The Potentials of Stimulated Recall for Investigating Novice / Trainee Teachers' Professional Development and Commitment to Continuous Professional Development

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In the past academic year Systematic Literature Reviews (SLRs) have been gaining significant attention at our graduate school. Therefore our research team conducted an extensive SLR focusing on *reflective pedagogical thinking*. Our aim was to examine the potentials of stimulated recall method for investigating novice / trainee teachers' professional development over the past four decades. This is a significant and relevant research area of the international educational science as well as the Hungarian educational science (Hennissen, Crasborn, Brouwer, Korthagen & Bergen 2011; Creswell 2014; Polat, 2015). Regardless of its importance the Hungarian educational science has not explored it appropriately yet (Bloom, 1953; Calderhead, 1981; Baumeister & Leary 1997; Gass & Mackey 2000; Mortimer & Scott 2002). This deficiency inspired our systematic literature review, in which we gathered all suitable articles and researches from two databases; and performed a critical analysis of the given articles (Lee, Landin & Carter 1992; Powell 1996; Artiles, Barreto, Pena & McClafferty, 1998; Akerson, Flick & Lederman, 2000; Yerrick & Hoving, 2003; Freitas, Jimenez & Mellado, 2004; Schepens, Aelterman & Van Keer, 2007).

Throughout this study the researchers will explain the characteristics and the role of stimulated recall with special attention paid to the potentials of stimulated recall among novice / trainee teachers. In addition to these the researchers will summarize their SLR findings, concerning stimulate recall protocols, and their use among novice teachers.

The research was carried out by using two different electronic databases (Ebsco, Web of Science). Following the protocol of SLR the researchers first determined the correct search parameters, settings and identified the search terms, which was followed by the skimming and scanning of the articles. The most important attributes were collected and presented in a chart, as well as in a Prisma checklist (2009). The researchers paid special attention to record the different forms of stimulated recall protocols, but even more notably they compared their findings with international trends.

This research draws attention to the fact that it is time to the Hungarian educational science to adapt the methods of SLR (Baumeister & Leary, 1997), which would contribute to the prestige of national and international doctoral and scientific researches. In addition to these incorporating stimulated recall methodologies into teacher training could have many beneficial features for novice teachers regarding professional growth and commitment to continuous professional development

Introduction

In the past academic years Systematic Literature Reviews (SLR) have been gaining significant attention at our graduate school. For this reason, our research team conducted an extensive SLR focusing on reflective pedagogical thinking. This is a significant and relevant research area of the international educational science as well as the Hungarian educational science (Hennissen, Crasborn, Brouwer, Korthagen & Bergen 2011; Creswell 2014; Polat, 2015). In the past decades reflective pedagogical thinking became a fundamental component of the Hungarian pedagogical sciences, teacher education and the Hungarian teacher evaluation system, however, the field is lacking thorough empirical studies and systematic literature reviews. Therefore, as part of an extensive research our aim was to examine the potentials of stimulated recall for investigating novice / trainee teachers' professional development over the past four decades with the help of the systematic literature review methodology.

Our investigations revealed that pedagogical reflective thinking is not only a current field of the international educational science, but it is also characterized by methodological diversity. The most common methods are think-aloud strategies, reflective diary and journal techniques, and case studies accompanied by other methods such as attitude scales, reflective questionnaires, reflective drawings, portfolios and video stimulated recalls. In this preliminary study we examined the use of video stimulated recalls (VSR), which is suitable for examining teachers' perspectives and developmental paths, their values, beliefs, assumptions, theories and strategies that underlie their behaviour and decisions (Borg, 2006). Many researchers emphasized the potential of this method to be used as a professional development tool which promotes continuous professional development, since it helps teachers to gain a clear insight into their practices and their own and their students' learning (Guichon, 2009; Schmid, 2011). In addition to these, video stimulated recalls can be used in a wide range of situations, as it enables the researchers to observe any person in our education system.

Our preliminary study consists of two main parts. In the first part we will briefly introduce the conceptual and historical foundations of the stimulated recall methodology, while in the second part we will present our systematic literature review with special attention paid to the characteristics and use of video stimulated recall in teacher education.

The conceptual and historical foundations of the stimulated recall methodology

Stimulated Recall methodology can be viewed as a subset of introspective research methods which help the researchers to accesses, examine and understand participant's reflections on mental processes (Fox-Turnbull, 2009). This method was first used and studied in the United States of America by Bloom; Ericsson and Simon; Wang and Creek; Borko and Calderhead. The aim of these researchers was to develop a method by which the classroom actions and the responding teaching activities could be examined accurately. Benjamin Bloom who was among the first researchers to describe the method as *stimulated recall* in 1953, thought that "the basic idea underlying the method of stimulated recall is that a subject may be enabled to relive an original situation with vividness and accuracy if he is presented with a large number of the cues of stimuli which occurred during the original situation (Bloom, 1953, p. 161)." Since its first appearance stimulated recall procedure has been used to study classroom practices and interactions (Beers, Boshuizen, Kirschner, Gijselaers, & Westendorp, 2006; Plaut, 2006; Sime, 2006; Slough, 2001), because it is suitable for investigating the knowledge systems, beliefs, attitudes, and experiences of both individual participant and groups.

The stimulated recall technique is similar to the interview procedures and one could say that it is a modified interview with the additional use of pictures, video-, or audio recordings (Henderson & Tallman, 2006). As a matter of fact stimulated recall protocols include opening interviews (background questions) and open-ended prompting questions as well as follow up interviews to gain a better understanding of the participants' mechanism of thinking (Plaut, 2006; Slough, 2001). In addition to the interview procedure stimulated recall has many common features with the act of microteaching which is an essential element of teacher education. The recognition of reflective teaching practice has led to the use of stimulated recall during trainee teachers' teaching practices and microteaching to discover their thoughts and decision-making processes. Stimulated recall provides an excellent way to study trainee teachers cognitive processes, feelings, thoughts, beliefs in a given teaching situation presented on a video sequence. The information from the stimulated commentary can lead to improvement in teacher education, even more the appropriate use of the method, could be beneficial for both the researchers and the novice teachers since it is a unique tool to discover their pedagogical self. For this reason, it is a very useful technique especially at the beginning of trainee teachers' professional development.

The use of stimulated recall method for investigating novice teachers' professional development

As we have already defined a systematic literature review is "*a review of a clearly formulated question that uses systematic and explicit methods to identify, select, and critically appraise relevant research, and to collect and analyze data from the studies that are included in the review. Statistical methods (meta-analysis) may or may not be used to analyze and summarize the results of the included studies*" (Cochrane Collaboration, 2014). We have followed the traditional steps of a SLR:

1. Develop a research question
2. Define inclusion and exclusion criteria
3. Locate studies
4. Select studies
5. Assess study quality
6. Extract data
7. Analyze and present results
8. Interpret results
9. Update the review as needed (Higgins and Green, eds.)

Our goal was to examine the potentials of stimulated recall method for investigating novice / trainee teachers' professional development over the past four decades. The research was carried out by using two different electronic databases (Ebsco, Web of Science). In both databases we used the same inclusion and exclusion criteria to guarantee validity. In both databases we used the 'basic search' option and marked the same search preferences which were English language articles from 1983 to 2016. Throughout the process we used two search terms *stimulated recall * and * teacher *, connected by the conjunction "AND". After we located the appropriate studies we recorded our findings in a Excel file and in a Prisma checklist (2009). All the studies in the Excel file were analyzed and the mismatches were extracted. All through the analysis special attention was paid to the categorization of the most important attributes such as the applied methods, tools, participants and the main findings. During our SLR we paid attention to the objectivity, transparency, clarity and repeatability. At the interpretation stage we compared our findings to international trends.

Figure 1. Prisma flow diagram (2009)
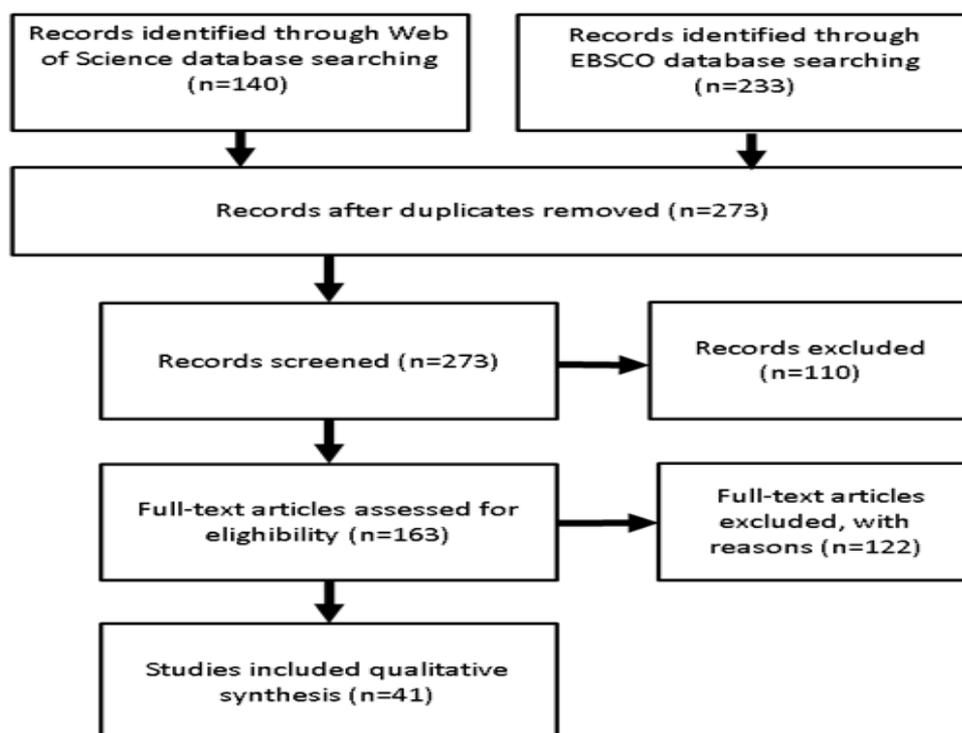
We recorded 373 studies from two databases. All of these studies fulfilled the above described search criteria. After removing the duplicates 273 studies remained. As a result of a thorough analysis 110 studies were excluded, mainly those studies which focused on the reflective thinking of the students and not on the reflective thinking of the teachers or trainee teachers. The remaining 163 articles were assessed for eligibility, and out of these 163 articles 41 articles focused on the professional development of novice / trainee teachers' and used stimulated recall methodology.

Since the key attributes of a systematic literature review are the objectivity, transparency, clarity and repeatability we tried to gather as much quotations from the original articles as possible. These quotations form a base to our qualitative synthesis, and they prevent information distortion. As an illustration of the review process, the following table summarizes the main records (goals, participants, and findings) of one of the databases. The following articles and quotations are elicited from the Web of Science database, while the full list of eligible articles can be found in Appendix A.

Author(s)	goal of the research	Sample	Findings
Powell, R.: *The Influence of Prior Experiences on Pedagogical Constructs of Traditional and Nontraditional Preservice Teachers (1992)* Retrieved from https://www.researchgate.net/publication/223127534_The_influence_of_prior_experiences_on_pedagogical_constructs_of_traditional_and_nontraditional_preservice_teachers [30.10.2016].	"The purpose of this study was to examine the influence of prior experiences on preservice teachers' personal constructs of teaching, and to consider how these experiences influence pedagogical development."	Participants: 25 nontraditional and 17 traditional preservice teachers.	"Preservice teachers who are influenced more by former K-12 experiences and role models, who have well developed beliefs about students, and who are being significantly influenced by relatives who are educators might not interact with their teacher education curriculum the same way as preservice teachers who are influenced primarily by former work and by a personal belief system that has been developed over many years, and who are only minimally influenced, if at all, by K-12 experiences and by relatives who are educators."
Byra, M.; Sherman, M.: *Preactive and Interactive Decision-Making Tendencies of Less and More Experienced Preservice Teachers (1993)* Retrieved from http://www.tandfonline.com/doi/abs/10.1080/02701367.1993.10608778 [30.10.2016].	"The purpose of this study was to describe the planning and interactive thoughts and decisions of less and more experienced preservice teachers."	Participants: 12 preservice teachers, 6 less and 6 more experienced.	"Descriptive analysis revealed that more experienced PTs made more information requests and decisions while planning than did less experienced PTs. During instruction, all subjects tended to teach from their plan when lessons were perceived to be progressing as planned. When lessons were perceived as not progressing as planned, the more experienced PTs tended to make lesson adjustments whereas the less experienced PTs tended to continue to teach without making any adjustment."
Powell, R. R.: *Epistemological antecedents to culturally relevant and constructivist classroom curricula: A longitudinal study*	"The purpose of this study was to explore how teachers' prior experiences, beliefs about knowledge, and schooling contexts collectively influenced their ability to implement classroom	Participants: 2 second-career teachers.	"The results of this study suggest that there is an important relationship between teachers' personal belief systems for teaching and learning, what Shuell calls teachers' worm views, and the nature of their classroom curricula."

of teachers' contrasting world views (1996) Retrieved from http://www.sciencedirect.com/science/article/pii/0742051X9500048O [30.10.2016].	curricula that were culturally relevant to their students."		
Artiles, A. J.; Barreto, R. M.; Pena, L.; McClafferty, K.: *Pathways to teacher learning in multicultural contexts - A longitudinal case study of two novice bilingual teachers in urban schools (1998)* Retrieved from https://asu.pure.elsevier.com/en/publications/pathways-to-teacher-learning-in-multicultural-contexts-a-longitud [30.10.2016].	"The purpose of this study was to explore learning trajectories of novice bilingual education teachers in an urban school."	Participants: 2 novice bilingual education teachers.	"Results suggest that the relationship between teachers' knowledge, beliefs, and decision making is complicated and dynamic. Classroom and school contexts affected teachers' attempts to enact constructivist and social justice education principles. Moreover, prior beliefs as well as the teacher education program (TEP) and teachers' own developmental needs contributed to the ways in which these teachers learned to teach."
Yerrick, R. K.; Hoving, T. J.: *One foot on the dock and one foot on the boat: Differences among preservice science teachers' interpretations of field-based science methods in culturally diverse contexts (2003)* Retrieved from http://onlinelibrary.wiley.com/doi/10.1002/sce.10057/full [30.10.2016].	"The purpose of this study was to investigate preservice science teachers' beliefs about science teaching and learning through reflections on their own teaching."	Participants: preservice teachers.	"Result show that preservice science teachers belong into two discrete categories: (1) those who demonstrated an ability to reflect on and revise their practices and engage in the production of new teacher knowledge and (2) those who seemingly deflected efforts to shift their thinking and instead reproduced their own educational experience with a new student population."

Schepens, Annemie; Aelterman, Antonia; Van Keer, Hilde: *Studying learning processes of student teachers with stimulated recall interviews through changes in interactive cognitions (2007)* Retrieved from http://www.sciencedirect.com/science/article/pii/S0742051X06001922 [30.10.2016].	"The aim of the study was to describe student teachers' learning processes through changes in their interactive cognitions."	Participants: 10 last year students of a teacher training college for teachers in secondary education.	"Results suggest that changes in students' interactive cognitions are understood as indicators for learning and professional development."
Nilsson P: Teaching for understanding: *The complex nature of pedagogical content knowledge in pre-service education (2008)* Retrieved from http://www.tandfonline.com/doi/abs/10.1080/09500690802186993 [30.10.2016].	"The aim of the study was to explore the development of student-teachers' pedagogical content knowledge during their pre-service education."	Participants: 4 student-teachers of mathematics and science.	"This empirical study concludes that the role of teaching experience and reflection in science teacher education serves as a way of better understanding the complex entities that constitute a knowledge base for teaching."
Sofo, Seidu; Curtner-Smith, Matthew D.: *Development of preservice teachers' value orientations during a secondary methods course and early field experience (2010)* Retrieved from http://www.tandfonline.com/doi/abs/10.1080/13573322.2010.493314 [30.10.2016].	"The purpose of this study was to describe preservice teachers' value orientations, and developed during an early field experience."	Participants: 17 preservice teachers.	"Qualitative data concluded that most PTs began the methods course with a superficial disciplinary mastery focus, and that those with strong coaching orientations thought much less about the purposes of the subject than those with teaching or weak to moderate coaching orientations. These data also suggested that teaching oriented PTs and PTs with weak to moderate coaching orientations acquired a more sophisticated understanding of and stronger commitment to the disciplinary mastery perspective."

Haggarty, Linda; Postlethwaite, Keith; Diment, Kim; Ellins, Jean: *Improving the learning of newly qualified teachers in the induction year (2011)* Retrieved from http://onlinelibrary.wiley.com/doi/10.1080/01411926.2010.508513/pdf [30.10.2016].	"The purpose of this study was to examine the development of student-teachers' pedagogical thinking and practice."	Participants: 15 preservice teachers.	"The researchers concluded that there is a need to change the beliefs and practices of induction mentors and develop their skills in discussing pedagogical ideas. This is most likely to be achieved within a school-wide culture of continuing professional learning".

The findings of our SLR show that a great proportion of the examined articles aim to explore novice teachers' pedagogical knowledge and the relationship between teachers' knowledge, beliefs, and decision making. Furthermore, the majority of the researchers agree that trainee teachers' prior beliefs as well as their teacher education program and their developmental needs contribute to the ways in which student teachers learn to teach. Many would agree that teacher education is a complicated and dynamic process. The stimulated recall protocol seemed a suitable method to observe the differences between pre service teachers thinking patterns.. Results show that changes in students' interactive cognitions are understood as indicators for learning and professional development. In summary we can say that stimulated recall is a unique research method which is gaining more and more approval, since it is ideal to explore novice teachers' thinking patterns, their pedagogical schemes, as well as their beliefs and value orientations. One should also emphasize that the first field/teaching experiences are decisive; therefore it is especially important to learn as much as we can about the difficulties of student teachers and incorporate solutions into the teacher education programs.

Conclusion

This research draws attention to the fact that it is time to the Hungarian educational science to adapt the methods of SLR (Baumeister & Leary, 1997), which would contribute to the prestige of national and international doctoral and scientific researches. We can conclude that despite its labour intensive and time consuming nature, systematic literature review is a useful methodology for gaining profound insight into novice teachers' reflective thinking mechanisms, their beliefs about teaching, and the relationship between beliefs and actions. It is especially important for teacher trainers to be aware of the student teachers' general pedagogical knowledge and pedagogical content knowledge in order to prepare them

for their first teaching experiences. In addition to these incorporating stimulated recall methodologies into teacher training could have many beneficial features for novice teachers regarding professional growth and commitment to continuous professional development, since it provides a safe environment for reflection and pedagogical growth.

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Appendix A

Studies included in quantitative synthesis (n = 41)
Powell, R.: *The Influence of Prior Experiences on Pedagogical Constructs of Traditional and Nontraditional Preservice Teachers (1992)*
Byra, M.; Sherman, M.: *Preactive and Interactive Decision-Making Tendencies of Less and More Experienced Preservice Teachers (1993)*
Powell, R. R.: *Epistemological antecedents to culturally relevant and constructivist classroom curricula: A longitudinal study of teachers' contrasting world views (1996)*
Artiles, A. J.; Barreto, R. M.; Pena, L.; McClafferty, K.: *Pathways to teacher learning in multicultural contexts - A longitudinal case study of two novice bilingual teachers in urban schools (1998)*
Yerrick, R. K.; Hoving, T. J.: *One foot on the dock and one foot on the boat: Differences among preservice science teachers' interpretations of field-based science methods in culturally diverse contexts (2003)*
Schepens, Annemie; Aelterman, Antonia; Van Keer, Hilde: *Studying learning processes of student teachers with stimulated recall interviews through changes in interactive cognitions (2007)*
Nilsson P: Teaching for understanding: *The complex nature of pedagogical content knowledge in pre-service education (2008)*
Sofo, Seidu; Curtner-Smith, Matthew D.: *Development of preservice teachers' value orientations during a secondary methods course and early field experience (2010)*
Haggarty, Linda; Postlethwaite, Keith; Diment, Kim; Ellins, Jean: *Improving the learning of newly qualified teachers in the induction year (2011)*
Allison, P.C.: *Classroom Teachers' Observations of Physical Education Lessons (1990)*
Fernández-Balboa, J.: *Beliefs, Interactive Thoughts, and Actions of Physical Education Student Teachers Regarding Pupil Misbehaviors* (1991)
Bennett, C.: *The Teacher as Decision Maker Program* (1991)

Kwo, O.: *The Relationship between Instructional Behaviour and Information Processing of Student Teachers: A Hong Kong Study* (1994)

Stanulis, R. N.: *Action Research as a Way of Learning about Teaching in a Mentor/Student Teacher Relationship* (1995)

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Brownlee, J.; Dart, B.; Boulton- Lewis, G.; McCrindle, A.: *The Integration of Preservice Teachers' Naive and Informed Beliefs about Learning and Teaching* (1998)

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Zimmerman, A.: *The Simultaneity of Beginning Teachers' Practical Intentions* (2015)

Löfström, E.; Pursiainen, T.: *Knowledge and knowing in mathematics and pedagogy: a case study of mathematics student teachers' epistemological beliefs.* (2015)

Mena, J.; García, M.; Clarke, A.; Barkatsas, A.: *An analysis of three different approaches to student teachermentoring and their impact on knowledge generation in practicum settings.* (2016)

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