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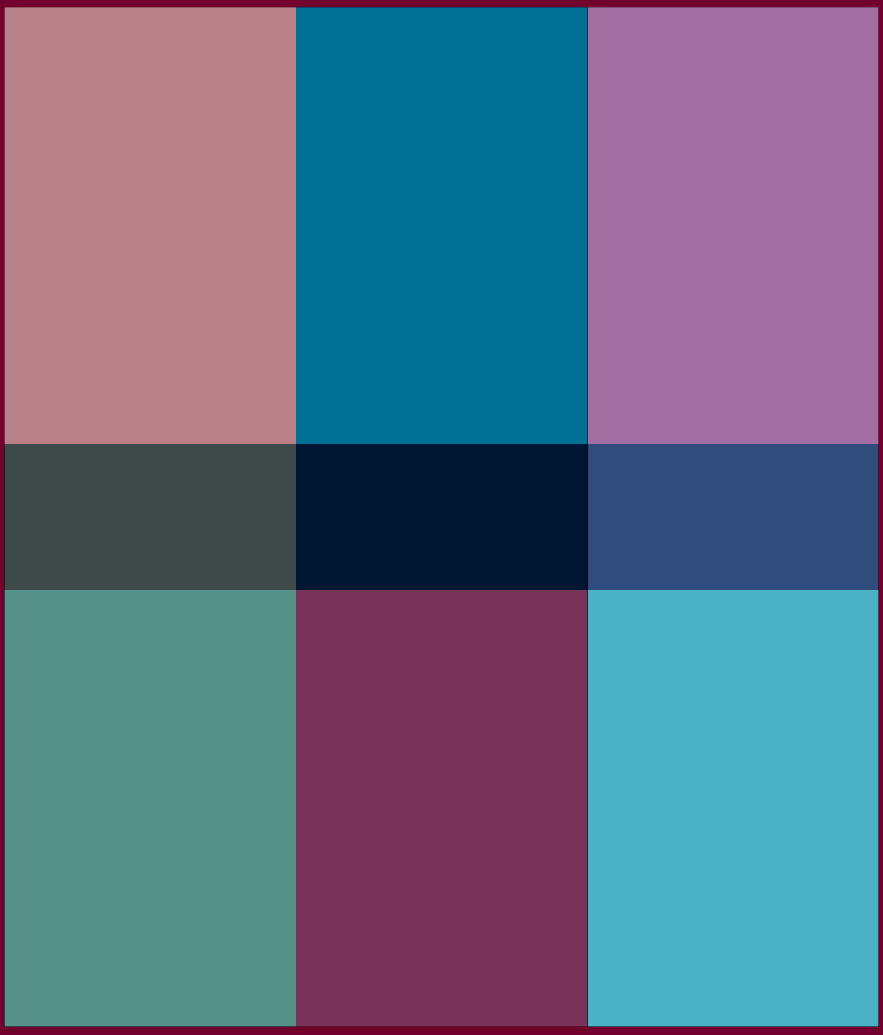

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C·E·P·S *Journal*

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The CEPS Journal is an open-access, peer-reviewed journal devoted to publishing research papers in different fields of education, including scientific.

Aims & Scope

The CEPS Journal is an international peer-reviewed journal with an international board. It publishes original empirical and theoretical studies from a wide variety of academic disciplines related to the field of Teacher Education and Educational Sciences; in particular, it will support comparative studies in the field. Regional context is stressed but the journal remains open to researchers and contributors across all European countries and worldwide. There are four issues per year. Issues are focused on specific areas but there is also space for non-focused articles and book reviews.

About the Publisher

The University of Ljubljana is one of the largest universities in the region (see www.uni-lj.si) and its Faculty of Education (see www.pef.uni-lj.si), established in 1947, has the leading role in teacher education and education sciences in Slovenia. It is well positioned in regional and European cooperation programmes in teaching and research. A publishing unit oversees the dissemination of research results and informs the interested public about new trends in the broad area of teacher education and education sciences; to date, numerous monographs and publications have been published, not just in Slovenian but also in English.

In 2001, the Centre for Educational Policy Studies (CEPS; see http://ceps.pef.uni-lj.si) was established within the Faculty of Education to build upon experience acquired in the broad reform of the national educational system during the period of social transition in the 1990s, to upgrade expertise and to strengthen international cooperation. CEPS has established a number of fruitful contacts, both in the region – particularly with similar institutions in the countries of the Western Balkans – and with interested partners in EU member states and worldwide.

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Revija Centra za študij edukacijskih strategij je mednarodno recenzirana revija z mednarodnim uredniškim odborom in s prostim dostopom. Namenjena je objavljanju člankov s področja izobraževanja učiteljev in edukacijskih ved.

Cilji in namen

Revija je namenjena obravnavanju naslednjih področij: poučevanje, učenje, vzgoja in izobraževanje, socialna pedagogika, specialna in rehabilitacijska pedagogika, predšolska pedagogika, edukacijske politike, supervizija, poučevanje slovenskega jezika in književnosti, poučevanje matematike, računalništva, naravoslovja in tehnike, poučevanje družboslovja in humanistike, poučevanje na področju umetnosti, visokošolsko izobraževanje in izobraževanje odraslih. Poseben poudarek bo namenjen izobraževanju učiteljev in spodbujanju njihovega profesionalnega razvoja.

V reviji so objavljeni znanstveni prispevki, in sicer teoretični prispevki in prispevki, v katerih so predstavljeni rezultati kvantitavnih in kvalitativnih empiričnih raziskav. Še posebej poudarjen je pomen komparativnih raziskav.

Revija izide štirikrat letno. Številke so tematsko opredeljene, v njih pa je prostor tudi za netematske prispevke in predstavitve ter recenzije novih publikacij.

The publication of the CEPS Journal in 2017 and 2018 is co-financed by the Slovenian Research Agency within the framework of the Public Tender for the Co-Financing of the Publication of Domestic Scientific Periodicals.

Izdajanje revije v letih 2017 in 2018 sofinancira Javna agencija za raziskovalno dejavnost Republike Slovenije v okviru Javnega razpisa za sofinanciranje izdajanja domačih znanstvenih periodičnih publikacij.

Contents

Reviews

Editorial

The fourth issue of volume eight of the CEPS Journal is devoted to thematically diverse papers – it is not a focus issue. This issue presents twelve authors from four different countries including Germany, Chile, Croatia, and Slovenia, who discuss different educational areas, including teacher education, educational psychology, teachers' professional development and special pedagogy, and show the broader aspects of research in education. One book review concludes this CEPSj issue.

The paper by Tanja Černe and Mojca Juriševič entitled *The Self-Regulated Learning of Younger Adolescents with and without Learning Difficulties – A Comparative Multiple Case Study* presents authors' views on self-regulated learning and how well-developed self-regulated learning pose the key to enabling learners to achieve both their educational goals and wider personal development. However, this can be especially challenging for adolescents with learning difficulties, because of their neuropsychological and neurophysiological characteristics, as well as the significant disparities they tend to experience between the effort put into learning on the one hand, and the resulting learning achievements on the other. The authors present a comparative multiple case study. They researched the self-regulated learning of three younger adolescents with learning difficulties and that of one younger adolescent without learning difficulties. The data were subjected to triangulation methods and qualitative analysis, with the results showing that the younger adolescents with learning difficulties mainly used cognitive rehearsal strategies, while the organisational and elaboration strategies were used only with the aid of the available social resources. The results also show that metacognitive strategies with regard to planning, assessment, and self-regulation were not yet fully developed in the participants with learning difficulties. They concluded that two of the three younger adolescents with learning difficulties show several signs of defensive pessimism and learned helplessness. All the adolescents participating in this case study received support and help in their home environments and developed suitable self-encouragement and self-rewarding strategies through perceptions of their own success in their free-time activities. The participating teachers did not fully identify the strong areas and performance factors in the younger adolescents, both with and without learning difficulties. The authors suggest that the results obtained from this case study might contribute to developing more efficient special-educational intervention approaches.

The second paper of the present issue, entitled *Certification Policy: Reflections Based on the Chilean Case of the INICIA Test for Beginner Teachers*, by

Felipe Aravena and Marta Quiroga analyses a specific educational policy in a national context: INICIA (In Spanish: Start) in Chile. Enacted in 2008, this policy evaluates beginning teachers at the national level before they start their professional careers in schools. The INICIA has been categorised as a certification policy to measure what teachers know in relation to a certain disciplinary area. At present, INICIA is voluntary for beginning teachers. However, due to policy changes, a passing score on it will soon be necessary to become a nationally qualified teacher in Chile. The authors applied a holistic analysis of the policy, and they develop a complex picture of the problem INICIA generates as a requirement for certification. According to their analysis, INICIA has been misunderstood as a policy that provides quantitative and qualitative information about a teacher's performance. They concluded that INICIA merely provides information about a specific moment in a teacher's professional development and cannot be used as a predictor of future performance.

The paper entitled *Mobile Teachers at Border Schools – Multilingualism and Interculturalism as New Challenges for Professional Development*, by Katica Pevec Semec, reports the results of the implementation of cross-border learning mobility, which has taken place in some schools and kindergartens at the tri-border area of Slovenia, Austria and Italy. The findings suggest that the implementation of multilingual and intercultural practices, which involve weekly exchanges of 'mobile teachers' from neighbouring countries, created a unique educational experience that has encouraged teachers to greater professional growth. In addition to another language, mobile teachers have brought with them various new educational approaches. Border mobility has contributed to the simultaneous strengthening and enriching of educational practices in various border kindergartens and schools. For teachers, the implementation of cross-border learning mobility strengthens the awareness of the importance of competence in multilingualism and interculturalism as an essential factor for their further professional development. Readers of this paper will be familiarised with the analysis of the knowledge and experience of professionals involved in such mobility programmes in terms of a new dimension of professionalism, and the need to develop multilingualism and interculturalism competences.

The fourth paper, by Anamarija Žic Ralić, Daniela Cvitković, and Snježana Sekušak-Galešev, entitled *Predictors of Bullying and Victimisation in Children with Attention-Deficit/Hyperactivity Disorder*, presents the question of whether age, gender, individualised education programme, the experience of victimisation by peers, and the experience of bullying others are predictors of bullying and victimisation in children with Attention-Deficit/Hyperactivity Disorder. The sample consisted of 72 children aged from 7 to 15 with

Attention-Deficit/Hyperactivity Disorder diagnoses. The authors concluded that gender is a significant predictor of physical bullying, whereas the predictors of verbal bullying are gender, being enrolled in an individualised education programme, verbal victimisation, and the feeling of security. The boys with Attention-Deficit/Hyperactivity Disorder without any school accommodations, such as individualised education programme and who are exposed to verbal victimisation are also more often verbally aggressive towards their peers. Children with Attention-Deficit/Hyperactivity Disorder who are verbally aggressive and feel secure in the school setting are more exposed to verbal victimisation.

The fifth paper, by Yannik Tolsdorf and Silvija Markić, entitled *Participatory Action Research in University Chemistry Teacher Training*, discusses the importance of the participatory action research model developed by Eilks and Ralle, and is very well known in science education. Over the years, many teaching and learning materials have been developed and implemented in German secondary schools using this method. The success of the model encouraged the authors to adapt it to the university level in order to develop university chemistry education courses. However, to do this, they encountered and conquered some challenges. For an advanced model, the focus is firmly on the extended development team, which comprise people who were not part of the original team. The role of the students also changes. In this paper, the authors describe the ideas they used to further develop the model and implement it in practice.

The last contribution in this varia issue is entitled *The Differences Between Pre-Service Chemistry, Fine Art, and Primary Education Teachers Regarding Interest and Knowledge About Fine Art Materials*, in which Robert Potočnik and Iztok Devetak consider the role of art education and its implications in science education and vice versa. The primary purpose of this paper is to identify the level of interest and knowledge about fine art materials (in selected works of art) that can influence pre-service primary school, chemistry, and fine art teachers' implementation of this content into their teaching. This knowledge can help them be aware of how a specific fine art material can be used in fine art classes. Fine art materials can also be applied in different manners by chemistry teachers and primary school teachers (science lessons) to explain the specific chemical characteristics of these substances. Altogether, 118 pre-service teachers from the Faculty of Education, University of Ljubljana participated in the study. The data were collected using different instruments. The authors concluded that pre-service teachers' average score on a knowledge test about fine art materials is quite low. The results also showed that pre-service fine art teachers achieved better results than primary school and chemistry teachers did. Similar results were also obtained regarding participants' interest and self-concept in learning

about fine art materials. The authors suggested that more emphasis should be placed on developing the understanding of chemical and fine art concepts due to the fact that fine art and chemistry can be interdisciplinarily presented in education, according to contemporary curricular guidelines.

At the end of this edition, a review of a monograph can be found. Gordana Čižman, who reviewed the book *Children's Rights, Educational Research and the UNCRC past, present and future* edited by Jenna Gillett-Swan and Vicki Coppock, published by Symposium Books (ISBN 978-1-873927-95-3), provides international perspectives on contemporary issues pertaining to children's rights in education.

Iztok Devetak

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The Self-Regulated Learning of Younger Adolescents with and without Learning Difficulties – A Comparative Multiple Case Study

Tanja Černe[1] and Mojca Juriševič[2]

Well-developed self-regulated learning is the key to enabling learners to achieve both their educational goals and wider personal development. However, this can be especially challenging for adolescents with learning difficulties, because of the neuropsychological and neurophysiological characteristics of such individuals, as well as the significant disparities they tend to experience between the effort put into learning on the one hand, and the resulting learning achievements on the other. In the current comparative multiple case study, we researched the self-regulated learning of three younger adolescents with learning difficulties and that of one younger adolescent without learning difficulties. The data were subjected to triangulation methods and qualitative analysis, with the results showing that the younger adolescents with learning difficulties mainly used cognitive rehearsal strategies, while the organisational and elaboration strategies were used only with the aid of the available social resources. The results also show that metacognitive strategies with regard to planning, assessment, and self-regulation were not yet fully developed in the participants with learning difficulties. Two of the three younger adolescents with learning difficulties show several signs of defensive pessimism and learned helplessness. All the adolescents participating in this case study received support and help in their home environments and developed suitable self-encouragement and self-rewarding strategies through perceptions of their own success in their free-time activities. The participating teachers did not fully identify the strong areas and performance factors in the younger adolescents, both with and without learning difficulties. The results obtained from this case study might contribute to developing more efficient special-educational intervention approaches.

Keywords: self-regulated learning, younger adolescents with learning difficulties, comparative multiple case study

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Učna samoregulacija mlajših mladostnikov z učnimi težavami in brez njih

Tanja Černe in Mojca Juriševič

Dobro razvita učna samoregulacija je ključna za doseganje izobrazbenih ciljev in osebni napredek učencev. Ta je pri mladostnikih z učnimi težavami zaradi nevropsiholoških in nevrofizioloških vzrokov ter zaradi pomembnih razlik med vlaganjem truda v učenje ter učnimi dosežki pogosto težje dosegljiva. V primerjalni multipli študiji primera smo raziskali učno samoregulacijo pri treh mlajših mladostnikih z učnimi težavami in pri enem mlajšem mladostniku brez učnih težav. Kvalitativna analiza na osnovi triangulacije metod in virov podatkov je pokazala, da mladostniki z učnimi težavami pri svojem učenju uporabljajo pretežno kognitivne strategije ponavljanja, organizacijske in elaboracijske strategije pa le s pomočjo uporabe socialnih virov. Metakognitivnih strategij načrtovanja, spremljanja in uravnavanja lastnega učenja še niso povsem razvili. Dva mladostnika z učnimi težavami sta kazala več znakov defenzivnega pesimizma in naučene nemoči. Mladostniki, udeleženi v raziskavi, so imeli podporo in pomoč domačega okolja; prek zaznave lastne uspešnosti so v okviru interesnih dejavnosti razvili ustrezne motivacijske strategije samopotrjevanja, samospodbujanja in samonagrajevanja. Sodelujoči učitelji niso povsem zaznavali močnih področij in dejavnikov uspešnosti mladostnikov z učnimi težavami ter brez njih. Pridobljeni raziskovalni izsledki lahko prispevajo k oblikovanju učinkovitejših specialnopedagoških intervencijskih pristopov.

Ključne besede: učna samoregulacija, mlajši mladostniki z učnim težavami, primerjalna študija primera

Literature review

Zimmerman (2000) defined self-regulation from the standpoint of social-cognitive learning and understands it as an interaction among people, behaviours and environmental processes (the influence of learning methods and practices, classroom atmosphere, and so on). He claims that lack of social experiences can lead to the dysfunction of self-regulated skills, and so create feelings of apathy and boredom, which are common among adolescents, both with and without learning difficulties (LD). Zimmerman and Martinez-Pons (1988) defined self-regulation through three general views of learning, which affect learning efficacy and the achievement of learning goals: self-regulated behaviour, self-regulated motivation, and self-regulated emotions. Wolters, Benzon, and Arroyo-Giner (2011) distinguished three components of self-regulated motivation: knowledge about motivation, observing motivation, and self-control of motivation. Strategies for self-regulated motivation are thus used by learners to increase their motivation and regulate their thoughts and activities towards goal achievement. Pintrich and DeGrott (1990) listed three components of self-regulation (metacognitive strategies for planning, observing and adapting one's mind; management and control of their efforts to carry out academic tasks; and the cognitive strategies used by learners when learning), and explain the influence of motivation on successful learning outcomes. Schunk and Ertmer (2000) underscored the importance of self-reflective practicing, especially in learners with LD, since their evaluation, reflection, and self-observance skills are less developed. Self-regulated learning (SRL) encourages the development of motivational learning strategies and enables the generalisation of the resulting knowledge to all learning areas. SRL includes a range of strategies, self-monitoring, self-reinforcement, self-awareness, self-efficacy, self-directed learning, self-determination, self-management, self-instruction and self-evaluation (Mitchell, 2014). Motivation regulation is a central concept in SRL and depends on the learner's knowledge about motivational processes and on their abilities to recognise, maintain, or to adapt their motivation to specific tasks and learning situations (Wolters, 2011). Motivational beliefs, beliefs about self-efficacy and the goals one has achieved are predictors of the application of self-regulated motivation (Paulino, Sá, & Lopes da Silva, 2016). Metacognitive knowledge about motivation is thus essential with regard to enhancing SRL, since a learner is more likely to complete a school task effectively by choosing and applying appropriate self-regulated motivation strategies (Paulino et al., 2016). Motivation is linked to the perception of one's own efficacy attributional style, while perceived self-efficacy is defined as an individual's expectations about how successful they will be at in organisation and performance in certain tasks or

activities, and in situations that include new, unexpected and stressful elements (Schunk & Ertmer, 2000). Research shows that well-developed metacognitive abilities can influence how one anticipates the consequences of one's actions, improve the understanding of situations, activate already achieved knowledge, improve activity and time planning, and have a positive impact on the memory (Bransford, Brown, & Cocking, 1999).

Boekaerts (1996) developed two models of SRL. First, she outlined a structural model in which self-regulation was divided into six components. There were organised around two basic mechanisms of SRL: cognitive and affective/motivational self regulation. The second SRL model, the Adaptable Learning Model, describes the dynamic aspects of SRL, and later, evolved into the Dual Processing self-regulation model. The Adaptable Learning Model offered a theoretical framework for understanding the findings from diverse psychological frameworks, including motivation, emotion, metacognition, self-concept, and learning (Boekaerts, 1996; Panadero, 2017).

In Slovene pedagogy, we distinguish between a general and specific learning difficulties. Attention deficit and hyperactivity disorder (ADHD) and problems caused by developmental delay (such adolescents tend to be slow learners) are examples of general learning difficulties. Examples of specific learning difficulties are problems caused by deficiency during the early development of auditory-motor processes, e.g., dyslexia (Magajna, Kavkler, Čačinovič-Vogrinčič, Pečjak, & Bregar Golobič, 2008). Hereinafter, 'learning difficulties' refers to adolescents with dyslexia, adolescents with ADHD, and adolescents who are slow learners.

We will describe SRL, learning motivation and metacognition in adolescents with LD to answer research questions.

Adolescents with dyslexia often have problems in organising time for learning, study materials, and accessories (Raduly-Zorgo, Smythe, & Gyarmathy, 2010) and thus with SRL. They have weak metacognitive awareness: they do not know, for example, how to approach a certain task (Reid, 2002). Reiter, Tucha, and Lange (2004) determined that adolescents with dyslexia experience difficulties in the areas of working memory, problem solving, inhibition, verbal and visual fluency, and thus with cognitive functions that are associated with the left prefrontal cortex. In adolescents with dyslexia, the external loci are more important, and they show less self-efficacy and use less effective motivational strategies (Sideridis, 2009).

Adolescents with attention deficit and hyperactivity disorder (ADHD) have insufficient self-control ability (i.e., a deficit in behavioural inhibition; Barkley, 2005), which can directly influence the occurrence of LD (Raggi & Chronis,

2006), and deficiencies in the areas of directing, maintaining and selecting attention. If an individual has several strongly negative experiences, then this can lead to very low self-esteem and self-image, or even depression (Peklaj, 2012; Reid, 2006). Moreover, insufficiencies in working memory and arousal influence can significanty decrease the learning-to learn ability (Carlson, Booth, Shin, & Canu, 2002). Adolescents with ADHD do not learn from their own experiences.

Adolescents who are slow learners tend to act as passive receivers of knowledge. As such, they can assimilate basic learning skills and knowledge, but in a slower manner and not as thoroughly as their peers do. They need more time for learning, should be offered multi-sensory approaches (Malik, Rehman, & Hanif, 2012), and require more practice and help in order to be successful (Shaw, 2010). They have general LD at different school subjects and in different fields of learning, showing problems with generalisation and subject matter transfer, and their information processing is slower than that seen in neurotypically developing individuals (Bonifacci & Snowling, 2008; Cooter & Cooter, 2004; Peklaj, 2012). They show less-developed metacognitive abilities, which include the planning, monitoring, and evaluation of their learning. Such adolescents are less motivated (Cooter & Cooter, 2004), which could be a consequence of negative adverse experiences when the expectations of the environment are not fulfilled, and the amount of effort and exertion put into learning does not match their abilities (Peklaj, 2012).

Research problem and research questions

This study thus aims to analyse research data regarding the differences and similarities in SRL in younger adolescents (an adolescent with dyslexia, an adolescent with ADHD, and an adolescent who is a slow learner), and an adolescent without LD) and to answer a research questions. To be more specific, we are comparing SRL within a group of adolescents with LD and the SRL taught to adolescents without LD. We are interested in the period in which adolescents rapidly develop their abilities of abstract and hypothetical thinking, planning, prediction of the consequences of their actions, reflecting on their own learning processes, engaging in productive introspection, accepting their own decisions and reducing the level of emotional dependence.

1. What are the differences or similarities in SRL in the group of younger adolescents with LD, and individually in this case study?
2. What are the differences or similarities with regard to cognitive, metacognitive and motivational strategies, according to the cognitive and motivational structures seen in the four cases analysed in this case study?

3. What kind of help do the home and school environments offer in creating, maintaining and changing the cognitive, metacognitive, and motivational learning strategies used by the four cases examined in this case study?
4. Does the school environment identify each adolescent's strengths and special needs, and encourage the development of dynamic adaptation processes, despite often difficult and threatening circumstances (due to the influence of the risk-resilience paradigm) in this case study?

Research design and procedure

We used a qualitative research approach and a comparative case study of three younger adolescents with LD and one younger adolescent without LD. We used the descriptive method of selective coding. The data were analysed by were qualitative content document analysis. Observing with participation was conducted in the individual situation. The author of this case study took the role of an observer and recorded short elaborations of the sentence during the observation and, on the same day, transcribed them into full notes. The author carried out semi-structured interviews with adolescents, parents, and teachers.

Participants

The current case study is a comparative study, which examined the issue of SRL in three younger adolescents with LD who were diagnosed and received team treatment in the Counselling Centre for Children, Adolescents and Parents, Ljubljana, and in one adolescent without LD. The teachers (of the last three grades of elementary school) who spend about two hours a week with these adolescents, prepare and monitor individualised programmes, also participated in this case study. They do not have specific knowledge in the field of special education. Parents of these adolescents also participated in the study. While both parents were invited, only the mothers took part in this study.

One of the participants, aged 14 years and 3 months, was diagnosed with dyslexia, and attended ninth grade (the final grade) of primary school in the 2015/16 school year. It is difficult to assess global intellectual abilities, due to high discrepancy (on the verbal scale: average, on the non-verbal scale: above average), changeable tempo in doing tasks, and diverted attention. Average grades are very good. He was assigned to a special education programme with an adjusted implementation of the curriculum and additional professional support.

Another participant, aged 14 years and 6 months, was diagnosed with ADHD, treated with pharmacological therapy, and also attended the ninth grade of primary school in the 2015/16 school year. He has average and below

average verbal and non-verbal intellectual abilities. He has an impulsive style of doing exam tasks and problems with keeping selective attention. His average grade is good. He was assigned to a special education programme with an adjusted implementation of the curriculum and additional professional support.

The third participant with LD, aged 14 years and 5 months, was identified as a slow learner, and also attended the ninth grade of primary school in the 2015/16 school year, and had individual and group help in school. He has low average to below average intellectual abilities and major difficulties in verbal expression, comprehension, memorising, calculating, and working memory. His average grade is very good.

The fourth participant, aged 14 years and 6 months, had no LD, and thus was not treated in the Centre for Children, Adolescents and Parents, and was also in the ninth grade of primary school in the 2015/16 school year. He has normal intellectual abilities. His average grade is very good.

Data collection method

Data collection was conducted with triangulation and the use of various data resources, from January to June 2016. Informed consent was obtained from all the participants, and this research was conducted in compliance with the Code of Ethics for Researchers at the University of Ljubljana and following the general code of ethics in the field of sociology. Data collection was conducted in the Centre for Children, Adolescents and Parents, Ljubljana, where the interviews were carried out with the younger adolescents and their parents, as well as the observation of SRL and a documentation study. The following documents were surveyed: results of the psychological tests, reports of educational institutions, medical and other expert documentation on the basis of diagnostic examination. Observing with participation was conducted with the help of a control list, designed on the basis of the six-component adaptive learning model (Boekaerts, 1997) with regard to cognitive and motivational self-regulation, and the observation was carried out in three meetings with the research author. The observation was a part of the special-pedagogical diagnostic procedure. In individual situations, the author made the following observations: the content area of learning, cognitive strategies, cognitive regulation strategies, metacognitive knowledge and motivational believes, motivational strategies and motivational regulation strategies. Each adolescent received initial instructions as to how to learn about a specific subject. The adolescents were left to their own devices and not accompanied by their parents-mothers who participated in this case study. Telephone interviews were conducted with the classroom teachers at a convenient time, and with the consent of the participants' parents.

All interviews were research-oriented, individual, direct and semi-structured (open- and close-ended type of questions).

The semi-structured interview that was done with each adolescent was structured on the basis of the four-component model of SRL (Hofer, Yu, & Pintrich, 1998) with regard to the focal cognitive, motivational structure and motivational strategies, and contained 12 questions.

The semi-structured interviews with mothers were designed and conducted within the diagnostic process on the basis of the literature review on the issues of motivational regulation, regulation of resources from the environment, self-organisation and parents' expectations, and contained 10 questions.

The semi-structured interviews with the teachers were constructed based on the Rating Students Self-Regulated Learning Outcomes/Self-Regulated Learning Outcomes – A Teacher Scale; (Zimmerman & Martinez Pons, 1988), with regard to the frameworks of learning organisation, self-initiative, interest, and seeking help, and contained 10 questions.

Data-processing Procedure

Data processing was conducted using a descriptive method of selective or focused coding in which we emphasised the codes that occur most frequently and those that tell the most about the research material (Vogrinc, 2008). Coding was conducted using a deductive approach on the basis of the prepared list of codes, as well as the relevant professional literature. All interviews were analysed using qualitative analysis, with word-for-word transcriptions and the retention of any colloquial expressions used by the participants. The basic coding categories were developed based on a review of the literature. The interview transcripts were analysed with the help of condensation and categorisation (Kvale, 1996). The documentation study was conducted following the steps of qualitative context documentation analysis.

Results

Qualitative data was obtained from the comparative study case with regard to the SRL of the younger adolescents with and without LD, which will be helpful for the further research and development of effective approaches in the context of special-educational interventions. Moreover, triangulation of the methods and approaches applied means that more valuable and reliable research data was gained in this process.

On the basis of the documentation survey, it can be concluded that all the participating adolescents with LD have individual learning help or

additional professional help, that they receive didactic-methodical adjustments and modifications regarding knowledge assessment and evaluation, are treated in the Centre for Children, Adolescents and Parents, Ljubljana, have strong fields of interest and intense home help and support. The adolescent without LD has no learning help, except for occasional assistance provided within the family. All four adolescents decided to continue their education in suitable high school programmes.

Acording to the transcripts of the interviews with the adolescents with LD and the adolescents without LD and the child without LD who participated in this case study, have support and help offered by the home environment with regard to establishing effective motivational, cognitive and metacognitive learning strategies. Overall, the parents' expectations encourage the younger adolescents examined in this study to show greater independence and responsibility. Based on the answers that were obtained, three main categories of home-based support were identified, as follows:

A) Home support in learning, as defined by the mother of the adolescent with dyslexia: 'Everything has to be looked upon positively ... I always say to him, even if you did something wrong, tell me, because everything can be solved.' The mother of the adolescent with ADHD noted: 'I help him with learning; when he gets a good grade, his self-esteem rises.' The mother of the adolescent who is a slow learner stated: 'He needs regular help with reading and reading comprehension. Both my husband and I regularly check his knowledge of the current subject matter.' Finally, the mother of the adolescent without LD said: 'I encourage him regularly, meet with teachers in office hours where I am informed if he does his homework or not and then we talk about it at home. Brothers and sisters help if needed.'

B) Organisation of learning, as defined by the mother of the adolescent with dyslexia: 'He has a monthly and weekly plan of learning. When he lacks energy, he needs to be encouraged, especially in subjects he doesn't like. He studies in his room, with light music in the background.' The mother of the adolescent with ADHD said: 'He studies more or less regularly, on a daily basis, depending on the motivation and contact with the teacher. He studies in his room. Studying is organised according to his training sessions.' The mother of the adolescent who is a slow learner stated: 'He is doing his homework more regularly this school year. My husband and I do not check his homework. He studies independently only if he is reminded to. He studies in his room or in the living room when we revise the subject matter ...' Finally, the mother of the adolescent without LD noted: 'He studies regularly this school year. He is committed and

persistent, especially with the subjects where he is successful. He studies in his room, in the evenings, and he does his homework when he comes home from school.'

C) Learning goals and further schooling, as defined by the mother of the adolescent with dyslexia: 'His goal is to attend school abroad (his brothers are his role models) ...' The mother of the adolescent with ADHD said: 'He cannot wait to finish primary school and change the environment ... It is important to be inventive and to be hardworking.' The mother of the adolescent who is a slow learner explained: 'He learns independently the subject matter he finds interesting. We encourage him to use the computer. We wish he was independent, inventive and would not come under the influence of some bad person.' Finally, the mother of the adolescent without LD stated: 'I wish he would improve his working and learning habits. That he wouldn't rely on other's people opinions, but his own.'

The transcripts of the interviews with the teachers show that the adolescents with LD, who participated in this case study, are passive in learning, do not seek additional information and help, are less motivated with regard to learning, and less persistent, and that it is only in the final year of primary school that they have been acquiring organisational and SRL habits. The adolescents without LD was able to pay attention and took an active part in the classes. On the basis of the participants' answers, two main categories of passive or active learning were created, as follows:

A) Seeking more information, as defined by the teacher of the adolescent with dyslexia: 'He doesn't seek additional information, doesn't put himself forward, is passive in class. He doesn't ask for help from the teacher or peers, perhaps his schoolmates ... I don't know him very well, because he doesn't take part in excursions, where I can learn about the students more.' The teacher of the adolescent with ADHD stated: 'He is passive in classes, doing only the tasks given. More interest is noticed in English class, which is his strongest field. He doesn't seek help from peers and teachers. His mom organises the notes for him.' The teacher of the adolescent who is a slow learner explained: 'He doesn't ask about the exam assessment details. He is quickly satisfied with task demands and doesn't seek additional information. A passing grade is enough for him. He follows instructions, is passive and compliant.' Finally, the teacher of the adolescent without LD said: 'He doesn't seek additional information, is hardworking and many times a role model to his classmates. He follows the instructions and asks for help from the teacher or peers.'

B) Learning organisation, self-regulation and motivation, as defined by the teacher of the adolescent with dyslexia: 'He doesn't do all his duties before the deadline, because he often gets sick. He doesn't do the best at learning. He listens in class and makes notes, he doesn't put himself forward and is not active. He makes agreements about the dates of his oral exams independently. He rarely volunteers for additional assignments, because he has a lot of free-time obligations.' The teacher of the adolescent with ADHD stated: 'In the past, he postponed studying – it is better now. He doesn't do his homework regularly. He has bad learning strategies and quickly gives up. He is passive in class, reserved, doesn't ask questions. He makes agreements about his oral examinations independently. He had problems in the previous school as well and was anxious and consequently failed to be present at school.' The teacher of the adolescent who is a slow learner reported: 'This school year he is doing the assignments more regularly and is showing more self-initiative. He makes agreements about adjustments in the class and minimal or basic knowledge standards independently. With individual help, he says that he has no interest in the subject matter and that he doesn't like literature.' Finally, the teacher of the adolescent without LD stated: 'In this school year he does his homework regularly, follows the class demands, has his school accessories and plans his learning. He cooperates and listens in class.'

The transcripts of the answers given by the younger adolescents are in Table 1, which shows a summary of the different compensation strategies used for learning, including both cognitive and semi-cognitive learning strategies, with their parents provided help in this regard. The transcripts also show that the adolescents want to understand the focal subject matter and use it in practical situations. Two of the adolescents with LD expressed a clear fear of failure and feelings of helplessness with regard to specific school subjects, showing several signs of defensive pessimism and learned helplessness. All the participating adolescents had developed suitable motivational strategies with regard to self-affirmation, self-encouragement and self-awarding, by identifying their successes in their areas of interest.

Table 1

Transcription of the answers from the semi-structured interviews with the younger adolescents

	Cognitive structure	Cognitive, metacognitive strategies	Motivational structure	Motivational strategies
Adolescent with dyslexia	– It is important to me to say the subject material in my own words, and to tell myself the main points.	– I write down the main points of the subject matter. – When I don't understand, I ask classmates or use the Internet.	– Before the oral exam, I was fine. The moment I sat down at the desk, my head started to spin, a force was pulling me to the left and I almost fell, I was so scared. – Sometimes I cannot sleep a week before the exam.	– I study regularly, sometimes I doubt my success. But mostly not. – I believe I would postpone studying if I didn't have training, and it would be harder to organize my time.
Adolescent with ADHD	– History is hard for me to learn, because I mess up the data or forget the years. – I do a lot of exercises at Math to really get familiar with it. – It is easier to me not to learn from the books only, but also the way we did at summer camp school.	– Mom makes me notes because I get confused. – I underline important words and write the explanations. I like it if there is not a lot of text.	– I don't know if I can learn everything. When I get a bad grade, my motivation falls. – I influence my success by listening in school, focusing, and studying.	– I try to put more energy into learning. I don't go out during the week, like my classmates do. – Sometimes it happens that my goals are too high for my knowledge. – I wish I had good grades but it doesn't work. – At sport, I get power and motivation when I am good at what I do. Sport means relaxation to me; to forget about school. It is easier to me to express my feelings with dancing.
Adolescent who is a slow learner	– In History, I use familiar words to help me remember the text. – In Math, my father helps me by giving me exercises that I practice until I can do them.	– First, I study what is easy, and then what is hard. – Mom and Dad and my teacher in school make notes for me.	– I don't like music classes and I am not interested, and this is why I think I can't learn it. I study just before the oral exam. – Learning about the 2nd World War in History was easy for me, because I was interested and I got a very good grade.	– When studying, I always think positive. – I am successful in Computer Science, where the teacher gave me a chance to clean the computers.

	Cognitive structure	Cognitive, metacognitive strategies	Motivational structure	Motivational strategies
Adolescent without LD	– When studying, it is important to understand the subject matter and to use the knowledge.	– I read the subject matter aloud and repeat it. – I know I have to do my best and to learn regularly.	– I am nervous before oral exams and get lower grades, compared to written tests. – When I am anxious, I revise or tell myself a positive thought.	– A good grade motivates me to learn more easily; otherwise I know I have to study to be successful in life.

Due to the results of the observation with participation, the following details were observed (Table 2): Younger adolescents with LD partly use declarative and procedural knowledge (with help from their social resources), while the adolescent without LD also uses conceptual knowledge. All the adolescents use the strategy of repetition, and to some extent also the organisational and elaborative strategies. The motivational beliefs in younger adolescents with LD are less effective and provide less learning support in comparison to that seen in the child without LD. Here it should be noted that the motivational strategies the adolescents used are mainly established based on the help provided by the social resources available in the home environment. The applied motivational regulation strategies differ among the three adolescents with LD, since one of them has quite a clear understanding of the goal of such strategies, whereas the other two need help from their social environments to connect their behavioural intentions with the plans they have for their learning activities. In contrast, the younger adolescent without LD is able to take care of his own learning activities plan, which he sometimes changes as the need arises.

Table 2

Observation with participation – six-component adaptable learning model

3. Cognitive regulation strategies	6. Motivational regulation strategies
Adolescent with dyslexia: creates activity plans for individual subjects; monitors his progress; assesses his goal achievements; is aware of his strong areas, deficiencies, and compensation strategies. **Adolescent who is a slow learner:** studies without any activity plans, mainly before tests or other assessments; is aware of the need for regular studying, which he partially achieves. **Adolescent with ADHD:** his mental representation of his learning goals is not clear, and these goals are not specific, and are simply aimed at getting good grades; his activity plans are linked to the effort and time he puts into learning. **Adolescent without LD:** his activity plans are linked to his regular educational goals.	**Adolescent with dyslexia:** keeps to his activities plans regardless of the obstacles met, since he keeps in mind a mental representation of the goal. **Adolescent who is a slow learner:** this learner's goal-orientation with regard to learning is linked to topics of interest in the subject matter; individual facts attract his attention and increase his desire to remember them and learning more effectively. **Adolescent with ADHD:** his mother helps him connect his behavioural intentions with his activity plans for learning; the child stated that the goals for his grades are too high. **Adolescent without LD:** his activity plans change when obstacles are encountered.

2. Cognitive strategies **Adolescent with dyslexia**: uses organizational and elaborative strategies (with help from parents and tutors); uses the strategies of self-checking and repetition. **Adolescent who is a slow learner**: uses organizational and elaborative strategies (with help from parents and teachers) and repetition strategies (independently). **Adolescent with ADHD**: mainly uses repetition strategies, and sometimes elaborative and organizational strategies (with help from his mother). **Adolescent without LD**: mainly uses repetition strategies, and rarely applies other approaches.	**5. Motivational strategies** **Adolescent with dyslexia**: creates his own learning intentions, such as goals that are connected with his further education; uses help from various social resources (mother, tutor, and special education teacher). **Adolescent who is a slow learner**: avoids and postpones learning; uses help from social resources (both parents and teacher). **Adolescent with ADHD**: often has negative feelings and anxiety, which he cannot regulate by himself, and this is why he needs modified assessments and tests; uses his social resources (parents and teacher). **Adolescent without LD**: avoids regular effort; less use of social resources; uses a suitable attributional style.
1. Content fields **Adolescent with dyslexia**: uses procedural and declarative knowledge; concepts about learning are linked to the use of knowledge in real life. **Adolescent who is a slow learner**: sometimes uses declarative knowledge and procedural knowledge (with parents' help). Concepts about learning and learning motivation are linked to the teacher of the subject. **Adolescent with ADHD**: needs a lot of practice to remember procedural knowledge; declarative knowledge is partly gained, since it is linked to weak processes of remembering and forgetting. **Adolescent without LD**: uses procedural and conceptual knowledge.	**4. Metacognitive knowledge and motivational beliefs** **Adolescent with dyslexia**: his beliefs about learning more difficult subjects are linked to extrinsic motivation; his goal-orientation is to finish primary school and continue schooling. **Adolescent who is a slow learner**: his beliefs about his own learning capacities are overestimated. **Adolescent with ADHD**: his negative beliefs about his attention capacities, memory, motivation and learning efficacy increase the anxiety he feels. **Adolescent without LD**: his beliefs about his capacities correspond to the use of strategies and are goal-oriented.

Findings that relate to SRL in individual adolescents

The younger adolescent with dyslexia, who has a great deal of support from his home environment, in addition to professional support and extra tutoring hours, uses various cognitive learning strategies and a number of metacognitive learning strategies, but only partly uses the motivational strategies of self-obstruction, defensive pessimism, and learned helplessness. In contrast, he uses strategies of self-affirmation to a greater extent, especially with regard to sports. This adolescent is also able to define well the acquisition of declarative, procedural knowledge, and knowledge about circumstances. This participant's implicit conceptions of learning encourage him to develop his learning-to-learn competence. Moreover, his motivational structure is shaped by beliefs in his own efficacy in some school subjects, interest in learning, and a positive goal-orientation on terms of setting learning and personal goals. While the teacher noted the adolescent's passivity in a school context, the results of the observations, documentation survey, and questionnaires indicate that this individual is an active learner, showing initiative and applying adequately developed

cognitive, metacognitive and motivational strategies, along with an appropriate attributional style. It is possible that this adolescent felt some test anxiety, which reduced his ability to engage in active learning and to show initiative, with both these being important components of academic self-esteem, and this would fit with research findings in the literature about significantly decreased learning self-esteem in learners with LD (Chapman, 1988).

The younger adolescent with ADHD uses the most strategies related to seeking help, and especially support from home, and this is because of his learned helplessness, defensive pessimism and feelings of test anxiety, as expected according to the manifestation and symptoms of ADHD. This is why this adolescent is less independent and more passive at learning, although it should be noted that, from a developmental perspective, he showed signs of gaining insights into various learning-to-learn competencies, and gradually changed from conscious incompetence to conscious competence. He uses cognitive strategies of repetition independently, while he applies the organisational and elaborative strategies with the help of the home environment. The adolescent's metacognitive strategies of planning, monitoring and regulating his own learning have not been developed yet, due to his problems with regard to an attention deficit, hyperactivity and test anxiety. He attributes his learning success to internal and external factors, which hinders his own progress as an independent learner. Finally, the motivational strategy of self-affirmation helps this learner with ADHD to feel protected, and thus experience success.

The adolescent who is a slow learner shows less insight into his cognitive structure of learning, due to his poorer cognitive functions, uses simpler cognitive learning strategies, and needs external help to direct his learning. This adolescent's metacognitive strategies of planning, monitoring, and regulating learning have not yet been developed, although he has made some progress in these areas. Moreover, the boy's beliefs about his own efficacy are not entirely realistic, while his goal-orientation is linked to rather narrow educational interests. The use of the strategies of goal-oriented monologue and encouragement have been able to maintain this adolescent's interest in learning, and overall these conclusions are supported by the comments of the boy's mother and teacher with regard to self-regulation.

Finally, the adolescent without LD does not recognise his cognitive, metacognitive and motivational strategies, but uses some of them, in line with the findings reported in the review of the literature. He applies a beneficial attributional style, supported by a realistic understanding of his own self-esteem, suitable beliefs about his efficacy, and appropriate personal and learning goals within his home and school environment.

Discussion and conclusion

This study offers insights into the SRL of four younger adolescents, three with LD and one without. Moreover, on the basis of its qualitative analysis with regard to the cognitive, self-regulative, metacognitive, and motivational strategies used by the adolescents, as gained by triangulation of both methods and resources, this study presents a clear outline of the participants' self-regulation skills (Boekaerts & Cascallar, 2006; Garcia Duncan, & McKeachie, 2005). The results obtained via observation give an objective picture of what learners did, in contrast to what teachers and mothers assumed learners thought they usually do. The results confirm the significant impact of parents' active participation in the education of their children, with this resulting in greater achievement and more motivation in a school context (Grolnick, Deci, & Ryan, 1991). The findings with regard to each case also confirm that the adolescents with LD who participated in this case study often put more effort and energy into seeking help from their peers and adults when doing schoolwork, or even attempt to convince others to complete their schoolwork for them (Grašič et al., 2010). All the adolescents with LD in this study tend to use cognitive strategies related to repetition of the subject matter, and only apply cognitive and elaboration strategies with the aid of social resources.

In general, the adolescents with LD show the motivational strategies of learned helplessness, test anxiety and defensive pessimism, which are congruent with the findings in the literature (Borkowski & Thorpe, 1994). These children also have a higher probability of feeling stress, as reported by themselves, and social conflicts, as reported by their teachers and parents, and thus more efforts need to be made to provide them with a familiar and safe environment within which learning can occur (Grolnick et al., 1991). All the adolescents who participated in this study show developed motivational strategies of self-confirmation, enabling them to protect their own self-esteem based on areas other than school. The teachers describe all the children as passive learners, with insuficient learning motivation and unsuitable organisation and SRL strategies. The learners are thus not able to identify their strong areas or sucess factors, which is possible reason for the co-occurence of secondary LD (test anxiety, passivity, and learned helplessness).

The intervention models in Slovenia that have currently been developed, which some primary and secondary schools have started to introduce, encourage the early development of some of the skills needed to cope efficiently with problems, search for various solutions when difficulties arise, and enhance the learners' skills with regard to assertiveness and communication (Kiswarday

Riccarda, 2012), all of which is important for adolescents with LD, both for their present and future schooling, as well as their personal and professional lives. The findings of this study can serve as a basis for defining guidelines for the provision of additional professional help in encouraging children to achieve higher educational goals, to counsel parents to assist their children with LD to become more independent, and to help teachers as they attempt to understand, make realistic assessments of, and encourage the development of adolescents with LD. Such moves could help prevent chain reactions (Kiswarday Riccarda, 2012) that can cause more secondary LD, such as emotional and behavioural problems (Magajna, 2015). Since this is a case study, we emphasise that the conclusions are based on a small number of cases and thus cannot be applied to an entire population with similar characteristics. With regard to future research in this area, further studies should aim to collect comparative data from a larger sample of adolescents with LD. Moreover, more precise observations are needed of the various behavioural indicators that indicate the use of SRL strategies in different groups of younger adolescents with LD, with a focus on the related contextual factors.

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References

Barkley, R. A. (2005). *ADHD and the nature of self-control*. New York, NY: Guilford Press.

Boekaerts, M. (1996). Self-regulated learning at the junction of cognition and motivation. *European Psychologist, 1*(2), 100–112.

Boekaerts, M., & Cascallar, E. (2006). How far have we moved toward the integration of theory and practice in self-regulation? *Educational Psychology Review, 18*(3), 199–210.

Bonifacci, P., & Snowling, M. J. (2008). Speed of processing and reading disability: A cross-linguistic investigation of dyslexia and borderline intellectual functioning. *Cognition, 7*(3), 999–1017.

Borkowski, J. G., & Thorpe, P. K. (1994). Self-regulation and motivation: A life span perspective on underachievement. In D. H. Schunk & B. J. Zimmerman (Eds.), *Self-regulation of learning and performance: Issues and educational applications* (pp. 45–75). Hillsdale, NJ: L. Erlbaum Associates.

Bransford, J., Brown, A. L., Cocking, R. R., & National Research Council (U.S.) (1999). *How people learn: Brain, mind, experience, and school*. Washington, DC: National Academy Press.

Carlson, C. L., Booth, J. E., Shin, M., & Canu, W. H. (2002). Parent- teacher- and self-rated motivational styles in ADHD subtypes. *Journal of Learning Disabilities*, *35*(*2*), 104–113.

Chapman, J. W. (1988). Learning disabled children's self-concepts. *Review of Educational Research*, *58*, 347–371.

Cooter, K. S. & Cooter, R. B. (2004). One size doesn't fit all: Slow learners in the reading classroom. *Reading Teacher, 57*(7), 680–684.

Garcia Duncan, T., & McKeachie, W. J. (2005). The making of the Motivated strategies for learning questionnaire. *Educational Psychologist, 40*(2), 117–128.

Grašič, A., Kavkler, M., Magajna, L., Lipec-Stopar, M., Bregar-Golobič, K., Čačinovič-Vogrinčič, G., & Janželj, L. (2010). *Težave dijakov pri učenju v poklicnem in strokovnem izobraževanju: opredelitev, prepoznavanje, oblike in mreža pomoči (analiza stanja)* [Learning difficulties of the students in career and technical education: definition, recognition, forms and network of help (situation analysis)] (Research report). Retrieved from http://www.cpi.si/files/cpi/userfiles/Datoteke/Publikacije/Tezave_dijakov_pri_ucenju_raziskovalno_porocilo.pdf

Grolnick, W. S., Deci, E. L., & Ryan, R. M. (1991). The inner resources for school performance: Motivational mediators of children's perceptions of their parents. *Journal of Educational Psychology*, *83*(4), 508–519.

Hofer, B., Yu, S., & Pintrich, P. R. (1998). Teaching college students to be self-regulated learners. In D. H. Schunk & B. J. Zimmerman (Eds.), *Self-regulated learning: From teaching to self-reflective practice* (pp. 57–86). New York, NY: Guilford Press.

Kiswarday, Riccarda, V. (2012). *Stališča učiteljev do možnosti razvijanja rezilientnosti pri učencih in dijakih* [Teachers'attitudes towards the possibilities of developing resilience in pupils and students. Unpublished Doctoral Dissertation.] Ljubljana: Pedagoška Fakulteta Univerze v Ljubljani.

Kvale, S. (1996). *InterViews: An introduction to qualitative research interviewing*. Thousand Oaks, CA: Sage.

Magajna, L., Kavkler, M., Čačinovič-Vogrinčič, G., Pečjak, S., & Bregar Golobič, K. (Eds.) (2008). *Učne težave v osnovni šoli: koncept dela* [Special needs in elementary school: the concept of work]. Ljubljana: Zavod republike Slovenije za šolstvo.

Magajna, L. (2015). Sodobne raziskave spoznavnih procesov in psiholoških virov pri specifičnih motnjah učenja: izzivi za razvojno delo in prakso. In Z. Pavlović (Ed.), *60 let podpore pri vzgoji, učenju in odraščanju* [60 years of supporting education, learning and growing-up] (pp. 141–160). Ljubljana: Svetovalni center za otroke, mladostnike in starše Ljubljana.

Malik, N. I., Rehman, G., & Hanif, R. (2012). Effect of academic interventions on the developmental skills of slow learners. *Pakistan Journal of Psychological Research, 27*(1), 135–151. Retrieved from http://www.pjprnip.edu.pk/pjpr/index.php/pjpr/article/viewFile/37/29

Mitchell, D. (2014). *What really works in special and inclusive education: Using evidence-based teaching strategies.* London, UK: Routledge.

Paulino, P., Sá, I., & Lopes da Silva, A. (2016). Self- regulation of motivation: Contributing to students' learning in middle school. *The European proceedings of social and behavioural sciences EpSBS.* Retrieved

from Future Academy website: http://dx.doi.org/10.15405/epsbs.2016.05.1

Panadero, E. (2017). A review of self-regulated learning: Six models and four directions for research. *Frontiers in Psychology, 8,* 422. Retrieved from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5408091/

Peklaj, C. (2012). *Učenci z učnimi težavami v šoli in kaj lahko stori učitelj* [Learners with learning difficulties in school and what a teacher can do]. Ljubljana: Filozofska fakulteta Univerze v Ljubljani.

Pintrich, P., & De Groot, E. (1990). Motivational and self-regulated learning components of classroom academic performance. *Journal of Educational Psychology, 82*(1), 33–40.

Raggi, V. L., & Chronis, A. M. (2006). Interventions to address the academic impairment of children and adolescents with ADHD. *Clinical Child and Family Psychology Review*, *9*(2), 85–111.

Raduly-Zorgo, E., Smythe L., & Gyarmathy, E. (2010). *Disleksija - vodnik za tutorje* [Dyslexia - a guide for tutors]. Ljubljana: Društvo Bravo.

Reid, G. (2002). *Nekaj v prijateljsko pomoč – vodnik za starše otrok z disleksijo* [With a little help from my friends – A guide for parents of dyslexic children] Ljubljana: Društvo Bravo.

Reid, G. (2006). Managing attention difficulties in the classroom: A learning styles perspective. In G. Lloyd & G. J. Stead (Eds.), *Critical new perspectives on AD/HD* (pp. 198–215). London, UK: Routledge.

Reiter, A., Tucha, O., & Lange, K. (2004). Executive functions in children with dyslexia. *Dyslexia*, *11*, 116–31.

Schunk, D. H., & Ertmer, P. A. (2000). Self-regulation and academic learning. In M. Boekaerts, P. R. Pintrich, & M. Zeidner (Eds.), *Handbook of self-regulation* (pp. 631–646). San Diego, CA: Academic Press.

Sideridis, G. D. (2009). Motivation and learning disabilities: Past, present, future. In K. R. Wentzel & A. Wigfield (Eds.), *Handbook of motivation at school* (pp. 604–625). New York, NY: Routledge.

Shaw, S. R. (2010, February). Rescuing students from the slow learner trap. *Principal Leadership*, 12–16. Retrieved from https://www.nasponline.org/Documents/Resources%20and%20Publications/Handouts/Families%20and%20Educators/Slow_Learners_Feb10_NASSP.pdf

Vogrinc, J. (2008). *Kvalitativno raziskovanje na pedagoškem področju* [Qualitative research in the area of education]. Ljubljana: Pedagoška fakulteta Univerze v Ljubljani.

Wolters, C. A. (2011). Regulation of motivation: Contextual and social aspects. *Teachers College Record, 113*(2), 265–283. Retrieved from http://www.tcrecord.org/library/Abstract.asp?ContentId=15977

Wolters, C. A., Benzon, M. B., & Arroyo-Giner, C. (2011). Assessing strategies for the self-regulation on motivation. In D. H. Schunk & B. Zimmerman (Eds.), *Handbook of self-regulation of learning and performance* (pp. 298–313). New York, NY: Routledge.

Zimmerman, B. J. (2000). Attaining self-regulation: A social cognitive perspective. In M. Boekaerts, P. R. Pintrich, & M. Zeidner (Eds.), *Handbook of self-regulation* (pp. 31–40). San Diego, CA: Academic Press.

Zimmerman, B. J., & Martinez-Pons, M. (1988). Construct validation of a strategy model of student self–regulated learning. *Journal of Educational Psychology*, *80*(3), 284–290.

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Certification Policy: Reflections Based on the Chilean Case of the INICIA Test for Beginner Teachers

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The main purpose of this paper is to analyse a specific educational policy in a national context: INICIA (In Spanish: Start) in Chile. Enacted in 2008, this policy evaluates beginning teachers at the national level before they start their professional careers in schools. The INICIA has been categorised as a certification policy to measure what teachers know in relation to a certain disciplinary area. At present, INICIA is voluntary for beginning teachers. However, due to policy changes, a passing score on it will soon be necessary to become a nationally qualified teacher in Chile. Through a holistic analysis of the policy, we develop a complex picture of the problem INICIA generates as a requirement for certification. According to our analysis, INICIA has been misunderstood as a policy that provides quantitative and qualitative information about a teacher's performance. In actuality, INICIA merely provides information about a specific moment in a teacher's professional development and cannot be used as a predictor of future performance.

Keywords: policy, certification, INICIA test, teacher's performance

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Politika certificiranja: refleksije, osnovane na čilskem primeru testa INICIA za učitelje začetnike

Felipe Aravena in Marta Quiroga

Glavni namen prispevka je analiza specifičnih edukacijskih politik v nacionalnem kontekstu INICIA (v španščini: start) v Čilu. Zakon, ki evalvira učitelje začetnike na nacionalni ravni, preden začnejo profesionalno kariero v šolah, je bil sprejet v letu 2008. INICIA je kategoriziran kot politika certificiranja, ki meri, kaj učitelji vedo v povezavi z določeno disciplino oziroma njenim področjem. Trenutno je ta prostovoljen za učitelje začetnike. Glede na spremembe politik bo uspešno opravljen test kmalu potreben za to, da postaneš nacionalno usposobljen učitelj v Čilu. Prek holistične analize politik razvijemo kompleksno sliko problema INICIA, ki ga ta ustvarja kot zahteva za certificiranje. Naša analiza je pokazala, da je bil INICIA narobe razumljen kot politika, ki zagotavlja kvantitativno in kvalitativno informacijo o učiteljevi uspešnosti. Dejansko INICIA samo zagotavlja informacijo o specifičnem momentu v učiteljevem profesionalnem razvoju in ne more biti napovedovalec prihodnje uspešnosti.

Ključne besede: politike, certificiranje, test INICIA, učiteljeva uspešnost

Introduction

In the previous decade, the Chilean national agenda has prioritised the establishment of a high-quality education system (The Ministry of Education of Chile, 2012). This goal requires the creation of a secure mechanism that measures the quality of the system. In so doing, an initial focus on the quality of early teacher training has become a crucial starting point in the overall improvement of the system (Avalos, 2003; Wilson, Floden, & Ferrini-Mundy, 2001). Thus, starting with a reform in initial teacher training was an intentional and conscious decision. Educational policymakers in Chile made a deliberate, political decision that positioned teachers at the top of the education system as key agents of change. International research and comparative studies from across the world showing strong evidence that teachers have the most important influence on student outcomes aided this conscious decision (Darling-Hammond & Sykes, 2003). Other perspectives and approaches also show a connection between the quality of the education system and the quality of initial teacher training processes (Wilson, Floden, & Ferrini-Mundy, 2001). As a result, Chile has selected a coherent path towards improving its education system.

In this scenario, the main purpose of this paper is to analyse a Chilean policy of teaching training processes called INICIA. On a national level, this policy evaluates beginning teachers before they start their professional careers in schools. Starting in 2008, the Chilean government mandated the INICIA as a 'final' test to measure and validate teachers' knowledge before they graduate and become professional educators. INICIA is not an acronym; it is the Spanish word for 'start'. At present, taking the INICIA test is voluntary for beginning teachers. However, due to policy changes, a passing score on the INICIA will soon be necessary to become a nationally qualified teacher in Chile. Using a holistic policy analysis approach, we present a complex evaluation of INICIA. Such an analysis requires the identification of several viewpoints and factors conducive to our holistic understanding of the costs and benefits of INICIA concerning the Chilean education system. Thus, the research question of this study is: What are the future implications of INICIA for the Chilean education system?

The current study is organised by the following structure: the first section provides a general overview of INICIA, placing the test within a larger educational context. This is followed by a discussion of policy trends at the international level, such as accountability process, competition, measurements and comparative competitions. We then analyse the tension INICIA has caused within the Chilean educational system. This breakdown leads to the fourth

section, which analyses what changing from an 'educator state' to an 'evaluator state' implies for Chile. In the last section, we will provide a rhetorical analysis of INICIA by highlighting implicit language within the policy. Finally, we will provide conclusions, future implications and recommendations for implementation of this specific policy.

Contextualisation: What is 'INICIA' (Start)?

Taking into consideration the multifaceted textualisation of ideological positions, educational policies in Chile are being designed in a complex scenario dominated by multiple and simultaneous reforms (Mizala & Romanguera, 1998; Mizala & Torche, 2012). Thus, Chile as a developing country is attempting to improve its rank within the OECD. Because of this goal, Chile tends to assimilate waves of measurements, competition and control as international trends (Razvy & Lingard, 2010). To achieve this goal, the Chilean government has spent the last decade focusing their efforts on improving the education system in different areas. These areas include quality and equity, education access, teachers' professional development, infrastructure, curriculum policies, and training programmes (Brun & Hinostroza, 2014). However, one area dominates the others regarding the enhancement of the Chilean education system as a whole: the teacher training process. The Ministry of Education of Chile (2015) currently places significant focus on initial teacher training programmes. It is within this context that INICIA emerged as policy.

Teacher education in Chile is in the hands of universities and pedagogical institutions. These organisations can be private or public. To become a teacher in Chile, it is necessary to study for at least eight semesters at one of these institutions (Avalos, 2003). In Chile, study centres do not provide teacher certification. Instead, each university creates its own standards, curriculum, and strategic alliances with schools that serve as practice centres for teachers in training. Generally, universities structure initial teacher training programmes into three stages: initial practice, intermediate practice, and final practice (Avalos, 2003). During the initial practice stage, student teachers are expected to understand the school culture, the role of the teacher and the learning routines of the students. Generally, some universities design spaces for classroom interventions, while others focus only on the observation and contextualisation of teaching. In the second stage, most trainee teachers visit an existing class for a period to teach a course with real students. Finally, in the third stage, teachers in training take charge of a course for a whole semester. In addition, they make portfolios about their performance that reflect on the learning outcomes of

their students and project challenges in their future as a professional teacher. In this sense, it is possible to point out that Chile does not employ a singular initial teacher training method. Although all Chilean teacher training programmes utilise an apprenticeship model, each university designs and utilises its own way to train teachers. Consequently, a national model for teacher training is non-existent in Chile. The context of the varied teacher-training organisations allows INICIA to emerge as a way to standardise the training processes and the results of teachers in training.

The first group of teachers evaluated by INICIA in 2008 yielded low outcomes. The results indicated that 60% of novice teachers did not have subject matter competency (Ministry of Education of Chile, 2015). In essence, 6 out of 10 novice teachers did not possess the minimum knowledge required to be a teacher in the Chilean school system. The results of the following years were not much different. Low scores raised questions for researchers, teachers, policymakers, and stakeholders, and caused INICIA to become a controversial method of measuring performance and university quality. As a result, the Ministry of Education of Chile (2012) emphasised that: "[...] INICIA was an evaluation system created to measure the quality of initial teaching processes, changing from a structural policy related to formal preparation of teachers into an evaluation system […]." (p. 8)

This modification caused controversy because it changed the role of INICIA in educational policy. Currently, it is understood as an evaluation system rather than a formative assessment for teachers. Because of this change, the policy's purpose is more closely aligned with control and accountability rather than teacher assessment.

In addition, INICIA identifies four sections to evaluate: "[…] disciplinary knowledge; pedagogical knowledge; communication skills and basic ICT (the Information and Communication Technologies) skills […]." (p. 10). For the Ministry of Education of Chile (2012), the main purpose of INICIA is: "[…] to display publicly vital information about teaching training process to four stakeholders, the universities, evaluated teachers, policy makers, and general community […]." (p. 10). Today INICIA is voluntary; however, in the coming years (stipulated but not detailed) the test will be compulsory for teachers who want to apply for jobs in the public-school system. The test will not be required for positions at private schools. This policy also includes economic incentives because novice teachers who score in the top 30% on the test will receive higher salaries (Meckes & Bascopé, 2012). In contrast, teachers who obtain unsatisfactory results will have the opportunity to retake INICIA with the support of performance-enhancing programmes provided at universities.

> […] Implications for training institutions: if 30% or more of the graduates in pedagogical careers or programs at the same institution take the exam for the first time in the same year and obtain an unsatisfactory score, said institution shall offer at least a free, semester-long remedial course for those who wish to obtain a higher score […]. (The ministry of Education in Chile, 2017, p. 13)

INICIA test results are public, which is problematic because it places too much responsibility on the teachers; and not enough on the inadequate preparation provided by universities. Results from the last INICIA test are summarised in four main points:

1. In general, less than a third of the graduates that took the exam answered more than 75% of the questions correctly.
2. The majority of the graduates achieved scores between 50% and 74% correctness.
3. With the exception of some disciplines, performance levels were similar for questions regarding disciplinary knowledge and didactics.
4. In the Abilities in Written Communication Test, the majority of graduates demonstrate a competent level of argumentation. (The Ministry of Education, 2014)

Policy trends: Globalisation and Chile

Today's globalisation affects education policy trends not only on the local and national levels (as in the past) but on an international level as well. As the process of globalisation has integrated and configured a new social context, it is now necessary to locate certain policies within a global system (Rizvi & Lingard, 2010). In other words, stakeholders must understand the complex relationships between globalisation, national contexts and policies. Due to the interconnectedness of global communities, policy is no longer merely text. Policy in the global social context represents action that changes the course of the future. As a result, new policies should be constructed to address the difficulties and opportunities within a globalised world (Ball, 1998; Marginson, 1999; Rizvi & Lingard, 2010; Tikly, 2001). International and national contexts implicate the need to understand policies from a socio-cultural perspective.

Levin (2010) pointed out that the challenge of educational improvement is shared throughout the world. For this reason, national governments have a vested interest in functioning within an interconnected world, which by extension represents a new era of educational reform for countries across the globe.

Now more than ever, it is vital that educational systems create opportunities for stakeholders to connect with the most remote areas around the world. Thus, educational policymakers from many different nations now share the same challenge of creating and integrating national policies that plant the seeds of the worldwide future of education. Chile's national government is no exception to this burgeoning challenge.

National governments, policymakers, and educational stakeholders are building more complex, dynamic, and flexible policies that are designed to put their nations ahead in the globalised world. Competition, measurement, comparison, indicators, reforms, results, and international tests significantly regulate the decision-making processes of national governments. These factors, the importance of which is augmented by globalisation, have brought structural adjustment to educational reforms as evaluation and comparison continue to play an essential role in addressing educational challenges (Carnoy, 1999). Researchers and practitioners are pushed to meet these challenges with the creation of innovative routes to successful, internationally validated and recognised school systems. As a result, sustained evidence regarding successful teaching-learning processes is necessary when future political situations require a measurement of teachers' performance.

According to Ball (2012), the relationships between government, education, and economy are complex, unpredictable, and tend to overlap in a globalised world. These dimensions are interrelated. Ball (1998) described five main key points to illustrate how this interrelationship occurs within a new orthodoxy called globalisation:

> (1) Improving national economics by tightening the connection between schooling, employment, productivity and trade; (2) Enhancing student outcomes in employment-related skills and competencies; (3) Attaining more direct control over curriculum content and assessment; (4) Reducing the costs to government of education; (5) Increasing community input to education by more direct involvement in school decision making and pressure of market choice. (p. 122)

As mentioned, Chile is no exception to this shift in policy-making strategies. In Chile and in other education systems around the world, budgetary investment is being made in order to compete internationally. Recent neo-liberal policies make common the use of economic growth as an indicator of education quality, which creates a quantified global ranking system. Ranking educational quality according to the economy causes international competition and an unceasing comparison between different realities. As a result, supranational

companies within the education field have become the point of reference for international comparison and measurement. Two examples include the Programme for International Student Assessment (PISA) developed by the Organisation for Economic Co-operation and Development (OECD), and the Trends in International Mathematics and Science Study (TIMSS) (Klenowskl, 2012). In the Chilean context, INICIA follows the directions of these organisations because they frame individual test outcomes as comparative results. Results from the INICIA test rank an individual teacher's achievement and compares it with others at a national level. This presents a potential risk because the test has more to do with accountability and controlled processes rather than the production of a formative assessment that enhances changes and improvements.

These principles demonstrate that globalisation has brought more interdependence between international actors and within national governments, especially in the economic, educational, and policy-making spheres. Although Chile created INICIA as a valid test to measure teacher preparation, its purpose is shifting in a globalised setting. What results from INCIA will soon indicate exemplifies how policies in Chile are now formulated based on international trends within a globalisation process.

Methodology

Analysing educational policies is a complex process. They are usually understood as concepts, phrases, and serious statements (Henry, 1999). However, policies are fundamentally more complex than that as they are ideological, political facts with their own power and influence (Ball, 1998; Marshall, 2000; Ozga, 2000). Because of the complex reality of policy, this paper approaches policy analysis from a holistic point of view to highlight the relevance of discourse (Bowe, Ball, & Gold, 1992). The holistic analysis approach moves away from the traditional view of policy as a final product. This theoretical shift is essential because it examines the new terms of implementation and practice for educational policies in a globalised context. Holistically analysing the trajectory of certain policy allows us to understand factors, rhythms, and revisions within the context in which they are enacted. Fundamentally, we seek to understand what future implications INICIA presents to the Chilean education system.

Ball (1993) expressed that the concepts of discourse and processes are relevant to the policy analysis because they involve a multifaceted textualisation of ideological positions within their respective documents. Therefore, for the purpose of this study, we analysed the textualisation of INICIA in terms of statements, quotes, and extracts. This implicates an analysis of the text in

different fragments. Thus, it was implemented an emergent coding. This means that two researchers independently identified key concepts in the document. If the researcher disagreed on the importance of a certain code, that code was removed. Once the policy text was coded, some quotes were selected to illustrate the main points of the discussion.

Jager and Maier's (2009) approach was selected as the methodology to generate discourse analysis of the INICIA policy. This approach undertakes discourse analysis through context, the surface of the text, rhetorical meanings, content, ideological statements, and discourse position of the text at different analytical stages (p. 55). In this study, we focus on the content and ideological statements of the INICIA textualisation. Consequently, analytical emphasis will be placed on textual and contextual articulations and the centrality of the content (discourse construction). Ball's (1993) concept of policy is profoundly important as this paper analyses a specific policy as a whole. The objective is not to simply critique INICIA, but rather to highlight the essential tensions between INICIA and its stakeholders by analysing textualisation and statements included in the policy.

Chile's Educational System and INICIA: Tension through change

INICIA has highlighted previously hidden tensions, complexities, and dilemmas. One such tension is between the teachers' union and the ministry of education. Teachers have questioned the ability of INICIA to measure the quality of teaching performance even though it solely focuses on disciplinary knowledge, pedagogical knowledge and communication, and ICT skills. Teachers argue that policy-makers focus too much on implementing a certification process, while their efforts should be geared towards improving the quality of initial teacher training provided by universities (Goméz, 2013).

Teachers claim that the government attempts to judge teachers rather than improving the programmes that train them. This is partially true. Teaching is a process that involves time, training, and experience and INICIA only provides cognitive information collected from a specific moment in time. However, there is always resistance to change. In contrast, one senator critiqued the position of the teacher's union:

> It is necessary to contribute to the construction of better education and not defend mediocre results…presenting results from a diagnostic is not a measurement against teachers, but rather the beginning of a process that would allow the quality of the country's education to improve. (Senator Lobos, 2012, p. 1)

As such, the reaction to the policy from teachers and officials is a general rejection of new requirements. This resistance is part of a natural process of change. Rather than a political tipping point, INICIA can also be considered a hopeful starting point that invites the possibility of other policy reform in Chile. If one considers INICIA as a starting point, it is fundamental to understand that, from a theoretical perspective, INICIA exists to ensure teachers are competent in subject matter. Moreover, INICIA assumes that knowledge is indispensable to teaching. This assumption is essential, but also too simplistic when considering teacher's professional development in broader terms. Instead, policymakers should ask more questions surrounding teacher pedagogy. If the real desire of official stakeholders is to improve the educational situation in Chile, seeking alternatives in pedagogy should be a central focus. For instance, a teacher's performance can be evaluated through long-term classroom observation, and subject matter competency can be measured by a test. In this hypothetical context, the questions become: In which area do teachers want to be evaluated? How can the government measure the quality of teacher training programmes? Is it possible to determine the quality of a teacher's performance?

INICIA emerged as a *certification policy* to measure what teachers know in relation to a certain discipline. As such, it has also been misunderstood as a policy that provides quantitative and qualitative information about a teacher's performance in the classroom. For the Ministry of Education (2012): '[…] INICIA represents a policy designed to guarantee the students quality outcomes as well as representing a guarantee for children in the future […].' In reality, INICIA solely provides information about a particular moment in teachers' professional development, and it is not an automatic predictor of performance. This is especially true because there is no official data. For example, a teacher who earns a high score on the INICIA will not necessarily perform well in his or her classroom (Goméz, 2013). Unfortunately, universities have not been able to assess teachers' basic knowledge and skills over the course of their professional careers. Furthermore, if universities cannot assess these skills in the initial teacher training, who can? It seems that The Ministry of Education as a part of the Chilean government is considered a reliable body to evaluate the professional skills of Chilean teachers. What this reveals is that INCIA, administered at Chilean Universities and pedagogical institutions under the control of The Ministry of Education, is largely an accountability policy.

As mentioned, INICIA has been communicated as a policy that provides information on teachers' competency (Ministry of Education, 2015). However, the incorrect use of INICIA as a predictor of a teacher's future performance challenges its purpose. The validity of INICIA is called into question because

it was designed to measure accumulated knowledge during five years of preparation but instead is used as an instrument to predict a teacher's future performance in the classroom. This misconception has raised much attention on social-media, singling out novice teachers as the main problem that hinders the improvement of Chilean education. However, novice teachers as individuals are not the main problem. Instead, the real problems within the Chilean education system are rooted in the ineffective educational policies used to evaluate the learning process in universities and pedagogical institutions. Since universities and pedagogical institutions are largely responsible for providing an environment that generates effective teachers, confronting the misconception and misuse of INICIA is essential to solving the more salient issues of the education system as a whole.

Policies are often either viewed as an ensemble or individual policies working in tandem with others. These policies can implicitly and explicitly generate a new comprehension of the world (Rizvi & Lingard, 2010). For this reason, textualised rhetoric becomes an essential component within policies, as words, phrases, and specific concepts tend to create different socio-political frameworks. In this specific case, the language used in INICIA clearly expresses that it is a policy that provides information on teachers' performance. However, the test itself actually provides information on subject matter competency. With this dissonance in mind, it is important to note that knowledge and performance are not the same thing. However, the rhetoric used in this policy presents knowledge and performance as synonymous. Thus, to holistically analyse INICIA it is important to make a distinction between knowledge and performance within the language of the written policy.

Changing from an 'educator-state' to an 'evaluator-state'

How people react to change is influenced by how it is communicated. When policy changes are introduced, how these changes are communicated plays an essential role in the entire process of implementation (Clarke, 2013; Fullan, 2007; Goleman, 1998). As mentioned, although INICIA was intended to measure subject matter competency, the test itself was misunderstood as a way to measure teacher performance. This misunderstanding created tensions between beginner teachers and The Ministry of Education, and thus a general atmosphere of resistance.

This outcome is expected, as change often generates resistance. Fullan, (2007), Goleman (1998), and Clarke (2013) stated that the different stages of the grief process are: internalisation, reflection, and acceptance of the change.

Using the stages of grief as a framework, we see that accepting changes necessitates time and energy in order to consider future outcomes. The changes brought about by INICIA and subsequent tension between teachers and the policymakers warranted additional time and effort to settle. The Ministry of Education held a crucial position in this process, because as a stakeholder it provided qualitative information that encouraged change. As a result, policymakers needed to clarify the significance of INICIA in order to convince teachers that this policy change is necessary. Clarification would aid in teachers' understanding of INICIA as an accountability policy intended to enhance the whole education system, as well as to provide a macro-political approach to education reform.

In Chile, INICIA represents both an educational policy change and a nationwide shift towards educational accountability. Azevedo (2008) explained that evaluation and certification have profoundly impacted educational policies worldwide. Education systems place a heavy emphasis on learning goals and evaluating people based on what they know. Unique quantitative measurements are being introduced to the education field, and INICIA is a part of this trend (Mercer, Barker, & Bird, 2010). According to Azevedo (2008), the focus on quantitative measurement represents a change in perspective on education reform. He stated that a government's concern with certification processes (as opposed to evaluation processes=signifies a transition from an 'educator state' to a 'evaluator state.' This transition is a result of globalisation, a phenomenon that warrants the use of quantitative data to compete on national and international levels. When the government becomes an evaluator, it is crucial to understand that evaluation is a process, one that is cyclical and permanent (Azevedo, 2008; Darling-Hammond, 2003). This idea has not been internalised and enacted within INICIA—or more importantly, within the Chilean education system as a whole.

Changing from an 'educator state' to an 'evaluator state' is not necessarily negative. It does signify a change in rhetorical terms because the language of the policy changes the role of the Ministry of Education. For instance, the Ministry of Education acts as an inspector and evaluator of the certification process. INICIA has been explained as a tool to concretely measure a teacher's preparedness at the conclusion of their training. However, this categorisation is fallacious because evaluation is a continuous process. Ideally, INICIA would be placed within both a process of evaluation and initial teacher training practices.

A complex question: Start or End?

The Ministry of Education has implemented INICIA as the final step in formal teacher preparation. The policy states: 'The Chilean Government is applying a "final" test at the end of their degree in universities called "INICIA"' (The Ministry of Education of Chile, 2012). Making it a final step is potentially dangerous because it conceptualises INICIA as a linear process, with different stages and steps to achieve specific goals. It is risky to conceptualise INICIA as a linear policy because there are multiple factors involved when policy changes are introduced. To create reform within the education system, the complexity of policy changes and various actors, factors, variables, and unforeseen situations need to be recognised. Because teaching and learning are processes themselves, it is crucial to understand that the implementation of education policy should be gradual and continuous. Ball (2012) and Braun et al. (2011) stated that policy implementation should be understood as an interpretable process due to the diverse and simultaneous structural changes that are endorsed rather than implemented. Larrive (2000) also explained that teachers need to be reflective in order to internalise different perspectives, reforms, and the complexities of teaching. This reflective process is always a part of the cyclical learning process (Dewey, 1933). Larrive (2000) further stated that teachers are involved in a perpetual cycle of problem-solving at a multidimensional level. These essential processes of reflection and cyclical learning are not assessed by INICIA. Therefore, if INICIA hopes to embody a structural change, it should be designed as a policy that views learning as a process.

Tone, voice, and discourse are also relevant components of policy-making. If we consider teaching and policy-making as cyclical processes, we see that INICIA is neither the beginning nor end of teacher training. It is simply a part of the process. Unfortunately, because INICIA has already been implemented as a pathway to employment, conceptualising INICIA as a part of a learning cycle is complex.

We would like to point out a linguistic paradox within the policy. INICIA means 'start,' however, the test itself represents an 'end' to initial teacher training. This is not merely a play on words. This linguistic paradox is key because it symbolises an ideological framework that explains the implications of the teaching process. Since teachers are involved in a continuous and complex process (Darling-Hammond, 2003), it is necessary to create a clear conceptualisation of what INICIA implies in theoretical and practical terms. Morais et al. (2005) pointed out that a theoretical basis for teacher training should also align with principles of pedagogical discourse. Therefore, stakeholders in teacher

professional development should recognise the tones, voices and discourses that generate the realities and practical dimensions.

In 2005, the OECD emphasised the importance of formative assessment within the teaching-learning process. To best support this approach, it is crucial that policy-makers understand the relevance of formative assessment in terms of teachers' professional development. In the Chilean context, INICIA should be considered a formative assessment as it helps identify the critical issues within initial teacher training before punishing or rewarding teachers. In other words, one should question what the universities and pedagogical institutions are doing to create effective initial teacher training programmes. Scores on INICIA can help provide an understanding of initial teacher training; however, the Chilean government should collect this information in the early stages of development in order to assess initial teacher preparation and to improve the process as a whole. To mitigate possible negative effects on a teacher's professional learning, the use of formative assessments is necessary to create reform at the teacher education level.

Conclusions, Implications and Recommendations

Clearly, INICIA serves as a foundational starting point to analyse the knowledge of Chilean teachers. This information is key as INICIA provides relevant data about what beginner teachers know within their respective discipline. These types of data are also indispensable for policymakers that seek to reform the whole system. It is essential to recognise the relevance of data within the teaching and learning processes at the macro- and micro-levels. Nevertheless, regardless of the useful data INICIA provides, using this assessment as a pathway to educational reform is inadequate.

INICIA is a policy designed to validate and evaluate a teacher's knowledge. However, in practice, it is being used to provide information about teacher performance. This utilisation of INICIA is erroneous, because it solely provides information within a specific moment and is not necessarily a projection of future performance. We believe that INCIA is overly simplistic and narrow and argue that INICIA is not a useful instrument to measure the quality of novice teachers in Chile. Knowledge is a relevant part of teaching performance; however, there are many other factors that also affect it. For example, school conditions, infrastructure, emotional intelligence, goals, motivation, and training, amongst other factors also affect how teachers are able to teach and students to learn. Moreover, teachers demonstrate more than just subject matter competency when they teach, which INICIA fails to take into consideration as part of its assessment.

We also critique INICIA and its position in the global context. To do this, we recognise accountability, external pressures, and control as common denominators of international trends in educational policy. The fact that INICIA is a policy requirement for teacher certification and contributes to the overall accountability of beginner teachers links the policy with the influence of the globalised world. Knowing this, INICIA can be considered a reactive policy because it symbolises a tipping point within the Chilean educational framework within a globalised context. Based on these linkages, INICIA can also be considered a positive force because it has highlighted tensions, complexities, and dilemmas that are necessary for ongoing research, interpretation, and reflection on education (specifically initial teacher training). It is also a starting point in designing new policies surrounding teacher training. INICIA represents the first steps of education reform from which other policies could emerge in a globalised world.

We also critique INICIA in the Chilean bureaucratic context. Although Chilean universities and pedagogical institutions are important internal agents of teacher training, the ministry of education (an external agent) validates the certification process. The external evaluation demonstrates that universities and pedagogical institutions are not considered reliable enough to certify their own teachers. Unfortunately, INICIA is the external measure used to validate teachers as professionals and is done so without considering the varied existing internal processes already employed by universities and pedagogical institutions.

However, the real problem has little to do with the INICIA test itself. The salient issues surrounding INICIA emerge from the policy's rhetoric and consequent misconceptions that falsely posit it as an accurate predictor of teacher performance. Furthermore, INICIA was introduced as a policy to measure and predict *how* teachers teach. To avoid this miscommunication, stakeholders should realise the implicit and explicit language that leads to the misinterpretation of the policy. In the case of INICIA, we recommend that policymakers analyse, distinguish, clarify, and define key concepts such as policy, knowledge, and teacher performance.

Novice teachers in Chile need more support in order to adapt to a new context. Since the quality of an individual teacher cannot be measured by a single assessment, other modes of support should be provided if teacher performance is to be judged by concrete standards. We propose that INICIA should be implemented with complementary support programmes geared towards helping teachers in training achieve optimal outcomes.

INICIA has brought important issues to the forefront of the Chilean national agenda. Now, the right questions about how to improve teacher quality

are finally being asked. However, INICIA is a temporary answer to these larger questions: Why do we need to certify teachers? Why can the government not rely on universities and pedagogical institutions to assess teacher knowledge? How do we involve universities and pedagogical institutions in the process of teacher assessment? How do we improve the selection process and standards for recruiting future teachers? These are the challenges that the Chilean education system needs to address as a whole.

References

Avalos, B. (2003). *La formación docente inicial en Chile* [Initial teacher education in Chile]. Santiago: Digital Observatory for Higher Education in Latin American and the Caribbean, UNESCO.

Azevedo, J. (2008). Challenges for performance improvement in education. *Portuguese Journal of Management Studies*, *13*(1), 7–17.

Ball, S. (2012). *Global education Inc. New policy networks and the neo-liberal imaginary*. London, UK: Routledge.

Ball, S. (1998). Big policies/small world: An introduction to international perspectives in education policy. *Comparative Education, 34*(2), 119–130.

Ball, S. J. (1993). What is policy? Texts, trajectories and tool boxes. *Discourse: Studies in the Cultural Politics of Education 13*(2), 10–17. doi:10.1080/0159630930130203

Braun, A., et al. (2011). Taking context seriously: Towards explaining policy enactments in the secondary school. *Discourse: Studies in the Cultural Politics of Education*, *32*(4), 585–596.

Brun, M., & Hinostroza, J. (2014). The international handbook of cultures of professional development for teachers: Comparative international issues in collaboration, reflection, management and policy. In B. Boufoy-Bastick (Ed.), *Developing a quality culture in initial teacher education in Chile: Curricular and pedagogical aspects related to ICT integration* (pp. 681–707). Strasbourg: Analytrics.

Bowe, R., Ball, S. J., & Gold, A. (1992). *Reforming education and changing schools: Case Studies in policy sociology*. London, UK: Routledge.

Clarke, H. (2013). Context, communication and commiseration, Psychological and practical considerations in change management. *Perspectives: Policy and Practice in Higher Education, 17*(1), 30–39.

Carnoy, M. (1999). *Globalization and educational reform: What planners need to know. Fundamentals of educational planning*. Paris: UNESCO.

Darling-Hammond, L., & Sykes, G. (2003). Wanted: A national teacher supply policy for education: The right way to meet the "Highly Qualified Teacher" challenge. *Education Policy Analysis Archives*, *11*(33), 1–55. Retrieved from https://epaa.asu.edu/ojs/article/viewFile/261/387

Dewey, J. (1933). *How we think: A restatement of the relation of reflective thinking to the educative process*. New York, NY: DC Heath and Company.

Fullan, M. (2007). *The new meaning of educational change*. New York, NY: Routledge.

Goleman, D. (1998). *Emotional intelligence.* San Francisco, CA: Jossey-Bass.

Goméz, S (2013). Repensando la Formación de los Formadores en Chile [Rethinking the professional development of trainers in Chile]. *Estudios Hemisféricos y Polares*, *4*(2), 124–133.

Henry, M. (1999). Working with/against globalisation in education. *Journal of Educational Policy*, 14(1), 85–97.

Jager, S., & Maier, F. (2009). Theoretical and methodological aspects of Foucauldian critical discourse analysis and dispositive analysis. In R. Wodak & M. Meyer (Eds.), *Methods of critical discourse analysis* (2nd ed.) (pp. 34–61). London, UK: Sage.

Klenowskl, V. (2012). Raising the stakes: The challenges for teacher assessment. *The Australian Educational Researcher*, *39*(2), 173–192.

Larrivee, B. (2000). Transforming teaching practice: Becoming the critically reflective teacher. *Reflective Practice: International and Multidisciplinary Perspectives*, *1*(3), 293–307.

Levin, B. (2010). Governments and education reform: Some lessons from the last 50 years. *Journal of Education Policy*, *25*(6), 739–747.

Marginson, S. (1999). After globalisation: Emerging politics education. *Journal of Educational Policy*, *14*(1), 19–31.

Marshall, C. (2000). Policy discourse analysis: Negotiating gender equity. *Journal of Education Policy*, *15*(2), 125–156.

Meckes, L., & Bascopé, M. (2012). Uneven distribution of novice teachers in the Chilean primary school system. *Education Policy Analysis Archives, 20*(30), 1–27. Retrieved from http://epaa.asu.edu/ojs/article/view/1017

Mercer, J., Barker, B., & Bird, R. (2010). *Human resources management in education. Contexts, themes & impact*. Oxon, UK: Routledge.

Mizala, A., & Romanguera, P. (1998). School performance and choice: The Chilean experience. *Journal of Human Resources*, *35*(2), 394–417.

Mizala, A., & Torche, F. (2012). Bringing the schools back in: The stratification of educational achievement in the Chilean voucher system. *International Journal of Educational Development*, *32*(1), 132–144.

Morais, A., Neves, I., & Afonso, M. (2005). Teacher training processes and teachers' competence: A sociological study in the primary school. *Teaching and Teacher Education*, *21*(4), 415–437.

Ministry of Education of Chile. (2012). Formación docente inicial [Preparing teachers]. Retrieved from http://www.mineduc.cl/index2.php?id_seccion=4243&id_portal=79&id_contenido=19887

Ministry of Education of Chile. (2015). Antecedentes de la evaluación inicia [Antecedents of Start test]. Retrieved from http://www.mineduc.cl/index2.php?id_seccion=4243&id_portal=79&id_contenido=20558

OECD. (2005). *Education at a glance.* Paris: OECD World-Bank.

Ozga, J. (2000). *Policy research in educational settings*. Buckingham, UK: Open University Press.

Rizvi, F., & Lingard, B. (2010). *Globalizing education policy.* Abingdon, UK: Routledge.

Tikly, L. (2001). Globalisation and education in the postcolonial world: Towards a conceptual framework. *Comparative Education 37*(2), 151–171.

Vidovich, L. (2015). Globalisation and the knowledge economy/society (Topic 2). Lecture notes. Perth: The University of Western Australia.

Vidovich, L. (2015). Devolution and accountability policies (Topic 4). Lecture notes. Perth: The University of Western Australia.

Wilson, S. M., Floden, R. E., & Ferrini-Mundy, J. (2001). *Teacher preparation research: Current knowledge, gaps, and recommendations*. Seattle, WA: Center for the Study of Teaching and Policy.

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Mobile Teachers at Border Schools – Multilingualism and Interculturalism as New Challenges for Professional Development

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This article discusses the implementation of cross-border learning mobility, which has taken place in some schools and kindergartens at the tri-border area of Slovenia, Austria and Italy. The findings suggest that the implementation of multilingual and intercultural practices, which involve weekly exchanges of 'mobile teachers' from neighbouring countries, created a unique educational experience that has encouraged teachers to greater professional growth. In addition to another language, mobile teachers have brought with them various new educational approaches. Border mobility has contributed to the simultaneous strengthening and enriching of educational practices in various border kindergartens and schools. For teachers, the implementation of cross-border learning mobility strengthens the awareness of the importance of competence in multilingualism and interculturalism as an important factor for their further professional development. This article will analyse the knowledge and experience of professionals involved in such mobility programs in terms of a new dimension of professionalism, and the need to develop multilingualism and interculturalism competences.

Keywords: mobile teachers, neighbour language acquisition, multilingualism and interculturalism, professional development

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Mobilni učitelji na obmejnih šolah – večjezičnost in medkulturnosti kot nov izziv za profesionalni razvoj

Katica Pevec Semec

Članek se nanaša na nekatere ugotovitve pri izvajanju medregionalne vzgojno-izobraževalne prakse, ki je potekala v nekaterih vrtcih in šolah, ki so na tromeji med Slovenijo, Avstrijo in Italijo. Ugotovitve kažejo, da se je izvajanje večjezične in medkulturne prakse, ki so jo tedensko uresničevali učitelji iz sosednjih držav, t. i. mobilni učitelji, izoblikovalo v edinstveno pedagoško izkušnjo, ki je učitelje spodbudila k večji profesionalni rasti. Poleg novega drugega jezika sosednje države so mobilni učitelji prinašali v vrtce in šole tudi različne nove vzgojno-izobraževalne učne pristope. Predstavljena obmejna mobilnost učiteljev je hkrati prispevala h krepitvi in k obogatitvi vzgojno-izobraževalne prakse v različnih obmejnih vrtcih in šolah. Pri učiteljih je izvajanje čezmejne mobilnosti okrepilo zavedanje pomena usposobljenosti na področjih večjezičnosti in medkulturnosti kot pomembnega dejavnika njihovega profesionalnega razvoja. V članku so analizirana nekatera spoznanja in izkušnje strokovnih delavcev, vključenih v mobilnost, v katerih se izkazujeta nova dimenzija profesionalnosti ter potreba po razvoju večjezičnost in medkulturnosti.

Ključne besede: mobilni učitelji, učenje sosedskih jezikov, večjezičnost in večkulturnost, profesionalni razvoj

Introduction

The learning and use of languages are fundamental to peaceful coexistence in the common European area, especially in those areas where languages and cultures have coexisted for centuries. In Slovenia, there is a long tradition of acknowledging the presence of the languages of neighbouring countries in the minority areas of Prekmurje and Istria. Moreover, it can be argued that these and other neighbouring languages (Croatian and German) are present in the area beyond the national borders, where there is urban proximity between the neighbouring countries: Slovenia, Austria and Italy. In elementary school, the neighbouring language is most often taught outside the compulsory curriculum, for example as an activity of interest to students. Therefore, the efforts of kindergartens (at the Kranjska Gora elementary school in Slovenia, at Camporosso in Italy, at Nötsch in Austria) and schools (Kranjska Gora Primary School, Volksschule Nötsch, Jesenice High School, Institutod'Istruzione Superiore Ingeborg Bachmann di Tarvisio) located on the triple border between Slovenia, Austria and Italy, with years of practical experience in the acquisition of neighbour languages and neighbour cultures, have particularly attracted our attention. Before the presentation of the project Comenius Regio Partnerships: Cooperation in the educational field between Italy and Slovenia (Co.E.S.I.) underpinning our discussion, we need to establish what is meant by, neighbour languages and neighbour cultures, multilingualism, and interculturalism and how these are reflected in the field of education. In addition, we will discuss several models for multilingual and intercultural education, including aspects of the professional development of teachers.

Multilingualism and interculturalism as important aspects of professional development

In many aspects of our lives nowadays, there are requirements for effective communication as a consequence of globalisation and coexistence in a multicultural and multilingual society. The expanding need for multilingual and intercultural communication occurs as a result of mobility and the spread of market employability within the European Union and beyond and, consequently, migrations of people because of better material living conditions and the revitalisation of some provinces and regions. Globalisation additionally blurs the boundaries between countries, while economic markets are expanding beyond national borders. The rapid development of information and communication technology, which eliminates local distances and encourages simultaneous communication

through various media, has also become an important factor. In the age of globalisation, we can add another fact '[...] that today more people than ever live in a nearby neighbourhood with different languages and cultures, many of them working together or having daily encounters' (Wintersteiner, Gombos, & Gronold, 2010, p. 28). People are thus becoming more mobile, for both private and professional reasons, and thus need to communicate in several languages. Knowledge of languages allows for intercultural dialogue and encourages the willingness to coexist along with mutual respect.

Neighbour languages and neighbour cultures (frontier languages) represent culturally marked opportunities for expression and are, therefore, an integral part of 'frontier policy' and can become both an instrument for demarcation or exclusion of countries, cultures and individuals and an occasion for encounter, contact and co-operation (Rasch, 2002, p. 18). Frontier regions are considered to have European characteristics and thus to represent potential areas for new approaches to learning and teaching (Beacco & Byram, 2002 in Rasch, 2002, p. 5). We agree with the Rasch (2002, p .10), who stated that language teaching and learning can help in the promotion of relations between neighbouring countries in Europe.

Knowledge of languages allows for intercultural dialogue and encourages the willingness to coexist along with mutual respect.

Multilingualism is a complex phenomenon that can be studied from different perspectives in disciplines such as linguistics, psycholinguistics, sociolinguistics and education (Cenoz, 2013). Baker (1993) believed that the concept of bilingual education can refer not only to pupils who are already speakers of two languages, but also to those pupils who are studying two additional languages. Sometimes pupils who learn additional languages are also speakers of a dominant language in their society, which they learn as migrants or immigrants, and which is also taught as the dominant language at school (Baker, 1993).

Garcia (2009) pointed to the difference in education: namely, that bilingual education is different from traditional foreign language learning, where pupils learn the language as a subject, while in bilingual education the language is used as a medium for passing on instruction. Bilingual programs teach content through languages other than a pupil's first language (Garcia, 2009). Above all, the author highlights that bilingual education is a model that provides for meaningful, education, equivalent to general education, as well as training that builds tolerance for other linguistic and cultural groups.

Multilingual education is provided by general education, with teaching in two or more languages to develop a multi-dimensional understanding of the languages and cultures and to encourage acceptance of human diversity.

According to Jazbec (2008), the original meaning of bilingualism in the Canadian and American contexts focuses on the integrative approach, where the primary focus is on the individual's competence in L2, which is being acquired and is in the process of becoming level L1 competence (Jazbec, 2008). Pižorn (2009) considered the term L2, which indicates those languages that are taught in a formal and non-language environment. These are characteristically used by children, predominantly in the school environment or in the media, but less commonly, in the home environment. Some authors, such as Wode (1995), claimed that L1 can be equated with the language in which individuals acquire increasingly genuine expression, one that also means belonging to a particular social group: that is, the language in which we dream and think.

For some authors, in the definition of multilingualism, the key difference lies between language competence and the use of a language. In this respect, Baker (2010) discussed functional bilingualism, which moves away from language skills and towards the use of language in everyday contexts and events. Functional bilingualism thus refers to when, where and with whom people use two languages (Fishman, 1965).

To summarise the work of Byram (2009), being bicultural or multicultural means accepting the beliefs and values of two or more different social groups and identifying with them. In so doing, someone who uses two or more languages and takes into account and analyses the similarities and differences between them can detect and analyse the similarities and differences between the values, beliefs, and behaviour of two or more groups to which they belong. In this case, such a person has the capacity for analytical use in practice, which involves coordination or mediation between distinct beliefs, values and behaviours. Such a person has the character of interculturalism with a focus on intercultural activities (Byram, 2009).

Below, we highlight some of the concepts of professional development for teachers that were used in the present case.

Several authors point out a number of aspects of professionalism: professional competence, i.e., the ability to perform given tasks in accordance with certain standards (Cummings & Schwab in Cvetek, 2004); and the ability to think in action (Schon, 1983).

Numerous studies have dealt with the professional development of teachers, highlighting the ineffectiveness of programs because two key factors are not taken into account: what motivates teachers for participation and professional development, and the observance of the typical process in which change occurs (Guskey, 2002).

The teacher should have the opportunity to ask and support for asking

questions such as why to change the existing working process, what to change and how, with whom to cooperate and how to tackle change. Ažman (2004) pointed out that teachers do this only in a school where similar questions are raised by other teachers, the school administration and other subsystems, while the social environment must also support and encourage such questioning.

It is essential in the creation of models of professional development that teachers in the process of lifelong learning give meaning to and develop their concepts as well as improve their teaching practice. This process relates to the fundamental task of a teacher, that is teaching, and includes their personal, professional and social dimensions, while also involving a progression towards a critical, independent, responsible, decision-making teacher (Valenčič Zuljan, 2001).

Presentation of the project practices on the borders between Slovenia, Austria and Italy - case studies

In this section, we will focus on the presentation of the different practices of educational projects, which took place from 2003 to 2013 in the border area between Slovenia, Italy and Austria: Tri roke, Tre mani, Drei Hände (2006–2013); Ciao vicino, Živijo sosed, Servus Nachbar (2010–2013); Mrežno povezovanje Tri-krat-tri. Trojezično od vrtca do mature, Trilingually from kindergarten to matura/GCE (2012); Esco izobraževanje brez meja (2013). The presented practices were conducted through trilateral border cooperation between Slovenia, Italy, and Austria, as experimental work and Comenius Regio cooperation between Slovenia and Italy including the participants presented at the beginning of this paper.

The overall objective was to establish cooperation in the field of education and deepen learning about the languages and cultures of neighbouring countries and to include mobile teachers in the implementation of the official curriculum.

A further common feature of the practices was the motivation of the participants involved in the drafting and implementation of joint events, which had to include children/pupils/students. Comparison of the project practices shows that the differences lay in the intensity of the events, where there were either periodic meetings between practitioners and children/pupils/students from the border kindergartens and schools once or several times a year, or intensive one-week teaching practices, enriched with the neighbour languages and cultures.

It should be noted that the need for interregional project developments in learning the languages and culture of neighbouring countries is permanently

present in the border area of Slovenia, Austria, and Italy. The differences are solely in how strongly the need for cooperation is supported on the local, regional and national levels and how they complement and reward each other.

During this period (2003–2013), there were also several meetings of professional staff, pupils, parents, principals, and other stakeholders. Teaching materials and the reflections of professional staff were presented at three conferences, with the participation of more than 300 colleagues from the three countries, together with representatives of faculties and universities in the countries involved.

The exploration of project practices in the field of education was qualitative in nature, mainly involving small groups of professionals, principals, and children and the external experts who have been planning and carrying out meetings, developing learning materials and evaluating the work. For research purposes, we developed and used a variety of instruments, such as the structured interview; we collected various data and documented cases of multilingual learning projects, recorded numerous cases of multilingual practices with students; we also developed educational materials and adapted them to the multilingual teaching practices. The core results are largely based on reflection, where some limitations to these practices become apparent, since the data collected was not intended for statistical processing.

Nonetheless, the users (teachers, professional staff, pupils, and principals) have recorded their reflections on the process of the implemented learning project examples. Their utility was tested for the relevant schools and kindergartens and upgraded with new experiences that occurred after the completion of the project.

Project findings are presented in full in a range of published materials, such as Esco-Educare senza confine-Bildung Ohne grenzen-Izobraževanje brez meja (2013); Pevec Semec, K. Poročilo projekta Commenius Regio: Italija-Slovenija (2010–2013), Wintersteiner et al. (2010). Večjezičnost, transkulturnost in izobrazba.

We realise that we cannot address the entire border project operation from this period, because it is simply too extensive for our discussion. Therefore, our further analysis refers only to one of three regional projects undertaken on the borders between Slovenia, Austria and Italy so-called Comenius Regio partnership of Slovenia and Italy.

Specifics of the *Comenius Regio* project

This project took place as a three-year project (2010-2013) between Italy and Slovenia to ensure continuity of cross-border cooperation between kindergartens and schools in Slovenia and Italy, while also including interested kindergartens and schools in Austria (Pevec Semec, 2013).

The Regio project upgraded the Tri roke, Tre mani, Drei Hände project's objectives in the direction of systematic implementation of multilingual teaching practice according to the CLIL methodology. The project involved local, mobile teachers. and school leaders (Kindergarten at Kranjska Gora Elementary School, Kindergarten Camporosso in Italy, Kindergarten in Nötsch in Austria, Kranjska Gora Primary School, Volksschule Nötsch, High School Jesenice, Institutod'Istruzione Superiore Ingeborg Bachmann di Tarvisio), faculty experts and representatives of the local community (University in Ljubljana, Maribor, Koper, Udine, Macerata and Higher Pedagogical School in Klagenfurt); coordination of the project was carried out by the National Education Institute Slovenia and the Regional Office of Friuli Venezia Giulia.

The project consisted of three-year cycles, comprising the following elements:

- Team meetings of practitioners (three times a year) included the creation of the annual project activity plan, the planning and implementation of reflection on lesson plans in three languages, the creation of didactic materials for the implementation of the lesson plans, the preparation for and implementation of the annual joint meetings of teachers and pupils, the monitoring and documentation of multilingual and intercultural learning practices;
- Meetings of school management and the project coordinator (twice a year) included the organisation of mobility and tackled the current implementation issues;
- Meetings of children, pupils, parents, teachers/educators, school management, representatives of the local community and other participants (once a year in different countries);
- Team monitoring of project activities such as the following: monitoring the implementation of multilingual and intercultural teaching practice; feedback collection from local and mobile teachers on their practical work; analysis of the annual reflections of project participants and analysis of participants' questionnaires at the end of the project.

In the first year, the focus was on organising weekly mobility, which

included the preparation of mobile teachers for their work in Austria and Italy, and the preparation of local teachers to work with teachers arriving from Italy and Austria. In addition to the implementation of weekly mobility, teachers also selected a common theme at their meetings, according to which they prepared a learning project and carried it out in the three languages. Together with the students they collaborated in the development of didactic materials that were used at a joint meeting of students, teachers, and school leaders, and prepared a post-production video of teaching practice.

In the second year, local teachers, who conducted the regular curriculum in elementary schools in Slovenia, made proposals about the objectives and content of teaching for the school year. Mobile teachers become familiar with the proposals and ideas and chose how they themselves carried out their classes when teaching a certain theme. In the second year, local and mobile teachers again chose a common theme, prepared a project, and carried it out at a meeting with subsequent post-production video of teaching practice.

In the third year, the focus was on the preparation and presentation of the synthesis of knowledge in the implementation of multilingual and intercultural teaching practice, on the documentation of teaching materials, and on the final joint meeting of students and teachers, at which they again organised a post-production video of teaching practice.

The project was qualitative in nature; data mainly consisted of records of learning projects, students' educational materials and analyses of the annual reflections of the project participants. For the purposes of our article, we will hereafter focus only on the one aspect, i.e., the professional and personal development of teachers involved in border mobility, which represents the greatest achievement of the project.

A model of professional development for 'teacher-directed changes'

The section below presents some of the key points of reflection, observed through three goals of professional development; it includes teachers' personal, professional and social dimensions, and constitutes a model of 'teacher-directed change'. Reflective activity was held twice during the project, in September 2012 and in July 2013 and included the following unfinished interview sentences: (*I managed to ...; I enjoyed ...; It was hard for me ...; I could not ...; A great help to me was ...; Next time I will change ...; I would like to say ...*). At the beginning and end of the project, we used the same type of interview instrument. This was followed by an analysis and categorisation of individual claims

measured against the professional development targets. The specific objective was then examined in the light of the initial and final states. In this way, we reached conclusions about the three findings relating to all aspects of professional development, findings which represent the key results of our research.

The group consisted of home and mobile teachers from Slovenia (a total of 7 teachers).

The first aspect of professional development: Change in the teaching practice of teachers

The model builds on the foundation that change for teachers is essentially based on a process of experiential learning (Guskey, 2002). Local teachers noticed the most changes in the necessity for pre-planning and coordinating parts of lessons with the mobile teachers.

One of the mobile teachers described the change in her teaching practice, saying:

> I managed to teach Slovene in neighbouring countries, improved my knowledge of German and started learning Italian, created a lot of didactic material for teaching Slovene as a foreign language, and learned to deal with a variety of situations that unexpectedly appear in the classes.

The data shed light on the conditions for the implementation of multilingual and intercultural teaching practice, which elicited several changes in the teaching practice of local teachers; they had to coordinate with other teachers outside their learning environment more than they usually did. In the act of coordination, they were exposed to both linguistic and professional challenges. The second part of the teacher's writing talks about a change in the preparation of didactic material for teaching Slovenian as a foreign language and, consequently, the need to improve language skills in foreign languages. The teacher also highlighted the skills for dealing with unforeseen learning situations.

The second aspect of professional development: Changes in learning outcomes and student performance

The measurement results do not relate to measurable achievements, but to the pupils' behaviour and attitude towards the subject, as well as his/her motivation.

The learning outcomes for pupils are broad-based, meaning that importance lies not only in cognitive and achievement-oriented learning but also in the pupils' behaviour and attitude (Guskey, 2002). These types of changes are reflected in the statements of local teachers, especially when they talk about what they managed to achieve: e.g., to motivate pupils for joint meetings; to

prepare them to enjoy meetings with their teachers/educators; to collect ideas together with pupils and successfully implement these at joint meetings.

> I enjoyed watching their optimism, enthusiasm, love of work, expectations, when I caught them in a spontaneous conversation with their peers from Italy or Austria. I liked that the work was interdisciplinary. (Local teacher)

You feel good when these children accept you among themselves, are happy when they meet you and are highly motivated to learn the Slovenian language. (Mobile teacher)

These statements highlight some of the psychological and social aspects of a supportive learning environment, aspects which significantly affect the learning achievement of children.

This is confirmed in the following statements:

> Such learning that takes place across borders and the project itself are priceless. Students have a wider view of the world, are able to adapt to situations, and are more successful at their school work (Local teacher).

> During the school year, I have noticed great progress in the understanding and perception of learning Slovenian. At the beginning students were often embarrassed by their incomprehension; however, later they became much calmer, motivated for work and confident in communicating in a foreign language. How interesting it is to observe children using three languages in a conversation (Mobile teacher).

The Third aspect of professional development: A change in the teacher's beliefs and attitudes

Learning to control something new, find it meaningful and try it in a new way requires time and effort. Each and everything that promises to increase teacher/educator competences and improve pupils' results means additional work, especially at the beginning. This requires additional time and energy, which leads to additional workload for the teachers. (Guskey, 2002).

Even after the second year of the project, the majority of teachers found it difficult to reconcile school work with project work.

> I have worked a lot in my spare time. There have been many such hours. Everything cannot be done at school (Local teacher).

One mobile teacher indicated that transport and support for the implementation of multilingual practices in the neighbouring country were quite

strenuous: 'It was hard driving in winter conditions and having lessons in Italy without an additional teacher in the class, totally on my own.'

In common with practitioners in many other fields, the teachers do not want to adopt a new practice or procedure until they have a sense that it works:

> In the years of work in the 'Tri roke, Tre mani, Drei Hände' and 'Živjo-Servus-Ciao' projects, the quality of my work in the classroom improved drastically. Working with students older than 12, I have come to the significant conclusion that success and progress are the direct result of good intrinsic motivation in students. Students needed to sense the meaning in language learning and its practical use, and I had to use all my senses and movement in teaching (Local Teacher).

Implementing change or trying something new also implies the risk of failure (Bolster, 1983).

> I could briefly describe the project as: Three countries, three languages, three cultures, three different school systems, curious, openhearted and motivated children, friendly, helpful and positive teachers, a lot of time-consuming preparation, the high quality of lessons in Slovene, laughter, good relationships and satisfaction on the part of the children (Mobile teacher).

Conclusion

Plurilingualism is gradually gaining ground at the European Council in the field of learning foreign languages. Plurilingualism is not a separation between languages but the construction of communicative skills, which contribute to the overall knowledge and experience of language. In this article, we have focused on the presentation of the promotion of multilingualism in the educational systems of the three countries and three neighbouring languages: Slovenian, German and Italian and of the three cultures that coexist in the geographic area between the region of Gorenjska (Upper Carniola), Carinthia and Friuli-Venezia Giulia.

Despite some weaknesses in methodology, the presented model for border mobility among professional staff can highlight some key elements arising from this model:

- The inter-regional cooperation in the field of education follows the European guidelines for the development of multilingualism and interculturalism in the direction of achieving the M + 2 norm.
- The concept of teacher mobility is unique. Mobile teachers as native

speakers are also carriers of culture and of national and other features that promote linguistic spontaneity and authenticity.

- Teachers and students have a common goal: the development of language and cultural awareness. A student will develop their awareness through the recognition of one or more mutual factors, whereas a teacher/educator will motivate students for the recognition of cultural consciousness (Swain & Johnson in Baker, 2010).
- The implementation of educational practice involving mobile teachers enriches the existing curriculum with the coexistence of different languages, cultures and educational and methodological approaches to teaching. Thus, it encourages professional growth in both mobile and local teachers. In the course of their work, mobile teachers get to know their personalities, share and update their teaching practice and build on the expertise and skills as well as language and culture of neighbouring countries. Here involving Slavic, Germanic and Romance cultures.
- The uniqueness of this model lies in its combination of both personal and territorial multilingualism in the new format, which, according to Jazbec (2013), does not yet have a name, but is multi-dimensional in character.

The model of education presented in this article was conducted as research into multilingual education. Many important steps have been made, which may lead to the formalisation of its implementation in the educational systems of the three countries. The model pointed out new aspects of professionalism among the professional staff that will need to be explored further in the direction of professional capital. The role of mobile teachers in educational practice presented in this article could constitute a further challenge for those faculties that educate future teachers.

Raasch (2002) points out that the frontier regions offer many new opportunities in which the values of plurilingualism become more visible and can be implemented more rapidly. We hope that this article, with its focus on the mobility of teachers, will serve as such a model for cross-border cooperation in the field of education and contribute to the consideration of borders between countries and, within our minds, becoming more permeable; for children who are educated in the border area, it is important that meeting people from neighbouring countries who speak a completely different language be accepted as an everyday situation and that children use their language and other skills to make their way towards neighbouring languages (Gombos, 2013).

References

Ažman, T. (2004). Profesionalni položaj in razvoj učitelja v sodobni šoli: dileme in perspektive [Professional position and development of a teacher in a modern school: Dilemmas and perspectives]. *Sodobna pedagogika*, *55*(special edition), 220–235.

Baker, C. (1993). Bilingual education in Wales. In H. Baetens Beardsmore (Ed.), *European typologies of bilingual education*. Clevedon, UK: Multilingual Matters.

Baker, C. (2010). *Foundations of bilingual education and bilingualism* (4th ed.). Bristol, UK: Multilingual Matters.

Byram, M. (2009). Jezikovno izobraževanje za plurilingvistične in medkulturne učence. In K. Pižorn (Ed.), *Učenje in poučevanje dodatnih jezikov v otroštvu* [Learning and teaching extra languages in childhood] (pp. 116–135). Ljubljana: Zavod RS za šolstvo.

Cenoz, J. (2013). Defining multilingualism. *Annual Review of Applied Linguistics*, *33*, 3–18.

Cvetek, S. (2004). Kompetence v poučevanju in izobraževanju učiteljev [Competencies in teaching and teacher education]. *Sodobna pedagogika*, *55*(special edition), 144–161.

Esco-Educare senza confine-Bildung Ohne grenzen-Izobraževanje brez meja (2013). [Education without borders]. Gorizia: Grafica Goriziana.

Fishman, J. A. (1965). Who speaks what language to whom and when? *La Linguistique*, 2, 67–68.

Garcia, O. (2009). *Bilingual education in the 21st century. A global perspective with contributions by Hugo Beatems Beardsmore.* Singapore: Utopia Press Pte ltd.

Gombos, G. (2013). A*naliza intervjujev vključenih udeležencev projekta Regio SLO-ITA*. Delovno gradivo. [Analysis of the interviews of the involved participants of the Regio SLO-ITA project. Working material.]. Ljubljana: Zavod za šolstvo.

Guskey, T. R. (2002). Professional Development and Teacher Change. *Teacher and Teaching*, *8*(3), 381–391.

Jazbec, S. (2008). *Sporazumevanje v tujih jezikih – Uvajanje tujega jezika in medkulturnega/medjezikovnega uzaveščanja v 1. VIO v OŠ: Teoretična razmišljanja* [Communication in foreign languages - Introduction of a foreign language and intercultural / interlingual awareness in the 1st VIO in the elementary school]. Retrieved from http://www.zrss.si/projektiess/skladisce/sporazumevanje_v_tujih_jezikih/tuj%20jezik%20v%20prvem%20triletju/Strokovni%20%C4%8Dlanki%20in%20prevodi/projekt_zgodnje_ucenje_sasa_jazbec_28_08.2008.pdf

Jazbec, S. (2013). *Večjezičnost – nov vidik za učiteljev profesionalni razvoj. Predstavljeno na mednarodnem posvetu: Kompetence brez meja* [Multilingualism - a new aspect for teachers‘ professional development. Presented at the international conference: Competence without borders]. Lignano: Zavod za šolstvo.

Mrežno povezovanje Tri-krat – tri (2012). Networking Three times – three. *On the way to cross-secondary education in Austria, Italy, Slovenia*. Retrieved from http://www.dreitretri.eu/index.php/de/wp3-2

Na poti do čezmejnega sekundarnega izobraževanja za Avstrijo, Italijo, Slovenijo. E.S.C.O. Izobraževanje brez meja. (2013). On the way to cross-border secondary education for Austria, Italy, Slovenia. E.S.C.O. Education without borders. Regione Autonoma Friuli Venezia Giulia. Goriziana.

Pevec Semec, K. (2013). *Poročilo projekta Comenius Regio: Italija-Slovenija (2010-2013).* [Comenius Regio

project report: Italy-Slovenia 2010-2013]. Working material.

Pevec Semec, K. (2012). Trojezično poučevanje: primeri iz različnih projektov. Presented at the conference: Poti do čezmejnega večjezičnega izobraževanja med Italijo, Avstrijo in Slovenijo [Trilingual teaching: examples from different projects. Presented at the conference: Paths to cross-border multilingual education between Italy, Austria and Slovenia]. Videm: Zavod za šolstvo.

Pižorn, K. (2009). *Učenje in poučevanje dodatnih jezikov v otroštvu*. [Learning and teaching extra languages in childhood]. Ljubljana: Zavod RS za šolstvo.

Rasch, A. (2002). *Europe, frontiers and languages. Guide for the development of language educational policies in Europe. From linguistic diversity to plurilingual education*. Strasbourg: Council of Europe.

Schon, D. (1993). *The reflective practitioner*. New York, NY: Basic Books.

Valenčič Zuljan, M. (2001). Pojmovanja znanja pri bodočih učiteljih [Knowledge of future teachers]. *Andragoška spoznanja*, *7*(2), 16–23.

Wintersteiner, W., Gombos, G., & Gronoland, D. (2010). *Večjezičnost, transkulturnost in izobrazba* [Multilingualism, transculturally and education]. Goriziana: Wieser.

Wode, H. (1995). *Lernen in der Fremdsprache: Grundzüge von Immersion und bilingualem Unterricht*. [Learning in the foreign language: basic features of immersion and bilingual teaching]. Ismaning: Max Hueber Verlag.

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Predictors of Bullying and Victimisation in Children with Attention-Deficit/Hyperactivity Disorder

Anamarija Žic Ralić*[1], Daniela Cvitković[2] and Snježana Sekušak-Galešev[2]

The objective of this paper is to determine whether age, gender, Individualised Education Programme, the experience of victimisation by peers, and the experience of bullying others are predictors of bullying and victimisation in children with Attention-Deficit/Hyperactivity Disorder (ADHD). The sample consisted of children aged from 7 to 15 with ADHD diagnosis (N=72). Gender is a significant predictor of physical bullying, whereas the predictors of verbal bullying are gender, being enrolled in an Individualised Education Programme (IEP), verbal victimisation and the feeling of security. The males with ADHD without any school accommodations (IEP) and who are exposed to verbal victimisation are also more often verbally aggressive towards their peers. Children with ADHD who are verbally aggressive and feel secure in the school setting are more exposed to verbal victimisation.

Keywords: attention-deficit/hyperactivity disorder, bullying, victimisation by peers, predictors, individualised education programme

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Napovedovalci ustrahovanja in viktimizacije otrok z motnjo pozornosti s hiperaktivnostjo

Anamarija Žic Ralić, Daniela Cvitković in
Snježana Sekušak – Galešev

Namen prispevka je ugotoviti, ali so starost, spol, individualiziran program šolanja, izkušnje viktimizacije vrstnikov in izkušnje ustrahovanja drugih napovedovalci ustrahovanja in viktimizacije otrok z motnjo pozornosti s hiperaktivnostjo. Vzorec predstavljajo otroci, stari od sedem do petnajst let, z diagnozo motnje pozornosti s hiperaktivnostjo (N = 72). Spol je pomemben napovedovalec fizičnega ustrahovanja, medtem ko so napovedovalci besednega ustrahovanja spol, vključitev v individualiziran program izobraževanja (IPI), besedna viktimizacija in občutek varnosti. Dečki z motnjo pozornosti s hiperaktivnostjo brez prilagoditev šolanja (IPI) in ki so pogosto izpostavljeni besedni vikitimizaciji, so pogosteje besedno nasilni do svojih vrstnikov. Otroci z motnjo pozornosti s hiperaktivnostjo, ki so besedno nasilni in se počutijo varne znotraj šolskega okolja, so bolj izpostavljeni besedni viktimizaciji.

Ključne besede: motnja pozornosti s hiperaktivnostjo, ustrahovanje, vrstniška viktimizacija, napovedovalci, individualiziran program šolanja

Introduction

'Bullying' implies aggressive behaviour, in which an individual or a group of individuals repeatedly attacks, humiliates or excludes a relatively powerless peer (Salmivalli, 2010). In this research 'bullying' is used as an umbrella term referring to the overall occurrence including the actions and experiences of both the bully and the victim. The term 'victimisation by peers' refers to the experience of the individual who is targeted by the bullying behaviour whereas 'bullying others' refers to the actions of the perpetrator of the bullying behaviour. The objective of this research is to identify the risk factors that have an impact on victimisation by peers and bullying others in children with attention-deficit/hyperactivity disorder.

According to the study carried out in Finland by Kumpulainen, Räsänen, and Puura (2001), among the children involved in bullying, attention-deficit/hyperactivity disorder is the most common psychiatric disorder. Several studies conducted after that one corroborate such results by a finding that children with attention-deficit/hyperactivity disorder are at elevated risk of being involved in bullying either as aggressors or as victims in comparison with typical children (e.g., Bacchini, Affuso, & Trotta, 2008; Holmberg & Hjern, 2008; Unnever & Cornell, 2003; Wiener & Mak, 2009).

To date, the research into the risk factors for bullying largely concerned typical children. In accordance with the great number of studies that have been carried, using meta-analysis Cook and associates (2010) investigated the predictors of the bully status groups, i.e., bullies, victims and bully-victims. The predictors refer to individual and environmental factors. Some individual predictors have received attention in literature: gender, externalising behaviours, internalising behaviours, self-related cognitions, other-related cognitions, social problem solving, and academic performance (Cook et al., 2010). The social-ecological perspective on peer victimisation suggests that both individual and environmental factors influence peer victimisation (Espelage & Swearer, 2003). The environmental factors that influence bullying include in particular: family and home environment, school climate, community factors, peer status, and peer influence (Cook et al., 2010).

Victimisation by peers

Although both boys and girls are victimised by peers, they experience different forms of victimisation (i.e., physical, verbal, relational) at different rates (Hanish, 2000). Boys are most likely to be physically victimised, and girls

are most likely to be relationally victimised (Crick & Bigbee, 1998). Boys are more often victimised than girls, although this depends somewhat on the form of victimisation (Cook et al., 2010; Swearer, Espelage, Vaillancourt, & Hymel, 2010). More recent studies bring attention to the fact that bullying may be targeted both within and across gender and may have different meanings when it occurs within versus across gender (for review, see Hanish, Bradshaw, Espelage, Rodkin, Swearer, & Horne, 2013).

Some children display behaviours whose poses a risk for the occurrence of bullying. One of the reasons that some children become victims of bullying lies in the fact that their peers perceive them to be unable to protect and defend themselves (Fox & Boulton, 2005; Hodges & Perry, 1996). Furthermore, low peer acceptance, high peer rejection, and having few or no friends predict increases in victimisation by peers (Card & Hodges, 2008). Some children develop an easy target status among their peers because they are physically weak, succumb submissively to their peers' demands, or are rejected by their peers and have few friends who would be ready to support and defend them (Card & Hodges, 2008; Fox & Boulton, 2005; Hodges & Perry, 1996). Such children are at elevated risk of bullying as the peers are not humiliated because of bullying, but are rather reinforced by tangible rewards, signs of distress and absence of retaliation (Fox & Boulton, 2005; Perry, Williard, & Perry, 1990).

The classical view of the victim of bullying is of a nonaggressive, shy, passive, and submissive child (Olweus, 1998). Studying how the victims behaved in bullying situations, Salmivalli, Karhunen, and Lagerspetz (1996) found that the so-called counter-aggressive victims were not rare. On the contrary, counter-aggressive responses (such as trying to pay back the bully in his own coin, attacking the bully) in bullying situations were rather typical, especially among boy victims. In terms of how such responses influence making the bullying stop or continue, the study by Salmivalli, Karhunen, and Lagerspetz (1996) found that the responses of showing helplessness (e.g., by crying) and counter-aggression in girls, and counter-aggression in boys, have an effect on making the bullying start or continue.

Salmivalli and Nieminen (2002) provided an overview of studies wherein it was identified that victims may also respond with aggression. Moreover, peers find some types of aggressive behaviour extremely irritating. Thus, children who exhibit reactive aggression and show angry retaliatory responses to real or perceived provocations are at especially elevated risk of continued bullying (Camodeca, Terwogt, & Schuengel, 2002; Hanish 2000). This process is more significant for boys than girls (Hanish, 2000).

To date, the studies make a distinction between nonaggressive (passive) and aggressive (provocative) victims, also called bully-victims (Salmivalli

& Peets, 2000; Salmivalli & Nieminen, 2002). They seem to differ from other victims in several respects: for instance, while internalising problems and psychosomatic problems are typical of victims, bully-victims show high levels of externalising behaviour and hyperactivity (Kumpulainen et al., 1998), and they are particularly at risk of remaining involved in bullying over longer periods of time (Kumpulainen, Räsänen, & Henttonen, 1999).

Some studies have demonstrated links between involvement in bullying and poor academic performance. While Hanish and Guerra (2002) and Woods and Wolke (2004) failed to demonstrate significant links between peer victimisation and academic achievement, a recent study conducted by Strom, Throesen, Wentzel-Larsen, and Dyb (2013) indicated significant association between bullying and poor academic achievement. Students in schools with higher levels of bullying performed worse academically. Swearer and associates (2010) specified that those students who are harassed and who also have few or no friends and little opportunity for positive peer interactions are at greater risk for low achievement, especially if they already exhibit conduct problems or hyperactivity. Thus, involvement in bullying does not automatically place a child at risk for poor achievement but can be one of a combination of factors that undermine a child's engagement in school, underscoring the need for educators to pay attention to children who are victimised.

Creating a safe environment for children to grow is essential for their maintaining a healthy outlook on their approach to life. From criminal acts to bullying and verbal abuse, school disorder compromises student safety and the learning environment. A study conducted by Eliot, Cornell, Gregory, and Fan (2010) investigated the relationship between student perceptions of support and student willingness to seek help for bullying and threats of violence. The results indicated the relationship between student perceptions of school climate and help-seeking attitudes at both the individual level and at the school level. If students feel safe in talking with teachers and staff about bullying issues they will be more likely to approach staff when a problem arises.

Bullying others

Children who bully others have little empathy for their victims and have a strong need to dominate and control other people (Olweus, 1998). Findings from recent studies imply that there are subgroups of bullies who differ from each other in significant respects. For a long time, researchers and practitioners regarded bullies as individuals who lack social skills and have low self-esteem, deficiencies in social information processing, low social standing and peer

group, and other adjustment problems (Salmivalli & Peets, 2009). Researchers have recently linked bullying behaviour to seemingly positive social competencies, including high social intelligence (Kaukiainen et al., 1999), and being seen by peers as powerful, attractive, popular, and leaders in their schools (Swearer et al., 2010). At least such 'socially smart' bullies do not seem to fit the picture of reactively aggressive children, who interpret the social cues inaccurately, easily lose self-control, suffer from social rejection in the peer group, etc. Although bullies were significantly less aggressive than bully-victims in the study of Salmivalli and Nieminen (2002), they scored higher than victims and controls on both reactive and proactive aggression. However, observations at the person level indicated that bullies were not only overrepresented among children who were both reactively and proactively aggressive but also among the only reactively aggressive as well as the only proactively aggressive groups.

Attention-Deficit /Hyperactivity Disorder (ADHD)

Characteristics of children with ADHD increase their vulnerability to bullying participation and its behavioural aftermath. Externalising behaviours and other symptoms of ADHD, including poor impulse control and reduced frustration tolerance, have the potential to lead to social difficulties for children with ADHD (Taylor, Saylor, Twyman, & Macias, 2010). Poor social competence and peer rejection, as frequent problems of children with ADHD, has a special role to play (Barkley, 2000; Hoza, 2007). In the process, the above-mentioned indicates that poor social competence and peer rejection are essential factors for bullying (Cook et al., 2010). In addition, there are difficulties in controlling environmental noise and their own emotions, which interfere with the activity the children with ADHD are involved with (Rief, 1998), difficulties in processing social situations which cause misinterpretation and, consequently, in unclear, provocative situations they attribute malevolence to peers and respond aggressively, and are more likely than peers to believe that aggressive behaviour will lead them to achieve the objective desired (Dumas, 1998).

The results of a considerable number of studies indicate ADHD as a risk factor for bullying (Bacchini et al., 2008; Holmberg & Hjern, 2008; Unnever & Cornell, 2003; Wiener & Mak, 2009). Furthermore, children with ADHD are more likely to engage in bullying, either as being victims or being perpetrators of bullying in comparison with their classmates (Holmberg & Hjern, 2008; Taylor et al., 2010; Unnever & Cornell, 2003; Wiener & Mak, 2009). Results from the study of Taylor and associates (2010) suggest that the psychological impact of peer Victimisation on youth with ADHD who experience bullying—as

victims, perpetrators, or both—are more likely to show psychosocial problems above and beyond their attention and social competence difficulties.

Unnever and Cornell (2003) believe that students with ADHD are more likely to become involved in bullying due to their poor self-control. The impact of impulsivity was also detected in a large cohort of typical adolescents (N=1232), wherein it was detected that in both female and male adolescents' impulsivity exacerbates the effects of community violence exposure by increasing involvement in deviant behaviour (Low & Espelage, 2014). One earlier study of the predictors of bullying by Espelage, Bosworth, and Simon (2001) found a significant association between impulsivity and a behavioural measure of bullying (e.g., name calling, teasing, threatening other students) among a sample of sixth-grade students.

In their study, Holmberg and Hjern (2008) found that the ADHD symptoms were significantly associated with bullying others, but also with victims of bullying. Children with ADHD more often demonstrate aggressive behaviour and have difficulties interpreting social codes, are three times more actively involved in bullying and ten times more likely to be classified as victims of bullying in comparison with children without ADHD (Holmberg & Hjern, 2008). A similar finding was also obtained in the study by Wiener and Mak (2009), wherein 57.5% of children with ADHD in the sample experienced some form of bullying (as a victim, bully or both) compared to 13.6% of children in the comparison group.

When mention is made of a gender difference among children with ADHD concerning bullying, Wiener and Mak (2009) detected that boys with ADHD bullied others more frequently than girls, and girls were more likely to become victims of bullying. However, such findings should be interpreted with caution, along with taking into account that aggressive behaviour is socially less acceptable for girls than for boys.

Timmermanis & Wiener (2005) investigated social correlates of bullying in adolescents with ADHD. They found that adolescents with ADHD perceived themselves as having lower total, peer, and family social support than adolescents without ADHD did. Among adolescents with ADHD, victimisation by peers was associated with higher levels of parent-rated peer relation problems and lower levels of perceived social support. These social factors were not associated with participation in bullying others among adolescents with ADHD (Timmermanis & Wiener, 2005).

In accordance with the preceding, the objective of this study is to investigate the impact of gender, age, academic performance, decisions on academic accommodations, that is, IEP (Individual Education Programme), experienced

victimisation, experienced bullying and the feeling of security on victimisation by peers and bullying others in children with attention-deficit/hyperactivity disorder.

Method

Participants

The study sample comprised 72 first-through-eighth graders of Zagreb elementary schools with ADHD diagnoses, 59 of whom were boys and 13 were girls. Elementary school in Croatia has eight grades in total, the first four of which are general education-oriented (lower grades) and the other four are subject-oriented (higher grades). Twenty-eight of 72 participants attended one of the lower elementary school grades, and 44 attended one of the higher grades. The age of students was between 7 and 15, but the average age was 12. To be selected as potential participants in the sample required the students have a confirmed ADHD diagnosis, as validated by their school files. According to the subtypes of ADHD, students were divided into two categories: ADHD *Combined* and *Predominantly Inattentive Type*. In total, the sample comprised 75% of students (54) in the ADHD Combined Type category, and 25% of students (18) in the category of ADHD Predominantly Inattentive Type.

For the largest percentage (86%) of students, an Individualised Education Programme (IEP) had been determined, whereas 13.9% of students had not received any decision on specific accommodations to compensate for individual weaknesses. In addition to ADHD, a majority of students (40) also had additional impairments, whereas 32 of them had no additional impairment at all or had no impairments specified in their school files. Table 1 indicates additional impairments of more than 40 students since a few children had more than one additional impairment. In the entire sample, there were only four boys who were administered the following ADHD-related medications: Lamictal, Normabel, Haldol, and Concerta. The pharmacological treatment of children with ADHD is not widespread in Croatia; it is only used for the most prominent symptoms which lead to frequent conflicts between the child and his/her environment.

Table 1
Incidence of additional impairments

Additional impairment	N
Specific learning disability (dyslexia, dysgraphia, dyscalculia, developmental reading and writing disorders)	32
Speech (pronunciation) and language disorders	9
Conduct disorders	5
Emotional impairments	5
Cerebral palsy	1
Agenesis of the corpus callosum	1
Intellectual disability	1

Instrument

The study uses the School-Bullying Questionnaire (UŠN, 2003) authored by Buljan Flander, Karlović and Štimac, designed in line with the Olweus Bully/Victim Questionnaire (Šimić, 2004). The UŠN-2003 included questions about age, gender, feelings of acceptance and security, and ten school bullying-related questions, including Victimisation and Bullying Scales, questions concerning the age and gender of perpetrators of specific forms of bullying, the victimised child's confidant, and the person who tried to help the child after finding out about victimisation (Buljan Flander, Durman Marijanović, & Ćorić Špoljar, 2007).

The Victimisation and Bullying Scales consist of 11 statements, which concern different forms of school bullying. Each student was to mark the frequency of a specific type of victimisation, i.e., bullying with an 'X'. In the context of incidence, the student could choose among one of the following answers: *Practically every day*; *Seldom or sometimes;* and *Never*. The results of either scale represented the total of points for all 11 items. Each participant could obtain a minimum of 11 points per scale (if all statements were answered with *Never*) to a maximum of 33 points (if all statements were answered with *Practically every day*).

In this study carried out on a sample of 72 students, the Cronbach alpha coefficient for the Victimisation Scale and for the Bullying Scale was α=.81 and α=.82, respectively.

Procedure

After the approval obtained from the Ministry of Science, Education and Sports and the Education and Teacher Training Agency, in compliance with

the Children Research Ethics Code (Ajduković & Kolesarić, 2003), prior to the implementation of the study, the parents were informed of the research and their consent was requested to allow their children to participate in the study.

In total, the parents received 124 consent forms, 80 of which were duly signed and returned. Finally, 76 questionnaires were filled out, 72 of which were valid.

The data were collected in twelve regular elementary schools in the Zagreb region throughout a period of two months in 2013. Although the questionnaire was initially planned to be filled out by groups, the inquiry was also conducted individually at some places. At the very beginning, the purpose and the objective of the study were explained, and the students were given instructions on how to fill out the questionnaire. Given the primary characteristics of ADHD (attention deficit), some students needed considerably more time than originally planned to fill out the questionnaire, additional explanation for each particular item, and more frequent work-related focusing. The time required to fill out the questionnaire varied depending on the student and his/her abilities. On average, it took about 15 minutes. All students received coloured cards as a working aid (similar to reading cards) to help them follow the items, that is, to mark the answer of their choice.

Results

Table 2 first indicates the descriptive statistics of the Victimisation and Bullying Scales.

Table 2
Basic descriptive parameters (N=72)

	M	SD	Theoretical range	Minimum value	Maximum value	Kolmogorov-Smirnov Test	
						z	p
Victimisation Scale	17.63	3.81	11-33	12	33	1.45	.03*
Bullying Scale	15.08	3.35	11-33	11	27	1.66	.00**
Verbal victimisation	7.78	1.79	4-12	4	12	1.31	.07
Physical victimisation	4.56	1.38	3-9	3	9	2.51	.00**
Sexual victimisation	1.12	.41	1-3	1	3	4.43	.00**
Economic victimisation	2.57	.89	2-6	2	6	2.98	.00**
Emotional victimisation	1.61	.67	1-3	1	3	2.61	.00**
Verbal bullying	6.51	1.84	4-12	4	11	1.23	.07

	M	SD	Theoretical range	Minimum value	Maximum value	Kolmogorov-Smirnov Test	
						z	p
Physical bullying	4.13	1.27	3-9	3	9	2.10	.00**
Sexual bullying	1.07	.35	1-3	1	3	4.56	.00**
Economic bullying	2.15	.43	2-6	2	4	4.35	.00**
Emotional bullying	1.22	.45	1-3	1	3	4.08	.00**

Note. * p < .05, ** p < .01

Distributions of results of the Victimisation and Bullying Scales and all subscales (with the exception of the verbal victimisation and verbal bullying subscales, which are not statistically significantly different from normal distributions) are positively asymmetrical.

The dependent variables selected for this paper include verbal and physical bullying and verbal and physical victimisation because such forms of bullying, i.e., victimisation, turned out to be the most common for this sample of respondents (see Table 3).

Table 3
Incidence and percentage of physical victimisation in a sample of 72 children with ADHD

Victimisation	Never		Seldom or sometimes		Practically every day	
	N	%	N	%	N	%
Other students call me mean and hurtful names	5	6.9	45	62.5	22	30.6
Other students say mean and hurtful things to me	9	12.5	48	66.7	15	20.8
Other students threaten to do something bad to me	40	55.6	27	37.5	5	6.9
Other students hit, kick, push or shove me around	15	20.8	47	65.3	10	13.9
Other students beat me up	58	80.6	9	12.5	5	6.9
Other students lose or destroy my things on purpose	45	62.5	23	31.9	4	5.6
Other students try to extort money from me	65	90.3	4	5.6	3	4.2
Other students do hurtful things to me	50	69.4	18	25.0	4	5.6
Other students exclude me from play/they completely ignore me	35	48.6	30	41.7	7	9.7
Other students tell lies or spread false rumours about me	19	26.4	38	52.8	15	20.8
Other students touch me on my body in an unpleasant way	65	90.3	5	6.9	2	2.8

The results indicate that 10% of children with ADHD reported that they experienced victimisation practically every day, and 3% of children with

ADHD admitted to bullying behaviour practically every day; 5% of children responded that they never experienced victimisation, and 11% that they never perpetrated bullying.

Table 3 illustrates that children with ADHD most often experienced some forms of verbal victimisation: other students called them mean and hurtful names, said mean and hurtful things to them and told lies or spread false rumours about them. For forms of physical victimisation, 13.9% of children reported that they experienced being hit, kicked, pushed or shoved around practically every day, whereas more severe forms of physical victimisation were seldom experienced.

Table 4 shows that children with ADHD reported that they most often perpetrated some forms of verbal bullying: called other students mean and hurtful names, said mean and hurtful things to other students and told lies and spread false rumours about other students, whereas 11.1% of children reported that they hit, kicked, pushed or shoved other students around practically every day, whereas other forms of physical bullying were rare.

Table 4
Incidence and percentage of bullying in a sample of 72 children with ADHD

Bullying	Never		Seldom or sometimes		Practically every day	
	N	%	N	%	N	%
I call other students mean and hurtful names	26	36.1	39	54,2	7	9.7
I say mean and hurtful things to other students	20	27.8	40	55.6	12	16.7
I threaten to do something bad to other students	54	75	18	0	0	0
I hit, kick, push or shove other students around	31	43.1	33	45.8	8	11.1
I beat other students up	61	84.7	9	12.5	2	2.8
I lose or destroy other students' things	64	88.9	7	9.7	1	1.4
I extort money from other students	70	97.2	2	2.8	0	0
I do hurtful things to other students	54	75	17	23.6	1	1.4
I exclude other students from play/completely ignore other students	57	79.2	14	19.4	1	1.4
I tell lies or spread false rumours about other students	32	44.4	34	47.2	6	8.3
I touch other students on their body in an unpleasant way	69	95.8	1	1.4	2	2.8

To detect significant predictors of bullying, a multivariate regression analysis was carried out, which included a selection of seven potential predictors: *Age, Gender, Academic performance, Individual Education Programme (IEP), Verbal victimisation, Physical victimisation and Security.* Multivariate

regression analyses to reveal significant predictors of victimisation included a selection of seven potential predictors: *Age, Gender, Academic performance, IEP, Verbal bullying, Physical bullying and Security.* Statistics regarding age, academic performance and IEP (whether the student is in possession of one or not) were obtained from the general part of the survey. The statistics concerning security were formulated as a simple linear combination of items that described the feeling of security in different places regarding the school environment: *in the classroom, on the playground, in the dining hall, in the washrooms, in the school corridor, in the school gymnasium.* The students' evaluation of the feeling of security included the following responses: *Insecure, Neither, Secure*; the higher the score, the stronger the feeling of security.

Acceptance by peers was not selected as a potential predictor variable since most children felt accepted, that is, there were only five children who reported being rejected by peers (see Table 5).

Table 5
Incidence and percentage of responses for the school peer acceptance variable in a sample of 72 children with ADHD

Valid	**N**	**%**
Accepted	51	70.8
Rejected	5	6.9
Neither	8	11.1
I don't know	8	11.1
Total	72	100.0

Table 6
Determinants of verbal bullying

Variable	**B**	**SE B**	β
Gender	-1.36.	.53	-.29*
Age	.09	.10	.10
Academic performance	-.03	.19	-.02
IEP	-1.26	.41	-.35**
Verbal victimisation	.32	.13	.31*
Physical victimisation	-.19	.18	-.15
Security	.14	.07	.25*

Note. N = 72, B = Unstandardized Coefficients, SE B = Standard Errors of B, β = Standardised Coefficients (Beta). *(R^2 = .31)., * p < .05, ** p < .01.

Table 6 indicates the relationship between seven potential predictors and the response variable of verbal bullying. The variables were scaled so as to be able to see how gender, IEP, verbal victimisation and the feeling of security in school were statistically significant predictors of verbal bullying.

The boys were more often verbally aggressive than girls were. The children without any IEP more commonly perpetrated verbal bullying as well as those children who were more often victims of verbal bullying. It is interesting to note that children who felt secure in school were more commonly perpetrators of verbal bullying.

The preceding variables accounted for 31% of the variance of the Scale of Verbal Bullying.

Table 7
Determinants of physical bullying

Variable	B	SE B	β
Gender	-1.11	.39	-.34**
Age	.02	.08	.04
Academic performance	-.09	.14	-.08
IEP	-.47	.30	-.19
Verbal victimisation	.07	.10	.09
Physical victimisation	.02	.14	.02
Security	.06	.05	.14

Note. N = 72, B = Unstandardized Coefficients, SE B = Standard Errors of B, β = Standardised Coefficients (Beta). R^2 = .20**.

Table 7 indicates the results of the regression analysis with identical predictors and the Scale of Physical Bullying as a dependent variable. Gender was the only statistically significant predictor of physical bullying and accounted for 20% of the variance of physical bullying. Boys were more commonly physically aggressive, whereas other variables did not predict physical bullying.

To obtain a significant regression coefficient, the variables of academic performance and IEP were excluded from the analysis when verbal victimisation was a response variable. In case of verbal victimisation as a response variable, security and verbal bullying were statistically significant predictors and accounted for 15% of variance of the Scale of Verbal Victimisation (see Table 8). The children who were more often perpetrators of verbal bullying also more commonly experienced verbal victimisation, and interestingly, children who felt more secure, (as in the case of verbal bullying) more often experienced victimisation.

Table 8
Determinants of verbal victimisation

Variable	B	SE B	β
Gender	-.10	.57	-.02
Age	.13	.11	.15
Verbal bullying	.34	.17	.36*
Physical bullying	.20	.24	-.14
Security	.19	.07	.34**

Note. N = 73, B = Unstandardized Coefficients, SE B = Standard Errors of B, β = Standardised Coefficients (Beta). R^2 = .15**, *p < .05, ** p < .01.

Table 9
Determinants of the Scale of Physical Victimisation

Variable	B	SE B	β
Gender	-1.03	.42	-.29*
Age	.02	.08	.04
Academic performance	-.09	.14	-.08
IEP	.08	.33	-.03
Verbal bullying	-.00	.13	-.02
Physical bullying	.08	.18	.07
Security	-.13	.05	-.30*

Note. N = 72, B = Unstandardized Coefficients, SE B = Standard Errors of B, β = Standardised Coefficients (Beta). *R^2 = .19, * p < .05, ** p < .01.

Table 9 shows the results of the regression analysis when the Scale of Physical Victimisation is used as a response variable. Security and gender were significant predictors of physical victimisation and accounted for 19% of the variance of the Scale of Physical Victimisation. The children who felt more insecure were more often victims of physical bullying. Boys were also more often victims of physical bullying, just as they were more commonly perpetrators of verbal and physical bullying.

Discussion

The objective of this research is to determine the impact of age, gender, academic performance, IEP, the experience of victimisation by peers, the experience of bullying others and security, on bullying and victimisation in children with attention-deficit/hyperactivity disorder. The data were obtained based on the self-evaluation of elementary school children with ADHD diagnosis (N=72), and they indicate the children's experience of victimisation by peers, that is, of bullying others.

Incidence of Peer Victimisation and Bullying

The children's self-estimations show that they more often felt themselves to be victims of bullying than they considered themselves as perpetrators. Most commonly, they were victims of verbal bullying and milder forms of physical bullying. Such results can be corroborated by many studies. As mentioned above, children with ADHD frequently suffer from poor peer status, which automatically enhances their probability of being bullied (Wan Salwina, Nik Ruzyanei, Tuti Iryani, Shamsul, Aniza, & Zasmani, 2010). Other children might find the ADHD symptoms weird, which can also make the children with ADHD targets of bullies (Wan Salwina et al., 2010). In addition, the learning problems and discipline difficulties in school, experienced by many ADHD children, might identify them as objects of scorn or derision by their peers (Unnever & Cornell, 2003). Provocative or inappropriate behaviour, which is commonly associated with ADHD, as well as poor social skills, might elicit the scornful behaviour of classmates towards the child with ADHD or their aggressive responses to such children (Unnever & Cornell, 2003). Furthermore, failures of attention can lead to a general sense of inadequacy at school, and to a consequent loss of self-esteem, which is often predictive of victimisation by peers in children with ADHD (Bacchini et al., 2008). Unnever and Cornell (2003) showed that students with ADHD were at greater risk of becoming victims of bullying. Notably, 34% of the students reported being bullied at least two or three times a month in comparison with 22% of the students who were their counterparts (without ADHD). In contrast, 13% of the students with ADHD reported that they bullied other students at least two or three times a month in contrast with only 8% of the students from the control group. Unlike their counterparts, it was detected that it is more likely for the students with ADHD to become victims of bullying but also to bully others. In a sample of 104 nine- to fourteen-year-old children, Wiener and Mak (2009) found that children with ADHD were more likely than

comparison children to report being victimised by peers. Children with ADHD also reported that they were subjected to verbal, physical, and relational victimisation more often than their counterparts without ADHD were.

Predictors of Bullying Others

Gender is a common predictor of verbal and physical bullying in our sample, and it is the only such common predictor. More significantly than girls, boys perpetrate both verbal and physical bullying. The references indicate some of the ADHD symptoms that might have an impact on becoming a bully: impulsive behaviour, lack of self-control, reduced empathy and aggressive reactions, often owing to the frustrations experienced by children at school (Bacchini et al., 2008). Unnever and Cornell (2003) believe that the students with ADHD are more likely to start bullying others due to low self-control. The impact of self-control on bullying is more significant than any other variable investigated in the preceding study. The results of Rucklidge (2006) also support this finding. His study of gender differences in neuropsychological functioning showed that males with ADHD showed some evidence of more impaired inhibition than females with ADHD.

As detected, males more often have a diagnosis of ADHD Combined and Predominantly Hyperactive-Impulsive Type, whereas females more commonly have a Predominantly Inattentive Type (Barkley, 2000; Taylor et al., 2010). For that reason, females are less impulsive, that is, have fewer problems with self-control and display aggressive behaviours less frequently. Bacchini, Affuso, and Trotta (2008) found that in males ADHD symptoms are a good predictor of bullying, whereas in females they predict victimisation. Furthermore, the ADHD-related problems are more common in males, which is also the case in our study.

The second possible explanation results from the environmental approach, whereby the conduct is interpreted in its social context. Higher incidence of bullying in males can also be interpreted as a socially acceptable, even expected male behaviour. Consequently, males can more often perpetrate, but also admit to such conduct in their self-estimations. Females are expected to exhibit internalising, less excessive conduct, which might also result in smaller incidence of such conducts but also in less reliable self-estimations (Sciutto, Nolfi, & Bluhm, 2004).

In terms of physical bullying, of the seven predictors assumed in our research, only gender seemed to be significant.

In addition to gender, in the context of verbal bullying, other significant predictors are as follows: IEP, verbal victimisation and the feeling of security. The

predictor of IEP can be justified by the fact that it enables students to have education in accordance with their needs and thus students have better academic performance. The students with ADHD but without the IEP are confronted with considerable frustrations due to inadequate school demands and often respond with verbal aggression to poorer academic performance than they would otherwise deserve according to their efforts and knowledge. It is a common fact that the organisational skills problems characteristic of children with ADHD are strongly associated with academic impairment (ability to manage materials and belongings, e.g., transfer of homework assignments to and from school). Because of that and other reasons, children with ADHD typically experience clinically significant impairment in the school setting as evidenced by lower school grades and achievement scores and higher rates of school dropout in comparison to their peers (DuPaul & Stoner, 2003; Frazier, Youngstrom, Glutting, & Watkins, 2007; Langberg, Epstein, Becker, Stephen, Girio-Herrera, & Vaughn, 2012). In Croatian schools, unfortunately, it can still happen that a child with impairments will not receive education in line with mandatory school accommodations contained in the IEP, which depends on several factors. Sometimes the parents do not consent to an individualised approach as they believe none is needed and that it would stigmatise the child. In children with ADHD Predominantly Hyperactive/Impulsive Type and without difficulties concerning the acquisition of school materials, the organisational and self-control issues are assigned to educational factors and the approach to such children is not individualised. For that reason, they are often reprimanded and criticised by teachers and their peer status is poor. They are scorned and ridiculed by other children, i.e., verbally victimised, which in turn results in their inappropriate verbal response, reactive verbal aggression, that is, the development of the bully-victim pattern (Salmivalli & Nieminen, 2002). Accordingly, our research also found that verbal victimisation was a significant predictor of verbal bullying.

Security in school was a predictor that affected the occurrence of verbal bullying in an unusual way. It was detected that children who felt more secure in school (in our research, they were males) were more inclined to verbal bullying. One possible explanation could be that feeling of security is based on self-perception of child with ADHD as 'stronger' than other children in school, and 'stronger' than adults who are not able to respond adequately to the challenging behaviour of ADHD children. In a school climate where teachers are powerless, uninterested in peer relations, or insufficiently skilled, a child with ADHD could feel secure to be verbally aggressive toward peers without any consequences. This explanation relates to the results of Meehan, Hughes, and Cavell (2003) that students who perceived their teachers as supportive and involved

are more likely to do well in school and less likely to display behaviour problems such as bullying. Moreover, Wang, Berry, and Swearer (2013) review research on school climate and bullying behaviour and propose that an unhealthy and unsupportive school climate (e.g., negative relationship between teachers and students, positive attitudes towards bullying) provides a social context that allows bullying behaviour to occur. The feeling of security as a predictor of verbal bullying might also be a consequence of an unrealistic evaluation of the feeling of security as children with ADHD often have unrealistic views of their own feelings and those of others, that is, commonly have illusory perception and self-perception (Owens, Goldfine, Evangelista, Hoza, & Kaiser, 2007).

Predictors of Peer Victimisation

There are two identified predictors of verbal victimisation: verbal bullying and security. It was found that children with ADHD (irrespective of their gender) were more exposed to verbal bullying if they were also perpetrators, and they felt secure in school. Such bully/victim situation was detected in a number of studies about children with ADHD, due to their often socially incompetent behaviour (Holbmerg & Hjern, 2008; Wiener & Mak, 2009). In accordance with the above-mentioned, it was also found in a sample of typical children that risk factors for victimisation by peers include both aggressive behaviour and social withdrawal (Hanish, 2000). For instance, Hodges and his colleagues (Hodges, Boivin, Vitaro, & Bukowski, 1999; Hodges, Malone, & Perry, 1997; Hodges & Perry, 1999) found that externalising behaviours (operationalised as aggressive, argumentative, and disruptive behaviour, dishonesty, and a pushy peer entry style) and internalising behaviours (operationalised as withdrawal, anxiety, and depression, and a hovering peer entry style) predict victimisation, both concurrently and over time. The correlation between aggressive behaviour and victimisation was also found in the research carried out by Salmivalli, Karhunen, and Lagerspetz (1996), who detected that the absence of aggressive response (counter-aggression) and nonchalance (e.g., acting as if they didn't care) in girls and absence of counter-aggression in boys were factors which had an impact on reduction or termination of bullying. The feeling of security in school reported by children in our sample, which is a predictor of both verbal victimisation and verbal bullying, might reflect some of the characteristics of children with ADHD. Impulsivity, lack of interest in others, low frustration tolerance, verbal and physical aggression, defiant behaviour (Barkley, 2000; Wåhlstedt, Thorell, & Bohlin, 2008), focus on instant need fulfilment (Taylor et al., 2010), lack of interpersonal empathy, consideration of other

pupils' needs, emotions and views (Cordier, Bundy, Hocking, & Einfeld, 2010), distort the child's perception, that is, are responsible for his/her focus on the current situation, poor awareness of the consequences and the events preceding a situation (Barkley, 2000).

As significant predictors of physical victimisation, in our research, the following predictors can be singled out: gender (males more commonly than females reported physical victimisation), and the feeling of insecurity. Such results do not correspond with the findings in references that indicate that ADHD is directly linked with bullying behaviour in males and victimisation in females (Bacchini et al., 2008). The explanation can probably be found in the type of victimisation in females (relational aggression), which was not one of the predictors of physical victimisation in our study. As indicated in the previous analysis, males were largely more aggressive than females, that is, gender was a significant predictor of physical bullying, and it can be assumed that this was a bully-victim pattern and that the males in our research were both victims and perpetrators of bullying.

The predictor of security, that is, insecurity, refers to the impact of a negative experience due to physical harassment, which is much more difficult than verbal bullying; therefore, in this case, it probably has a more negative influence on self-perception, developing fear and increasing awareness of one's own vulnerability and insecurity in the school setting.

In the context of other potential predictors, it can be seen that in our sample age and academic performance did not have a significant impact on either victimisation or bullying. Academic performance probably had an indirect impact via the predictor of being enrolled in an individual educational programme, but age was not found to be significant for the interpretation of victimisation and bullying. It is possible that poor self-control and other characteristics responsible for bullying behaviour in children with ADHD persist from early childhood to adolescence.

It was identified in our sample that the bully/victim pattern was much more present in boys with ADHD than in girls. It was also detected that age and academic performance were not significant predictors of any form of bullying in our sample of respondents.

Constraints of the Research

Although the research carried out has constraints due to a positive illusory bias present in the self-evaluation of children with ADHD, the results obtained are an important starting point for further research, but also for the

planning of interventions to prevent the occurrence of bullying and victimisation in children with ADHD. Consequently, the subsequent research should investigate whether there are any differences between the predictors in the context of bullying in the case that bullying is evaluated by teachers and/or parents.

The results should also be considered with caution as it was impossible to include a comparison group in this phase of research and the group of respondents was relatively small. In the next phase, the examination will be expanded to include a considerably larger number of respondents together with the comparison group, and then the impact of other potential variables on bullying by peers in children with ADHD will be verified.

Conclusion

The self-estimations in children with ADHD in our study indicated that gender and the feeling of security in school predicted bullying and that gender, IEP (i.e., the support the children obtained in school), and bullying were significant predictors of victimisation. The children with ADHD more commonly felt themselves to be victims than they considered themselves to be perpetrators of bullying, and most frequently as victims of verbal bullying and milder forms of physical bullying.

Gender was an important predictor of physical bullying: males were (more significantly than females) perpetrators of physical bullying, whereas both gender and security were significant predictors of verbal bullying. Males were (more significantly than females) perpetrators of verbal bullying, and felt secure in school.

Verbal bullying and security were significant predictors of verbal victimisation. The children with ADHD who were perpetrators of verbal bullying were also more often exposed to that type of bullying, but still felt secure in the school setting.

Gender and security were significant predictors of physical victimisation. Males were more exposed to physical bullying and felt insecure.

It was found that the bully/victim pattern was much more significantly present in males with ADHD than in girls in our sample.

In comparison with the research in a sample of children without any impairments (Swearer, 2011), neither age nor academic performance was found to be a significant predictor of any form of bullying in our sample of respondents.

The results obtained are an important starting point for further research, but also for planning of interventions to prevent the occurrence of bullying and victimisation in children with ADHD.

References

Ajduković, M., & Kolesarić, V. (Eds.) (2003). *Etički kodeks istraživanja s djecom* [Ethical code of research with children]. Zagreb: Vijeće za djecu Vlade Republike Hrvatske, Državni zavod za zaštitu obitelji, materinstva i mladeži.

Bacchini, D., Affuso, G., & Trotta, T. (2008). Temperament, ADHD and peer relations among schoolchildren: The mediating role of school bullying. *Aggressive Behavior*, *34*(5), 447–459. doi: 10.1002/ab.20271

Barkley, R. A. (2000). *Taking charge of ADHD*. New York, NY: The Guilford Press.

Buljan Flander, G., Durman Marijanović, Z., & Ćorić Špoljar, R. (2007). Bullying in Croatian schools with regard to gender, age and acceptance/rejection in school. *Journal for General Social Issues, 16*(1-2), 157–174.

Camodeca, M., Terwogt, M. M., & Schuengel, C. (2002). Bullying and victimization among school-age children: Stability and links to proactive and reactive aggression. *Social Development*, *11*(3), 332–345.

Card, N. A., & Hodges, E. V. (2008). Peer victimization among schoolchildren: Correlations, causes, consequences, and considerations in assessment and intervention. *School Psychology Quarterly, 23*(4), 451–461. doi: 10.1037/a0012769

Cook, C. R., Williams, K. R., Guerra, N. G., Kim, T. E., & Sadek, S. (2010). Predictors of bullying and victimization in childhood and adolescence: A meta-analytic investigation. *School Psychology Quarterly, 25*(2), 65–83.

Cordier, R., Bundy, A., Hocking, C., & Einfeld, S. (2010). Comparison of the play of children with attention deficit hyperactivity disorder by subtypes. *Australian Occupational Therapy Journal*, *57*(2), 137–145. doi: 10.1111/j.1440-1630.2009.00821.x

Crick, N. R., & Bigbee, M. A. (1998). Relational and overt forms of peer victimization: A multi-informant approach. *Journal of Consulting and Clinical Psychology*, *66*(2), 337–347.

Dumas, M. C. (1998). The risk of social interaction problems among adolescents with ADHD. *Education & Treatment of Children*, *21*(4), 447–461.

DuPaul, G. J., & Stoner, G. (2003). *ADHD in the schools: Assessment and intervention strategies* (2nd ed.). New York, NY: Guilford.

Eliot, M., Cornell, D., Gregory, A., & Fan X. (2010). Supportive school climate and student willingness to seek help for bullying and threats of violence. *Journal of School Psychology, 48*(6), 533–553. doi: 10.1016/j.jsp.2010.07.001

Espelage, D. L., Bosworth, K., & Simon, T. R. (2001). Short-term stability and prospective correlates of bullying in middle-school students: An examination of potential demographic, psychosocial, and environmental influences. *Violence and Victims, 16*(4), 411–426.

Espelage, D. L., & Swearer, S. M. (2003). Research on school bullying and victimization: What have we learned and where do we go from here? *School Psychology Review, 32*(3), 365–383.

Fox, C. L., & Boulton, M. J. (2005). The social skills problems of victims of bullying: Self, peer and teacher perceptions. *British Journal of Educational Psychology, 75*(2), 313–328. doi:10.1348/000709905X25517

Frazier, T. W, Youngstrom, E. A., Glutting, J. J., & Watkins, M. W. (2007). ADHD and achievement: Meta-analysis of the child, adolescent, and adult literatures and a concomitant study with college students. *Journal of Learning Disabilities*, *40*(1), 49–65.

Hanish, L. D. (2000). Predictors of peer victimization among urban youth. *Social Development*, *9*(4), 521–543.

Hanish, L. D., Bradshaw, C. P., Espelage, D. L., Rodkin, P. C., Swearer, S. M., & Horne, A. (2013). Looking toward the future of bullying research: Recommendations for research and funding priorities. *Journal of School Violence*, *12*(3), 283–295.

Hanish, L. D., & Guerra, N. G. (2002). A longitudinal analysis of patterns of adjustment following peer victimization. *Development and Psychopathology*, *14*(1), 69–89.

Hodges, E. V. E., Boivin, M., Vitaro, F., & Bukowski, W. M. (1999). The power of friendship: Protection against an escalating cycle of peer victimization. *Developmental Psychology*, *35*(1), 94–101.

Hodges, E. V. E., Malone, M. J., & Perry, D. G. (1997). Individual risk and social risk as interacting determinants of victimization in the peer group. *Developmental Psychology*, *33(6)*, 1032–1039.

Hodges, E. V. E., & Perry, D. G. (1999). Personal and interpersonal antecedents and consequences of victimization by peers. *Journal of Personality and Social Psychology*, *76(4)*, 677–685.

Holmberg, K., & Hjern, A. (2008). Bullying and attention-deficit-hyperactivity disorder in 10-year-olds in a Swedish community. *Developmental Medicine & Child Neurology*, *50*(2), 134–138. doi: 10.1111/j.1469-8749.2007.02019.x

Hoza, B. (2007). Peer Functioning in Children With ADHD. *Journal of Paediatric Psychology*, *32(6)*, 655–663. doi: 10.1093/jpepsy/jsm024

Kaukiainen, A., Bjorkqvist, K., Lagerspetz, K., Osterman, K., Salmivalli, C., Rothberg, S., et al. (1999). The relationships between social intelligence, empathy, and three types of aggression. *Aggressive Behavior*, *25*(2), 81–89.

Kumpulainen, K., Räsänen, E., & Henttonen, I. (1999). Children involved in bullying: psychological disturbance and the persistence of the involvement. *Child Abuse & Neglect, 23*(12), 1253–1262.

Kumpulainen, K., Räsänen, E., Henttonen, I., Almqvist, F., Kresanov, K., Linna, S. L., et al. (1998). Bullying and psychiatric symptoms among elementary school-age children. *Child Abuse & Neglect*, *22*(7),705–717.

Kumpulainen, K., Rasanen, E., & Puura, K. (2001). Psychiatric disorders and the use of mental health services among children involved in bullying. *Aggressive Behavior, 27*(2), 102–110.

Langberg, J. M., Epstein, J. N., Becker, S. P., Girio-Herrera, E., & Vaughn, A. J. (2012). Evaluation of the homework, organization, and planning skills (HOPS) intervention for middle school students with attention deficit hyperactivity disorder as implemented by school mental health providers. *School Psychology Review*, *41*(3), 342–364.

Low, S., & Espelage, D. (2014). Conduits from community violence exposure to peer aggression and victimization: Contributions of parental monitoring, impulsivity, and deviancy. *Journal of Counselling Psychology*, *61*(2), 221–231. doi:10.1037/a0035207

Meehan, B. T., Hughes, J. N., & Cavell, T. A. (2003). Teacher–student relationships as compensatory

resources for aggressive children. *Child Development*, *74*(4), 1145–1157. doi: 10.1111/1467-8624.00598

Olweus, D. (1998). *Bullying at school: What we know and what we can do*. Zagreb: Školska knjiga.

Owens, J. S., Goldfine, M. E., Evangelista, N. M., Hoza, B., & Kaiser, N. M. (2007). A critical review of self-perceptions and the positive illusory bias in children with ADHD. *Clinical Child and Family Psychology Review*, *10*(4), 335–351. doi: 10.1007/s10567-007-0027-3

Perry, D. G., Williard, J. C., & Perry, L. C. (1990). Peers' perceptions of the consequences that victimized children provide aggressors. *Child Development*, *61*(5), 1310–1325.

Rief, S. (1998). *The ADD/ADHD Checklist: An Easy Reference for Parents & Teachers.* Paramus, NJ: Prentice Hall.

Rucklidge, J. J. (2006). Gender differences in neuropsychological functioning of New Zealand adolescents with and without attention deficit hyperactivity disorder. *International Journal of Disability, Development and Education*, *53*(1), 47–66.

Salmivalli, C. (2010). Bullying and the peer group: A review. *Aggression and Violent Behavior, 15*(2), 112–120.

Salmivalli, C., Karhunen, J., & Lagerspetz, K. M. J. (1996). How do the victims respond to bullying? *Aggressive Behavior*, *22*(2), 99–109.

Salmivalli, C., & Nieminen, E. (2002). Proactive and reactive aggression among school bullies, victims, and bully-victims. *Aggressive Behavior, 28*(1), 30–44.

Salmivalli, C., & Peets, K. (2009). Bullies, victims, and bully-victim relationships in middle childhood and early adolescence. In K. H. Rubin, W. M. Bukowski, & B. Laursen (Eds.), Handbook of peer interactions, relationships, and groups (pp. 322–340). New York, NY & London, UK: The Guilford Press.

Sciutto, M. J., Nolfi, C. J., & Bluhm, C. (2004). Effects of child gender and symptom type on referrals for ADHD by elementary school teachers. *Journal of Emotional and Behavioral Disorders, 12*(4), 247–253.

Strom, I. F., Thoresen, S., Wentzel-Larsen, T., & Dyb, G. (2013). Violence, bullying and academic achievement: A study of 15-year-old adolescents and their school environment. *Child Abuse & Neglect, 37*(4), 243–251. doi: 10.1016/j.chiabu.2012.10.010

Swearer, S. M. (2011). Risk factors for and outcomes of bullying and victimization. *Educational Psychology Papers and Publications, p*aper 132. Retrieved from http://digitalcommons.unl.edu/edpsychpapers/132

Swearer, S. M., Espelage, D. L., Vaillancourt, T., & Hymel, S. (2010). What can be done about school bullying? Linking research to educational practice. *Educational Researcher*, *39*(1), 38–47. doi: 10.3102/0013189X09357622

Šimić, N. (2004). Contribution to research the incidence of bullying in school. Unpublished Graduate Thesis. Zagreb: University of Zagreb Faculty of Humanities and Social Sciences. Retrieved from http://darhiv.ffzg.hr/110/1/Natalija%C5%A0imi%C4%87.pdf

Taylor, L. A., Saylor, C., Twyan, K., & Macias, M. (2010). Adding insult to injury: Bullying experiences of youth with attention deficit hyperactivity disorder. *Children's Health Care*, *39*(1), 59–72.

Timmermanis, V., & Wiener, J. (2005). Social correlates of bullying in adolescents with attention-

deficit/hyperactivity disorder. *Canadian Journal of School Psychology*, *26*(4), 301–318. doi: 10.1177/08295735114232l2

Unnever, J. D., & Cornell, D. G. (2003). Bullying, self-control, and ADHD. *Journal of Interpersonal Violence*, *18*(2), 129–147. doi: 10.1177/0886260502238731

Wåhlstedt, C., Thorell, L. B., & Bohlin, G. (2008). ADHD symptoms and executive function impairment: early predictors of later behavioral problems. *Developmental Neuropsychology, 33*(2), 160–178. doi: 10.1080/87565640701884253

Wang, C., Berry, B., & Swearer, S. M. (2013). The critical role of school climate in effective bullying prevention. *Theory Into Practice, 52*(4), 296–302. doi: 10.1080/00405841.2013.829735

Wan Salwina, W. I., Nik Ruzyanei, N. J., Tuti Iryani, M. D., Shamsul, A. S., Aniza, I., & Zasmani, S. (2010). The association between the attention deficit hyperactivity disorder (ADHD) symptoms and bully/victim problem among Malaysian sixth-graders. *ASEAN Journal of Psychiatry*, *11*(1), 79-86.

Wiener, J., & Mak, M. (2009). Peer victimization in children with attention-deficit/hyperactivity disorder. *Psychology in the School*, *46*(2), 116–131. doi: 10.1002/pits.20358

Woods, S., & Wolke, D. (2004). Direct and relational bullying among primary school children and academic achievement. *Journal of School Psychology*, *42*(2), 135–155. doi:10.1016/j.jsp.2003.12.002

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Participatory Action Research in University Chemistry Teacher Training

Yannik Tolsdorf[1] and Silvija Markić*[2]

The Participatory Action Research (PAR) model developed by Eilks and Ralle is very well known in science education. Over the years, many teaching and learning materials have been developed and implemented in German secondary schools using this method. The success of the model encouraged us to adapt it to the university level in order to develop university chemistry education courses. However, to do this, we encountered and conquered some challenges. The present paper is based on an advanced model of Participatory Action Research for developing university chemistry teacher training. For an advanced model, the focus is strongly on the extended development team, which contains people who were not part of the original team. The role of the students also changes. The ideas we used to further develop the model and implement it in practice will be described and discussed below.

Keywords: model, participatory action research, university chemistry teacher education

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Participativno akcijsko raziskovanje pri izobraževanju učiteljev kemije

Yannik Tolsdorf in Silvija Markić

Model participativnega akcijskega raziskovanja, ki sta ga razvila Eilks in Ralle, je zelo dobro poznan v naravoslovnem izobraževanju. Skozi leta je bilo v nemških srednjih šolah razvitih in implementiranih veliko materialov za poučevanje in učenje z uporabo te metode. Uspeh tega modela nas je spodbudil, da smo ga prilagodili univerzitetni ravni z namenom razvoja predmetov na področju kemijskega izobraževanja. Da smo to naredili, smo se spoprijeli z nekaterimi izzivi in jih tudi uspešno rešili. Ta prispevek temelji na naprednem modelu participativnega akcijskega raziskovanja, ki omogoča razvoj poučevanja učiteljev kemije. Za napredni model je značilen fokus na razširjeni razvojni skupini, v katero so vključeni ljudje, ki niso bili del prvotne skupine, ki je razvijala ta model. Tudi vloga študentov se je spremenila. Ideje, ki smo jih uporabili za razvoj modela in njegovo implantacijo v praksi, so opisane in obravnavane v prispevku.

Ključne besede: model, participativno akcijsko raziskovanje, univerzitetno izobraževanje učiteljev kemije

Introduction

Diagnostic competence is one of the primary competences that future teachers, in general, and future chemistry teachers, in particular, should possess. This competence is needed whenever one deals with heterogeneity, models of lesson design, and issues of individual support (e.g., Heritage, Kim, Vendlinski, & Herman, 2009; Herman, Osmundson, Dai, Ringstaff, & Timms, 2015; Loughran, Berry, & Mulhall, 2006; Shulman, 1987). In general, diagnostic competence is described as knowledge about students' learning conditions, their social skills, and their evaluation of any other students' activities in the classroom. In addition, it is essential for the appropriate diagnosis of students' learning conditions, including any obstacles for successful learning (Tolsdorf & Markic, 2016). Diagnostic results and observations help chemistry teachers in their lesson planning and, thereby, in the analysis and development of their own lessons (Klug, Bruder, Kelava, Spiel, & Schmitz, 2013). Jäger (2006) described diagnostic competence as mainly based on the following knowledge domains: (i) Conditional Knowledge, (ii) Technological Knowledge, and (iii) Knowledge of Change. Conditional knowledge is knowledge about the background of one given person, any influences that affect personal experiences, and those that cause certain behaviours. In addition, this also includes the knowledge of such effects and their possible manifestations in a particular survey. The aspects of heterogeneity and diversity belong to this knowledge domain. Technological Knowledge involves the ability to select the most appropriate data collection and analysis methods for diagnostic questions. Finally, the Knowledge of Change means any knowledge that allows the teacher to apply strategies dealing with changing the learning experience and/or the behaviour of anyone involved in the interactions (Jäger, 2006).

Thus, diagnosis is an essential and central issue in the work of teachers. It becomes even more difficult in the larger, complex structure of learning and teaching (Brante, 2009). Since the importance of diagnostic competence increases with a corresponding rise of diversity and heterogeneity in schools, a need to include diagnostic knowledge in higher education courses exists. But how can we integrate and implement such new aspects into teaching in higher education?

Participatory Action Research for Secondary schools by Eilks and Ralle

The origin and history of Action Research are somewhat unclear. McKernan (1991) has identified action research as a method from the origin of science in education in roughly the late 19th century. For Kemmis, McTaggart, and

Nixon (2014), the classical action research model by Lewin remains a cyclical development process with four phases: 1) Planning or Development, 2) Action, 3) Observation, and 4) Reflection. These represent easy and helpful steps for a communicative development process (Altrichter, Kemmis, McTaggart, & Zuber-Skerritt, 2002). They were adapted in the model by Eilks and Ralle (2002).

The Model of the Participatory Action Research by Eilks and Ralle (2002) has had success in the development of new and innovative teaching materials. It is a development model for the school context, in which in-service practitioners and experts (theoreticians) work together communicatively and equally to better teaching practices (see also Eilks, Parchmann, Gräsel, & Ralle, 2004). Many materials have been developed with this model over a broad period (Eilks & Markic, 2011; Markic & Eilks, 2006). In the school context, positive experiences have been collected and documented in many publications (Eilks, Markic, & Witteck, 2010; Valanides, Nicolaidou, & Eilks, 2003). The model of Eilks and Ralle (2002) is presented in Figure 1.

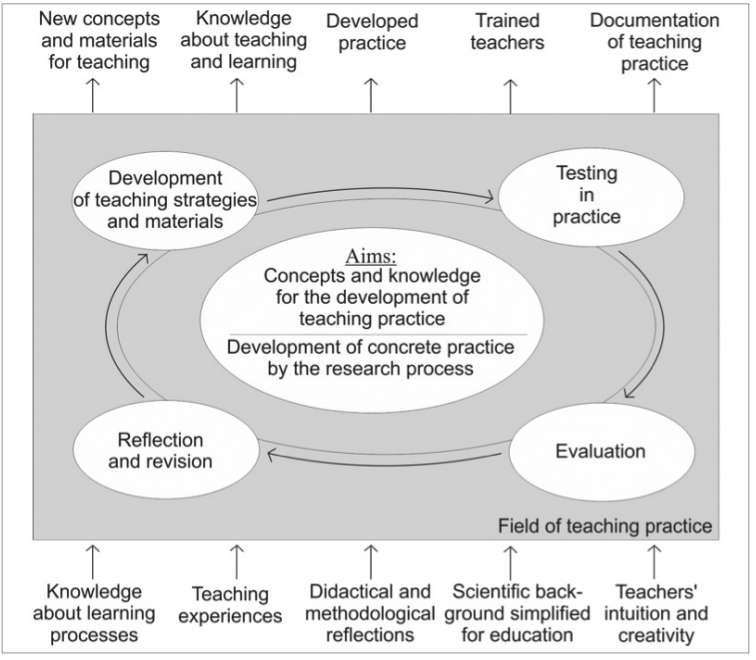

Figure 1. Participatory Action Research by Eilks and Ralle (2002, p. 82).

Furthermore, Eilks and Ralle (2002) adapted the continuous, cyclical process mentioned above. The development of new materials and the research of practice, therefore, consist of a multi-step process. The aim of cyclical

development is the 'conception and knowledge for the development of teaching practice' and the 'development of concrete practice by the research process' (Eilks & Ralle, 2002, p. 89). Additionally, it is of fundamental interest to the present model to positively change teaching practices. The problems found in current practices should be minimised or even solved in multiple cycles, with the help of stepwise changes in practice (Eilks & Ralle, 2002). Cooperation between two types of groups, practitioners (chemistry teachers) and researchers (chemistry educators) is essential.

There are several different models of action research (e.g., Holter & Schwartz-Barcott, 1993; Kemmis & McTaggart, 1988). Masters (1995) differentiated models of action research in three types and described three new types. Moreover, these types of action research are connected to the present research perspective:

1. scientific-technical view of problem-solving: the researcher takes the lead in the main part of the developmental process and brings new ideas (e.g., research question, strategies, new materials) into the process. Furthermore, the researcher has the task of evaluating the 'new' practice. Here, the practitioners are on hand to help the researcher and to field test the materials in everyday practice.
2. practical-deliberative action research: all the people involved cooperate more and more in the developmental process. The practitioners participate in development and testing. Here, the researcher only starts the development process with a problem from teaching practice.
3. critical-emancipatory action research: the practitioners and researcher have equal rights, but the practitioners take the lead in the main part of the developmental process. The researcher is more of a support aid for development, and the practitioners participate in all steps of the development process. Therefore, the problems come directly from the practitioners themselves.

The Participatory Action Research model of Eilks and Ralle (2002) adheres more to the second type of research above, since the practitioners and researcher are equal, but an initial question from the researcher instigates the whole action of the development process. Eilks et al. (2004) state that the development team and the tasks in the team can change over time, as can the type of action research. The different characteristics of the people involved influence the development of materials. They thus represent a mixture of various teaching experiences, didactic and methodological experience, knowledge about the learning process, and creativity.

The development process consists of many successive cycles. It can be divided into three phases in which the cycles have differing priorities. The development team is small in the first phase. It gains awareness of the problem and discusses any relevant subject knowledge and the pedagogical background. Initial approaches are developed in the team and tested in each small group (Eilks & Ralle, 2002). New practitioners are supposed to be involved in development during the second phase. This expands the practice field and yields new approaches from the practitioners that can enrich the overall development of teaching practices. A wider evaluation is carried out in multiple groups at the end of this phase. After this, the third phase begins with the examination of whether or not the new approaches have been sufficiently well-documented, so that they can be used without the more detailed supervision of the practitioners in lessons (Eilks & Ralle, 2002).

Challenges in the adaptation from the school level to higher education

Because Participatory Action Research (PAR) at the secondary school level was able to collect positive experiences and create many useful materials, the idea of adapting the model for the development of university-level, chemistry education seminars arose. Additionally, several initial projects for developing chemistry education already exist and have yielded positive results (Burmeister & Eilks, 2013; Krause & Eilks, 2015). Thus, the focus of the present study is the adaptation of the model of Participatory Action Research of Eilks and Ralle (2002) for the development of university chemistry teacher training. What such an adapted model looks like is to be determined.

However, we encountered some adaptational challenges with our model for higher education, which had previously been advantages when working with the original Participatory Action Research model. These occurred as we started developing teacher-training modules for chemistry, which focused closely on diagnosis and support. These challenges have already been documented for two previous projects (see Burmeister & Eilks, 2013; Krause & Eilks, 2015).

The original model set clear distinctions between the in-service personnel (teachers) and the theoreticians (university chemistry educators). However, both groups were now represented by one person in the new university model. On the one hand, the chemistry educator leads the practitioners in the chemistry educational modules; on the other, he or she is also a researcher in this field. This causes limitations that should be considered during development. Furthermore, a radical redefinition of the original model of Eilks and Ralle (2002)

had to be faced, since only two people were sufficient for the developmental process. This meant that the chemistry educator could develop the materials independently. However, this does not fulfil the spirit of Action Research, in which the developmental team employs a larger group creating productive, communicative exchanges during the developmental process.

As for implementing the material, at the University of Bremen, the relevant seminars are offered annually and are attended by small groups of student teachers. It is difficult to find parallel groups researching the same topic, since most universities in Germany do not have the same curricula for their university teacher-training programmes. Thus, involvement in a wider field of practice is limited and remains difficult. However, the feedback provided by student teachers is essential.

This approach places the focus on developing diagnostic competence in our seminars. It is crucial to remember, however, that such competence is less in line with the main focal points in chemistry education. As important as diagnostic ability is for teachers, this area is more represented by educational aspects found in such subjects as psychology, German language teaching, and special needs education. However, this also means that focussing solely on the goals and topics of a normal university chemistry education would deprive all chemistry teachers and educators almost entirely of the necessary competencies and helpful knowledge to be found in this vital field. Therefore, a mix is fundamentally necessary.

Extended development team

Starting with the challenges above and the pitfalls faced by a strictly one-discipline approach, the development team needed to be reformed. To prevent the researcher from being placed in a double role, more university faculty must be involved in the development. Other subject disciplines and closely related research domains with regard to the issue should be integrated into the development team. The chemistry educator who will teach the seminar serves as the practitioner in the original model. This person intimately knows the old course and has detected a problem in his or her own teaching that needs to be solved or minimised. The various experts in the group have different and deeper understandings and knowledge about various aspects of the topic. Furthermore, this group possesses a large pool of theoretical knowledge. The other people involved bring new practical and theoretical knowledge, thereby enhancing the overall view of new methods, theories, and opinions for the developmental process (see Reinhardt, 2009). Through this extension, subjective theories can influence the

development of materials, and these theories exist parallel to the scientific theories. Both types of theories from chemistry educators can, therefore, influence each other (Baumert & Kunter, 2006) and lead to otherwise unexplored results. Specific subjective theories are activated by certain actions, and these (along with other factors (e.g., emotional aspects to the problems)) influence the actions, behaviour, and practical work of the participants (e.g., Aquirre & Speer, 2000; Mansour, 2009). This allows the theories to influence development. Furthermore, attitudes and subjective theories differ between chemistry educators, because they depend on personal, practical experience (Fussangel, 2008). Finally, Feldmann (1996) and Bencze and Hudson (1999) have documented a change in practical knowledge during this process, which helps to improve all of the participants' teaching practices. Thus, educators from similar disciplines (biology, physics) should also be included in the development process.

Diagnostics and heterogeneity tend to be less the focus of chemistry teaching and chemistry education; they are more likely to be found in the disciplines of pedagogy or special needs education. This obviates the involvement of educators from language learning, pedagogy, or inclusive education. The involvement of researchers from outside the science education realm should be tailored to the problems. This type of group parallels the original model by Eilks and Ralle (2002) more closely, because such people possess a deeper knowledge of diagnostics and heterogeneity, two topics which are relative newcomers in chemistry education. Moreover, experiences and teaching attitudes can also positively affect the development process. According to Markic, Broggy, and Childs (2013), language plays a central role in the acquisition of knowledge and promotion of communication in science teaching. Thus, language and linguistic promotion aspects should be integrated into chemistry teacher-training programmes. This consequently means that German educators and German-as-a-second-language (GSL) educators participate actively in the development team.

Reinhardt (2009) also describes a discrepancy between teachers as practitioners and researchers as pedagogical theoreticians (see also Huberman, 1993). He concludes that teacher-training programmes must respond to this discrepancy. Both perspectives need to be considered in education. Teachers have the general pedagogical knowledge to design and plan lessons, which depends on their personal experience. On the one hand, this knowledge also means organisational and methodical knowledge for particular classroom actions; on the other, it includes concrete strategies and methods for lesson planning (Baumert & Kunter, 2006). Teachers also have specific beliefs and attitudes about learning and teaching (Fussangel, 2008). Additionally, post-university student teachers are exposed to this at school during their final teacher training. This ensures that they are not

shocked by real-world learning situations, and it makes the transition from a life of study into the workaday world easier. This process must also be actively supported by university teachers. This can be done by including teachers' attitudes, beliefs, and subjective theories into the curriculum at the university (Schüssler, Keuffer, Günnewig, & Scharlau, 2012). Thus, experienced teachers should also be involved in the development of university teacher training.

Finally, student teachers themselves should be involved in the development of their education. Teacher trainees have the same role as the students in the original model and, consequently, they help to test the developed materials from the university in their classrooms. The German Federal Ministry of Education and Research (BMBF, 2009) has previously remarked that university students are rarely or insufficiently in contact with their professors. Their courses are rarely adapted to the students' needs and attitudes. Moreover, student teachers' task does not only consist of testing new materials at the university. It also entails reflection upon these materials and giving personal feedback about them. Trainees are supposed to enlarge the overall picture presented by the materials, provide feedback to the entire group, and initiate rapid intervention in the developmental process. The student teachers are an integral part of the development team.

To summarise, an overview of the formation of the development team is presented in Figure 2.

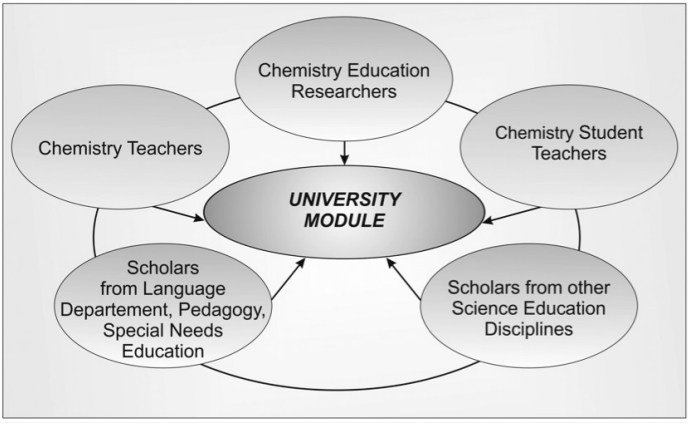

Figure 2. Groups involved in the development team for university courses.

Because such multi-faceted composition of the teams has to be deduced from the theory, the resources available significantly influence the development process. This allows the mixing of two contrary knowledge domains (empirical

research results and practical experience), which has already been mentioned in the literature (McIntyre, 2005). Other significant aspects include the summarisation of teaching experiences, the inclusion of intuitive action skills, the use of unlimited creativity, and the harnessing of the diverse academic backgrounds among the people involved.

The developed model of Participatory Action Research for higher education

We also adopted the idea of a cyclical process and a multi-step development process with four phases for the creation of university courses. This means that an initial problem is detected by the chemistry educator, who is also the lecturer in the chemistry educational course. To ensure that the problem is not simply a one-off situation and ascertain whether rectification of the problem provokes general interest, the experts first discuss the problem. At the beginning of the process, the development team consists of chemistry educators, chemistry teachers, and educators from other scientific disciplines. An analysis of the relevant literature also has to be made. These first two steps of initiating the development process are also described by Eilks and Ralle (2002). The literature review is continuously carried out throughout the developmental process work. All information obtained is provided to the complete study group (Burmeister & Eilks, 2013). At the same time, the student teachers also discuss the problem to ensure that it is also observable in daily practice from their side.

The development team has to be put together based on the initial problem and the competencies or skills that are needed to solve the problem. Therefore, team construction represents a main part of the advanced model. All members of the teams are not necessarily active in testing the materials. Some individual members, therefore, take a cooperative, advisory function in the development team. However, it is necessary for the development process that all questions arising during the development process are made accessible to the complete group. The chemistry educators, chemistry teachers and the chemistry student teachers are always involved in development and, thus, form the core of the team.

Team building has become the main role in this model, because the group of people has changed noticeably. Therefore, the team is constructed before the cyclical development process starts. The decision regarding which experts to invited into the team depends directly upon the question at hand.

After the formation of the team, the development of the teaching module, the materials, and the cyclical development routine begins. Courses will be gradually updated and changed, thus minimising and possibly eliminating the problem

of the course. The changes and development may contribute to the production of new approaches and media offerings. General knowledge and experience are collected about the overall learning and teaching processes at the university. The team begins to develop concrete materials through communicative exchange. This produces preliminary teaching materials and teaching media that are then used in practice at the university. The development team plans the practical use and selects the type of practical experience that is to be the object of consideration in the development process. After testing, each of these steps is analysed and evaluated. Just like with the model for the secondary school context (see Eilks & Ralle, 2002; Elliot, 1991; Feldman, 1996), an appropriate evaluation method is also selected for the university model. The collected information, practical experiences of the educators, and the overall success or failure of the lessons must all be considered in the further development process. New problems can arise during the reflection phase, which involves the formation of a new team and starts the process from the beginning. Thus, new problems may require the invitation of new members into the development team. An illustration of the enhanced model of Participatory Action Research at the university level is shown in Figure 3.

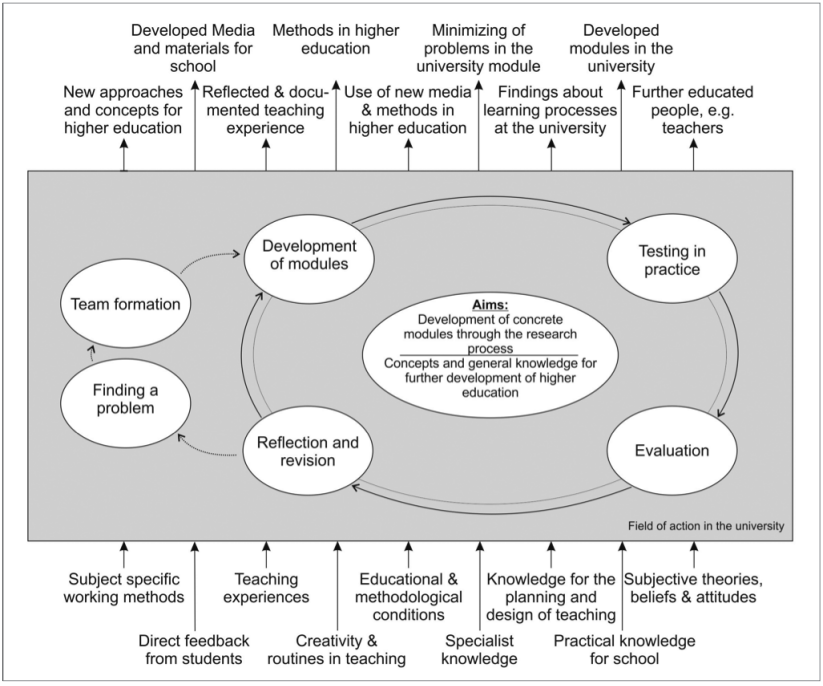

Figure 3. Model of Participatory Action Research for the development of university teaching.

The result of the development process is new teaching materials, media, and methods for university lessons, but materials for secondary school can also arise. The problem from the seminar has been reduced or eliminated, which begins the developmental process again. In addition, the group obtains many documented and reflected experiences from teaching at the university. The original model of Eilks and Ralle (2002) states that teachers can also learn during the development process. For our new model, this means that all shareholders can learn something from each other. This only describes a part of the final output from development, but the most important aspects are summarised in Figure 3.

An example of development in sensitising students to linguistic heterogeneity

Up to this point, the newly developed model has been described for the general development of university courses in chemistry. The general description helps to adapt the model to the older version. Furthermore, the development team possesses sufficient freedom during the development process, so the process is not limited.

The following example illustrates the development process and the use of the current model. This example concerns linguistic heterogeneity in chemistry with a focus on reading strategies. One chemistry educator noticed that student teachers needed knowledge about tools to help their future students in reading and understanding scientific literature (including worksheets). Coincidentally, chemistry teachers named various problems that they had observed among their own students when reading scientific texts. During the first phase, the development team (a chemistry educator, chemistry teachers, and one other science educator) discussed the problem intensely. In the first meeting, the team classified several problem areas. The chemistry educators recognised the importance of this issue for their teacher-training programme, especially for chemistry teachers. A literature review of this problem revealed that German education teaches various reading strategies, but only for short stories, newspaper articles, and longer texts. However, the texts in science lessons are different than these text types. This made the easy transfer of the reading strategies to science texts next to impossible. For this reason, a researcher from the GSL department was invited to visit the team. The researchers explained the problems that had been identified, including one with concrete texts taken from science teaching and examples selected from chemistry lessons. Their first aim was to develop reading strategies specifically for understanding scientific texts. The reading strategies from German education were adapted to the scientific texts.

In the next step, these tactics were incorporated into the university seminar for chemistry teachers. The seminar was then evaluated with the help of a questionnaire. The whole group also reflected upon the seminar.

One main result of the reflection was the fact that most student teachers could not recognise a need for reading strategies in chemistry lessons. Student teachers often feel that addressing linguistic problems does not fall under the list of the responsibilities of chemistry teachers. The new materials were developed; but a new problem, which seems more fundamental, arose. Student teachers' attitudes needed to be changed. Thus, the team was expanded by another language educator. The aim was to develop a seminar with regard to sensitisation for linguistic heterogeneity. Finally, the reading strategies became one among many aspects of the seminar. The seminar was organised in several phases and was structured as follows:

1. *Sensitising student teachers for linguistic heterogeneity in chemistry classes* (e.g., by reading and analysing specialised texts from business, economics, or psychology; lecturing in English instead of German, etc.);
2. *Recognising the problem based on authentic teaching material* (working on material taken from chemistry textbooks and analysing them with a focus on linguistic heterogeneity in chemistry classes);
3. *Learning about reading strategies in science teaching* (learning-at-stations exercises about different reading strategies (compare to Markic & Baginski, 2014));
4. *Developing teaching materials with reading strategies* (integration of reading strategies in concrete materials).

During the last reflection exercise in the group, which took place during group discussion time in the seminar with the help of a Likert questionnaire, the chemistry students who had participated in the seminar gave feedback. They stated that they now understand the need for special reading strategies and that they would use them during their next internship at school. The development process is presented again in Figure 4.

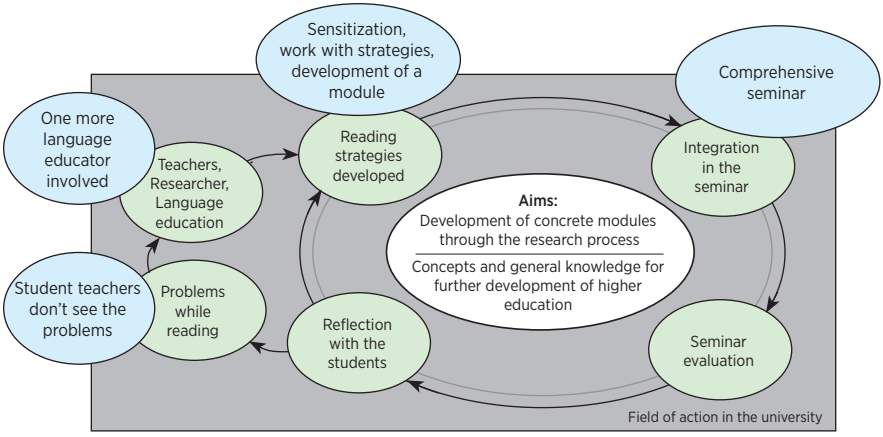

Figure 4. The development process of a university course for linguistic heterogeneity.

Phases of Participatory Action Research

In the original model of Participatory Action Research of Eilks and Ralle (2002), the authors proposed a division of development into three phases. Because of the challenges to the adaptation of the original model to the university level, a different split of the developmental phases was proposed at this point. This was also caused by the limited number of available educators for a given subject at university, especially in chemistry education.

The first phase of the new model starts with team building, which is dependent on the problem and thus on the competences single members of the team need to have. This initial development team is relatively small and can be enlarged as needed during the development process. In this phase, the focus is on the problem, the teams' available content knowledge, and its' pedagogical content knowledge. This means that agreement on particular terms and terminology must be accomplished. At the end of this phase, initial approaches and materials are developed. One characteristic of this phase is very frequent, often significant modifications of media, materials, and concepts.

In the second phase, the initially developed materials, media, and concepts are differentiated, developed, tested, and evaluated. Ideally, the testing should be performed by several university course groups. In this phase, the implementation of the materials is the focus.

In the third phase, all the newly-developed materials are disseminated. These materials can be used in further lectures or in courses at other universities. Implementation at other universities offers the opportunity that the

materials be developed afresh and ensures the parallel dissemination of the materials and media to a broader group of participants. Ideally, this expansion could go on to form university (or even international) networks researching the same questions. In each of these three phases, the development process can consist of multiple development cycles, as seen in Figure 2 (Development, testing, evaluation, reflection).

Discussion and Conclusion

The development of one's own teaching at the university level through the Participatory Action Research was seen to be significantly influenced by self-reflection upon the practical experiences of the participants in school and at university. In addition, the various members of the development team proved to be successful for the development of university courses. The members differed in creativity, beliefs, knowledge, and attitudes, since they represented a very heterogeneous group (e.g., Fussangel, 2008; Mansour, 2009; McIntyre, 2005). The German Association for Subject Matter Didactics (Konferenz der Vorsitzenden Fachdidaktischer Fachgesellschaften) has also found that a broad network of contacts is important to universities (KVFF, 1998).

By using this model, education can enhance interdisciplinary and interinstitutional networking. The participants can also learn from each other. One criticism might be that a culture of development with lecturers acting within their own seminars may be insufficient to reach the stated goals, since the lecturer is also a practitioner and a researcher. One risk is that close personal involvement might lead the participants' evaluation of their courses to be only superficial. However, were this to be true, they would also fail to reap the benefits of better teaching and learning methods and materials in their own classrooms. Shareholding can also be a powerful motivator. We hold the consequent evaluation and gradual development of university courses to be possible using this new model. Additionally, general knowledge and concepts can be gained, which can further develop other university courses. For this reason, the model presented above helps to successively optimise university teaching modules in chemistry coursework. Our new seminars were giving both theoretical and practical backgrounds of the topic. Furthermore, it was much easier to find the connection from one seminar to the other. Starting from the experts in the development team, we can say that our seminars were showing different perspectives to our further chemistry teachers but also were considering the needs of our student teachers – since they were part of the development team as well. To summarise, previous experiences have been very positive, and the

involvement of teachers in university development has proven useful for both school education and teacher-training programmes. Science educators can learn new and practical elements of chemistry education through the development process. Therefore, the model created by Eilks and Ralle (2002) can serve both for teacher training and for the Continuous Professional Development (CPD) of educators as well.

However, we must note that work on this model is an additional, time-consuming task for educators. Furthermore, lecturers need the willingness to change. This is a basic requirement for any development process. Additionally, in-service teachers generally have less time available to research and test further actions when developing university education. This is because the extra time comes on top of lesson planning, teaching, grading, going on excursions, and taking class trips. Therefore, one aim of this ongoing project (in addition to increasing the CPD level of chemistry teachers) should be the development of practical and suitable teaching materials, which can be used by volunteer teachers with limited time to take part in research. A good extension of the development team was the involvement of student teachers in the development process of their own education. Courses should be adapted to the needs, perceptions, performance, and opinions of the students taking part. Conversely, in the future, we must address the question of whether student teachers need more help to better their ability to reflect on their teacher-training. From our experience, however, student teachers‘ willingness to be involved was great. Their feedback was, in our opinion, very constructive and helpful for future work.

The present paper presented an advanced model of Participatory Action Research in the field of developing university teacher education seminars. The focus of the advanced model is on the formation of the development team. The model itself and an example of the development of one seminar were described. The advanced model gives new opportunities for developing seminars which combine theoretical knowledge and practical experience. All in all, even if following this model means much more work for lecturers, the positive experiences outweigh the effort expended. More learning strategies and materials for the university have been developed with this model and have already been implemented at a second university.

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References

Aguirre, J., & Speer, N. M. (2000). Examining the relationship between beliefs and goals in teacher practice. *Journal of Mathematical Behaviour*, *18*(3), 327–356.

Altrichter, H., Kemmis, S., McTaggart, R., & Zuber-Skerritt, O. (2002). The concept of action research. *The Learning Organization*, *9*(3), 125–131.

Baumert, J., & Kunter, M. (2006). Stichwort: Professionelle Kompetenz von Lehrer Lehrkräften [Keyword: Professional competence of teachers]. *Zeitschrift für Erziehungswissenschaft*, *9*(4), 469–520.

Bencze, T., & Hodson, D. (1999). Changing practice by changing practice: Toward more authentic science and science curriculum development. *Journal of Research in Science Teaching*, *36*(5), 521–539.

Brante, G. (2009). Multitasking and synchronous work: complexities in teacher work. *Teaching and Teacher Education*, *25*(3), 430–436. Retrieved from http://www.sciencedirect.com/science/article/pii/S0742051X08001704?via%3Dihub

Burmeister, M., & Eilks, I. (2013). Using participatory action research to develop a course module on education for sustainable development in pre-service chemistry teacher education. *Center for Educational Policy Studies Journal*, *3*(1), 59–78.

Eilks, I., & Ralle, B. (2002). Participatory action research. In B. Ralle & I. Eilks (Eds.), *Research in chemical education – What does it mean? Proceedings of the 16th symposium on chemical education at the University of Dortmund, 22-24 May 2002* (pp. 87–98). Aachen: Shaker.

Eilks, I., & Markic, S. (2011). Effects of a long-term Participatory Action Research project on science teachers´ professional development. *Eurasia journal of Mathematics, Science & Technology Education*, *7*(3), 149–160. Retrieved from http://www.ejmste.com/Effects-of-a-Long-Term-nParticipatory-Action-Research-nProject-on-Science-Teachers-nProfessional-Development,75196,0,2.html

Eilks, I., Markic, S., & Witteck, T. (2010). Collaborative innovation of the science classroom by Participatory Action Research – Theory and practice in a project of implementing cooperative learning methods in chemistry education. In M. Valencic Zuljan & J. Vogrinc (Eds.), *Facilitating effective students learning trough teacher research and innovation* (pp. 77–101). Ljubljana: University of Ljubljana.

Eilks, I., Parchmann, I., Gräsel, C., & Ralle, B. (2004). Changing teacher' attitudes and professional skills by involving teachers into projects of curriculum innovation in Germany. In B. Ralle & I. Eilks (Eds.), *Quality in practice-oriented research in science education. Proceedings of the 17th symposium on chemical education held at the University of Dortmund, 3-5 June 2004* (pp. 87–98). Aachen: Shaker.

Elliot, J. (1991). *Action research for educational change*. Keynes, UK: Open University Press.

Federal Ministry of Education and Research (BMBF). (Ed.) (2009). Bachelor-Studierende: Erfahrungen in Studium und Lehre: Eine Zwischenbilanz [Bachelor students: experience about study and teaching: interim balance]. Berlin: Federal Ministry of Education and Research. Retrieved from https://www.bmbf.de/pub/Bachelor_Studierende_Zwischenbilanz_2010.pdf

Feldman, A. (1996). Enhancing the practice of physics teachers: Mechanisms for the generation and sharing of knowledge and understanding in collaborative action research. *Journal of Research in Science Teaching*, *33*(5), 513–540.

Fussangel, K. (2008). *Subjektive Theorien von Lehrkräften zur Kooperation* [Subjective theories of teachers about cooperation]. Unpublished Doctoral Dissertation. Retrieved from http://elpub.bib.uni-wuppertal.de/servlets/DerivateServlet/Derivate-1129/dg0802.pdf

Heritage, M., Kim, J., Vendlinski, T., & Herman, J. (2009). From evidence to action: A seamless process in formative assessment. *Educational Measurement: Issues and Practice*, *28*(3), 24–31.

Herman, J., Osmundson, E., Dai, Y., Ringstaff, C., & Timms, M. (2015). Investigating the dynamics of formative assessment: Relationships between teacher knowledge, assessment practice and learning. *Assessment in Education: Principles, Policy & Practice*, *22*(3), 1–24.

Holter, I. M., & Schwartz-Barcott, D. (1993). Action research: What is it? How has it been used and how can it be used in nursing? *Journal of Advanced Nursing*, *18*(2), 298–304.

Huberman, M. (1993). Linking the practitioner and researcher communities for school improvement. *School Effectiveness and School Improvement*, *4*(1), 1–16.

Jäger, R. S. (2006). Der Diagnostische Prozess. In F. Petermann & M. Eid (Eds.), *Handbuch der psychologischen Diagnostik* [Handbook of psychological diagnosis] (pp. 89–96). Göttingen: Hogrefe.

Kemmis, S., & McTaggart, R. (1988). *The action research planner* (3rd ed.). Geelong: Deakin University Press.

Kemmis, S., McTaggart, R., & Nixon, R. (2014). *The Action research planner: Doing critical participatory action research*. Singapore: Springer.

Klug, J., Bruder, S., Kelave, A., Spiel, C., & Schmitz, B. (2013). Diagnostic competence of teachers: A Process model that accounts diagnosing learning behaviour tested by means of a case scenario. *Teaching and Teacher Education*, *30*, 38–46. Retrieved from http://www.sciencedirect.com/science/article/pii/S0742051X12001503

(KVFF) - Konferenz der Vorsitzenden Fachdidaktischer Fachgesellschaften (Eds.) (1998). *Fachdidaktik in Forschung und Lehre* [Education in research and teaching]. Kiel: IPN.

Krause, M., & Eilks, I. (2015). Lernen über digitale Medien in der Chemielehrerausbildung – ein Projekt Partizipativer Aktionsforschung [Chemistry student teachers learn about digital media – a project participatory action research]. *CHEMKON*, *22*(4), 173–178.

Loughran, J., Berry, A., & Mulhall, P. (2006). *Professional learning: understanding and developing science teachers' pedagogical content knowledge*. Rotterdam: Sense.

Mansour, N. (2009). Science teachers´ beliefs and practices: Issues, implications and research agenda. *International Journal of Environmental & Science Education*, *4*(1), 25–48.

Markic, S., & Baginski, K. (2014). Aufgaben leichter verstehen: Lese- und Verständnishilfen zur Bearbeitung von Aufgaben [Easier to unterstand tasks: helps to reading and understanding for working of tasks]. *Unterricht Chemie*, *142*(25), 14–17.

Markic, S., & Eilks, I. (2006). Cooperative and context-based learning on electrochemical cells in lower secondary science lessons - A project of participatory action research. *Science Education International*, *17*(4), 253–273.

Markic, S., Broggy, J., & Childs, P. (2013). How to deal with linguistic issues in the chemistry classroom. In I. Eilks & A. Hofstein (Eds.), *Teaching chemistry - A studybook* (pp. 127–152). Rotterdam: Sense.

Masters, J. (1995). The History of Action Research. In I. Hughes (Ed.), *Action research electronic reader*. Sydney: The University of Sydney. Retrieved from http://www.aral.com.au/arow/rmasters.html

McIntyre, D. (2005). Bringing the gap between research and practice. *Cambridge Journal Education*, *35*(3), 357–382.

McKernan, J. (1991). *Curriculum action research. A handbook of methods and resources for the reflective practitioner.* London, UK: Kogan.

Reinhardt, S. (2009). Gelingende Lehrerbildung – Professionstheorie und Fachdidaktik, Erfahrungen und Konsequenzen [Successful teacher training – professional theory and education, experiences and consequences]. *Journal of Social Science Education, 8*(2), 23–31.

Schüssler, R., Keuffer, J., Grünnewig, K., & Scharlau, I. (2012). Praxis nach Rezept? Subjektiven Theorien von Lehramtsstudierenden zu Praxisbezug und Professionalität [Recipe for practice? subjective theories from student teachers to practice and professionalism]. *Schulpädagogik heute*, *3*(5), 141–161.

Shulman, L. S. (1987). Knowledge and teaching: Foundations of the new reform. *Harvard Educational Review*, *57*(1), 1–21.

Tolsdorf, Y., & Markic, S. (2016). Dealing language in science classroom – Diagnosing student' linguistic skills. In S. Markic & S. Abels (Eds.), *Science Education towards Inclusion* (pp. 23–42). New York, NY: Nova.

Valanides, N., Nicolaidou, A., & Eilks, I. (2003). Twelfth-grade students' understanding of oxidation and combustion – Using action research to improve teachers' practical knowledge and teaching practice. *Research in Science and Technological Education*, *25*(2), 19–175.

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The Differences Between Pre-Service Chemistry, Fine Art, and Primary Education Teachers Regarding Interest and Knowledge About Fine Art Materials

Robert Potočnik*[1] and Iztok Devetak[2]

The primary purpose of this paper is to identify the level of interest and knowledge about fine art materials (in selected works of art) that can influence pre-service primary school, chemistry, and fine art teachers' implementation of this content into their teaching. This knowledge can help them be aware of how a specific fine art material can be used in fine art classes. Fine art materials can also be applied in different manners by chemistry teachers and primary school teachers (science lessons) to explain the specific chemical characteristics of these substances. Altogether, 118 pre-service teachers from the Faculty of Education, University of Ljubljana participated in the study. The data were collected using three instruments: information about participants (IP), fine art materials achievement test (FAMAT), and individual interest questionnaire (IIQ), which comprise items for self-concept. It can be concluded that pre-service teachers' average score (49.6%) on FAMAT is quite low. The results also showed that pre-service fine art teachers achieved better results than the other two groups did. Similar results were also obtained regarding participants' interest and self-concept in learning about fine art materials. It can be concluded that more emphasis should be placed on developing the understanding of chemical and fine art concepts due to the fact that fine art and chemistry can be interdisciplinarily connected in education, according to contemporary curricular guidelines.

Keywords: fine art materials, interest, pre-service teachers' knowledge, science education

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Razlike v zanimanju in znanju o materialih likovnih del med prihodnjimi učitelji kemije, razrednega pouka in likovne pedagogike

Robert Potočnik in Iztok Devetak

Glavni namen tega prispevka je določiti raven zanimanja in znanja o materialih v izbranih likovnih delih, ki lahko vplivajo na poučevanje na razredni stopnji ter poučevanje kemije in likovne umetnosti. Znanje o likovnih materialih lahko prihodnjim učiteljem likovne pedagogike in razrednega pouka pomaga pri uporabi v okviru likovne dejavnosti. S pomočjo likovnih materialov lahko prihodnji učitelji kemije in razrednega pouka razložijo specifične kemijske lastnosti teh snovi. V raziskavi je sodelovalo 118 prihodnjih učiteljev Pedagoške fakultete Univerze v Ljubljani. Podatki so bili zbrani z uporabo treh instrumentov: informacije o udeležencih, testa znanja o likovnih materialih in vprašalnika o zanimanju o likovnih materialih, ki je vključeval tudi elemente samopodobe. Povprečno znanje študentov o likovnih materialih je precej nizko (49,6 %). Rezultati so tudi pokazali, da prihodnji učitelji likovne pedagogike izkazujejo več znanja v primerjavi s prihodnjimi učitelji razrednega pouka in kemije. Podobni rezultati so bili pridobljeni tudi glede posameznikovega interesa in samopodobe za učenje o likovnih materialih. Raziskava izkazuje, da je treba bolj poudariti razvijanje razumevanja kemijskih in likovnih pojmov, saj so lahko v izobraževanju vsebine likovne umetnosti in kemije interdisciplinarno povezane, kar je skladno s smernicami sodobnih učnih načrtov.

Ključne besede: likovni materiali, zanimanje, znanje študentov, naravoslovno izobraževanje

Introduction

Fine art and chemistry can be interdisciplinarily integrated into education from the primary to secondary and university levels. The primary purpose of this paper is to identify the level of knowledge about fine art material that can influence primary school, chemistry, and fine art teachers' implementation of this context into their teaching. It is essential to emphasise that knowledge of the chemistry of fine art materials can be beneficial for fine art teachers. This knowledge can help them be aware of possibilities and limitations that a specific fine art material can be used to define the techniques and application of these materials in fine art classes. Chemistry teachers can benefit from fine art materials when explaining the chemical characteristics of these substances.

The chemistry education community has recognised that the examination of artwork is a valuable tool for teaching science to students at all stages of education (Uffelman, 2007). Since the late 1970s, different reports have suggested how to integrate fine art into chemistry classes in ways that represent the cognitive features of chemistry contents through various fine art materials, fine art techniques, and other features of artworks (Denio, 1979; Newman, 1972; Stamovlasis, 2003).

One of the aims of the general science and chemistry curriculum is to make science and chemistry more relevant to students, including by relating art to chemistry in interdisciplinary, individualised, and life-oriented approaches to learning the content of these subjects (Kafetzopoulos, Spyrellis, & Lymperopoulou-Karaliota, 2006). Gaquere-Parker and Perker (2012) suggested that students from all backgrounds benefit from working with real-life applications of chemistry and by keeping the students engaged with cross-disciplinary examples (such as fine art products). Using simple art concepts can assist non-science university students in better appreciating scientific facts related to chemistry (Hemraj-Benny & Beckford, 2014).

For implementation in school environments, practices dealing with fine art materials and techniques can be found, for example making paint (Potočnik, 2017; Solomon Rutkowsky, Mahon, & Halpern, 2011) and exploring ancient and modern pigments (Orna, 2001), dyes and dying process (Alves, Manhita, Barrocas Diasb, & Ferreira, 2014; Epp, 1995), glass, pottery, and ceramics (Denio, 2001; Kolb & Kolb, 2000). Furthermore, in close observation of art objects, students can be introduced to a variety of modern analytical tools and tests designed to assess the composition, age, and condition of art objects. Students learn to perform elemental analyses with a hand-held X-ray device, fluorescence (XRF) device, to collect infrared (IR) spectroscopic data on dyes

and binders, to use gas chromatography and mass spectrometry (GC-MS) to analyse paint-binding media, and to use florescence microscopy for close observation of paint chip cross-sections (Wells & Haaf, 2013).

Some research (Burton, Horowitz, & Abeles, 1999; Danipog & Ferido, 2011) in the last two decades has shown that students exposed to art-based chemistry activities have significantly higher mean scores in chemistry achievement tests (e.g., they easily made connections between new and old information, they related the familiar with the unfamiliar information, and integrated the new intellectual challenge into the existing mental structures) than the students exposed to non-art-based activities did.

As mentioned above, fine art material can be used for stimulating students' individual interests and self-concepts about science in general (e.g., students beliefs about their academic performance), and specifically in chemistry. According to Schraw, Flowerday, and Lehman (2001), interest stimulates learning, and promoting interest in the classroom increases students' intrinsic motivation to learn (Belova & Eilks, 2014; Pressley, El-Dinary, Marks, Brown, & Stein, 1992; Slapničar, Devetak, Glažar, & Pavlin, 2017). Interest is one of the components of the intrinsic motivation for learning and could be described as 'psychological arousal including focused attention, increased cognition, persistence and emotional involvement' (Hidi, 2000, p. 311). Research shows that there is a stable distinction between two types of interest: individual (personal) and situational interest (in the context of the specific situation). Personal interest is oriented to the areas that are characterised by the individuals' complete dedication to the task or learning problem (Renninger, 2000). Among the pre-service primary school teachers in Slovenia, interest in chemistry is low (Juriševič, Devetak, Razdevšek-Pučko, & Glažar, 2008).

The other important aspect of someone's awareness of their learning problems is their self-concept. As Landsman (1962, p. 286) defined, 'self-concept is an organised group of feelings and attitudes which an individual is concerning himself' while learning a specific topic. McCarthy and Schmeck (1988) also described self-concept as an important cognitive structure organising an individual's experience. One's self-concept can, for that matter, steer the process of learning with stimulating or obstructing the cognition processes.

Some research shows that in general students' interest in fine art is higher than in other subjects, so it can be deduced that an interdisciplinary approach could be useful for teaching science and chemistry (Dhanpal, Kanapathy, & Mastan, 2014). Artworks could be an adequate tool for achieving stimulating situations among students for learning chemistry, for example: finding hidden chemistry in Egyptian artefacts (e.g., arsenic, copper, lead substances in

pigments and the degradation of its colour over time) (Gimenez, 2015), exploring different material components of artefacts in museum collections (Brown, Losoff, & Hollis, 2014), or frescos found in Pompeii that contain mercury in the vermilion pigments (Gaquere-Parker & Perker, 2012). Some authors report that younger students (in primary school) and their parents were highly positive about the activities (for example, making a copper-based pigment and painting with it); many parents requested ideas on how to perform similar experiments at home (Gaquere-Parker, Allie Doles, & Parker, 2016).

When assessing students' level of understanding of fine art material concepts, different diagnostic instruments can be used. One option is the application of the multi-tier diagnostic instruments that come in various forms and can be used to identify students' misconceptions, as suggested by Treagust (1988). The two-tier test is quite popular and has been used in numerous research studies in science education. This form cannot distinguish correct responses on the basis of whether these are due to guesswork or content mastery. These limitations can be addressed significantly with the use of three-tier or four-tier diagnostic questions. In these instruments, a confidence rating (typically on a scale from just guessing (1) to absolutely confident (6)) is added. If the confidence tier is appended to both tiers separately, the instrument is four-tiered, and where a mean rating is required in respect of answer and reason tiers, it becomes a three-tier instrument. Because the answer and reason tiers may have different difficulty levels, it is reasonable to assume that students would have different levels of confidence for both tiers (Caleon & Subramaniam, 2010; Gurel, Eryilmaz, & McDermott, 2015). For the purpose of this paper, only students' responses to the answer and reason tiers were used.

Overall, it can be summarised according to the literature review that cross-curricular integration of the content could be a useful tool to develop adequate understanding of the chemical and fine art concepts; therefore, the knowledge about fine art materials that different teachers (e.g., fine art, chemistry, and primary school) have is one of the most critical factors of context inclusion.

Research problem and research questions

Some attempts have been made to popularise the correlations between chemistry and fine arts so that chemistry teachers would be aware of the possibilities of using fine art in chemistry classrooms (Vrtačnik, 2004) in Slovenia. However, the contents of learning about some specific chemistry concepts through artworks in the primary, lower, and upper secondary schools had not

been emphasised previously, and has not come to implementation as part of the science, chemistry, and/or fine art subjects. Consequently, the main purpose of this paper is to identify the level of knowledge about fine art material that can influence primary school, chemistry, and fine art pre-service teachers' implementation of this context into their teaching. This knowledge can help pre-service fine art teachers be aware of the possibilities and limitations of a specific fine art material when using it to define techniques and the application of these materials in fine art classes. Fine art materials can be used by pre-service chemistry teachers and pre-service primary school teachers to explain the chemical characteristics of these substances. This implementation of fine art materials in science lessons and vice-versa can provide an interdisciplinary approach to education. It is, therefore, up to the pre-service teachers to use their own competences to include (or not) the interdisciplinary contents related to fine art materials, according to the curriculum.

To present the context of the research, the Slovenian educational system should be introduced. The primary school teacher (graduates from the Faculty of Education) teaches the subjects Learning about the Environment, Science and Technology, and Fine Art between the 1st and 5th grades (6–10-year-old students); the chemistry teacher teaches the subject Chemistry in the 8th and 9th grades (13- and 14-year-old students); the fine art teacher usually teaches fine art from the 6th to 9th grades (11- and 14-year-old students). The Chemistry teacher and Fine Art teacher (graduates from the Faculty of Education) can also teach at the upper secondary level if the subject is not part of the Matura exam (national external exam at the end of upper secondary school). According to the research problem, five research questions were formed:

RQ1: How significantly do pre-service fine art teachers differ in the fine art materials achievement test (FAMAT) scores from pre-service chemistry or primary education teachers?

RQ2: How significantly do pre-service teachers who create fine arts products in their free time (drawings, painting, sculpting, etc.) differ in FAMAT scores than those who do not?

RQ3: How significantly do pre-service chemistry, fine art, and primary school teachers differ in levels of individual interest and self-concept for learning about fine art materials?

RQ4: How significantly do pre-service teachers who expressed higher individual interest in art material differ in achievement scores on FAMAT?

RQ5: How significantly do pre-service teachers who expressed higher self-concept for art material differ in achievement scores on FAMAT?

Method

Sample

Altogether, 118 pre-service teachers from the Faculty of Education, University of Ljubljana participated in the study; 21 (17.8%) of them were fine art pre-service teachers, 25 (21.2%) pre-service chemistry teachers, and 72 (61.0%) were pre-service primary school teachers. There were only 14 males (11.9%), and the average age was 22.8 years (SD = 1.2 years). All students were in the fourth year of undergraduate study. To illuminate the participants' fine art and chemistry backgrounds, we emphasise that in the Slovenian primary and lower secondary school system, chemistry, and fine art are obligatory subjects. However, in the upper secondary school system, some programmes do not include the subjects Chemistry or Fine Art. In our research, four (3.4%) participants had not taken upper secondary chemistry, and two (1.7%) had not taken fine art. At the Faculty of Education, pre-service chemistry teachers cannot participate in any fine art courses, and pre-service fine art teachers cannot participate in any chemistry courses. Pre-service primary school teachers participate in the science (chemistry topics) course during a 15-week period (30 hours of lectures; 25 hours of lab work and 5 hours of field work) in the first year of undergraduate study and fine art course during a 15-week period (45 hours of lectures and 30 hours of practical work) in the third year of undergraduate study.

Instruments

The data was collected using three instruments: the information about participants (IP), the fine art materials achievement test (FAMAT), and the individual interest questionnaire (IIQ), which comprise items for self-concept.

The information about participants (IP)

The IP questionnaire comprises general information about the participants (e.g., gender, age, study programme, creating fine art products in their free time), a five-point scale about interest in chemistry and fine art in primary, lower secondary and upper secondary schools, and a matching item about colour concepts such as the difference between the concepts of colour, colouring substance (paint and pigment) to determine pre-service students' basic knowledge of these concepts.

The fine art materials achievement test (FAMAT)

The FAMAT was constructed as a diagnostic test using the methodological framework to identify students' misconceptions, as suggested by

Treagust (1988). It includes four-tier multiple-choice items. The FAMAT comprises six tasks (each task shows a different visual representation of a painting; for example; on stone, wood, wall, and other); each task has two different parts. In the first part, participants had to define the type of painting support and in the second part the materials of painting layers. Each part comprises four different questions; see Figure 1 for an example of such a task. The construct validity of the instrument was confirmed by three independent experts in chemical education, fine art education and, cultural heritage conservation/restoration. For the purpose of this paper, only global achievement means of FAMAT were used.

A detail of a fresco painting is displayed (Sandro Botticelli and assistants, Sistine Chapel, 1481–1482). Answer the following questions based on your experience in the context of fine art materials.

Image used from Wikipedia.

1.1 What is the support of the painting?
A Lime plaster.
B Stone.
C Wood.
D Metal.

1.2 How sure are you about the correct answer under 1.1?

1	*2*	*3*	*4*	*5*	*6*
Just guessing	*Very unconfident*	*Unconfident*	*Confident*	*Very confident*	*Absolutely confident*

1.3 State the reason for the specific answer under 1.1?
A The stone surface could be seen on the fresco painting.
B Smooth texture, which is typical for the wall surface, could be seen on the fresco painting.
C *Patine* could be seen, on the fresco painting which is formed on the surface of the metal when it is exposed to the air.
D The visible structure and colour of the wood, formed after the treatment could be seen on the fresco painting.

1.4 How sure are you about the correct answer under 1.3?

1	*2*	*3*	*4*	*5*	*6*
Just guessing	*Very unconfident*	*Unconfident*	*Confident*	*Very confident*	*Absolutely confident*

1.5 Which materials were used for painting (painting layers)?
A Pigments like chromium and cobalt oxides, compounds of lead and antimony and calcium hydroxide (slaked lime) as a binder.
B Pigments like iron oxides, lead carbonate and lead hydroxide, copper carbonate, iron hexacyanoferrate and liquid fat-oil as a binder.
C Pigments like chromium and cobalt oxides, lead and antimony compounds, iron oxides, lead carbonate and lead hydroxide, copper carbonate, iron hexacyanoferrate and egg yolk as a binder.
D Pigments like iron oxides, carbon from burning wood and bones, calcium carbonate-calcite and saliva or fat as binder.

1.6 How sure are you about the correct answer under 1.5?

1	*2*	*3*	*4*	*5*	*6*
Just guessing	*Very unconfident*	*Unconfident*	*Confident*	*Very confident*	*Absolutely confident*

1.7 State the reason for the specific answer under 1.5?
A We can find the typical texture of wall surface with materials that could be painted on-fresh lime plaster.
B We can find the typical texture of applied oil colours of different thicknesses, cracks (craquelure) and gentle transitions between shades of colours.
C We can find the typical texture of thinner application of the painted layer on the wooden support with the hatching pattern (*tratteggio*) and sharp transitions between shades of colours.
D We can find the typical texture of thin layers of various materials, without any preparation of painting support.

1.8 How sure are you about the correct answer under 1.7?

1	*2*	*3*	*4*	*5*	*6*
Just guessing	*Very unconfident*	*Unconfident*	*Confident*	*Very confident*	*Absolutely confident*

Figure 1. An example of the task comprising FAMAT; answer tier (1.1.; 1.5.), confidence tier for answer (1.2.; 1.6.), reason tier (1.3; 1.7); confidence tier for reason (1.4.; 1.8.); the correct answer and the correct reason are marked in bold and underlined.

The individual interest questionnaire (IIQ)

The third instrument used in this research is the individual interest questionnaire (IIQ). It includes items about students' individual interest in fine art materials (e.g., 'I am interested in the works of fine art, so I'm often viewing them (in the galleries, churches, etc.'; 'I want to deepen my knowledge problems related to the fine art materials.') and their self-concept about learning about fine art materials (e.g., 'The content dealing with the materials of the fine art products is not too difficult to understand.'; 'When I create artwork with different materials (for example, painting, sculpturing, making posters...'), I achieve good grades'). The response to each item is on a five-point Likert-type scale anchored at 1 = strongly disagree, 2 = disagree, 3 = agree, 4 = strongly agree, and 5 = cannot decide).

The internal consistency (Cronbach α) of the individual interest scale in IIQ was .82. The average inter-item correlation was determined to indicate the self-concept scale in the IIQ level of consistency due to the small number of items in this scale. The average value is .53, showing optimal inter-item correlation for the self-concept scale. Three independent experts confirmed the validity of the instrument in chemistry, fine art education, and educational psychology. All instruments were designed specifically for this study.

Research design

The design of the research was non-experimental, cross-sectional, and descriptive. The research was conducted in May 2017. All instruments were applied anonymously in groups, and all the participants had the same conditions for completing the questionnaires and the FAMAT achievement test. The participants were informed that the data would be used for research purposes only, and the main objective of the study was explained. Participants spent on average 35 minutes to fulfil the questionnaires and solve the achievement test.

The acquired data were analysed using SPSS 22. Descriptive statistics (mean (M), standard deviations (SD)) were applied to reveal the knowledge, and interest characteristics of the participants. To determine the differences in mean scores regarding their undergraduate pre-service teacher education programme (fine art, chemistry, and primary school education), the paired-sample t-test was used. Pearson's correlation coefficients for determining the correlation between colour concepts and results on FAMAT, individual interest, and self-concept about fine art material were calculated. In addition, the one-way between-groups analysis of variance (ANOVA) was conducted to explore the influence on knowledge, interest, self-concept of learning about fine art materials. If the test of homogeneity of variances was statistically significant when

comparing the means of the groups of participants, the more robust test (Welch test) of equality of means was used. Statistical significance ($p \leq .05$) was determined for all differences between means that were calculated.

Results and discussion

Due to the lack of literature at our disposal about the context of our research problem, the discussion part of our paper is limited. The results of the analysis are reported according to the research questions.

Pre-service teachers' knowledge about fine art materials

The first research question relates to the differences between pre-service teachers who study fine art education, chemistry education, or primary education in achievements on FAMAT scores. It is important to emphasise that achievements on FAMAT were quite low. Participants achieved 11.9 points out of 24.0 on average; this means that participants gathered only 49.6% of all points on the achievement test. If the analysis of the success on FAMAT is performed in more detail, regarding the pre-service educational programme, it can be summarised that the highest average success is identified in fine art teachers (68.8% of all points), followed by the primary school teachers (48.3%) and the lowest level of fine art materials knowledge was expressed by pre-service chemistry teachers (36.3%). This is expected, because pre-service chemistry teachers do not have a course in their undergraduate study in which these topics are covered. The ANOVA was conducted to explore the differences between three groups regarding their undergraduate pre-service teacher education programme (Group 1: chemistry, Group 2: fine art, Group 3: primary education). The differences are statistically significant ($F(2,115) = 25.05$, $p \leq .000$). The effect size, calculated using eta squared, was 0.303; this means that effect size is large, and 30.3% of the change in the FAMAT score can be accounted for by the pre-service education programme. Post hoc comparisons using Tukey HSD indicated that the mean score between Group 1 ($M = 8.7$; $SD = 3.4$) was significantly different from Group 2 ($M = 16.5$; $SD = 3.8$) and between Groups 1 and 3 ($M = 11.6$; $SD = 3.9$) ($p \leq .000$). The different between Group 2 and Group 3 is also statistically significant ($p = .003$). The number and proportion of correct answers to the four questions in each of six tasks of the FAMAT by the three groups of pre-service teachers are presented in Table 1.

Table 1
The success of pre-service teachers on FAMAT

The content of the specific item in the FAMAT	Pre-service chemistry teachers		Pre-service fine art teachers		Pre-service primary school teachers	
	f	*f* %	*f*	*f* %	*f*	*f* %
fresco paintings	0	20.0	0	4.8	0	15.3
	1	20.0	1	9.5	1	8.3
	2	40.0	2	23.8	2	34.7
	3	8.0	3	9.5	3	20.8
	4	12.0	4	52.4	4	20.8
cave paintings (parietal art)	0	8.0	0	4.8	0	9.7
	1	36.0	1	4.8	1	11.1
	2	36.0	2	19.0	2	27.8
	3	4.0	3	71.4	3	25.0
	4	16.0	4	4.8	4	26.4
paintings on wooden support (panel paintings)	0	60.0	0	19.0	0	37.5
	1	32.0	1	23.8	1	33.3
	2	8.0	2	38.1	2	19.4
	3	0.0	3	9.5	3	5.6
	4	0.0	4	9.5	4	4.2
oil paintings on canvas	0	20.0	0	4.8	0	16.7
	1	44.0	1	14.3	1	19.4
	2	20.0	2	19.0	2	16.7
	3	8.0	3	33.3	3	33.3
	4	8.0	4	28.6	4	13.9
paintings on paper (aquarelle)	0	24.0	0	0	0	5.6
	1	0.0	1	0	1	15.3
	2	24.0	2	33.3	2	27.8
	3	44.0	3	23.8	3	33.3
	4	8.0	4	42.9	4	18.1
woven painting (tapestry)	0	36.0	0	14.3	0	33.3
	1	32.0	1	14.3	1	27.8
	2	20.0	2	9.5	2	19.4
	3	8.0	3	23.8	3	12.5
	4	4.0	4	38.1	4	6.9

It can be summarised from Table 1 that 52.4% of pre-service fine art teachers correctly answered all four questions in the fresco painting task. Most of the pre-service chemistry teachers (80%) correctly answered a maximum of two questions (out of four) about materials that are used in fresco painting. Almost 80% of pre-service primary school teachers correctly answered a minimum of two questions (out of four) regarding materials of fresco painting. The results of the question regarding fine art materials in cave paintings (parietal art) are similar to those about fresco painting. Most of the pre-service

fine art teachers (more than 75% correctly answered three or four questions) recognised materials on cave painting (painting support, type of pigments, and binder). In contrast, almost 80% of pre-service chemistry teachers answered two questions correctly. Around 80% of pre-service primary school teachers correctly answered at least two questions (out of four) regarding the materials of which the paintings in caves are made.

The third task, regarding the fine art materials of paintings on a wooden support (panel paintings), was the most demanding for all students. Around 90% of pre-service chemistry and primary school teachers and more than 60% of pre-service fine art teachers answered only two or fewer questions correctly. Pre-service teachers' scores on the fourth task (regarding materials of oil paintings on canvas) are similar to the scores that pre-service teachers obtain on the fresco and cave art paintings tasks. Pre-service fine art teachers (around 80%) and pre-service primary school teachers (about 60%) achieved better results: more than two correct answers (out of four). Around 80% of pre-service chemistry teachers correctly answered a maximum of questions. In general, all pre-service teachers achieved the highest scores solving the fifth task; understanding materials of paintings on paper (aquarelle). Surprisingly, more than 50% of all pre-service teachers manage to answer three or four questions correctly, regarding the materials that are used in aquarelle paintings. Almost half of the pre-service fine art teachers (42.9%) correctly answered all four questions; 44% of pre-service chemistry teachers correctly answered three questions.

The last task, defining materials in tapestry, was demanding for most pre-service teachers; 31% of pre-service fine art teachers answered all four questions correctly; most (around 80%) pre-service chemistry and pre-service primary education teachers correctly answered at most two questions (out of four) regarding materials used in tapestry painting. The results could be compared with findings that experience with the works of fine art could benefit in understanding the chemical characteristics of the materials (Gaquere-Parker & Perker, 2012; Hemraj-Benny & Beckford, 2014; Kafetzopoulos, Spyrellis, & Lymperopoulou-Karaliota, 2006), because the most successful results on the FAMAT were from pre-service fine art teachers followed by pre-service primary school teachers. Both groups of participants had experiences with fine artworks in their undergraduate study. In addition, low FAMAT results among pre-service chemistry teachers confirm that they do not encounter the issues of fine art materials during the study, as can be summarised from the analysis of undergraduate courses for chemistry teachers (https://www.pef.uni-lj.si/204.html); consequently, using interdisciplinary approaches is not possible according to contemporary curriculum guidelines (Devetak, 2017).

In contrast, pre-service teachers of primary education have less knowledge of fine art materials than pre-service teachers of fine art do, but more than pre-service chemistry teachers do, because they were engaged in chemistry and fine art courses during their undergraduate studies. It can be assumed that pre-service primary school teachers are somewhat more interested in science than pre-service fine art teachers and fine art than pre-service chemistry teachers are.

The most challenging task for all pre-service teachers was correctly answering the questions about fine artworks on wooden supports (panel paintings) and tapestry (woven painting). One possible reason that could be identified is the fact that pre-service fine art teachers do not lack experience with the traditional fine art materials and material characteristics. In addition, recognising paper as a fine art material among all pre-service teachers shows that experience with this material helps them understand its characteristics.

The second research question relates to the differences between those pre-service teachers who create fine art products in their free time (drawings, painting, sculpting, etc.) and their counterparts who do not do so on the FAMAT results. An independent-samples t-test was conducted to compare the students' results on FAMAT and their ability to create fine art products in their free time. There was a significant difference in scores between pre-service teachers who create fine art products in their free time ($M = 13.1$; $SD = 4.52$) and those students who do not ($M = 10.2$; $SD = 3.91$; $t(112) = 3.61$, $p \leq .000$). The magnitude of the differences in the means was very small (eta squared = .07). These results confirm that experiences with fine art materials help in understanding materials' characteristics during the creation of fine art products.

Pre-service teachers' interest in chemistry and fine art

The third research question refers to the pre-service chemistry teachers, fine art teachers, and primary school teachers' differences in levels of individual interest and self-concept for learning about fine art material. The ANOVA was conducted to explore the differences between three groups regarding their undergraduate pre-service teacher education programme (Group 1: chemistry, Group 2: fine art, Group 3: primary education) in levels of individual interest and self-concept for learning about fine art materials. The differences in individual interest in learning about fine art materials between participants in different undergraduate programmes are significant ($F(2,115) = 24.19$, $p \leq .000$). The effect size, calculated using eta squared, was 0.296; this means that the effect size is large, and 29.6% of the change in the individual interest scores can be accounted for by the participants' educational programme at the university.

Post hoc comparisons using Tukey HSD indicated that the mean score between Group 1 (M = 12.5; SD = 3.4) was significantly different from Group 2 (M = 22.1; SD = 5.1) and between Group 1 and 3 (M = 16.8; SD = 4.9) ($p \leq .000$). The difference between Group 2 and Group 3 is also statistically significant ($p \leq .000$). The differences in self-concept for learning about fine art materials between participants in different undergraduate programmes are significant ($F(2,115)$ = 9.56, $p \leq .000$). The effect size, calculated using eta squared, was .14; this means that the effect size is large, and 14% of the change in self-concept scores can be accounted for by the students' educational programme. Post hoc comparisons using Tukey HSD indicated that the mean score between Group 1 (M = 5.7; SD = 2.2) was significantly different from Group 2 (M = 9.0; SD = 2.9) ($p \leq .000$), and between Group 1 and 3 (M = 7.3; SD = 2.6) (p = .020) and between Groups 2 and 3 (p = .024). More detailed results about pre-service teachers' individual interest and self-concept are presented in Table 2.

Table 2
Results of individual interest questionnaire (IIQ)

Items defining individual interest in learning about fine art materials.	**Pre-service chemistry teachers**		**Pre-service fine art teachers**		**Pre-service primary school teachers**	
	M	***SD***	***M***	***SD***	***M***	***SD***
I am interested in works of fine art, so I am often viewing them (in galleries, churches, etc.).	2.33	1.12	3.57	.74	2.48	.85
I want to deepen my understanding of problems related to the fine art materials.	1.12	.33	2.28	1.05	1.72	.79
I am focused when I have the opportunity to get to know the contents of fine art materials.	1.40	.64	2.47	1.36	1.79	1.07
I put more effort into learning about fine art materials than required by my study.	1.20	.50	2.19	1.12	1.69	.91
I like experimenting with fine art materials.	1.76	1.20	3.42	.59	2.33	1.13
While I am observing artworks (paintings, sculptures, etc.) I wonder about what kind of materials they are made of.	1.20	.70	2.85	.96	2.06	.90
I am interested in learning about fine art materials, also in my free time.	1.16	.68	1.90	1.04	1.44	.70
Everything related to fine art materials attracts my attention.	1.28	.73	1.85	1.10	1.59	.92
When I want to figure out which of the materials the artwork is made of, I persist until I understand it.	1.12	.33	1.57	.97	1.66	.76

Items defining self-concept for learning about fine art materials.	Pre-service chemistry teachers		Pre-service fine art teachers		Pre-service primary school teachers	
	M	*SD*	*M*	*SD*	*M*	*SD*
The content dealing with the materials of fine art products is not too difficult to understand.	1.40	.91	1.95	1.02	1.75	.83
When I create artwork with different materials (for example, painting, sculpturing, making posters, etc.) I achieve good grades.	1.80	1.19	3.00	1.37	2.25	1.29
I am a quick learner regarding the contents of fine art materials.	1.28	.73	2.61	1.11	1.87	1.14
I am good at recognising fine art materials.	1.20	.50	1.42	1.24	1.43	.76

The highest, but still moderate, on a five-point scale, individual interest in general for learning about fine art materials was reported by pre-service fine art teachers (M = 2.5; SD = 1,0). Pre-service chemistry teachers expressed very low individual interest in this topic (M = 1.4; SD = .7), but pre-service primary school teachers showed slightly higher individual interest (M = 1.9; SD = .9) than their chemistry counterparts did. This is understandable, because they will teach fine art and science to students aged from 6 to 11 years.

It can also be summarised from Table 2 that the lowest level of expressed individual interest in fine art materials was identified among pre-service chemistry teachers; they do not put much effort into learning more than their studies require (M = 1.2; SD = .5); when observing artworks (paintings, sculptures, etc.), they do not wonder about what kind of materials they are made of (M = 1.2; SD = .7), and they do not insist on finding out what materials are used in the specific artwork (M = 1.1; SD = .3).

In contrast, pre-service primary school teachers have higher levels of individual interest regarding learning about fine art materials in comparison with pre-service chemistry teachers. In general, they lack competences for recognising fine art materials and have low individual interest in learning about them in their free time. Taking into account pre-service teachers' self-concept about learning about fine art materials it is obvious that fine art teachers expressed the highest level of self-concept for this topic (M = 2.2; SD = 1.2), followed by primary school teachers (M = 1.8; SD = 1.0), and then by pre-service chemistry teachers (M = 1.4; SD = .8). It can be concluded from Table 2 that pre-service fine art teachers have the highest self-concept regarding learning about fine art materials through fine art experience (M = 3.0; SD = 1.4). This was expected. Regardless, in general, they lack a self-concept regarding recognising (defining) the materials of artworks in general (M = 1.4; SD = 1.2). Compared to the others, pre-service fine art teachers have much more knowledge but, in general, the level is low, which is also reflected

in their self-esteem; they are not completely overwhelmed by properly defining fine art materials, which were presented in the research. We can review some of their comments regarding the research problem: pre-service fine art teachers would like to understand which materials are compatible, how and why some materials react under certain conditions, from what they are composed, how to obtain some materials, how to use materials at school, etc. Some excluded any kind of dealing with the chemical compositions of materials during their study process or simply lacked awareness that fine art materials are something more than just products to be bought in a shop.

For the fourth research question, ANOVA was conducted to explore the differences between the three groups of participants that expressed different levels of individual interest (Group 1: low, Group 2: average, Group 3: high individual interest) in fine art material regarding their achievement score on FAMAT. The differences are statistically significant ($F(2,115) = 9.53$ $p \leq .000$). The effect size, calculated using eta squared, was 0.14; this means that effect size is large and 14% of the change in the FAMAT score can be accounted for by the students' higher individual interest in fine art material. Post hoc comparisons using Tukey HSD indicated that the mean score between Group 1 ($M = 9.6$; $SD = 3.4$) and Group 3 ($M = 15.2$; $SD = 4.9$) is significant ($p \leq .000$). The difference between Group 2 ($M = 11.7$; $SD = 4.2$) and Group 3 is also significant ($p = .003$). There is no significant difference between those pre-service teachers who express low and average interest in fine art materials. According to these results, it can be confirmed that higher levels of situational interest and self-concepts in learning about fine art materials results in better understanding of this topic as well as to the higher intrinsic motivation for learning more complex content.

The fifth research question deals with the pre-service teachers' self-concept for art materials and their achievements with FAMAT. The ANOVA was conducted to explore the differences between three groups (Group 1: low self-concept, Group 2: moderate self-concepts, Group 3: high self-concept in fine art material) regarding their achievement score on FAMAT. The differences are not statistically significant ($F(2,115) = 2.42$; $p = .094$) between Group 1 ($M = 10.4$; $SD = 4.6$), Group 2 ($M = 12.0$; $SD = 4.3$) and Group 3 ($M = 13.8$; $SD = 4.8$). According to these results, participants' awareness of their learning problems about fine art materials does not influence the achievements that participants demonstrate in solving knowledge tasks about recognising fine art materials in artworks and what their chemical composition is.

Conclusions

The basic research problem of this study was to determine the level of knowledge of pre-service teachers from different university educational programmes about fine art materials using a four-tier test and how this knowledge is connected with the level of their individual interest and self-concept for learning about fine art materials. It can be concluded that pre-service teachers' scores on the fine art materials achievement test (FAMAT) are not sufficient (average score is below 49.6%) and that more emphasis should be placed on developing the understanding of chemistry and fine art concepts due to the fact that fine art and chemistry can be interdisciplinarily connected in education, according to contemporary curriculum guidelines. This is important for all pre-service teacher programmes that were selected for this study, especially because all teachers should be generally educated. For that matter, chemistry teachers (they already have professional competences to teach chemistry) should be familiar with specific materials and fine art techniques used in different periods of history. In contrast, fine art teachers ought to understand the specific chemical characteristics of substances used for fine art products in their professional career as a teacher. However, primary school teachers need to be competent in teaching science and fine art classes and, for that reason, they should learn both expect from the discussed problem. It was expected that better results would be achieved by pre-service fine art teachers, because of their experience with fine art material. In contrast, pre-service chemistry teachers show the least knowledge in fine art materials, because of their lack of experience with such material in general as well as lack of awareness of the materials of which artworks are made.

However, the results also reveal that pre-service primary school teachers' knowledge of fine art material is somewhat lower than that of fine art teachers but better than that of chemistry teachers. This is a consequence of the fact that they have some experiences with fine art materials during their studies, which results in better understanding. The results also confirmed that those pre-service teachers who create fine art products in their free time (e.g., drawings, painting, sculptures) express higher knowledge of fine art materials.

It can also be summarised from the results that individual interest and self-concept for learning about fine art materials differ according to the study programme at the university and that these two variables also influence knowledge about fine art materials that was measured by the FAMAT. Works of fine art could be a great tool for interdisciplinary approaches to teaching the contents of chemistry and fine art, so cooperation between teachers is necessary.

For cooperation between different teacher profiles, knowledge about fine art materials from the chemistry perspective is necessary, as is designing learning units to help with already developed teaching approaches in fine art, science, and chemistry classes. Good practices can already be found, for example, on the web page of the Royal Society of Chemistry, under the title 'Chemistry and Art', accessible at http://www.rsc.org/learn-chemistry/resources/art/home.

It could also be recommended that chemistry teachers use the context of fine art materials to teach the chemical characteristics of substances. Those primary and secondary school students who are not intrinsically motivated to learn chemistry but show more interest in fine art activities could benefit more from chemistry classes. However, this aspect could be expressed vice versa by emphasising that integrating chemistry expects in fine art classes could stimulate those students who are not interested in fine art activities. The low level of pre-service teachers knowledge about fine art materials suggest that an interdisciplinary elective course (e.g., topics regarding inorganic pigments and organic dyes as painting material, polar and non-polar solvents for dissolving pigments and dyes, chemical characteristics of cellulose and limestone as painting supports, plastics and clays as polymers for sculpturing, etc.) in pre-service teacher education programmes at the university level should be developed for building competences for integrating chemistry into fine art classes and vice versa.

Limitations of this study

The most obvious limitation of this paper is that there are very few reports about students' knowledge and interest in fine art material. As mentioned above, numerous papers have been published especially about introducing specific art actives that can be implemented into the science (chemistry) classroom. The other limitation is also the small sample size (due to the lower numbers fine art and chemistry students enrolled in master level education). It would be prudent to repeat the data collection process in the coming academic years so that the number of students would increase. However, specific insights to the problem presented in this paper could be given, even though the sample size is small.

Further research

According to the results of this study and also taking into account the literature already published internationally, more research should be conducted to explore: (1) the differences in knowledge about fine art materials among fine art pre-service and in-service teachers regarding their level of undergraduate

and master education; (2) how to develop and evaluate courses of fine art materials for fine art, chemistry, and primary school pre-service teachers; (3) more detailed analysis should be conducted regarding students' misconceptions about fine art materials; (4) in-service fine art, chemistry, and primary school teachers' interdisciplinary approaches to teaching fine art, chemistry, and science should be explored.

References

Alves, H. Manhita, A., Barrocas Diasb, C., & Ferreira, T. (2014). Traditional dyeing – an educational approach. *Chemistry Education Research and Practice*, *15*(4), 610–619.

Belova, N., & Eilks, I. (2014). Promoting societal-oriented communication and decision making skills by learning about advertising in science education. *Center for Educational Policy Studies Journal*, *4*(1), 31–49.

Brown, H. B., Losoff, B., & Hollis, R. D. (2014). Science instruction through the visual arts in special collections. *Libraries and the Academy, 14*(2), 197–216.

Burton, J., Horowitz, R., & Abeles, H. (1999). Learning in and through the arts: Curriculum implication. In E. B. Fiske (Ed), *Champion of change: The impact of the arts on learning* (pp. 35–46). Columbia, NY: Columbia University.

Caleon, I., & Subramaniam, R. (2010). Development and application of a three-tier diagnostic test to assess secondary students' understanding of waves. *International Journal of Science Education*, *32*(7), 939–961.

Denio, A. A. (1979). Chemistry for artists and art buffs, chemistry for artists and art buffs. *Journal of Chemical Education*, *56*(1), 30–33.

Denio, A. A. (2001). The joy of colour in ceramic glazes with the help of redox chemistry. *Journal of Chemical Education*, *78*(10), 1298.

Danipog, L. D., & Ferido, B. M. (2011). Using art-based chemistry activities to improve students' conceptual understanding in chemistry. *Journal of Chemical Education, 88*(12), 1610–1615.

Devetak, I. (2017). Context-based teaching material and learning chemistry. In L. Leite, L. Dourado, A. S. Afonso, & S. Morgado (Eds.), *Contextualizing teaching to improve learning: the case of science and geography* (pp. 261–282). New York, NY: Nova science.

Dhanapal, S., Ravi Kanapathy, R., & Mastan, J. (2014). A study to understand the role of visual arts in the teaching and learning of science. *Asia-Pacific Forum on Science Learning and Teaching, 15*(2), 1–25.

Epp, N. D. (1995). World of colour: Investigating the chemistry of vat dyes. *Journal of Chemical Education*, *72*(8), 726–727.

Gaquere-Parker, A. C., Allie Doles, N., & Parker, C. D. (2016). Chemistry and art in a bag: An easy-to-implement outreach activity making and painting with a copper-based pigment. *Journal of Chemical Education, 93*(1), 152–153.

Gaquere-Parker, A. C., & Parker, C. D. (2012). Bridging the gap of art and chemistry at the introductory level. In P. L. Lang, & R. A. Armitage (Eds.), *Collaborative endeavors in the chemical analysis of art and cultural heritage materials* (pp. 241–249). Washington, DC: American Chemical Society.

Gimenez, J. (2015). Finding hidden chemistry in ancient Egyptian artefacts: Pigments degradation taught in a chemical engineering course. *Journal of Chemical Education*, *92*(3), 456–462.

Gurel, K. D., Eryilmaz, A., & McDermott, C. L. (2015). A review and comparison of diagnostic instruments to identify students' misconceptions in science. *EURASIA Journal of Mathematics, Science and Technology Education, 11*(5), 989–1008.

Hemraj-Benny, T., & Beckford, I. (2014). Cooperative and inquiry-based learning utilizing art-related topics: Teaching chemistry to community college non-science majors. *Journal of Chemical Education, 91*(10), 1618–1622.

Hidi, S. (2000). An interest researcher's perspective: The effects of extrinsic and intrinsic factors on motivation. In C. Sansone, & J. M. Harackiewicz (Eds.), *Intrinsic and extrinsic motivation: The search for optimal motivation and performance* (pp. 309–339). San Diego, CA: Academic Press.

Juriševič, M., Devetak, I., Razdevšek-Pučko, C., & Glažar, S. A. (2008). Intrinsic motivation of pre-service primary school teachers for learning chemistry in relation to their academic achievement. *International Journal of Science Education*, *30*(1), 87–107.

Kafetzopoulos, C., Spyrellis, N., & Lymperopoulou-Karaliota, A. (2006). The chemistry of art and the art of chemistry. *Journal of Chemical Education*, *83*(10), 1484–1488.

Kolb, E. K., & Kolb, K. D. (2000). Glass—sand + imagination. *Journal of Chemical Education*, *77*(7), 812–816.

Landsman, T. (1962). The role of the self-concept in learning situations. *The High School Journal*, *45*(7), 289–295.

McCarthy, P., & Schmeck, R. R. (1988). Students' self-concepts and the quality of learning in public schools and universities. In R. R. Schmeck (Ed.), *Learning strategies and learning styles* (pp. 263–276). New York, NY: Springer.

Newman, J. A. (1972). The arts and the sciences: A very miscible solution. *Science Education*, *56*(2), 137–138.

Orna, V. M. (2001). Chemistry, colour, and art. *Journal of Chemical Education*, *78*(10), 1305–1310.

Potočnik, R. (2017). Effective approaches to heritage education: Raising awareness through fine art practice. *International Journal of Education through Art*, *13*(3), 285–294.

Pressley, M., El-Dinary, P. B., Marks, M. B., Brown, R., & Stein, S. (1992). Good strategy instruction is motivating and interesting. In A. Renninger, S. Hidi, & A. Krapp (Eds.), *The role of interest in learning and development* (pp. 333–357). Erlbaum: Hillsdale.

Renninger, K. A. (2000). Individual interest and its implications for understanding intrinsic motivation. In C. Sansone, & J. M. Harackiewicz (Eds.), *Intrinsic and extrinsic motivation: The search for optimal motivation and performance* (pp. 373–400). San Diego, CA: Academic Press.

Schraw, G., Flowerday, T., & Lehman, S. (2001). Increasing situational interest in the classroom. *Educational Psychology Review*, *13*(3), 211–224.

Slapničar, M., Devetak, I., Glažar, S. A., & Pavlin, J. (2017). Identification of the understanding of the states of matter of water and air among Slovenian students aged 12, 14, and 16 years through salving authentic tasks. *Journal of Baltic Science Education, 16*(3), 308–323.

Solomon, D. S., Rutkowsky, S. A., Mahon, L. M., & Halpern, M. E. (2011). Synthesis of copper pigments, malachite and verdigris: Making Tempera paint. *Journal of Chemical Education*, *88*(12), 1694–1697.

Stamovlasis, D. (2003). Teaching photography: Interplay between chemical kinetics and visual art. *Chemistry Education Research and Practice*, *4*(1), 55–66.

Treagust, D. F. (1988). Development and use of diagnostic tests to evaluate students' misconceptions in science. *International Journal of Science Education*, *10*(2), 159–170.

Uffelman, E. S. (2007). Teaching science in art: Technical examination of 17th-century Dutch painting as interdisciplinary coursework for science majors and non-majors. *Journal of Chemical Education*, *84*(10), 1617–1624.

Vrtačnik, M. (2004). Chemistry in art and art in chemistry. In D. Krnel, & S. A. Glažar. (Eds.), *Programme and abstracts*, 7th ECRICE, European Conference on Research in Chemical Education [and] 3rd ECCE, European conference on chemical education (pp. 22–23). Ljubljana: Zavod Republike Slovenije za šolstvo.

Wells, G., & Haaf, M. (2013). Investigating art objects through collaborative student research projects in an undergraduate chemistry and art course. *Journal of Chemical Education*, *90*(12), 1616–1621.

Biographical note

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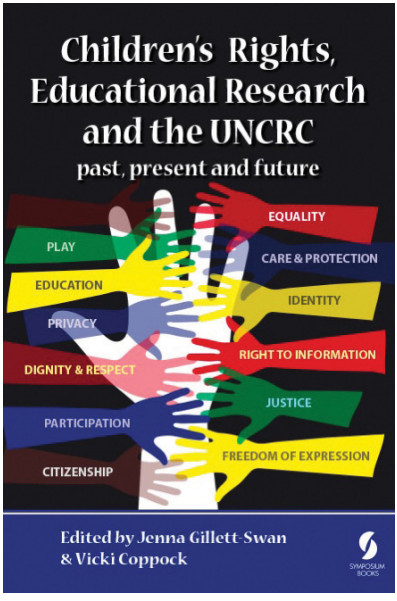
Gillett-Swan Jenna and Coppock Vicki (Eds.) (2016). Children's Rights, Educational Research and the UNCRC: past, present and future. Oxford, UK: Symposium Books. 166 p. ISBN 978-1-873927-95-3

Reviewed by Gordana Čižman



The Convention on the Rights of the Child (hereinafter: the CRC) was signed and ratified by most countries in the shortest possible time. As a legal document, it had an extremely significant impact on national legislation and indirectly on the situation of children and their rights in the world. There is no doubt that it is merely a merit-based convention; today, we are much more aware of the situation of children, which has improved significantly throughout the world. It is true, however, almost thirty years after its enforcement, that children's rights are still and often violated and are often the subject of many research studies and debates in various professional circles, in politics, and in everyday discourse.

The book, edited by Jenna Gillett-Swan and Vicki Coppock, *Children's Rights, Educational Research and the United Nations Convention on the Rights of the Child: Past, Present and Future*, presents the contributions at the annual conference of European Research Associations, which was attended by experts from Australia, Finland, Portugal, Sweden, and the United Kingdom. Each of the seven chapters of the book focuses on various aspects of the rights of the child in the context of educational research and their current place in society and presents changes in the understanding of children's rights that have occurred since the adoption of the CRC to date. Among other things, the book presents a theoretical and historical overview of children's rights and the concept of childhood, the importance of human rights education and models of

child participation, which offers an interesting reading, not only for researchers and pedagogical workers but for anyone interested in children's rights in general.

In the introductory chapter, the editors present the reasons for the publication of the book, its goal and the general conceptual framework of the book. They present three key topics that are discussed in the book, and which are also most often the subject of research and publications since the adoption of the CRC. These are the autonomous and participative role of the child as a new norm in educational policies and practices (understanding that a child is competent to represent him/herself), then the dichotomy of children's and parental rights (the right of parents to raise a child according to one's own beliefs and the right of the child to self-determination) and de-contextualisation of the rights of the child from the child's experiences in everyday life. The latter topic deals with the challenges of the so-called global children's rights industry (page 9), which reduces the child's rights to identifying the techniques such as standards, implementation, and control that dominate discussions on the content and meaning of children's rights. These topics are presented in the chapters of the book, and their contribution is primarily to show the diversity of understanding of children's rights and their place in educational programmes, as well as the diversity of educational contexts in which children's rights are being implemented.

In the first chapter, John I'Anson presents a historical overview of children's rights and the historical background of the connection between children's rights and research in education. The author analyses a series of key issues that have prevailed in research on children's rights in education, such as 'voice', 'cooperation', and 'ecological perspective' and analyses them from different aspects of children's rights. The author warns about different approaches and interpretations of children's rights and different practices in different cultural environments. He draws attention, in particular, to the approaches that separate children and their rights from certain cultural contexts and argues for the use of more nuanced interpretations of children, childhood and children's rights. I'Anson also draws attention to the content and meaning, as he calls it, 'neglected articles' (page 24) of the CRC and identifies shortcomings in the area of research in the field of children's rights and concludes the chapter with a short discussion on orientations for the future.

The next two chapters focus on educating children about their rights. Louise Gwenneth Phillips refers to Article 42 of the CRC which requires states to 'inform of the contents of the CRC both, children and adults', and presents a critical analysis of the different approaches to promoting CRCs through human

rights education and draws attention to restrictions on their implementation. It also presents a number of international programmes and national initiatives, aimed at bringing CRC to the attention of children and presenting how this kind of education is conducted around the world. Regardless of all this, Phillips believes that the CRC is still relatively unknown among adults and children. The reasons for this are sought in the historical and contemporary conceptualisation of the child and childhood, and the solutions in the change of attitude towards children, teacher education and the constructive use of information technology. In her paper, Phillips clearly emphasises that the very existence of the CRC is unfortunately not sufficient to realise the rights of the child, and therefore addresses the adults with her initiative to recognise children as social agents who should know and understand their rights.

Nina Thelander's article points out the importance and contents of children's and young people's education on human rights. The author offers a discussion on the development of international and regional policies related to the right of the child to human rights education and what this learning means from a) knowledge, skills, b) values, attitudes and behaviours, and c) activities for the protection and promotion of human rights. In her contribution, she focuses on another international initiative - the World Program for Human Rights Education, which also represents the conceptual framework of its qualitative research on human rights education at two elementary schools in Sweden. To illustrate, she presents the experiences and examples of two teachers who, in their daily work, introduce human rights education to school, and thus also an insight into the challenges that they encounter in the implementation of these tasks.

In Chapter 4, Reetta Niemi, Kristiina Kumpulainen, and Lasse Lipponen represent examples of the realisation of children's participatory rights in everyday pedagogical practice in Finland, based on an action research study carried out at the elementary school there. The authors present three models of child participation (after Hart, Shier, and Lundy) and offer a discussion on how these models are reflected in the Finnish national curriculum and in pedagogical practice. In addition to an in-depth presentation of the field of child participation, the article also presents case descriptions that can be educational material for all who deal with children's rights at different levels and in different contexts.

In Chapter 5, Joana Lúcio and Fernando Ilídio Ferreira deal with the issue of children's rights in the context of social and economic instability in Portugal. Through the framework of the rights of the child to 'care, protection and participation', children's rights can be threatened in challenging economic times. In a survey among pre-primary teachers, they are exploring the issue of their role in the civil and political development of children and the willingness

to implement approaches based on the realisation of rights and the impact of the social and economic crisis on children. They also discuss how the content of teacher education has changed with the introduction of the Bologna system at Portuguese universities, which has given priority to 'academic and didactic perspectives' (page 116) before a more humanistic approach, which is necessary for the realisation of children's rights.

In Chapter 6, Gordon Tait and Mallihai Tambyah present an interesting perspective and a critical analysis of the child's right to privacy, as defined in Article 16 of the CRC. Starting from the context of Australia, they present a comparison between CRC, the Australian legislation and practice. They thoroughly describe the idea of privacy as a social construct and the impact of this idea on children today. However, nowadays the child's privacy is increasingly shrinking due to social pressures of increasing control over children, the right to privacy and the right to protection may conflict, so it is necessary to look for ways to balance them. This is a great challenge, not only for parents, but also for the family, and for schools where the right to privacy is limited by physical supervision and the control of an ever-increasing amount of data. The author also deals with the legal protection of the child's right to privacy, which is not foreseen in the CRC. Nonetheless, they believe that the CRC is vital as an aspirational document and a symbolic lens through which it is also necessary to discuss the child's right to privacy.

The last chapter explores the future of children's rights and how technology or the digital world shapes the lives of children. Authors Jenna Gillett Swan and Vicki Coppock argue that the expansion of technology has helped children to express themselves and have access to various sources of information, that is, to the implementation of Articles 13 and 17 of the CRC. They represent how the scope of children's rights is changing with the increased use of technology and reflect on the benefits of digital technology, such as support for the education on children's rights, as well as on the weaknesses and the issue of security and the right to privacy and protection, which are greatly jeopardised by the expansion of digital media.

The book can be of interest to all those who are also interested in children's rights in general. It is recommended for all those who work in the field of education, especially because of its message on the importance of awareness of the education of children about their rights and their implementation in the field of education. The content of the book can serve as a learning example for the introduction of new practices in the education of children, as a starting point for educating pedagogical workers, as well as a reminder that human rights education does not take place only within the framework of education,

but also in everyday life, in which adults by showing that we respect children's rights set example and act in an educational way. The application value of the book is also in a detailed description of the research and education research contexts in relation to the rights of the child, which can encourage research.

Although the editors predict that the monograph also offers a global perspective and presentation of diverse and extensive contexts, this prediction is premature and somewhat exaggerated. Given that almost all of the presented examples of research on children's rights were carried out in Europe, which is a historically, culturally, economically and politically specific space, the results would be difficult to apply to the environment beyond this geopolitical space. In order to at least partially achieve the aim, one would expect the book would round up with a more in-depth and analytical discussion in the final chapter, since the individual chapters are unconnected and, at the same time, contradictory. Otherwise, the monograph offers a pleasant reading, which again draws attention to the importance and value of knowing, respecting, and exercising the rights of the child.

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