TEACHERS' BELIEFS ABOUT CLASSROOM PRACTICES THAT DEVELOP THE METACOGNITIVE AND SELF-REGULATEDLEARNING SKILLS OF STUDENTS

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Abstract: Teachers have an important role in promoting and sustaining the development of metacognition and self-regulation learning in students, and in order to attain this goal they need to use their own metacognitive and self-regulation skills. Taking into consideration this important role of teachers,the present study aims to reveal and understand the beliefs and practices of teachers regarding the best teaching strategies that can be used in classroom in order to facilitate the development of students' metacognitive and self-regulation learning skills. A number of 120 teachers from preschool to highschool levels have participated at the present research. Participants had to complete an online form of the 'Self-Regulated Learning Opportunities Questionnaire', developed by Vrieling, Bastiaens and Stijnen (2012), and to answer to three open-ended questions. The questionnaire assessed the extent to which teachers use the following strategies to promote metacognitive and self-regulation learning in their classroom: planning (including goal-setting, metacognitive knowledge activation, task value activation and time management) and monitoring of the learning process (including metacognitive awareness and monitoring of cognition). The scale includes 20 items assessed on a 5-point Likert scale, from 1 (strongly disagree) to 5 (strongly agree). Some of the items of the scales are: 'Students describe personal learning goals for my course',' Students describe short-term learning goals to master their long-term personal learning goals for my course','Students divide big assignments into smaller parts for my course', 'Students make a time plan to master the learning goals for my course' and 'Students describe their progress for my course'. Theopen-ended questions aimed to reveal the participants' opinions about the best teaching practices that facilitate the development of metacognitive and self-regulation skills of students, the factors that hinder the development of these skills and the way in which teachers can promote self-regulation learning in their classrooms. Data were analysied using the SPSS software for the quantitative data and the thematic-analysis for the qualitative ones. Descriptive statistics show that most of the participants are females from preschool and primary school levels of education, who teach in an urban area. More than half of the participants (65%) have the first grade in teaching,with 53.3% of them having a Masters Degree. The thematic analysis of the qualitative data allowed us to identify the following main themes: factors at the student level that hinder the development of the metacognitive and self-regulation skills, factors at the school level and factors at the educational system level. The results of this study are discussed both at the classrooms and schools level as well as at the broader level of educational policies.

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STEAM EDUCATION IN ELEMENTARY SCHOOL: A HOLISTIC INVESTIGATION ON TECHNOLOGY ENHANCED TEACHING AND LEARNING

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Abstract: When we address the learning of mathematics in elementary school, we imagine pupils doing experiments, discoveries, and combining the different elements from arithmetics to geometry. Pupils interact with their environment and try to use their learned skills to get a deeper understanding of the world. They engage in a mathematical thinking process (Selter & Zannetin 2018) and try to interact with their environment. However, when you visit a classroom, you find a rather old fashioned teaching based on a deductive approach where imitations of technics play an essential role. Based on our observations, pupils learn mainly through to repetitions in textbooks. Experimentation, if any, comes as additional work, it is seen as a ludic activity rather than as real learning activity. In our research, we inquired about different ways to engage pupils in an experimental approach. We used digital and physical modulation, augmented reality, and various educational technologies.

In one of our first studies, we designed a tutoring system to foster process-related skills in mathematics within the educational software MathemaTIC (Haas et al 2017). We collected data on pupils in assessments on transferring mathematical thinking from instructional technology to the everyday classroom teaching. In a second study, we worked with pupils from elementary schools, kindergarten, and from the special needs section to go beyond two-dimensional representations and discover how mathematics operates in three-dimensional settings. Pupils worked on designing software and three-dimensional printing. We collected data on how pupils and parents perceived the learning and teaching and how this influences the further thinking in mathematics.

In a holistic approach, we aimed to identify how pupils, teachers and parents perceive the learning through these new technologies and how it affects the learning and teaching. Our research happened in onsite and remote teaching. In this conference, we will present results from the different studies, give insights into our research, and present future experimental investigations.

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TEACHERS' ROLE AND POSSIBILITIES IN STUDENTS' DIGITAL ENCULTURATION

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Abstract: In the international PISA measurements Hungary usually performs below OECD average in most competency areas. Strikingly, in 2012 we were the last in Europe in the field of digital literacy and problem-solving skills. The methodological innovations are one of those possible answers that can improve the efficiency of schools. In the new millennium and changing technological environment the improvement of the general quality of teaching can be remedied partially by involving IT solutions. However, to effectively employ technology in teaching methodologies, we need skilled teachers. But the majority of public-school teachers has socialized and studied without digital era resources. Their thinking pattern differs from later generations' and today's students', for whom digital and networked culture is natural. Knowledge-based society lies on the cognitive theory of networked learning (connectivism). However, compulsory courses aiming to develop digital competencies are missing in Hungarian teacher training, which causes problems to the mentioned teacher generations.

In our methodological research we assumed that properly applied ICT improves student performance. Besides desk-research, we performed two empirical studies. In the desk research we aimed to assess the state of today's informatics training, map possibilities and methods that could foster a major improvement. We compared regulations of the current (2012) Hungarian National Curriculum and Curriculum Framework to international trends and needs, as well as looked at curricula of university training programs. In the first empirical research we examined how typical the knowledge and use of key concepts of modern education technology are in the texts; what tools teachers know for designing learning processes; and how positive teachers' attitudes are towards application of technological developments. We aimed to retrace teachers' image about possibilities of modern education, therefore we performed discourse analysis on correspondent teacher students' texts on „How ICT can facilitate methodologies?" with the help of QDA Miner Lite software. The results showed that modern phrases have not yet been incorporated in teachers' thinking, and that their common key concepts are very outdated, thus teachers are lagging far behind economic and technological developments in terms of both theoretic knowledge as well as general and disciplinary teaching methodology. Teachers only have a general image about ICT devices, they don't know how to use or are unable to access them. However, a significant positive outcome should be mentioned too: they are open to apply technological developments, which provides a basis for their further training.

The second research was based on a survey, which was carried out at an IT workshop, where teachers of humanities and sciences were present. We aimed to measure the participants' methodological status and preparedness; also sought the answer to how traditional education and using IT devices in classroom and at home influence the development of digital competencies and problem-solving skills.

With presenting our results we would like to contribute to the development of IT teaching and IT specialist training, facilitating an increase in general IT literacy; and to the modernization of teacher and professional training systems, which are essential in the effective implementation of the educational paradigm of global knowledge-based society.

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APPLICATION OF TRANSFORMATIONS ON ARCHITECTURAL MODELS

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Abstract: Application of Transformations on Architectural Models
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This research main target is to apply the new emerging technologies to the field of education following STEAM teaching approaches. The project scope will be the transformation of the physical to digital modeling and vice versa to connect the virtual world to the real world of the physical objects by applying 3d printing, 3d scanning and augmented reality technologies. Providing the teachers with multiple scenarios and tools that they can teach to their students.

   Many researches were conducted to tackle the relationship between physical to digital transformation and vice versa. In this project we are trying to connect this relation with augmented reality to serve an educational purpose were students get exposed to new technologies as 3D scanning and 3D printing while going through the journey of data transformation. Many researches were conducted to test the effect of augmented reality in teaching as we can see Figueiredo (2015) proposed in his work how to provide activities that students can do at home that increases the time they spend learning and practicing mathematics. Yingprayoon (2015) proposed that learners who view geometrical objects in 3-dimention will have a better understanding of the structures. The research goal of this project is to add new educational concepts to students, by teaching students that objects could have many forms (Physical/ Digital) through variant transformations and by making use of 3D scanning, 3D printing and augmented reality technologies. Students will imply mathematical formulas from famous architecture by assembling and disassembling the components of the digital models, they will have to use reasoning and problem solving in order to disassemble the objects and assemble them back. Students will learn 3d scanning in order to scan the physical objects and they will learn 3d printing in order to print the digital models they created. Students will learn modelling concepts (symmetry, mirroring, balancing) in order to model their own architecture samples in augmented reality. We believe augmented reality will enhance the experience of our concept, because augmented reality in its nature has the ability of imposing digital representations over the physical world, hence it enhances and connects the physical to digital transformations. The tool we are planning to use is Geogebra, it is a powerful mathematical software which allows the creation of 3D models in augmented reality and it is powerful enough as it has the 3D printing capabilities. The models that we want to target are inspired from the ancient Egyptian architecture. Students will learn how to extract mathematical concepts from these architectures. The learning scenarios will be variant in terms of learning content or in terms of the technology used providing the teachers and the students a wide spectrum of creativity. The research questions we are tackling is, what are the design principles to visualize the data transformation from physical to digital forms and vice versa using augmented reality in architectural constructions?

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BECOMING A TEACHER – FACTORS INFLUENCING THE DEVELOPMENT OF BEGINNING STUDENT TEACHERS' PROFESSIONAL IDENTITIES

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Abstract: The research field "teachers' professional identity" (hereinafter referred to as TPI) has become increasingly important in recent years and is considered to be an independent research approach. It plays a central role in the training of future teachers and has a direct influence on enactment, motivation, self-efficacy, and beliefs (Korthagen, 2004). TPI is defined as an evolving process by reflecting and interpreting experiences, includes both person and context, consists of multiple identities and sub-identities and is based on personal action, or is regarded to as an active personal process (Beijaard & Meijer, 2017). Special attention is paid to the different factors influencing the development process of TPI at the micro, meso, and macro levels. Both antinomies during teacher education, which are defined as gaps in knowledge, worries, contradictions and conflicts, and (critical) key experiences in the social environment are highlighted and can influence the development of student teachers (Meijer, Graaf & Meirink, 2011). The presented project follows the following research questions:

(1) What kind of TPI can be identified in beginning student teachers?
(2) Which extrinsic and intrinsic factors influence the development process of TPI?

The qualitative longitudinal study examines the development of TPI among 16 student teachers during the introductory phase in secondary teacher education training. The presented data sets consist of episodic-narrative interviews (beginning 2017/18) which are inductively analysed based on above mentioned factors influencing the development process of TPI. The cases were selected through systematic random sampling. Particular attention was paid to age, gender, and teaching subject. The first results of the comparative analysis from the first and second round of interviews are presented and put up for discussion.

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EXAMINING THE PROPERTIES OF GAMIFICATION TOOLS FOR EDUCATION

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Abstract: Integrating game elements into non-game contexts is defined as gamification. Creating fun, attracting attention, engaging students, increasing motivation and improving learning are some main effects of the gamification in education. Online applications have been developed to provide teachers tools for gamifying their lessons and support them to achieve these goals. In this study, it is aimed to examine the free-to-use gamification tools which are independent of content and provide some suggestions on what to consider in the selection or design of a gamification tool for education. Six gamification applications including ClassCraft, ClassDojo, Gimkit, GooseChase, Play Brighter and Pointagram were found in the research process. Gamified quiz applications like Kahoot! and content-dependent applications like Duolingo were excluded since they need to have different criteria to be evaluated. The selected tools were analyzed according to game elements (Badge, status, point system, level, challenge, virtual goods, leaderboards, gifts), game mechanics (Reward, achievements, competition, altruism, story, teams) and e-learning related gamification components (Small tasks, immediate feedback, progression, technical specifications). The triple structure, element - mechanics - e-learning components, is determined based on the model proposed by Urh, Vukovic, Jereb and Pintar (2015). Strengths and weaknesses of the applications have been determined according to these categories.

As a result, it can be said the point and challenge features are sufficiently included in the existing tools. However, there are also features to be carefully implemented, such as badges, leaderboards and levels, achievements, virtual goods, feedback. It was decided that the required attention was not paid to the design of gift, achievement, and level design features in the applications examined. On one hand, the lack of giving place to the game elements is determined, on the other hand the game elements which are underdesigned and not used for their intended purposes is also discussed. For instance, the points in Play Brighter or ClassDojo which either disappear at the end of the task or do not have any use.

gamification, education, gamification tools, gamification applications, game elements

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