger, C. (1997). What's in dots-per-box? Conceptual bootstrapping with stripped-down visual analogs. *The Journal of the Learning Sciences*, 6(2), 143-181.
- Sophian, C. (2007). The origins of mathematical knowledge in childhood. Studies in mathematical thinking and learning. New York: Lawrence Erlbaum Associates.
- Stavridou, H. & Grammenos, S. (2009) Teaching with "The Density Notebook": Learning Outcomes about the Concepts of Mass, Volume and Density. International Journal of Learning, 16 (7), 311-323.
- Stott, A. E., & Hattingh, A. (2015). Conceptual Tutoring Software for Promoting Deep Learning: A Case Study. Educational Technology & Society, 18 (2), 179–194.
- Ünal, S. & Coştu, B. (2005) Problematic issue for students: Does it sink or float? Asia-Pacific Forum on Science Learning and Teaching, 6 (1), art. 3, 1-16.
- Van Der Valk, T., Van Driel, J.H. & De Vos, W. (2007). Common characteristics of models in present-day scientific practice. *Research in Science Education*, 37, 469–488.
- Vysotskaya, E., Rekhtman, I. & Yanishevskaya, M. (2010). *How Students Construct the Concept of Ratio by Joint Actions.* // European Association for

EAPRIL Conference Proceedings 2016

Research on Learning and Instruction: Moving through cultures of learning. Utrecht, September, 2010.

- Vysotskaya, E., Rekhtman, I., Lobanova, A. & Yanishevskaya, M.(2015). From proportions to fractions. /EAPRIL Conference Proceedings 2014. pp. 42-53.
- Vysotskaya, E., Rekhtman, I. & Yanishevskaya, M. (2011). *Object-oriented actions as a basis of proportional reasoning and the concept of ratio.* // ISCAR Congress, Rome, September, 2011.
- Wiser, M., & Amin, T. G. (2002). Computer-based interactions for conceptual change in science. In *Reconsidering conceptual change: Issues in theory and practice* (pp. 357-387). Springer Netherlands.
- Zhang, J., Chen, Q., Sun, Y., & Reid, D. J. (2004). Triple scheme of learning support design for scientific discovery learning based on computer simulation: Experimental research. *Journal of Computer Assisted Learning*, 20(4), 269-282.

THE CURSE OF DROPOUT FROM DISTANCE EDUCATION – WHAT IS IT ABOUT? A STUDY OF MOTIVES AND MASTERY AMONG DISTANCE EDUCATION STUDENTS IN NORWAY

Wenche m. Rønning

Researcher, ph.d.(education), Department of education and lifelong learning, Norwegian university of technology and science, Trondheim, Norway, wenche.m.ronning@ntnu.no

ABSTRACT

This Norwegian study was carried out to investigate motivation and mastery among distance students. The dropout rate from distance studies is high, and the intention was to find out whether these factors might contribute to explain dropout. A web-based questionnaire was distributed through Flexible Education Norway, a network that consists of most of the publicly approved web-schools, 6000 questionnaires were sent. Although the response rate was low (1231 responses), the sample represented the variety of courses in the network fairly exhaustive. For the purpose of the present article, 3 groups of students were chosen from the total sample for further study (N=998): high school courses (26%), "vocational colleges" (2 years post high-school)(26.4%) and higher education courses (47.6%). The results show that these students were highly motivated when they started, they were both intrinsically and extrinsically motivated, and they exposed a variety of ambitions; work-related, competence and career oriented, and personal (self-development). They also mastered this mode of study well, their selfefficacy was quite high, and they were quite comfortable with studying online. Consequently, their motivation and mastery cannot explain the high dropout. At first sight, this sample is not candidates to join the dropout statistics. However, they run into a number of challenges that might hamper completing the study they chose. Lack of belonging to the study environment and lack of identity as a student, stand out as possible explanations. The solution may be designing a more personalized and learning motivational contact with the students to make them feel included.

BACKGROUND

Estimated from the number of students enrolled in distance education in Norway (around 14300, Statistics Norway, 2016), it is fair to assume that this mode of study is considered attractive, and for a number of reasons. Many adults consider distance education their only opportunity to acquire or renew their formal competence, due to conditions in their everyday life, where family and work-life obligations take up much of their time (Rønning, 2009; Lehman & Conceicao, 2014). In addition, Norway with it's population of only 5 million, there is a challenge of geography. Quite a few live in sparsely populated areas, and institutions that offer formal "on-site" education is not available for everybody outside the more densely populated areas. Outside the bigger cities for instance, access to "on-site" higher education is limited.

The quality of distance education studies in Norway is considered high. The network "Flexible Education Norway" (FuN) organizes 40 Norwegian publicly approved providers of flexible education; including independent distance education institutions, public universities and colleges, private institutions and training centers for business and industry. These member schools provide an extensive range of subjects, courses and study programs from primary to university level, and customized courses for professionals.

Most suppliers of distance education within the network "Flexible Education Norway" work continuously to improve the accessibility and the quality of their course portfolio. User-friendly learning platforms are available; the teachers are considered well qualified to handle distance students in terms of giving efficient and quick feedback on their assignments.

Despite this, the dropout rate is high, as it is internationally (estimated between 20-50%; Statistics Norway, 2016; Simpson, 2013, Woodley & Simpson, 2013). Simpson (2013, p.117) claims "dropout remains a fundamental characteristic of distance education with probable negative consequences for students and consequently institutions". The question is why?

There are a number of reasons why distance students choose not to complete the educational pathway they started on. First, research has failed to prove that the advances in the technology used in distance education have any effect on reducing dropout (Simpson, 2013). The technology itself is in other words not a place to start in order to reduce dropout rates. However, Lehman and Conceicao (2014) found that in order to reduce dropout from online courses, it is necessary to focus on motivating learning activities, which can be built into the courses as an expansion of instructing the students in how to use the learning management systems. In other words, the facilitators of online courses need to focus on the

students' needs, for instance to familiarize them with the online experience (Lehman and Conceicao, 2014, pp 40-41).

When students themselves are asked to name reasons for dropout (planned or actual), the most frequent reasons mentioned in this respect are; lack of time, changes in circumstances at work or within the family, lack of support from family or workplace (managerial support), the study activity is overshadowed by to other, more urgent commitments in life, and therefore is more easily voted out than doing changes in other areas of everyday life. Further, underestimating the workload is mentioned, as well as experiencing that they were lacking appropriate study skills and study strategies (Weinstein, Palmer & Schulte, 2002; Rovai, 2003; Park, 2007; Rønning, 2008; Rønning, 2009; Simpson, 2013). However, the main reason for dropout is suggested to be insufficient, or decreasing learning motivation among the students (Chyung et al. 2001; Menager-Beeley, 2004; Simpson, 2013).

The aim of this article is to investigate whether factors like motivation and mastery among distance students indicate "personal states" (i.e. low motivation and low self-efficacy) that may explain dropout.

THEORETICAL FRAMEWORK

According to a number of educational researchers, motivation is considered as the most important factor in student retention. Anderson (2006) claims that the *best* predictor of student retention is motivation. He suggests that what he calls retention services (this may be student counseling) need to build on this insight, and find out what the issues are that influence diminishing motivation among students. One strategy is to be proactive, and reach out to the students. Anderson (2006) found in his research that the students who need counseling the most in order to prevent dropout, were the one's least prone to seek help and encouragement. They become invisible.

According to Simpson (2013), in distance education a number of initiatives has been tried out to increase retention, with a positive effect. Efforts to get in touch with students, like telephone calls and motivational emails have been tried out over a period of 15 years (2001-2013). He states that the problem with dropout has little to do with the quality of teaching and course materials, but the lack of focus on the individual student. He advises to redirect resources from teaching to a focus on "proactive individual learning motivational support" (Simpson 2013, p 113). This is supported also by Lehman and Conceicao (2014).

Both Astin (1993) and Tinto (1993) claim that if students genuinely feel part of the study environment they belong to, this will contribute to their success in terms of

keeping up the motivation, their well-being, achievement and retention. However, it goes without saying that it takes more to get this sense belonging in a distance study environment, than in an onsite study environment. The sense of "social" belonging to groups of fellow students (i.e. on the same course) is naturally difficult to obtain. But a sense of belonging to the academic environment can probably be solved in a number of ways, if the suppliers of distance studies set their mind to it. They may develop further online systems that include such properties. Frequent feedback, individualized guidance; both academically and personal will probably contribute to a sense of belonging. In today's situation, most schools will rightfully claim that they already do this, but when distance students start to withdraw from the scene (i.e. do not hand in assignments or answer e-mails), nobody follows up (Simpson (2013). Simpson claims that to make a difference to dropout, it is vital to find a way of strengthening students' learning motivation, to make it more resilient "in the face of isolation, and the inevitable problems that arise from part-time study" (Simpson 2013, p. 117).

Motivation and Mastery

In Deci and Ryan's (1985) definition, motivation is "to be moved" to do something, meaning that a person may feel energized or activated toward an end. They make an important distinction between intrinsic and extrinsic motivation, meaning whether a behavior is autonomous or externally controlled. These two types of motivation may help shed some light upon the study of distance students' considerations around retention or dropout. Ideally, one should be motivated from "within", but if this is not the case, external pressure (i.e. get a new job, be better qualified, strengthen the self image) may represent a force that makes people see the necessity to carry through the task they started on. In strenuous phases that normally turn up throughout a distant study, the inner motivation to complete what they started may be challenged. But if they feel a strong external pressure (motivation; i.e. improve their position in the labour marked), this may probably compensate for loss of, or reduced, intrinsic motivation. This sense of volition means that they somehow may come to value the perceived outcome of their study (Ryan & Deci, 2000).

Intrinsic motivation

When people are being autonomous or intrinsic motivated they will experience a full set of volition, willingness and choice of what they are doing, meaning they are willing to behave in certain ways. The characteristic of this type of motivation refers to being inherently interested, and the task appears enjoyable to the person. Also, this type of motivation is closely connected to a person's values and beliefs. It is further assumed that being intrinsically motivated results in high-quality learning and creativity, better performance and positive emotions. It is also

associated with psychological and physiological health. A consequence of acting on one's inherent interests is that one grows in knowledge, skills and feelings of accomplishment (Ryan & Deci, 2000).

On the other hand, there are certain conditions that elicit, sustain, and enhance this type of motivation versus those that subdue or diminish it (Ryan & Deci, 2000, p. 58). Most important, if the task causes *feelings of competence*, intrinsic motivation is enhanced. Optimal challenges are an important element in this, as is constructive feedback. Being a distance student, with limited contact with the learning environment, this point may be a factor of vulnerability. The point of optimal challenges in a distance study environment is not personalized to the same extent as in an "on-site" learning environment. This also applies to constructive feedback, although distance teachers are well qualified to handle this task, provided the student keeps his/her part of the "contract" (hand in the assignments in time).

Several studies have shown that positive feedback on performance enhance and maintain intrinsic motivation (Deci, 1971; Bandura, 1977; Harackiewicz, Abrahams & Wageman, 1987). On the other hand, negative performance feedback seems to diminish it (Deci, 1972). It is possible to imagine that no feedback has the same effect. There is a risk of receiving no feedback from the school if the student does not "deliver".

Extrinsic motivation

The characteristics of extrinsic motivation is that an activity is performed to obtain a particular outcome or behavior. But it is a challenge to make people undertake tasks that are not interesting to them. One may either been seduced or coerced into behaving, in both cases it may result in a sense of tension and anxiety, which has negative consequences for performance and well-being (Ryan & Deci, 2000).

However, there is a variety in the degree of *autonomy* of the activity that is performed, from no autonomy, which means complying with external control, to a feeling of choice and desire to obtain an outcome, although it is of instrumental value. Deci and Ryan (1985) describe these processes as a continuum, where internalization is the point where an individual takes in the value of a regulation, whereas integration means that the person fully transforms the regulation into their own (Deci & Ryan, 1985).

An even more self-determined form of extrinsic motivation is regulation through identification (Ryan & Deci, 2000, p. 62). In this case, the person has identified with the personal importance of a certain behavior, and accepted it as his or her own. The most autonomous form of extrinsic motivation is integrated regulation, meaning the new regulation is in congruence with one's other values and needs. According to Ryan and Deci (2000, p.62), integrated forms of motivation share

many qualities with intrinsic motivation. But, they are still extrinsic, because behavior motivated by integrated regulation is presumed to have an instrumental value with respect to the outcome that is separate from the behavior, even though it is both volitional and valued. Applied to the study of distance students, this may come into the picture and have a preventive effect on dropout, when they are worn out, or the study efforts and time used on studies feels "wrong" in competition with other commitments. There is another strong force in play as well; the pressure from society (i.e. the workplace), the family (not to appear as "a quitter" and loose face) and even the pressure felt by themselves to relate to what others think, feel and do (Ryan and Deci, 2000, p.64).

Self-efficacy - implications for mastery

The belief in one's ability to perform a given task, like starting on an educational journey through distance education, is a crucial determinant both for a person's behavior, and the outcome of it. In Banduras terms, expectations of personal mastery affect both initiation and persistence of coping behavior (1977, p.193). Further, according to Bandura, the strength of people's convictions in their own effectiveness is likely to affect whether they will even try to cope with given situations (p.193). Self-efficacy will, in other words, influence the wish to fulfill the need for new or higher qualifications.

However, it is not unusual to try and avoid situations one believes exceed one's coping skills (p.194). Skepticism might probably also influence the learning effort in itself: "am I able to manage this?" Bandura claims "efficacy expectations determine how much effort people will expend and how long they will persist in the face of obstacles and aversive (negative) experiences" (p. 194). If a person perceives his or her self-efficacy as strong, this has a positive effect on their efforts and activity (Bandura 1977, p. 194). But regardless of the initial level of self-efficacy, frustrations along the way may occur. However, if the self-efficacy is good, it will "survive" unexpected challenges and setbacks. But mastery expectations alone will not produce a desired outcome. Capability is also a necessary prerequisite, in particular in order to willingly choose an activity (Bandura 1977, p. 194).

If this is to happen, Bandura claims that people are dependent on different information sources that are known to produce a sense of efficacy; performance accomplishments, vicarious experience, verbal persuasion and psychological states (Bandura 1977, p. 195). Applied to distance students, two of these sources will be particularly important; performance accomplishments and psychological states.

Performance accomplishments is the most influential source, because it is based on actual, personal mastery experiences. Success enhances mastery expectations, repeated failures lowers them (Bandura 1977, p. 195). It is particularly important to get positive mastery experiences early.

Emotional arousal is another source of information that is connected to a sense of personal competency (Bandura, 1977). Stressful situations followed by anxiety, "may produce fear-provoking thoughts about lack of aptitude" (Bandura, 1977, p. 199). This may for instance occur if one is overwhelmed by the workload, get too little help and feedback from the school, feel the risk of "loosing face" in relation to your boss, workmates, family or own expectations and self-image.

THE STUDY

Sample, procedure and instrument

The question that guided the study presented here was to what extent motivation and mastery can offer some explanation in relation to distance students' inclination to drop out. The sample was drawn from Flexible Education Norway's registers of active students. A web-based questionnaire was distributed through the Flexible Education Norway's network, where 15 (out of 22) of the member schools helped distribute it to active students' e-mail address, in all 6000 questionnaires were distributed, and 1231 students answered it. In retrospect, it was discovered that there were some irregularities concerning student registration systems (students were registered several times if they studied several subjects), so the sample number of 6000 is probably far too high. It is therefore some uncertainty connected to estimation of the response rate. However, the respondents represented a variety of distance courses on a variety of levels, and in that respect mirrored the diversity of students in distance education.

For the purpose of the present article, 3 groups were chosen from the total sample for further study (N=998): students in high school courses (26%), in "vocational colleges" (2 years post high-school)(26.4%) and in higher education (47.6%).

The questionnaire was developed for this study and it contained the following thematic areas:

- 1. Background information (age, gender, marital status, children, geographic area and previous educational background)
- 2. Previous experience with distance studies
- 3. Motivation (why choose the present distance study) (16 items)
- 4. Goals and ambitions (16 items)
- 5. Use of study strategies (time management 10 items)
- 6. Mastery (self-efficacy)(8 items)
- 7. Reasons to consider dropout (13 items).

The questions were scaled 1-6 (from 1=disagree completely to 6=agree completely). This was done in order to avoid a neutral "mid-category"(5).

Variables

Sum variables were constructed based on a factor analysis procedure, in order to measure motivation, ambitions and mastery. A Principal Component Analysis (PCA) with oblique rotation was conducted, using Kaiser's criterion (eigenvalue <1). A 0.40 criterion was applied for including an item in the factor. A Cronbachs alfa measured internal consistency of the factors, and this turned out satisfactory.

The **motivation questions** (16 items) came out in two factors; "intrinsic and extrinsic motivation".

The intrinsic motivational factor contained the following questions; being allowed to study in my own pace, feeling independent and efficient, my own or others' earlier experience from this distance education. Quality considerations related to their choice of school was included as well, like their impression of the technological platforms (previous to starting) and good teachers.

The extrinsic motivational factor contained; work and family obligations, and place of residence.

The **goal and ambition questions** (16 items) came out in three: "personal ambitions", "competence development wishes" and "career enhancement wishes".

The personal ambitions factor contained the questions: wishes to improve their self-confidence, be more independent, get approval and recognition from family and colleagues and prevent losing work.

A competence development factor contained the following questions; wishes to strengthen competence within their professional field, pure interest, keep up with developments, improve qualifications, get new assignments and more responsibility at work, and increase income.

The career enhancement factor contained; wishes to improve career possibilities, obtain new qualifications in a different field, change job, get access to the workforce (from unemployment).

The **mastery questions** (20 items) came out in two factors "overall mastery", "time management strategies".

Overall mastery (including reaching goals, satisfaction with own effort, being up to date with assignments, good understanding of subjects, good feedback from school, asking supervisor for help).

Time management strategies (negotiations for time on studies with family, reducing leisure time activities, planning towards exams).

One single item measured *self-efficacy*: "Do you master this way of studying?"

The respondents were asked if they ever had considered *dropping out* from the present study, and they were introduced to 13 possible reasons why.

RESULTS

The students – background characteristics

The age distribution in this sample was 20-71 years (average of 36.1 years). In the sample, 2/3 were in age groups 26-45 years, 69 % of them had children living at home. Nearly 50% of the sample had full-time employment, 23.5 % worked part-time, while 8.6% studied full time. The rest (10.1 %) were outside working life. The results show that the greater part of the respondents is considered being in an age group and have everyday obligations that can be characterized as busy. Many obviously experience challenges with time when combining studies with everyday life (family and work).

The gender distribution was 77.3% women and 22.7 % men. Their place of residence was in the bigger cities (46.1 %), in smaller communities (27.7 %) and in the countryside (26.2 %). This tells us that more than half of them had distance studies as their only option to get the qualifications they needed.

Around 20% of the sample answered that they had considered to drop out from the present study.

Motives and ambitions- why choose distance studies?

The results showed that the distance students had high scores on motivation, in particular on *intrinsic motivation* (mean score 4.55). The attitude towards distance studies as such was positive, because of the flexibility is gives. It is considered efficient, and some had positive experienced from being distance students earlier. They had high expectations about the teachers and they assessed the learning platforms as good. These reactions undoubtedly show that for these students, distance education was a strategic choice.

One extrinsic motivational factor was found. External considerations like place of residence, work and family obligations had played a part in their decision (mean score 3.87).

The three factors that expressed ambitions, first and foremost was connected to work and career, but they were also connected to self-development.

Competence development expressed a strong wish among these students (mean score 4.70). They had chosen this way of studying because they wanted to strengthen their competence within their professional field, or they had chosen this particular study out of pure interest. They also had realized the need to keep up with developments and improve their work-life qualifications. An element of instrumental considerations is also included in this factor: the wish to make an effort in order to get new assignments and more responsibility at work, and to increase their income.

Career enhancement was another strong factor in the ambition category (mean score 4.10). This was connected to work, partly an expression of some anxiety in order to strengthen their relationship with their present work-life situation, but also the labour market; need to improve career possibilities and obtain new qualifications in a different field. Wishes to change job, or to get access to the workforce (from unemployment).

Personal ambitions was the third of the ambition factors. The mean score (3.57) indicated a "hopeful" attitude concerning the outcome of their education; they wished to improve their self-confidence, be more independent, get approval and recognition from family and colleagues, and to prevent losing work. These responses indicate that distance education is considered a way that is hoped to remedy a vide variety of needs.

Mastering distance studies

The students exposed a high degree of *self-efficacy* (mean score 4.78). They felt that they coped well with this way of studying, which is a good point of departure, all the challenges with this type of study taken into consideration. In addition, two additional factors measured their mastery, including a variety of aspects; *overall mastery* and *time management*. Time management is one of the most important indicators of success across all educational models.

The one factor that measured *overall mastery* came out with a quite high score (mean score 4.55). This indicated that the students were quite comfortable with distance studying. The factor included questions about to what extent they felt they were able to reach the learning goals of the course, the satisfaction with their own effort (i.e. being up to date with handing in assignments). The extent of having a good understanding of subject content was also included. In addition the kind of feedback received from school, and to what degree they asked teachers for help if they needed it were asked.

A third factor showed their *time management strategies*. The mean score was quite good 4.10, thereby indicating that they managed this crucial condition for success

well. Included in the factor was whether they negotiated with their family to get sufficient time on their studies, and if they had chosen to reduce leisure time activities to allow more room for studies. They were also asked to describe their progress towards exams.

This study of Norwegian distance students gives us a picture of success. The students had in a well-considered fashion chosen to study at a distance, they were motivated on several levels, and they seemed to master most of the challenges known to characterize distance education. Only 20% stated that they had considered dropping out.

Inclination to drop out

The respondents were asked if they up to this point in their study had considered dropping out. Twenty percent confirmed this. They answered the 13 questions presented to them. They were not asked to prioritize reasons, but to indicate to which degree they agreed to the statements. The answer most of them agreed to (73.5 %) was that they had underestimated the work-load, the second most mentioned reason was that the subject they had chosen proved to be more difficult than anticipated (59.5 %). The third most mentioned reason was that they had problems with combining studies and work (53.7%). Some were dissatisfied in general with the study they had chosen (37 %). Economy seemed to be a problem for 29.6%, and had caused some considerations to stop studying. Others discovered that the study they had chosen was less relevant that they initially thought (27.5 %). Some got problems with their own or others' health, and had considered breaking off the studies for that reason (26.8 %). Too little support from management at work and from the family was another reason to consider quitting for respectively 23.6% and 21%. Around 20% had problems with handling the learning platform. Some of the less important reasons were problems with reading or writing (literacy problems), or that Norwegian was a foreign language to them (9%). Some had got a new job, and hence the study was not so relevant anymore (7.6 %). Only a few agreed that they did not have sufficient proficiency in managing the technology (7.1 %).

The answers to these questions indicate that there are some problems to be overcome to avoid dropping out from distance studies. The students that answered these questions had considered quitting, but they still "hung in there" at the time of this investigation.

Challenges and risk factors

The respondents were asked how they experienced a number of the factors that normally create a risk for dropout. According to Astin (1993) and Tinto (1993),
feeling part of a study environment will contribute to success, in terms of keeping up the motivation, well-being, achievement and retention. The results showed that most students in this sample (80 %) experienced a *lack of belonging* to the study environment, despite the options that were available and adapted for the purpose of communicating with fellow students, the school and the teachers. However, 80 % felt taken good care of in terms of support and follow-up from teachers in connection with assignments, but the social dimension of being a student was experienced as absent. Around 40 % reported that they would have appreciated more cooperation and social contact with fellow students.

Another challenge that is typical of the situation in which distance students find themselves in, is the possibility to *concentrate* when they study, in the meaning being a "proper" student in their home environment. This can create problems, because being a flexible, part-time, distance student might send signals to the family that open up for all kinds of interruptions, and little respect for the status "student". It is necessary to negotiate for sufficient time to study, to avoid this situation. If this is not done explicitly and repeatedly, the risk of interruptions increase and time to study concentrated decreases (Rønning & Grepperud, 2012). The results showed that around 60% of the distance students have a "sheltered" environment where they study, while 40% were more exposed to disturbances, and had no regular place to work (in the kitchen, in the living room, or "cram" themselves in elsewhere). There were no differences in this respect between those who had considered dropping out versus those who had not.

The picture was a bit different when they were asked about *actual disturbances* that affected the quality of their study efforts. Here we found significant differences between the groups. Those who had considered dropping out reported more often that they were interrupted and disturbed by their partner (45% vs. 48%, p < 0.000). The same appeared when they were asked about interruptions from their children (39.4% vs. 33.6%, p < 0.000). Friends and family were also interrupting. More than 30% of the potential dropouts reported this versus 18.7% of the others (p < 0.000).

Interruptions are an important factor in terms of time management. For adult, distance students with other obligations in life, this is quite a challenge to handle, because it involves having to limit the contact with close relations, like family and friends. It implies taking on an additional identity as student, and that this is respected and accepted by one's "significant others". If this is not the case, it creates vulnerability and probably increases the risk for dropout.

CONCLUSION

The results from this study show that the students had an overall positive attitude towards distance education, the flexibility it gave them, and the possibilities it opened up, due to work and family obligations and place of residence. More than half of them lived in sparsely populated areas, in smaller communities and in the countryside, confirming that distance studies were their only possibility.

They were highly motivated for a number of reasons important to them, both work and career-related, but also at a personal level; like self-development and strengthening their self-confidence vis-à-vis family, friends and colleagues. In other words, they score quite high on both intrinsic and autonomous extrinsic motivation.

The students were also quite confident about mastering the study they had chosen, and that they would reach their learning goals. They also seemed to master the subject they had chosen in terms of good academic and content understanding.

There are however, certain costs connected to being a distance student. The feeling of belonging to a study environment was lacking for most of them. Inclusion in the academic environment is one of the strongest antidotes against dropout. The lack of this constitutes a strong risk factor. Despite that these students are well informed about the characteristics of distance studies (loneliness) many still missed having the chance to be in contact with and perhaps cooperate with fellow students.

I addition there was a problem related to *not* being regarded as a "proper" student in the eyes of "significant others", symbolized by not being allowed sufficient time to study. Many, in the way of being interrupted and disturbed when they needed time for homework, experienced this situation.

The students who never had considered dropout as an option seemed to have a reasonable control over their time management, but the students in the "risk" group exposed a poorer situation with much irregularity when it came to prioritizing and doing their homework. Their study conditions were different, for some reason. A closer look into this issue showed that interruptions from family and friends occurred quite frequently for many, more in the "risk" group that in the other group. This can be considered as an unclear exposure of the student identity.

In other words, strong forces challenge the distance student's will and ability to study. Lack of social and academic integration in the educational environment is a well-known risk factor for dropout (Tinto, 1993). In combination with the chores of everyday life, this constitutes a rather strong factor that obviously overrides personal motivation and ambitions. Does this mean that we are back to square one? And nothing can be done?

The question of how this can be remedied, leads back to newer research based insights that are introduced by Simpson (2013) and Lehman and Conceicao (2014). They suggest that those who offer and facilitate distance studies need to incorporate a strong element of "learning motivation" into the different courses. This implies establishing a closer and more personalized connection with the distance students.

REFERENCE

- Anderson, E. (2006). *Retention for Rookies*. Presentation at the National Conference on Student Retention, San Diego.
- Astin, A. (1993). What matters in college? Four critical years revisited. San Fransisco: Jossey Bass.
- Bandura, A. (1977). Self-efficacy: Toward a Unifying Theory of Behavioral Change. *Psychological Review*, 84 (1), 191-215.
- Deci, E.L.(1971). The effects of externally mediated rewards on intrinsic motivation. *Journal of Personality and Social Psychology*, 18, 105-115.
- Chyung, A.F. (2001).Systematic and systematic approaches to reducing student attrition rates in online higher education. *The American Journal of Distance Education*, 15 (3), 36-49.
- Harackiewicz, J. M., Abrahams, S. & Wageman, R. (1987). Performance evaluation and intrinsic motivation: The effects of evaluative focus, rewards, and achievement orientation
- *Journal of Personality and Social Psychology*, *53* (6), 1015-1023. http://dx.doi.org/10.1037/0022-3514.53.6.1015
- Lehman, R.M.& Conceicao, S.O (2014). *Motivating and retaining online students: research-based strategies that work.* San Fransisco: Jossey Bass, A Wiley brand.
- Menager-Beeley, R. (2004). Web-based distance learning in a community college: The influence of task values on task choice, retention and commitment. *Dissertation abstracts International, 64* (9-A), 3191.
- Park, J.-H.(2007). Factors Related to Learner Dropout in Online Learning. http://files.eric.ed.gov/fulltext/ED504556.pdf.
- Rovai, A.P (2003): In search of higher persistence rates in distance education online programs. *Internet and Higher Education*, *6*, 1-16.
- Ryan, R.M. & Deci, E.L.(2000). Intrinsic and Extrinsic Motivations: Classic Definitions and New Directions. *Contemporary Educational Psychology*, 25, 54-67.

- Rønning, W.M. (2008). Tidsbruk og tidsstyring i fleksible studier. En utfordring for voksne studenter (Time use and time management in flexible education. A challenge for adult students). Nordic Educational Research, 28 (2), 104-119.
- Rønning, W.M. (ed) (2009). *The Invisible Student*. Trondheim: Tapir Academic Press.
- Rønning, W.M. (2013). Web-School Students Motives, Mastery and Ambitions. Final Report, Trondheim: the Norwegian University of Technology and Science.
- Rønning, W.M. & Grepperud, G. (2012). The Family as Study Environment. In L. Aarsand & P. Aarsand: *Family-life and Learning, chapter 7*. Lund: Student Literature Ltd. ISBN 978-91-44-07809-0.
- Simpson, O. (2013). Student retention in distance education: are we failing our students? Open Learning: The Journal of Open, Distance and e-Learning, 28 (2), 105-119.
- DOI: 10.1080/02680513.2013.847363.
- Statistics Norway (2016). Participation in Adult Education, Participants in Authorized Web-schools 2015.
- Tinto, V. (1993). Leaving College. Rethinking the Causes and Cures of Student Attrition (2^{ed}). Chicago and London: The University of Chicago Press.
- Weinstein, C.E., Palmer, D.R. & Schulte, A.C. (2002). *LASSI: Learning and Study Strategies Inventory*. Clearwater: F.L: H&H Publishing.
- Woodley, A. & Simpson, O. (2013). Student dropout the elephant in the room of distance education. In O. Zawacki-Richter & T. Anderson (Eds). Online, distance education - towards a research agenda. Edmonton: Athabasca University Press.

EVOLVING PARADIGMS: METHODS OF DELIVERY AND TEACHING PHILOSOPHIES FOR A DIGITAL AGE

Zarina M. Charlesworth*, Natalie B. Sarrasin**, Hilary C. Murphy*** *Professor and EMBA Program Director, HEG Arc School of Business, University of

Applied Sciences & Arts Western Switzerland (HES-SO), 21 Espace de l'Europe, 2000 Neuchâtel, Switzerland, <u>zarina.charlesworth@arc.ch</u>, **Professor of Digital Marketing, HEVS, Institut Entrepreneuriat & Management, University of Applied Sciences & Arts

Western Switzerland (HES-SO), Route de la Plaine 2, 3960 Sierre, Switzerland, <u>natalie.sarrasin@hevs.ch</u>, ***Professor and Associate Dean for Faculty Development, Ecole Hôtelière de Lausanne (EHL), University of Applied Sciences & Arts Western Switzerland (HES-SO), Route de Cojonnex 18, Le Chalet-à-Gobet, 1000 Lausanne 25, Switzerland, hilary.murphy@ehl.ch

ABSTRACT

Education and the way it is delivered is undergoing profound change. The advent of digital technologies and their increasingly ubiquitous nature has not only educators, but students and administrators alike, on the shifting sands of paradigms in transition. In addition to this, there is a certain amount of conjecture about what is actually happening on the ground. This paper presents research that originates in the practice of sixteen digital technology "champions", all lecturers in the higher education management classroom. The main objective of the research was to explore the impact of technology on teaching practice. Qualitative inquiry, through the use of semi-structured interviews (n=16), provided the methodology for the study. The findings presented in this paper identify issues of major importance to the participants and relate them to the learner-centred paradigm of education. Directions for future paradigm change are discussed and suggestions made for the successful adoption of technology-enhanced learning within this framework.

BACKGROUND

This research takes an in-depth look at the practices specific to a small group of technology-enhanced learning advocates and how their practice has evolved over the years. A recent OECD report on education (2015) highlights the uncertainty that digital technologies are engendering and suggests that educational institutes of all levels are far from ready to move ahead with the successful integration of such technologies in the classroom. In order to identify ways to move ahead, a sample (n=16) of educators having made technology-related changes in their course delivery were invited to talk about what they had done and why. These narratives, after initial analysis, were further examined through the lens of the learner-centred paradigm of education. Much of current educational practice is, often implicitly, based on constructivist or socio-constructivist theories of education. One wonders, however, whether these paradigms are sufficient in a digital world. Conole and Alevizou (2010) provide a comprehensive review of learning theories and pedagogy in light of the use of technology and Web 2.0 before putting forth examples of new paradigms of learning that might be developing.

The focus of this paper is how digital technology is impacting classroom practice and philosophies of education. Such a study is important to provide a voice for educators embracing this paradigm change and to elucidate the links between teaching as we've always understood it and where it may be heading today. With this in mind, the central research goal here was to examine the impact of such technologies on the classroom, methods of teaching and the educational philosophies of a selected group of educators defined as "champions" meaning advocates of technology-enhanced learning. This paper discusses changes identified in the research and looks at implications for future practice.

LITERATURE REVIEW

The talk of a paradigm shift in education has been going on now for well over two decades. What started with the role of the educator being called into question with Allison King's (1993) "sage on the stage, guide on the side" article, paved the way for others to look at what could be considered as simply a change in teacher behaviour to be something far more wide-reaching. It was not long before the whole question of the educational paradigm slowly came under increasing scrutiny (Saulnier, 2008). In North America the question of changing paradigms in education have been part of the academic literature starting with Barr and Tagg's (1995) publication in the United States and shortly thereafter Langevin and Villeneuve's (1997) publication in French-speaking Canada and thereafter followed by an increasing number of voices. This marked a turning point in the higher education debate. As the question of how to rise to the challenge of

educating college students in the 21st century and preparing them for their careers was increasingly being asked, the traditional models of education were increasingly being called into question. The debate was not restricted to North America, on the other side of the Atlantic similar questions were being asked and articles relating to changing paradigms in education began to appear in the scientific literature across Europe.

Coming back to the United States, however, the idea of a new paradigm for education was first examined through a variety of lenses (Smith & Waller, 1997) before settling on paradigms which, for the most part, can be classified as learnercentred (Conole & Alevizou, 2010). A move from a teacher-centred or instructional paradigm past a content-based paradigm and on to a learner-centred paradigm is clearly underway. Although the learner-centred paradigm of education has gained wide acceptance, the advent of Web 2.0, the Internet and the digital technologies currently available, both in and out of the higher education classroom, adds yet another level of complexity to the issue.

Education is complex and the theories of education that stood us in our stead through the industrial revolution do not seem to be fully in tune with the world today. Some (Jörg, Davis, & Nickmans, 2007) see this as a crisis for education going so far as to say that the first step should be "to recognize that an adequate theory of learning and education should take the complexity of reality into account" (p. 145). A complexity that, at least in part, is related to the technological changes that we are witnessing, their impact on education and on the role of the educator. A complexity that opens up a world full of new possibilities and new challenges. "Perhaps the greatest challenge with implementing the learner-centered paradigm of education and training is the difficulty that instructional theorists, researchers, educational policymakers and practitioners face in transcending Industrial-Age mental models or mindsets about instruction in both education and training contexts" (Reigeluth, Beatty, & Myers, 2017, p. XIV).

Another way in which these changes are impacting what is happening in education is that that the competencies that are being taught are taking on increasing importance over the content. Indeed, a recent publication by the World Economic Forum (WEF) (Thomson, 2016) highlights the fact that we are educating students for a tomorrow that is largely unknown and for jobs that do not yet exist saying that "35% of the skills necessary to thrive in a job today will be different five years from now". What is essential is that today's students leave their institutes of higher education with 21st century competencies. In the same WEF report, a survey of some 900 companies supported the idea that the skills most relevant for the future are soft skills and include the following competencies: teamwork, knowledge of digital tools, an understanding of rules and regulations, responsibility, and, commitment (Thomson, 2016). Yet if today's educators do not see that their use of technology in the classroom and its inclusion in course design and delivery for the promotion of digital literacy is becoming a necessity then students are unlikely to grasp the importance of such competencies for their future careers (Johnson, Adams Becker, Estrada, & Freeman, 2014; Lemoine & Richardson, 2013).

Finally, the combination of a broad palette of digital tools for instruction, changes in the learning environment (Wi-Fi access, laptops, and mobile devices the norm, etc...), and evolving student expectations (Johnson et al., 2014; Sharples et al., 2013) can only lead to a change in role for the educator (Ertmer, Ottenbreit-Leftwich, Sadik, Sendurur, & Sendurur, 2012). The question here is to find out how far up the learning curve educators really are. Only a few years ago an OECD report (2015) bemoaned the fact that the potential of technology for education was simply not being leveraged. This research looks at what is happening on the ground to see how true this is.

In order to explore the impact of technology on teaching practice, the research themes identified were:

- 1. What constitutes a technology-enhanced approach to classroom management.
- 2. The impact of digital technologies on method(s) of instruction.
- 3. Whether the educator's underlying educational philosophy had changed or evolved due to these technologies.

METHODOLOGY

The research design followed the qualitative tradition of narrative research (Creswell, 1994). The four dimensions concerned are shown below

- Focus: Exploration of how an individual has reacted to the advent of digital technology with respect to his/her teaching practice
- Data collection: Primary interviews, course reference sheets, project outlines
- Data analysis: Full transcription followed by coding and clustering
- Narrative form: Personal experience

The research presented here took place at three management schools within a Swiss University of Applied Sciences with lecturers seen as "discipline champions" (n=16) for the use of technology enhanced learning. The sample comprised 6 male and 10 female faculty members with between 2 and 22 years of teaching experience and between 29 and 53 years of age. All of the participants were teaching on bachelor level management degree courses and with class sizes of between 18 and 60 and having an average of 30-35 students per class.

Semi-directed interviews lasting between 30 and 45 minutes were fully transcribed prior to coding. A first reading allowed for an initial classification as per the three research themes. Further analysis followed the traditional pattern of coding, starting with a within-case role-ordered matrix and the identification of frequently used words and expressions followed by the clustering of words using the dendogram method (Miles & Huberman, 1994). This allowed for within-theme clusters to be progressively reduced resulting in relatively few but well documented clusters per theme.

FINDINGS

In terms of the educators' practice and, in line with the three main themes several clusters were identified. A brief summary by theme is presented below followed by a selection of exemplars taken directly from the interviews.

Theme 1: Technology enhanced approach to classroom management

According to the participants, the use of technology leads to a classroom that is more motivating and dynamic; efficient and practical; and allows for more diversity and participation than does the traditional classroom. For a few of the participants, the use of technology was seen to add value in terms of future career options for the students as they become digitally literate in a professional sense. The participants were also aware of their somewhat reductionist use of technology and despite being confirmed users, a need for additional guidance and support in order to better use technology in course delivery was expressed.

Theme 2: Methods of instruction / course delivery

Participants were quite unanimous in saying that technology had impacted the amount and manner in which they included theory in their course delivery. In line with the learner-centred paradigm previously mentioned, a number of participants were focussed on the students' use of technology for the development of work-related competencies. Other clusters identified included student-centric type of instruction; with increased interactivity and a much more diversified delivery than in the traditional classroom. Technology was also seen as a good tool to integrate in formative assessment.

Theme 3: Evolution of educational philosophy

Finally, the participants spoke of what their personal philosophies of education were and whether technology was having them re-examine or revise their positions. Here too, and in line with what was previously mentioned about the changing role of the educator from teacher to coach the majority of those interviewed confirmed a change in what they felt their role was. Additionally, the participants felt a need to implicate students more in the learning process and create, what more than one participant categorized as, "passionate students". They also saw their role as one of adding-value to the learning experience by being there to put things into context. The issue of reflection and constant review of practice came across as increasingly important in today's classroom.

As interesting as the above findings are, they cannot replace actual words. Therefore, and in order to give a voice to the research participants, a selection of exemplars is presented below by theme.

Interview exemplars: a technology-enhanced approach to classroom management allows for:

The main takeaway is varying the activities. That was THE thing I discovered using technology [...]to make the learning dynamic so they [the students] don't feel bored, tired. Prof. #4

I think these technologies can help in the sense that they can activate the audience, and another point which is important is diversification. Technologies are an instrument which you can use to diversify. Prof. #5

Students are on board, much more on board. I think that it is much more useful if we can use technology and it's a really good way to diversify, in class, the activities. Prof. #2

There are many possibilities but at the end of the day it is difficult to put things into place. One has the impression that all the information is available but students are often drowned in information and we have to teach them how to use the tools that are at their disposition. Everyone says that this generation was born with internet and all but they don't kow how to use all this technology to learn and we have to teach them. Prof. #8

Interview exemplars: impact on methods of instruction/course delivery

The second theme that was explored in the interviews concerned the integration of instructional technology in teaching practice and the impact that it had on the way courses were being delivered. Exemplars that clearly show the kind of impact experienced are shown below:

I make the students do a lot more, my slides are mostly images and I tell

a lot of "stories". The students have to find the information, fill in blanks and through the use of the simulation and their interaction they learn on their own. It is through my feedback that I am able to include the theoretical elements that were previously presented in class. Prof. #13

We have to use it in [technology] in our teaching because these are the tools that the students will have to use in their professional lives once they leave us. Prof. #7

So, for me using different technologies is basically trying to switch the mode of delivery. I try to pep up my lecture so that I stop talking every 15 minutes. Either I show them [the students] a video or I give them a task. I found out that students nowadays really need that change of pace. Prof. #1

I think my classes are more motivating than before. Technology gives me more liberty to change things, I can insert images at the last minute, add a video etc... and make my classes come alive. Prof. #10 I have much less theory than before and a lot more interaction with the

students. For example, they love using the online questionnaires at the end of a chapter for in-class feedback, watching the percentages, the different responses and all and I see whether they have understood and they too see whether they have understood and we can discuss problem areas. Prof. #16

Interview exemplars: changing teaching philosophy

The final cluster identified in the findings was related to teaching philosophy and the manner in which the participants saw teaching and learning.

If a course goes well it is not only there is a very good professor but also that there are students willing to respond, willing to listen and who in fact contribute to the course. Prof. #5

When I started [to teach] I felt like I needed to show them [the students] how to get there, it was like demonstrations most of the time. Today I am there to facilitate the learning process, me being there is because I can always put into context what we are doing, give further examples, make links and facilitate the learning process; facilitate the exchange between students. That's mainly my role today: it's not to demonstrate it is to facilitate. Prof. #4 It's not really technology but it's like the ease of access to information. I hope students will become lifelong learners. At the end of the day that's the most important thing but we don't know yet we just have to try. Prof. #3

Technology has allowed me to change my teaching style and teaching objectives, the material I teach, how I teach, what I teach, everything. Today my students have to gain something positive from me, some kind of impact that my teaching gives them in the broader scope of career and life. Prof. #6

I have another role...I used to decide what was important and what wasn't, now with internet and the tools available the students they can also decide what's important and participate more, it's not just me, I am more a coach that a professor. Prof. #7

The above clearly shows a move towards a new role for the educator moving from the *stage* to the *side*. Admittedly, the participants in the study were amongst change makers and, thus, were certainly more inclined to move out of the teaching zones of comfort, however, these findings suggest that the paradigm shift mentioned previously with relation to the new role of the educator is indeed taking hold – be it slowly.

DISCUSSION

The results presented here are limited in that they are specific to one institute and come from a small sample yet educators, administrators, instructional designers alike can all refer to this study. Educational practice will only move forward through a concerted effort on the part of all stakeholders. Unfortunately, there seems to be a gap between what the different parties want and change will not come about this way. Administrators who feel that providing resources is sufficient are not providing the scaffolding and support necessary for educators as they move up rather steep learning curves. Instructional designers who come up with new pedagogical scenarios need to have these tested in the classroom and need to understand the needs of both the educators and the students and not fall back too much on new and exciting technologies than might not provide any added value. Educators need to use their voice to say what their needs are and, finally students too are stakeholders whose voices need to be heard. Educators in today's higher education classroom are now faced with a population of students frequently classified as "digital natives". It behoves educators to listen to the preoccupations of their students, become familiar with the mediums that they are used to using and, understand the manner in which they frequently interact with the world around them. This does not, however, imply that technology should be seen as a means to

"edutain" or just diversify but rather that it is all important to see how best to incorporate such technologies into course delivery so as to add value and increase student professional competencies.

The learner-centred paradigm certainly seems more adapted to the direction that education is taking today. The participants in this research, although without specific reference to, were clearly putting their students in a more central position. This suggests that there is an implicit move towards this sort of paradigm change. Yet for the implicit to take hold and become anchored in practice clear and explicit encouragement and involvement on the part of the institutions concerned is necessary.

CONCLUSION

The main conclusions are that educational practice is indeed changing and in such a manner so as to blur the boundaries between the theories of education that have stood us in good stead for so many years. It may be time to look at learning in new or other ways such as:

- 1. student-centric
- 2. competency development
- 3. adding value to the learning experience

Finally, in order for any paradigm shift to become reality, full support on the part of educational institutions is a requirement. It is not enough to provide resources and expect the educators to invest in their implementation nor to assume that students know how to use such resources for learning.

REFERENCES

- Barr, R. B., & Tagg, J. (1995). From teaching to learning A new paradigm for undergraduate education. *Change: The magazine of Higher Education*, 27(6), 12-26.
- Conole, G., & Alevizou, P. (2010). *A literature review of the use of Web 2.0 tools in higher education*. Retrieved from Milton Keynes, UK:
- Ertmer, P. A., Ottenbreit-Leftwich, A. T., Sadik, O., Sendurur, E., & Sendurur, P. (2012). Teacher beliefs and technology integration practices: A critical relationship. *Computers and Education*, 59, 423-435.
- Johnson, L., Adams Becker, S., Estrada, V., & Freeman, A. (2014). *The NMC Horizon Report: 2014 Higher Education Edition*. Retrieved from Austin, texas:

- Jörg, T., Davis, B., & Nickmans, G. (2007). Towards a new complexity of learning and education. *Educational Research Review*, *2*, 145-156.
- King, A. (1993). From Sage on the Stage to Guide on the Side. *College Teaching*, *41*(1), 30-35.
- Langevin, L., & Villeneuve, L. (Eds.). (1997). L'encadrement des étudiants. Un défi du XXIe siècle. Montréal: Les Editions Logiques.
- Lemoine, P., & Richardson, M. D. (2013). Cyberlearning: The impact on instruction in higher education. *The Researcher: An Interdisciplinary Journal*, 26(3), 57-83.
- OECD. (2015). Students, Computers and Learning: Making the Connection. Retrieved from Paris: <u>http://www.oecd.org/publications/students-computers-</u> and-learning-9789264239555-en.htm
- Reigeluth, C. M., Beatty, B. J., & Myers, R. J. (2017). Preface. In C. M. Reigeluth,
 B. J. Beatty, & R. J. Myers (Eds.), *Instructional-design theories and models* (volume 4): The learner-centered paradigm of education: Routeledge.
- Saulnier, B. M. (2008). From "Sage on the Stage" to "Guide on the Side" Revisited: (Un)Covering the Content in the Learner-Centered Information Systems Course. Paper presented at the ISECON, Phoenix, Arizona.
- Sharples, M., McAndrew, P., Weller, M., Ferguson, R., Fitzgerald, E., Hirst, T., & Gaved, M. (2013). *Innovating pedagogy 2013*. Retrieved from Milton Keynes, UK:
- Smith, K. A., & Waller, A. A. (1997). New paradigms for college teaching. In W. E. Campbell & K. A. Smith (Eds.), *Paradigms for college teaching*. Edina, MN: Interaction.
- Thomson, S. (2016). The most important skills of tomorrow, according to five global leaders. In W. E. Forum (Ed.), World Forum on Sport and Culture; Co-Creation, Co-Growth for Tokyo 2020 and Beyond. Retrieved from https://www.weforum.org/agenda/2016/10/the-most-important-skills-of-tomorrow-according-to-five-global-leaders/.

THE CARNIVAL OF THE ANIMALS (COA) - IPAD APP AS A TOOL FOR THE STUDENTS' PROFESSIONAL GROWTH VIA PRACTICE ORIENTED RESEARCH ON CULTURE-BASED INTERACTION

Kaarina Marjanen *, Markus Cslovjecsek**

*Dr. (music education), Senior Lecturer, Laurea UAS, Uudenmaankatu 22, 05800 Hyvinkää, Finland, <u>kaarina.marjanen@laurea.fi</u> **Professor, Pädagogische Hochschule University of Applied Sciences North-Western Switzerland (FHNW), Bahnhofstrasse 6, 5210 Windisch, <u>markus.cslovjecsek@fhnw.ch</u>

ABSTRACT

The education profession is currently facing the world of touch-based electronic devices in the teaching profession. Richtel (2010) reported concerns of the devices may bring. IPad also might help creative stimulation (Geist, 2012), and help boost the individual learning levels of children (Wilkinson, 2010). In this study project, the Carnival of the Animals (COA) -app for the iPad was set as a tool for the teacher students' professional growth while also investigating the children's interaction behavior. The project was based on child-oriented and practice based study methods. Besides the video and tracking data (669,89 min.) resulting from the COA study procedure (Perez & Cslovjecsek, 2013), including two interviews in each family performed by the students (n=20) with the 3-4-year-old children (n=10), five students were interviewed (195,16 min. data) six months after the study process. Data on one of the children analyzed by a group of students was taken for a more detailed analyses by the teacher-researcher. As a result of the project, according to the students' professional identity and growth, and especially with reference to the two parallel analyses (student – teacher-researcher) made, it was shown that a deeper musical basis, knowledge and understanding of the musical elements, would provide the student with a variety of tools to observe and interpret the child's musical interaction behavior. The COA as a tool may support the development of the professional identity, in a culture-oriented dialogue with music education with its possibilities to support the student also in the researchoriented tasks.

INTRODUCTION

The Carnival of the Animals (COA) -iPad app as a possible tool for the students' professional growth was investigated via practice oriented research on culturebased interaction. The aim was to create understanding of the iPad as a tool in education, as the field is still missing research results. Many factors point out to the need of finding research evidence on the use of these devices with children in education. Richtel (2010) reported concerns of the devices may bring with possible problems and addictions games might cause (Adams, 2014). iPad also might help creative stimulation (Geist, 2012), and help boost the individual learning levels of children (Wilkinson, 2010). In this investigation, the understanding of the connections of well-being/positive equilibrium (Marjanen & Poikolainen, 2012), music and languages as interaction, holistic learning processes and multisensory experiences (cf. Marjanen, 2015) were set as a ground to understand the child's behaviour and the students' professional development. (Evelein, 2015; Marjanen & Cslovjecsek, 2014).

However, as the COA App seems to support the child's interaction behavior (Marjanen, 2014a; 2014b; 2015; 2016; Marjanen & Cslovjecsek, 2016; Tu, Hao, & Hernandez, 2016; Tu, 2016; Tu, Cslovjecsek, Pérez, Blakey, & Shappard, 2014), it also awoke our interest towards the possible support to learn about the child's interaction behavior during the teacher studies. Interaction can be considered as one of the core fields of a teacher, connected with the professional identity. In the current paper, the focus includes the main approaches from musical interaction and research in musical interaction, to support the students' professional identity. The major subject of those students is constructed from the social service's field, with a special focus on early childhood studies, to provide them with a special qualification for a kindergarten/nursery school/early childhood teacher (60 cr)ⁱ.

THE THEORY

The study aims to serve the understanding of the child's interaction as a basis for the teacher's work; thus it is clearly practice-originated. In this paper, the theory includes the idea of music as cultural framework, basic comprehensions of knowledge and skills, especially on the concept of tacit knowledge, and professional identity.

Music as a cultural framework in learning

Music can be understood as a bridge between many phenomena, but one of the most important ones is the understanding of music as a tool to pass on cultural meanings and understanding between generations and nations. It functions also in

the subcultures, representing the voices of families, going towards Hinde's (1997) theory as presented later in this paper, towards the 21st Century skills (Gordon, Halsz, Krawczyk, Leney et al., 2009) and the components of social learning (Wenger, 1998). The musical circle can be described as experiences of "leaving the reality" and through imagination and mental images (Kurkela, 1994). This connects music strongly also to the understanding of tacit knowledge (Polanyi, 1966/1983), as described later.

Musical elements

The elements of music function also as the elements of language. They support the interaction and teaching purposes towards the set goal, functioning as a low-threshold model for music and language learning to meet the teaching practices. The elements of music provide us with the abilities to interact, to talk and create music. Interaction behaviour also supports us in learning (Vygotski, 1978). These elements are rhythm, pitch, loudness, timbre, duration, harmony and form. Besides these elements, it is essential to include emotions in the message, to blow the spirit in music. This is also important for learning in any form, and one of the reasons for music being such a strong factor.

Music, language and interaction

As a ground for musical, linguistic and speech interaction, it is important to remember, that even though information is created and transmitted through words and in social networks, we still rely on the individual interpretations on the basis of our own background. Thus, all information includes the tacit dimension. As personal information tacit knowledge refers also to moral responsibility and emotions. Tacit knowledge functions as a counterforce between the generations. (Rolf, 1995, p. 13-14.) For the purposes of this study, it is important to remember the meanings of the musical-linguistic fingerprint (Patel, 2008) and the tonal centre (Krumhansl, 1990; Rosch, 1973; 1975; Patel, 2008) for the child's development in music, language and as a whole, supporting the child's ability to interprete and understand the world.

Stephen Brown (2000) describes a Musilanguage model to explain the connections of music and languages, constructed of the same musical-linguistic elements. The analysis of phrase structure and phonological utterances, it can be stated that music and language share a common ancestor, a "musilanguage" stage, described as five various possibilities in the model. (Brown, 2000, p. 276.)

Robert Hinde (1997) describes the interaction behaviour through the responses and their impacts on the relationships between the participants, especially on a setting with a child and an adult. The process is regulated by a) the contents of interaction

(what is done); b) how it is done; c) the versatility of interactions; d) the characteristics of various interactions; e) the qualities that are generated because of various interactions, their relational incidence and form; f) the reciprocity and the complementarity of interactions; g) the intimacy – grade of revealing oneself to the other; h) the way of discovering the other; and i) commitment to the relationship.

Knowledge and skills

A musician needs many kinds of knowledge to be able to perform or practice (Pöyhönen, 2011). The theory of multiple intelligences (Gardner, 1999) can be observed also as a reflection on many-dimensional knowledge, with the connection to tacit knowledge (Cslovjecsek, 2004): Musicianship and the mastery of it is labelled with complex processes of information, knowledge and understanding also via the processes in the underconsciousness, with the dynamic nature of knowing, and the construction of knowledge according to the time (Pöyhönen, 2011).

Mikko Anttila (2008) talks about procedural information: knowing how, skillbased knowledge: know-how, declarative, propositional knowledge: knowing that, and about learning approaches (cognition and construction) according to the understanding of information. The concept of knowledge is strongly connected to the concepts of learning – in remembering, understanding, experiencing and comprehension. When thinking of the holistic concepts of understanding of a man/learning/world, to follow the holistic concepts of Rauhala (1983), we are approaching the concept of Tacit knowledge.

Tacit knowledge

The concept of tacit knowledge (Polanyi, 1966/1983) can be considered as a central concept, when observing a human behaviour. We can think of tacit knowledge either as silence; speechless or wordless knowledge, or on the other hand refer to the concept of tacit by the understanding of information passing on within cultures, connected with practically-oriented expertize, experiential learning with no articulation or even without the possibility to articulate the information (Pöyhönen, 2011, p. 89).

In research, tacit knowledge supports the researcher with lots of challenges simultaneously faced, to pay attention to the possibilities of various types of data, and the holistic interpretation not only to hear or read the words said, but also to "read between the lines", being present. According to Hannele Koivunen, tacit knowledge can be defined as such experiental knowledge, that is not or cannot be encoded. In communication, encoding means a set of rules to support the analysist to transform the information from one system to another. (Koivunen, 1997.)

Tacit knowledge can be described as all the skills and information learned at school, at work and during the leisure time. It includes the experiences of the life as a whole, connected with values and ethics. We learn a lot even though we are not especially taught, and also when something is not defined as learning processes. We also pass on the information on the basis of our comprehension through the behavior, attitudes, and expressions other than in words, other than to teach. Through tacit knowledge the information may pass on from one generation to another, and between subcultures and groups. This has a lot to do with musical information. It has a lot to do with human practice-oriented research.

In music, emotions are passed on and interpreted through individual experiences. This creates a ground for music education, with the aims for collective experiences to support the learner, connected with many skills and motivation. Music supports us also to remember, and to save the information in our long-term memory (Huo-tilainen, 2011) Sometimes tacit knowledge can be understood as a contradiction to apparent or visible knowledge – connected to the idea of the Western culture with visual nature (Pöyhönen, 2011, p. 89). We suggest this as a main orientation also to direct research and research thinking.

Professional Identity

On the ground of the experiences both as an educator and researcher at the teacher training, and in the social service's field, there is a lot to learn from each other, to recreate the training from the shared interests towards wellbeing and learning through shared experiences.

There is a special pedagogical orientation developed in Laurea UAS, called the Learning by Developing pedagogy (Raj, 2007; 2014). An application was created to better meet the school expectations (Henriksson, Korkiakangas & Mantere, 2014, p. 13). In this model the learning pathways are described in four main factors, creativity, partnership, research-oriented approach, and experiental nature. This idea was applied for the current research-based project. Please see the model in Figure 1.

The socionom professional development model was described by Ellström (1977), pointing out to the meaning of a real-life work connection as a part of the development. Please see the theory in Figure 2 below. It can, however be adopted to any professional orientation, from choosing of the professional orientation, growth towards it, and developing in the profession.



Figure 1. Laurea Learning by Developing model for comprehensive schools (Henriksson et al., 2014, p. 13)

According to the teaching profession, the fields of interaction and learning with the perspectives from curricula, methods, pedagogies, learning aims etc. provide the learner proficient tools to grip for the wellbeing-connected phenomena both at the individual and the societal levels. The holistic understanding of the society would in return support the teaching professionals in their confronting of the children and families. These both can better be reached with musical integration, supporting the teacher's ability to pay attention to learning and be present for the child (Marjanen & Cslovjecsek, 2014).



Figure 2. Socionom professional learning and growth

Music education to support the professional identity growth

Music works as a support when aiming for the creation of a positive atmosphere to support learning. Interaction is based on trust, to create a solid ground for learning. This can be considered as a fundamental reason to increase musical integration and to let the rays of sun in music (Wood, 1982) as integration touch as many as possible fields connected to learning, fostering, education and teaching.

Besides of Wood (1982), also Csire (1998) writes about the holistic impacts of music towards the human personality, supporting learning in all. Music can be used in training and education processes as a transfer agent for our consciousness; the pulse, energy and skills can be formed and practiced, simultaneously benifitting all the complex human psychological aspects. Through musical learning all the main thinking functions are included (analysis, synthesis, comparing, associating and dissociating; generalizing, abstraction, realisation and concretisation). (Csire, 1998.)

As a child's behavior, music is strongly connected to the concept of play (Järvilehto, 2014; Kurkela, 1994) – also functioning as a bridge from music to the device with the app, as the child plays it like he would play a musical instrument. Here we confront also Vygotski's (1978) Zone for optimal experience, to support our understanding of learning processes.

THE RESEARCH

The research problems and goals

In this study project, the Carnival of the Animals (COA) -app for the iPad was set as a tool for the teacher students' professional growth while also investigating the children's interaction behavior. It was asked, if the COA app would serve the students in the understanding of child-based working approaches as a teacher, while creating an understanding of the 3-4-year-old children's interaction behavior, and simultaneously serve the development of the teacher's professional identity. The factors of child behavior and interaction with research understanding and comprehension of knowledge and values were set as a focus for the current investigation. This was thought to create information for the student on learning to discuss with teaching, the COA as a tool, and also teaching technology in a wider sense, and of music, language and multisensory experiences as a framework for the interviews.

The research method

The study protocol

The study project was a part of a course on child based methodology, and it was performed as a core content for the course, with goals set on child-oriented and practice based study methods. The students were divided in five groups of four students in each, and they followed the COA study procedure (Perez & Cslovjecsek, 2013), each group collecting the data from two families during four visits.

The study protocol (Perez & Cslovjecsek, 2013) included qualitative and quantitative parts, based on four visits in families. The data was collected both as a result of the use of the Carnival App, in tracking lists, and the video evidence recorded during the visits. The students followed this protocol, including also the starting and ending interviews with the children and their parents. Furthermore, to learn about research, they created their own additional research questions.

Data

Our research on the students' learning/processes included three parts. To start with the current study, (1) the students had collected data as described in Table 1 (below), with (2) some interviews made with the students after six months of the data collection, to follow a protocol as described in Figure 3 (below). During the interview the themes, supported with the figure, were discussed by the choices and order designed by the interviewee (the child/interaction with the child;

understanding and meanings of research; knowledge and values; learning/teaching; The Carnival of the Animals –tool/technology; and music, language & multisensory experiences). After the analyses of the data made by the students and the interviews, by the researchers, (3) the dataset of one child with an active musical-linguistic behavior on the videos, was chosen for a more detailed analysis made by the teacher-researcher.

Table 1

Group	The child		Age: 11/ 2015	Sessions for data collection				
	Female born	Male, born	Y:M	<i>S1</i>	<i>S</i> 2	<u>S</u> 3	<i>S4</i>	hours
1A		21.9.2012	3:1	12.10.	19.10.	26.10.	2.11.	5.15 pm
1B	22.9.2012 (trackings missing)		3:1	15.10.	22.10.	5.11.	12.11.	5 pm
2A		23.3.2013	2:7	28.10.	3.11.	13.11.	19.11.	2.50-7.10 pm
2B	24.7.2013		2:3	4.11.	9.11.	13.12.	Videos missing	6.30 pm
3 A		15.10.2011	4:0	21.10.	28.10.	5.11.	19.11.	8 pm
3B	26.5.2012		3:5	27.10.	4.11.	10.11.	18.11.	3 pm
4A		28.4.2012	3:6	4.11.	9.11.	18.11.	26.11.	5 pm
4B	1.11.2012		3:0	4.11.	11.11.	18.11.	27.11.	5 pm
5A		26.1.2012	3:9	18.11.	19.10.	26.10.	2.11.	5 pm
5B	31.8.2011		4:2	21.10.	28.10.	4.11.	11.11.	5.30 pm

Students' data collection schedules and children's ages in November 2015



Figure 3. The structure for the students' interviews with the researcher, by the assumptions on the dialogical elements surrounding the professional development

This analysis was simply performed by adding the transcribed details with red font in between the observations written (please see in Figure 4) by the students, to find out about the difference at the analyst behavior. This way, it was possible to show the differences between the students with no musical or special research background, and the researcher, with musical and research background.



Figure 4. Video transcriptions made by the students (black font) and the teacherresearcher (red font), as a visual element to observe

The data included video and tracking data (669,89 min.), two interviews in each family and the data collecting with the 3-4-year-old children (n=10). This data was

analyzed by the groups of students, both from the quantitative (tracking lists) and qualitative (video transcriptions) approaches. Five students were interviewed (195,16 min. data) by one of the researchers six months after the study process to finalize the project. The recorded interview data was analyzed with the support of theory-based content analysis method, including the same phases for both, the students and the teacher-researcher. The theories on music and language as sounds, musical-speech and holistic interaction and the support from musical activities created an understanding for the teacher-researcher in a way, that cannot be taught only as a part of a short course, but needs a deeper learning path on music, also as experiences of music making. This was confronted in the analyzing processes, pointing out for the importance of teaching music for these students. The analyzing processes themselves followed the same procedure, writing down the talks and happenings, and the classification of those, to make conclusions.

Systematic video analysis

Systematic video analysis is widely used in qualitative research, especially in interaction studies or studies with social interests. The triangulation of data, methods, and investigators supports the results of the video analysis. The idea of the video analysis is to collect rich data from a small sample, to recreate and generate new knowledge. (Marjanen, 2009.)

As an interesting part of the data, the video materials turned out to function as a powerful tool, on the other hand for the students learning about children's behavior, and on the other hand, when looking for the abilities to analyze the child's interaction behavior with no musical training (the students) or when doing it on the basis of a musical training (the music educator & researcher). It is of course important to realize also the factor of the level of research experience when estimating this. This can be seen as Figure 4, which includes the teacher-researcher's transcription of the video data in red font, and the students' original transcriptions in black, only as a visual output.

The results

The results point out to the app being useful for the development of the students' professional identity, with strong support for the understanding of child interaction behavior, the musical, linguistic and multisensory experiences, the iPad as a tool, learning processes, comprehension of knowledge and values, and the understanding and meaning of research for the future teaching orientations. This can be observed in A) the students' learning about child behavior, directed by their own research questions, and B) the students' meta-learning about how and why doing research in classrooms.

When observing the learning results from these two approaches, it can be stated, that:

- 1. the possibility of creating the own research questions is fundamental for the inner motivation, as a ground for the learning processes. It supports the student to find meanings, and confront the responsibility of the process as a whole, with the importance of being present with the child while the observations. The quality of the research question comes only at a second stage, when doing the first investigations. During the process, the students will learn also about the ways to present the questions, because of the discussions with the peers and the teacher. This all supports the finding of the meanings from a wide and deep perspective.
- 2. On the basis of the interviews, Carnival of the Animals as a tool may support the development of the professional identity, as described in Figure 5 (below).

Musical elements and musical activities provided us with a clear construction for the observation of the interaction behavior of the children. They also made us to confront the limitations in interpreting and analyzing the data, which was not possible without the understanding or recognizing of the musical elements, or without the comprehension of the importance of the detailed analysis. The reanalysis of the video data of one child points out towards undeniable differences because of the missing education in music, and the adequate amount of research studies. They both should be supported with close interaction and supervision, also with the peer groups. Research and musical abilities are important for the professional development.



Figure 5. The Carnival of the Animal –study protocol with multiple connections as a dialogue towards a support in professional development

CONCLUSIONS

It seems to be well defined to work with the proposed framework and the tools to bring teacher students in a positive contact with questions of educational research from the aspects as described above (A & B). Their reflection seems to ground on experience that is relevant. We can assume, that the relevance comes out of their own research question, being connected with their own interests and probably as well to the next step of their development. Based on this, they start acquiring for the main research elements– reliability, validity, ethics and so on. The students need support during the process, and even before it. Further development of and designing of the materials towards the human-oriented education programs is supported.

REFERENCES

Adams, G. (2014). The day I realized my toddler was addicted to the

iPad: Three-year-old William tugged at the duvet and woke his

father demanding the tablet...at 4am. *Mail online*. Retrieved from <u>http://www.dailymail.co.uk/femail/article-2548365/As-revealed-one-three-children-use-tablet-talk-fathers-alarming-story-The-day-I-realised-toddler-addicted-iPad.html</u>

Anttila, M. (2008). Kohti kolmannen vuosituhannen musiikkikasvatusta. Osa 4: Luokanopettajaopiskelijat ja musiikki. Joensuun yliopisto, 2008.

Brown, S. (2000). The "Musilanguage" model of music. In N-L. Wallin, B. Merker

- & S. Brown (Eds.) The Origins of Music. London: The MIT Press, pp. 271-300.
- Csire, I. (1998) *Educația muzicală din perspectiva creativității*, Universitatea de Muzică, Bucuresti, România.
- Cslovjecsek, M. (2004). "Sprachenlernen mit Musik: Die Qualitäten von Musik als Werkzeug des Lernens" In: mip-journal, Vol. 4, 9/2004, pp. 6-13
- Ellström, P-E. (1997). The many meanings of educational incompetence. In
- Brown, A. (ed.) *Promoting vocational education and training: European perspectives*. Hämeenlinna, Finland.
- Evelein, F.G. (in press). Cooperative learning in Music: Music Education and the Psychology of Integration. In M. Cslovjecsek & M. Zulauf (Eds.) Integrated Music Education. Challenges for Teaching and Teacher Training. Bern: Peter Lang Editors
- Geist, E. A. (2012). A qualitative examination of two-year-olds interaction with

EAPRIL Conference Proceedings 2016

- Tablet based interactive technology. *Journal Of Instructional Psychology*, 39(1), pp. 26-35.
- Gordon, J., Halsz, G., Krawczyk, M., Leney, T. et al. (2009). *Key competences in Europe. Opening doors for lifelong learners across the school curriculum and teacher education.* Warsaw, Center for Social and Economic Research on behalf of CASE Network. Retrievable in http://ec.europa.eu/education/more-information/moreinformation139_en.htm

Hinde, R.A. (1997). Etologinen teoria ja suhdeteoria. In R. Vasta (Ed.) Kuusi teoriaa lapsen kehityksestä. Kuopio: Kuopion yliopiston painatuskeskus, pp. 289-320.

Huotilainen, M. (2011). Greetings from brain research – music education is important for brain development. *Proceedings of the 5th Conference of the European Network of Music Educators and Researchers of Young Children*. Helsinki, Finland.

Järvilehto, L. (2014). *Hauskan oppimisen vallankumous* (The revolution of learning with fun). PS-Kustannus.

Koivunen, H. (1997). Hiljainen tieto. Helsinki: Otava.

- Krumhansl, C.L. (1990). Tonal hierarchies and rare intervals in music cognition. *Music Perception*, 7, pp.309-324
- Kurkela, K. (1994). Mielen maisemat ja musiikki. Musiikin esittäminen ja luovan asenteen psykoynamiikka. (Music and mental landscapes. Musical performance and psychodynamics of a creative attitude, 2nd edition). EST-publications, 1. Helsinki: Hakapaino, Inc.
- Marjanen, K. (2016). The Carnival of the Animals an iPad App to Support Interaction. *R&M Source. Special Issue #5,* September 2016, Pädagoogishe Hochschule NiederÖsterreich. ISSN: 2313-1640.

Retrievable: <u>http://journal.ph-noe.ac.at</u>

Marjanen, K. (2015a). Self Organised Symposium, "Finnish six-year-olds play with 'The Carnival': case study two. Presentation as a part of a *The*

Carnival of the Animals: an international study to explore children's interactivity with an app for Ipad" chaired by Jessica Pérez. EECERA 25th Conference, Barcelona, Spain 07- 10 September 2015.

Marjanen, K. (2015b). Towards the understanding of Sound Education -

Music Education, Language Education and Well-Being. CFMAE The

Changing Face of Music and Art Education- Interdisciplinary Journal for Music and Art Pedagogy. https://cfmaejournal.wordpress.com/2015/09/01/cfmae-7-1-playful-soundspersonhood/ ISSN 2228-0715/ ISSN 2228-0723 (Online,pdf)

- Marjanen, K. (2014a). Playful Musical Activities for iPad: The Carnival of the Animals as a Support for Musical Interaction. International Society for Music Education, Early Childhood Seminar Proceedings, Brazil, Brasilia, 15-19 July 2014
- Marjanen, K. (2014b). Language loves music Creative sounds as a support for interaction. Arts, technology and cultures – From invisible to visible. 17th of October 2014, University of Helsinki. Conference abstract and paper presentation.
- Marjanen, K. (2009). The Belly-Button Chord. Connections of Pre- and Postnatal Music Education with Early Mother-Child Interaction. University of Jyväskylä. Jyväskylä Studies in Humanities 130. A music education dissertation. (Retrievable in <u>https://jyx.jyu.fi/dspace/bitstream/handle/123456789/22602/9789513937690</u>.pdf)
- Marjanen, K. & Cslovjecsek, M. (2016) The design and method of the Carnival of the Animals: an international study to explore children's interactivity with an app for iPad. Symposium. 32nd World Conference of the International Society for Music Education ISME: 24-29 July 2016, Glasgow, UK.
- Marjanen, K. & Cslovjecsek, M. (2014). Recreating the Teacher Training on Musical Interaction and Transversal Learning: in, through and with Music. Proceedings 31st World Conference of the International Society for Music Education ISME: 20-25 July, Porto Alegre, Brasilia
- Marjanen, K. & Poikolainen, J. (2013). Lasten Ikihyvä hyvinvoiva lapsi kuntapalveluissa: Loppuraportti 20.12.2012 (The Positive Equilibrium of Children – an affluent child as a part of the communal services 20th December 2012.) Helsingin yliopisto, Palmenia.
- Patel, A. D. (2008). *Music, language and the brain*. New York: Oxford University Press.
- Perez, J. & Cslovjecsek, M. (2013). The Carnival of the Animals: a collaborative research project to explore the interactivity of 2-8-year-olds from diverse locations with a APP for iPad. Study protocol.
- Polanyi, M. (1966/1983). *The Tacit Dimesion*. Garden City, New York: Doubleday & Company.
- Pöyhönen, M. (2011). Muusikon tietämisen tavat: Moniälykkyys, hiljainen tieto ja musiikin esittämisen taito korkeakoulun instrumenttituntien näkökulmasta.

(The ways of knowing of a musician. Multiple intelligences, tacit knowledge and the art of performing seen through instrumental lessons of bachelor and postgraduate students.) Doctoral dissertation. Jyväskylä Studies in Humanities, 164. Retrievable in <u>http://julkaisut.jyu.fi/?id=978-951-39-4516-9</u>.

Raj, K. (2007). Learning by Developing. *Laurea Publications A 58*. Retrievabe in https://www.laurea.fi/dokumentit/Documents/A58.pdf

- Raj, K. (2014). Learning by Developing Action Model. Laurea Publications 36. Retrievable in <u>https://www.laurea.fi/dokumentit/Documents/36%20%20Raij%20LbD%20</u> Action%20Model.pdf
- Rauhala, P. (1988). Holistinen ihmiskäsitys. Sosiaalilääketieteellinen Aikakauslehti, 25, pp. 190–201
- Richtel, M (2010). Your brain on computers: Attached to technology and paying a price. *The New York Times*. Retrieved from <u>http://www.nytimes.com/2010/06/07/technology/07brain.html?pagewanted=</u><u>all& r=0</u>
- Rolf, B. (1995). Profession, tradition och tyst kunskap. Nora: Nya Doxa.
- Rosch, E. (1975). Cognitive Representations of Semantic Categories. *Journal of Experimental Psychology:* General 104, pp. 192-233.
- Rosch, E. (1973) On the Internal Structure of Perceptual and Semantical Categories. In Cognitive Development and the Acquicition of Language, T.E. Moore (ed.), 111-144. New York: Academic Press.
- Tu, C., Hao, W.D., & Hernandez, J. (2016). Interactivities with the Carnival of the Animal App: A Quantitative Study (submitted for review)
- Tu, C. (2016). Book chapter: A two-year study on young human's interactivity with an iPad App: The Carnival of the Animals (COA). *Music Learning across the Lifespan*, Routledge Research in Music.
- Tu, C., Cslovjecsek, M., Pérez, J., Blakey, J. & Shappard, E. (2014). Assessing the Interactivity of 3-year-old Children with an iPad App: The Carnival of the Animals. *Perspectives, Journal of the early childhood music and movement* association. 9 (3), pp. 15-18.
- Vygotski, L. (1978). Interaction between learning and development. Mind and
- society, 79-91. Cambridge, MA: Harvard University Press.
- Wenger, E. (1998). *Communities of Practice: Learning, meaning and identity*. New York: Cambridge University Press.

EAPRIL Conference Proceedings 2016

- Wilkinson, A. (2010). *iPads as an educational tool for the prekindergarten classroom* (Unpublished master's thesis). University of St. Thomas, Houston, Tx.
- Wood, D. (1982). Move, sing, listen, play. Preparing young children for music. Toronto: Thompson Limited.

ⁱ <u>https://www.laurea.fi/en/studying-and-applying/bachelors-programmes-in-english/social-services</u>

LOW PERFORMERS IN MATHEMATICS IN PRIMARY TEACHER EDUCATION

Ronald Keijzer*, Gerard Boersma**

*Professor of applied sciences, University of Applied Sciences iPabo, Amsterdam, R.Keijzer@ipabo.nl, **Teacher educator/researcher, HAN University of Applied Sciences, Nijmegen, the Netherlands, gerard.boersma@han.nl

ABSTRACT

This study reports on Dutch prospective teachers in their fourth year in teacher education, who are achieving low in mathematics. These student teachers had not yet passed a third year national test in mathematics when entering their fourth year. We investigated what characterizes these prospective teachers. Data were collected through interviews and a questionnaire. We found that on some aspects, such as most questions concerning their attitude towards mathematics, the low performers did not differ from other student teachers. On other aspects, such as the connection between test scores and mathematical proficiency in secondary education, we found differences between these groups. Most low performers stated that they did not fail to pass the test because of their limited mathematical proficiency. Instead, they argued that there was limited support in their teacher training, and a lack of practice materials and that their failure was related to the (nature of the) test.

INTRODUCTION

Around the year 2000 mathematics education in primary school was the subject of national debate in the Netherlands. Supposed reduction in educational results for mathematics in primary education and the Netherlands' lower ranking in international studies caused this unrest (Van Weerden & Hiddink, 2013; Mullis, Martin, Foy, & Arora, 2012). Measures were taken to improve educational results, including in primary teacher education. In teacher education mathematics had not been a priority and it was suggested that new teachers were insufficiently prepared for teaching mathematics (KNAW, 2009; Keijzer, 2010). The Association of Universities of Applied Sciences (Vereniging Hogescholen) took these complaints about the quality of teacher education seriously and decided on the composition of a so called 'mathematics knowledge base', describing prospective primary teachers' mathematical knowledge for teaching, and on a national test for the mathematics subject matter knowledge included in the 'mathematics knowledge base' (Van Zanten, 2010; Van Zanten, Barth, Faarts, Van Gool, & Keijzer, 2009; Vakcommissie rekenen-wiskunde, 2013). Starting 2013, subject matter knowledge from the mathematics knowledge base is tested nationally. Student teachers can take this test at the end of their second year or in their third year in teacher education.

Prospective teachers who fail to pass the test cannot graduate. In the first round of testing in 2013, the test was considered rather difficult by both prospective teachers and teacher educators. Educators formulated several arguments for the test's difficulty, namely:

- topics in the test are somewhat removed from subjects in primary school (Keijzer, Garssen, & Peijnenburg, 2012),
- a student teacher's score on the national entrance test is a predictor for the score on the knowledge base test. However the pass mark set for this entrance test is too low for passing the knowledge base test (Keijzer & Hendrikse, 2013),
- student teachers who are low achievers in mathematics are generally unable to systematically work on problems and unable to select well-chosen schemes in solving problems (Keijzer & De Vries, 2014).

THEORETICAL FRAMEWORK

Little is known about characteristics of prospective primary school teachers who are low achieving in mathematics and about effective interventions that could help these student teachers in enlarging their mathematical knowledge for teaching. However, we know what the effects of this type of knowledge and skills are on students learning mathematics. Hill, Rowan and Ball (2005) show that teachers' competences in mathematics are positively related to student development in mathematics. Ball, Thames and Phelps (2008) elaborated Shulman's (1987) work into a framework for mathematics subject matter knowledge. In their scheme they distinguish common content knowledge (CCK), specialized content knowledge (SCK) and horizon content knowledge (HCK).

Common content knowledge refers to general mathematical knowledge, needed to apply mathematics in everyday situations. CCK is thus not specific for teachers. Specialized content knowledge is teacher specific. SCK is mathematical knowledge that is unique to the practice of teaching. SCK includes interpreting student work and utterances in a mathematical way. Horizon content knowledge is mathematical knowledge that is not a part of the primary school curriculum, but is mathematically related. An example of HCK is number systems with a base other than 10. These number systems are not part of the (Dutch) primary school curriculum. However, teachers should have knowledge of these non-decimal number systems, as knowing these number systems is typical for knowing the concept of place value. Both CCK, SCK and HCK are included in the knowledge base test.

RESEARCH QUESTION

This study is motivated by the high number of prospective teachers who fail to pass the knowledge base test several times and have ended up in their fourth year in teacher education. Teacher educators wonder how they could support these student teachers so as to prepare them well for the national knowledge base test. They also ask themselves whether it is possible to identify student teachers who in the end appear unable to pass the test at an early stage. Thus, teacher educators actually show a need to know the characteristics of student teachers in this group. Reformulated as a research question, this is:

What are characteristic of prospective primary school teachers who did not pass the knowledge base test in their third year in teacher education?

METHOD

This study focusses on prospective teachers in their fourth year in teacher education, who are low achievers in mathematics. Specific characteristics of student teachers in this group are not known well. We therefore started this study by interviews with twelve prospective teachers from this group. We asked them why they did not pass the mathematics knowledge base test, how they prepared for the knowledge base test and other mathematics tests, what support they need for preparing for the test, about their experiences in learning mathematics, and their experiences in teacher education. Using a small number of reports from interviews, a group of 15 experienced mathematics teacher educators constructed a first idea of an underlying theory for the prospective teachers' failure in passing the knowledge base test. They next tested this first idea, while interpreting reports of the rest of the interviews (Glaser & Strauss, 1967). Next, typical utterances from prospective teachers were elaborated into statements which were presented in a survey for all prospective teachers in their fourth year in primary teacher education in the Netherlands. This survey also contained questions on the background of the student teacher, including past results of mathematics tests and results from secondary education, and about their attitude towards mathematics.`

We used the national mathematics teacher education network ELWIeR to share the survey with all prospective teachers in their fourth year in primary teacher education. This strategy allowed the survey to be spread in a short time across many teacher education institutes in the Netherlands, but means that we do not know the exact number of prospective teachers who received the survey. We do know that (between March and May 2015) we received a response from 265 prospective teachers from 21 institutes. In this group there were 155 prospective teachers who passed the test in their third year in teacher education (T3 prospective teachers), 15 prospective teachers who passed the test in their fourth year in teacher education (T4-plus prospective teachers) and 85 prospective teachers who had not passed the test at the time they filled in the questionnaire (T4-minus prospective teachers are overrepresented here.

We included three open questions in the survey, namely:

- What is needed to pass the mathematics knowledge base test?
- What did help you in preparing for the mathematics knowledge base test?
- What can teacher education do better in supporting prospective teachers in passing the mathematics knowledge base test?

We coded the responses from these open questions using Atlas.ti (version 22) and shared and discussed our coding with experienced mathematics teacher educators from the national network ELWIeR. Next, regression analyses in SPSS (version 25) were used to determine whether T4 prospective teachers' characteristics differ from those of T3 prospective teachers. When appropriate we differentiated between T4-plus and T4-minus prospective teachers.

Raw results from these analyses were again shared and discussed with experienced teacher educators from the national network ELWIeR. These discussion led to refining the analyses. These refined analyses are included in this paper.

RESULTS

Overview

In this section we present findings from the interviews. We show how prospective teachers' responses are elaborated into statements for the survey so that these statements cover the many reasons the prospective teachers brought up in explaining their failure in passing the mathematics knowledge base test. In doing so, it was needed to interpret prospective teachers' utterances. We made use of the expertise of experienced teacher educators in the national network ELWIeR to make these interpretations.

Interviews

T4 prospective teachers do not form a homogenous group. For example, they bring up various reasons for why they think they have not yet passed the knowledge base test. A few prospective teachers admit that they did not invest enough in studying for this test. Others say they ran out of time while working on the test. Some prospective teachers say that the test is just too difficult. The interviewees do not agree on the mathematical knowledge they think appropriate for a primary school teacher. One of them reports: 'I passed an entrance test in my first year in teacher education. This test shows that I know primary school mathematics and in my opinion that is enough.' Another prospective teacher thinks that knowledge on a higher level is necessary: 'I experience that what is in the knowledge base test is needed when teaching 12 year olds.'

Not only is the test in itself problematic for some prospective teachers, the form of the test can also be an obstacle. One prospective teacher reports: 'It would help me if I could postpone an item and work on it a bit later. (...) I could usually solve a problem when I looked into it again when I nearly finished the test.' The test consists of four parts. The test software does not allow returning to a part that is already finished.

Generally low achieving prospective teachers do not consider their limited mathematical abilities a problem in teaching mathematics. One of them explains how she carefully prepares specific troublesome subjects for herself. Another prospective teacher does not see any problem as she decided to teach in lower grades only. Yet another thinks that being a low achiever in mathematics is more of an advantage as she knows what students in primary education experience.

Prospective teachers tell us that as a consequence of failing to pass the mathematics knowledge base test they changed their attitude towards mathematics. One of the prospective teachers states that mathematics was her favourite subject, but has become a punishment, because she now associates it with failing to pass the test.
For some prospective teachers this attitude towards mathematics has changed into despair: 'I don't get it. Why do I need to pass this test in my third or fourth year in teacher education, while I am so badly prepared and teacher education still expects me to pass the test rapidly.'

When we ask prospective teachers who did not pass the knowledge base test in their fourth year what help they need, they generally indicate that this help should be tailor-made.

From interviews to questionnaire

Responses in the interviews were used in constructing a questionnaire for all prospective teachers in their fourth year in teacher education in the Netherlands. Figure 1 shows statements in de questionnaire. These statements were derived from what prospective teachers who did not pass the third year knowledge base test in their fourth year said in the interviews. All fourth year prospective teachers in the Netherlands who did not pass the test yet or did so in their fourth year in teacher education were asked to indicate whether they agreed with the statement, on a five point scale ranging from 'totally disagree' to 'totally agree'.

Statements: Reasons why the prospective teacher did not pass the knowledge base test in the third year in teacher education.

1. I did not pass the knowledge base test yet (or: in my fourth year in teacher education) because I am a low achiever in mathematics.

2. I did not pass the knowledge base test yet (or: in my fourth year in teacher education), because I did not invest enough.

3. I did not pass the knowledge base test yet (or: in my fourth year in teacher education), because I am stressed while being tested.

4. I did not pass the knowledge base test yet (or: in my fourth year in teacher education), because of the lack of support from teacher education.

Open question: What other reasons cause you to not yet pass the test (or: in your fourth year in teacher education)?

Note: Alternative formulation for prospective teachers who did pass the test in their fourth year, when responding.

Figure 1. Statements on why the prospective teachers did not pass the test.

The interviews provided some insight into the prospective teachers' attitude towards mathematics. This gave us some clues for a second set of statements (figure 2).

Statements on prospective teachers' attitude towards mathematics.
1. I am always enthusiastic when I start working on a mathematics problem.

- 2. When I have to make a calculation, I always check if I can do so in a clever way.
- 3. I trust my calculator more than my own mathematics skills.
- 4. I use what is going on in the world in my mathematics teaching.
- 5. When I see numbers in a newspaper I always check how I can imagine these numbers.
- 6. When I solve a mathematics problem I check if it could be done more cleverly.
- 7. I always explore a mathematics problem before I start solving it.
- 8. In my opinion it is important that I can solve a problem in several ways.
- 9. I find it important that I understand the mathematics I use.
- 10. After I solve a mathematics problem, I always check whether the answer is realistic.

Figure 2. Prospective teachers' attitude towards mathematics

Prospective teachers responses in the interviews show differences in how they prepare for the test and in what was effective or less effective in supporting them. In line with responses we formulated three open questions about this support, namely:

- What do you need in order to finally pass the mathematics knowledge base test?
- What did help in preparing for the mathematics knowledge base test?
- What could teacher education do better or different for future prospective teachers?

We asked only T4-minus prospective teachers to answer the first question. We asked all fourth year prospective teachers to answer the second and third question. The questionnaire finally contained several questions regarding the prospective teachers' study behaviour, private tutoring, materials used and how they cooperated with peers.

Questionnaire

265 prospective teachers completed the questionnaire; this included 155 so-called T3 prospective teachers, 15 T4-plus prospective teachers and 87 T4-minus prospective teachers.

In their response prospective teachers provided their highest score on the mathematics entrance test. Those who passed final exams on mathematics in secondary education also provided their mark in this exam. Moreover, the prospective teachers shared all their scores on the third year mathematics knowledge base test. These test scores show that both the prospective teachers' score on the entrance test and the exam mark in secondary education are related to the highest score on the knowledge base test. The entrance test score 'explains' a little less than 10 percent of the variance in the knowledge base score ($R^2=0,094$, $\beta=0,314$, t(194)=4,589, p<0,001). The mark for the mathematics exams 'explains' 15 percent of the variance in the knowledge base score, if the prospective teacher

did an exam in mathematics A (with a focus on applications) ($R^2=0,151$, $\beta=0,396$, t(147)=5,205, p<0,001) and 7 percent if the prospective teacher did an exam in mathematics B (with a focus on pure mathematics) ($R^2=0,071$, $\beta=0,298$, t(52)=2,230, p<0,05). We established that a mark of 7 out of 10 for the final exam in mathematics A in secondary education and a mark of 6 out of 10 for the final exam in mathematics B is generally sufficient (as a starting point) for passing the mathematics knowledge base test in the third year in primary teacher education.

Why was the test not passed?

We asked T4-plus prospective teachers to value several statements describing reasons why they did not pass the test in their third year in teacher education. We elaborated these statements somewhat so that they could also be used for T4-minus prospective teachers. For example we changed 'I passed the test in my fourth year in teacher education because teacher education did not give enough support into 'I did not pass the test yet because teacher education did not give enough support.' Table 1 shows how different groups of prospective teachers responded.

Table 1

Responses on statements 'Why not passed the test in third year in teacher education?'. Table shows mean and sd: totally disagree = 1, disagree = 2, ..., totally agree = 5. Statements, see figure 1.

	statement 1	statement 2	statement 3	statement 4
T4-plus prospective	2,71 (1,490)	1,64 (1,008)	2,50 (1,225)	2,29 (1,326)
teachers (n=14)				
T4-minus prospective	2,94 (1,236)	1,63 (0,864)	3,51 (1,279)	3,13 (1,173)
teachers (n=95)				

Prospective teachers are clear about their own investment in preparing for the mathematics knowledge base test. That was sufficient (statement 2). A majority of prospective teachers does not agree that they failed to pass the test because they consider themselves low achievers in mathematics (statement 1). T4-plus prospective teachers differ significantly with T4-minus prospective teachers in their response to two statements. T4-minus prospective teachers more often report tenseness or stress as a reason for their failure (statement 3) and they also more often consider the quality of teacher education a reason for not passing the test (statement 4).

We asked T4-minus prospective teachers to name other factors that caused them to not yet pass the test. In response to this open question about 40 percent of these prospective teachers state that their failure in passing the mathematics knowledge base test is due to the test's form, the test's duration in time, the number of items in the test and the impossibility of navigating between items. Also 40 percent of the T4-minus prospective teachers states that the content of the test causes them to not pass the test. A statement from one of the prospective teachers is typical for many responses: 'The test is about mathematical content knowledge one does not need as a teacher in primary education. I agree that the teacher needs to be better in mathematics than the students, but this is overdone.'

About 40 percent of the T4-minus prospective teachers state they did not pass the test because there is not enough material that can be used to prepare for the test. More than 30 percent report personal factors here, like dyscalculia and stress. Other reasons mentioned for not passing the test are limited possibilities for feedback after a test and test conditions like malfunctioning applications. Many prospective teachers report more than one reason why they did not pass the test.

Attitude

All prospective teachers were asked to respond to ten statements which allowed them to share ideas about their attitude towards mathematics. Table 2 provides an overview, where results for T3, T4-plus and T4-minus prospective teachers are presented separately.

Table 2

Responses on statements on attitude towards mathematics. Table provides mean and sd: totally disagree = 1, disagree = 2, ..., totally agree = 5. For statements, see figure 2.

	st.1	st.2	st.3	st.4	st.5	st.6	st.7	st.8	st.9	st. 10
T3 PTs	3,56	3,89	2,85	3,52	2,84	2,69	3,52	3,17	4,25	4,10
(n=154)	(1,337)	(1,007)	(1, 125)	(1,039)	(1, 144)	(1, 163)	(1,039)	(1,113)	(0,881)	(0,937)
T4-plus	3,07	3,93	3,00	3,27	2,20	2,93	4,00	3,13	4,33	4,13
PTs	(1, 207)	(0,704)	(1,069)	(1,223)	(1,082)	(1,223)	(0, 845)	(1,302)	(0,900)	(0,743)
(n=15)										
T4-	2,99	3,66	2,85	3,43	2,69	2,87	3,79	3,04	4,20	3,94
minus	(1,087)	(0,876)	(1,136)	(1,019)	(1,155)	(1, 265)	(0,942)	(1, 187)	(0,905)	(0.998)
PTs										
(n=87)										

In only one case do T4 prospective teachers' responses differ significantly from those of T3 prospective teachers, namely being enthusiastic when starting working on a mathematics problem (statement 1). T3 prospective teachers are more often so compared to T4 prospective teachers. Responses are about 'neutral' for statements where relying on one's own mathematical skills or on a calculator (statement 3), seeing mathematics in daily reality and using it in teaching (statement 4) and reflecting on one's approach and consider more efficient strategies (statement 10). Prospective teachers, irrespective of their success in passing the mathematics knowledge base test, consider understanding mathematical procedures (statement 9) to be important.

What is needed?

Table 3

Responses on open question: What is needed to pass the mathematics knowledge base test? Categorized in eight labels, in percentages.

Label	T3 prospective teachers (n=154)	T4 prospective teachers (n=102)
Private tutoring	8	40
Teacher educator	6	3
Sources from internet	14	9
Learning	4	4
Practicing	43	28
Meetings in teacher education	22	10
(Practice) material	19	8
Nothing	2	21

We asked all prospective teachers in their fourth year in teacher education what is needed for passing the knowledge base test. We categorized the responses in labels, where – depending on the response – a response could be labelled double or triple (table 3). The table presents a percentage of prospective teachers bringing forward an argument that is related to this label. In doing so we distinguished between T3 and T4 prospective teachers.

Table 3 shows that T3 prospective teachers trust in their own strength more and were supported more by regular teacher education compared to their T4 peers. T3 prospective teachers for example report less frequently that private tutoring is needed and pointed more often at practicing for the test as effective for passing the test. This group of prospective teachers is also better helped by available materials for practicing. Some T4 prospective teachers show frustration. About a fifth of the prospective teachers in this group reports that nothing helps.

What can be improved?

Using an open question all prospective teachers in their fourth year in teacher education were asked to share what, in their opinion, teacher education could do better. Here too we labelled responses, where again more than one label could be attached to a single response (table 4). The numbers in the table represent percentages of prospective teachers who formulated a response we connected to this label. Again we distinguished between T3 and T4 prospective teachers.

Table 4

Prospective teachers' responses for the open question: What can teacher education do better in supporting prospective teachers in passing the mathematics knowledge base test? Categorized in seven labels, in percentages.

Label	T3 prospective teachers (n=154)	T4 prospective teachers (n=102)
Teacher education (educator,	43	71
meetings, supervising)		
Other support	3	4
Materials	33	35
Commitment	18	12
Personal characteristics	12	4
Features of the test	9	27
Other (including 'no idea')	15	12

Nearly three-quarters of the T4 prospective teachers and a little more than 40 percent of the T3 prospective teachers indicate that teacher education could be improved. These figures probably reflect the question. Other labels show more precise ideas from prospective teachers how they think things could be improved. In both groups of prospective teachers about a third write that materials that prepare for the test could be better. There are differences between the groups concerning the prospective teachers' commitment as characteristic of what could be improved. Prospective teachers bringing up this point often express here that one needs to be committed to preparing for the test in order to realize a sufficient result. Probably T4 prospective teachers more often regard their commitment as sufficient than T3 prospective teachers reporting about their T4 peers.

This is similar to prospective responses categorized as personal characteristics. We labelled responses as such when prospective teachers wrote about attitudes that might lead to a better test result, like: 'Realize an active and learning attitude in prospective teachers'. About 10 percent of the T3 prospective teachers responded in this way, while only about 4 percent of the T4 prospective teachers did so.

About a quarter of the T4 prospective teachers indicate that the test itself needs improvement. This is remarkable as this does not answer this question in the questionnaire.

Responses and test score

We observe differences in responses on open questions between T3 and T4 prospective teachers. For example, T3 prospective teachers rely less on help from others, like private tutoring, and bring up that practicing helps more compared to their T4 peers. This turns out to be the case if we compare responses in regression analyses with the highest test result on the mathematics knowledge base test. Such an analysis shows that prospective teachers who indicate that working hard helps is related to higher scores on the test ($R^2=0.028$, $\beta=-0.181$, t(201)=-2.607, p<0.01). A similar analysis shows that a higher test score is related to mentioning personal

characteristics as helpful in passing the test (R²=0,029, β =0,169, t(201)=2,423 p<0,02).

We also checked how the labels related to the prospective teachers' increase in score over the tests they made. In only two cases did we find such a relation between labels and scores. Prospective teachers who reported that nothing helps them in preparing for the test, did indeed not increase their score over the tests. These prospective teachers looked at their efforts and concluded that they did a lot and nothing seemed to help. A second group of T4 prospective teachers who did not increase their score were prospective teachers who complained about the quality of teacher education.

CONCLUSION AND DISCUSSION

This study focuses on Dutch prospective teachers in their fourth year in teacher education, who appeared unable to pass a national mathematics knowledge test in their third year in teacher education. Many prospective teachers are able to pass this test in their third and some even in their second year in teacher education, but a number of prospective students fails to do so. These prospective teachers may need to leave teacher education before graduation, because they are unable to meet these requirements for mathematics. Therefore practice is helped if we know more about this specific group of prospective teachers. We found that a low mark for the mathematics entrance test or a low mark for mathematics in secondary education predict failure for the knowledge base test. Moreover, prospective teachers in this group:

- do not consider themselves as low achievers in mathematics,
- often report stress and math anxiety,
- generally think they invest enough in mathematics,
- criticize the test's content and form,
- criticize teacher education.

Compared to the group of prospective teacher who succeeded in passing the mathematics knowledge base test in their second or third year in teacher education, they enjoy mathematics less and rely more on help from others.

For some part these findings most likely result from prospective teachers' repeated failure and therefore cannot be considered personal characteristics for these prospective teachers. This could be the case for decreasing fun in doing mathematics, stress and anxiety and reliance on others. Another part of the response does point at personal characteristics, which we would like to qualify as lack of self-reflection. This comes forward in responses like not considering oneself as a low achiever, the opinion that the investment in mathematics is sufficient and blaming the test and teacher education for failing to pass the test.

Of course this situation is problematic for prospective teachers who after three or four years in teacher education experience that they are unable to fulfil national requirements. This is a concern for teacher education institutes, that need to support and inform prospective teachers adequately at an early stage in their study. This preparation should make clear what is involved in the third year mathematics knowledge base test. Moreover, it is important that prospective teachers who will probably not be able to pass the third year test, are warned in their first year in teacher education. There are indications that changing the pass mark for the mathematics entrance test is an adequate means for realizing this (Keijzer, 2015). When all teacher education institutes in the Netherland decide to raise the pass mark for the entrance test and invest in supporting prospective teachers in developing in mathematics, they show both prospective teachers and society what quality requirements for prospective teachers are set. It would be good if this signal also means that failing the test indicates that the prospective teacher should work harder on mathematics. This is something that not only the prospective teacher needs to deal with, but a responsibility for prospective teacher and teacher education together.

REFERENCES

- Ball, D. L., Thames, M., & Phelps, G. (2008). Content knowledge for teaching: What makes it special? *Journal of Teacher Education*, 59, 389-407.
- Glaser, B. G., & Strauss, A. L. (1967). *The discovery of grounded theory : strategies for qualitative research.* Chicago: Aldine.
- Hill, H. C., Rowan, B., & Ball, D. L. (2005). Effects of Teachers' Mathematical Knowledge for Teaching on Student Achievement. *American Educational Research Journal*, 42(2), 371-406.
- Keijzer, R. (2010). Stand van zaken bij rekenen-wiskunde en didactiek op de lerarenopleiding basisonderwijs [State of the art for mathematics in primary teacher education]. *Tijdschrift voor Hoger Onderwijs*, 28(1), 31-45.
- Keijzer, R. (2015). Changing the pass mark for the mathematics entrance test. In G. Makrides (Ed.), *EAPRIL Conference Proceedings 2014* (pp. 254-269). Nicosia, Cyprus: EAPRIL. retrieved from https://eaprilconference.files.wordpress.com/2014/07/eapril-2014-proceedings_issn-aanvraag_def1.pdf
- Keijzer, R., & De Vries, D. (2014). Leren van de toetsing van de kennisbasis rekenen-wiskunde [Learning from testing the mathematics knowledge base]. *Tijdschrift voor Lerarenopleiders*, 35(2), 5-13.

- Keijzer, R., & Hendrikse, P. (2013). Wiskundetoetsen voor pabo-studenten vergeleken [Comparing mathematics tests for prospective primay teachers]. *Reken-wiskundeonderwijs: onderzoek, ontwikkeling, praktijk, 32*, 41-46.
- Keijzer, R., Garssen, F., & Peijnenburg, A. (2012). Greep krijgen op de toetsing van de Kennisbasis rekenen-wiskunde [Learning from testing for the mathematics knowledge base]. *Reken-wiskundeonderwijs: onderzoek, ontwikkeling, praktijk, 31*(1), 14-22.
- KNAW. (2009). Rekenonderwijs op de basisschool. Analyse en sleutels tot verbetering [Mathematics in primary school. Analysis and keys for improvement]. Amsterdam, The Netherlands: KNAW.
- Mullis, I. V., Martin, M. O., Foy, P., & Arora, A. (2012). *TIMSS 2011 International Results in Mathematics*. Boston (MA): TIMSS & PIRLS International Study Center.
- Shulman, L. (1987). Knowledge and Teaching: Foundations of the New Reform. *Harvard Educational Review*, 57(1), 1-23.
- Vakcommissie rekenen-wiskunde. (2013). Toetsgids pabo rekenen-wiskunde [Syllabus primary teacher education mathematics test]. Den Haag: Vereniging Hogescholen.
- Van Weerden, J., & Hiddink, L. (Red.). (2013). Balans van het basisonderwijs. PPON: 25 jaar kwaliteit in beeld [Balance sheet of primary education. PPON: an image of 25 years of quality]. Arnhem, The Netherlands: Cito.
- Van Zanten, M. A. (2010). De kennisbasis rekenen-wiskunde voor pabo's ontwikkelingen en overwegingen [The mathematics knowledge base for primary teacher education - developments and considerations]. Rekenwiskundeonderwijs: onderzoek, ontwikkeling, praktijk, 29(1), 3-16.
- Van Zanten, M. A., Barth, F., Faarts, J., Van Gool, A., & Keijzer, R. (2009). Kennisbasis Rekenen-Wiskunde voor de lerarenopleiding basisonderwijs [Mathematics Knowledge Base for primary teacher education]. Den Haag: HBO-raad.