The personal learner profile, as the key component for shaping a personalized learning journey, in a learning management system in the digital era

Moshe Facler

Babeș-Bolyai University Cluj Napoca, Romania

moshef@et.amalnet.k12.il

Abstract: For a long time, personalized learning was applied to students in the special education category, due to personal traits that delay their learning in comparison to their peers. Bloom's well-known experiment from 1984 shows that students improve their performance when they follow a path that is unique for them.

Israel, as part of the OECD, through the Ministry of Education in the Israeli educational system (schools, universities) uses 16 fundamental indicators to diagnose gaps in personal study, in the context of final exam preparation in high school and higher education institutions (faculties, universities). The diagnosis is made by a psychologist or psychiatrist with the approval of the school and the national committee, being integrated into a learning framework that has been used for more than 150 years - a teacher in front of a class during school hours and at a set time. This system is called "One Teacher-One Class" or "One-size-fits-all", or even "Sit and get".

For many years, attention disorders have also been recognized in the general population in increasing numbers, and personalized learning has already become the common practice for improving learning. The digital age allows a leap forward by being able to create a personalized path for the learner by getting to know his personality, dreams, hobbies, interests, strengths, and weaknesses that need to be improved in order to face the challenges of the 21st century in the digital age and develop the skills necessary for lifelong learning. Today's student must learn based on what he will encounter tomorrow. All student abilities matter. The compilation of student profile data is a significant component alongside the others used regularly in the digital age, especially today, after the COVID-19 pandemic, and for the future.

The article presents the effect of defining the student's learning profile in order to create his personal learning path in the REVODUCATE system. The Personal Learning Profile paints a holistic picture of the learner at the start of their personalized learning journey. It contributes greatly to the students' ability to succeed in achieving their learning goals and is a powerful tool in the personalized approach to learning. The REVODUCATE system deviates from accepted diagnosis of external factors and regulated basic parameters of learning, such as extra time, reading, level of handwriting (legible or illegible), learning aids for those with difficulties, etc. It makes possible to listen to and prioritize the student's wishes for a suitable learning environment tailored to Generation Z, often ignored by today's teachers who are always a generation behind. Parents play an essential role in building the student's learning profile, as they are those who know the student best pre-school, during school, and later in life. Using the REVODUCATE system as a central and critical component for student success also changes the role of the teacher, and defines a new type of responsibility.

Keywords: Personalized Learning, digital competence, REVODUCATE, personalized learning profile (PLP), teacher-student role, component, personalized learning path.

iPad, youPad, wePad: Collaborative creative tasks with iPads

Brigitta Békési, Tony Houghton & Zsolt Lavicza

Johannes Kepler University, Austria

bek@gys.at

Abstract: Education experiences long covid in each country, but in a more positive way. There is no turn back to the old methods, technology has become a constant presence at school. To keep up with this change, the Austrian government decided to digitalise the lower secondary schools. The project, called 8 – Steps – Plan (8 – Punkter – Plan) started with distributing iPads to the year – 5 and year-6 classes in September of 2021. During the lockdowns, teachers gathered experiences about the use of technology, still, it is vital to provide teachers support, readymade lesson plans and ideas, and how to implement technology in meaningful ways to convince teachers about the benefits of technology implementation and to enhance teachers' motivation. In this paper, we will present creative tasks where the students make videos instead of just watching them. The presented tasks can be put into two main categories: the first one is a joint project with the art teacher showing the connection between mathematics and arts, and the second one is a flipped classroom task where even the roles are flipped turning the students into teachers. The tasks presented have one feature in common, both are easy to reuse and adapt.

Keywords: iPads, videos, Steam, creativity, teamwork.

Designing and Implementing Word Problem in STACK: a Study with Potential Secondary Education Mathematics Teachers

Ángel Ríos-San-Nicolás[1], Jose Manuel Diego-Mantecón[1], Zaira Ortiz-Laso[1], Guido Pinkernell[2]

[1]University of Cantabria

[2]Heidelberg University of Education

angel.rios@alumnos.unican.es

Abstract: STACK is a Computer-Aided Assessment System (CAAS) that allows teachers to pose mathematical tasks with random content and to provide feedback adapted to the solver responses (Sangwin, 2013). Since educators and researchers have mostly used STACK for procedural tasks (Ríos-San-Nicolás et al., 2022), we seek to analyse the pedagogical and digital competency of potential Secondary Education Mathematics teachers for designing and implementing word problems in STACK. To undertake this study, an experiment was conducted with 16 fourth-year Mathematics undergraduate students enrolled in a course on Mathematics didactics. After two months of instruction, the subjects were invited to design in pairs a word problem involving two different solution strategies and to implement it in STACK providing randomization and feedback. The designed problems were analysed qualitatively through a rubric and cognitive interviews were undertaken to understand the internal processes involved during the design and implementation phases. The elaborated problems were characterized as arithmetic or algebraic according to Bednarz y Janvier's (1986) classification. The results revealed that those pairs who posed an arithmetic word problem had more difficulties to provide a natural alternative solution strategy. The subjects could provide geometric strategies, but they preferred not to implement them in STACK in favour of unnatural algebraic strategies. The randomization led not only to an insufficient number of problem variants but also uncoherent variants within the context of the problems. The feedback provided was essentially verificative without elaborated components. It often addressed just procedural steps, not considering feedback related to the concepts or to metacognitive processes involved during the resolution processes. The aforementioned results were in general due to the lack of experience with the tool and the little pedagogical competency of the subjects on problem posing.

References

Sangwin, C. J. (2013). Computer Aided Assessment of Mathematics. Oxford University Press.

Bednarz, N. y Janvier, B. (1996). Emergence and Development of Algebra as a Problem-Solving Tool: Continuities and Discontinuities with Arithmetic. In Approaches to Algebra (pp. 115–136). Springer Netherlands. https://doi.org/10.1007/978-94-009-1732-3_8

Ríos-San-Nicolás, Á., Diego-Mantecón, J. M., Ortiz-Laso, Z., y Pinkernell, G. (2022). The Use of STACK for Developing Problem -Posing and -Solving Skills of Future Mathematics Teachers. Computer Algebra and Dynamic Geometry in Mathematics Education (CADGME) 2022: Digital Tools in Mathematics Education, 83-85.

Keywords: mathematical word problems, randomization, solution strategies, feedback, STACK.

A STEAM professional development program for training Spanish high school teachers

Zaira Ortiz-Laso[1], Jose Manuel Diego Mantecón[1] & Teresa F. Blanco[2]

[1]Universidad de Cantabria, Spain

[2]Universidad de Santiago de Compostela, Spain

zaira.ortiz@unican.es

Abstract: In recent years, policymakers worldwide have advocated for an integrated education approach to the STEAM disciplines (Science, Technology, Engineering, Arts and Mathematics). In Spain, this approach is promoted through the last law of education already implemented in some grades (Diego-Mantecón et al., 2022). The new curriculum considers STE(A)M as one out of eight key competences that students must develop when finishing compulsory education at the age of 16. However, Spanish high school teachers are subject-specific, i.e., they have often been trained for teaching only one STEAM discipline (Diego-Mantecón et al., 2021). In this talk, we will describe the professional development programme that was implemented in the Spanish context with 21 in-service teachers from March to May 2022. The participants were science, mathematics and technology teachers. The programme incorporated four main dimensions: (1) theoretical sessions, (2) experimental activities, (3) lesson designs, and (4) implementation practices. The first two dimensions took place through face-to-face workshops, whereas the support offered by STEAM trainers during the lesson design and implementation was online. The programme is a consequence of the research conducted within the European project STEAMTeach (https://www.steamteach.unican.es/; Erasmus+), and the national project CCDMEI-PDA (PID2021-122326OB-I00; Agencia Estatal de Investigación).

Keywords: Professional Development, Secondary education, STEAM education.

Students in the elementary stage struggle to solve mathematical word problems from the perspective of their teachers

Suzan Khatib & Ciascai Liliana

Babes-Bolyai University, Romania

suzanizomar@gmail.com

Abstract: This study attempted to detect elementary-level students' difficulties in solving mathematical word problems from the perspective of their teachers. Also, to know what procedures teachers follow to overcome these difficulties. In addition to identifying the teachers' difficulties in teaching mathematical word problems and determining where is the gap in mathematics curricula that creates these difficulties.

The study tool was a questionnaire. The participants were 57 mathematics teachers from Romania. The results showed that the students' difficulties were mainly due to their inability to deeply read and understand the word problem and establish the necessary steps to solve the problem, which in turn makes them unable to determine the information given and required. They have difficulty creating a solution plan, translating the word problem into mathematical symbols, and checking their solution.

The most procedures followed by teachers to overcome these difficulties are: using different methods to explain word problems to students, like creation of drawings, graphs, tables, etc., using real-life word problems or problems from student's experiences and using word problems to show students, applications of math concepts, and applying critical thinking. Furthermore, the findings showed that the most difficulties teachers face in teaching math word problems are the lack of school materials needed to explain math word problems to students and the limited time allowed to finish the textbook. For the textbook, it does not contain a sufficient number of word problems. Also, the book examples are mostly difficult, not related to the student's environment, and they are not attractive.

Keywords: Word problems, mathematic, difficulties.

Dialogue in Video Production: a possible approach to the mathematics classroom

Fernanda Martins da Silva

São Paulo State University, Brazil

fm.silva@unesp.br

Abstract: This ongoing doctoral research aims to investigate the role of digital video production to encourage a dialogue between teachers and students about mathematical concepts. For this, meetings with Mathematics teachers are proposed for the elaboration of a silent video task, that is, a video without sound or text that addresses a mathematical concept elaborated through GeoGebra (Kristinsdóttir, et al., 2020). The activity will be developing the silent video task with the teacher and the student's role is to record the sound explaining the mathematical concept in the video and add other multimodal resources. The investigation will look for dialogical relationships throughout the video production, aiming to identify aspects of liberating education. Qualitative in nature, this research will use the research methodology based on projects, because it allows adaptation according to the contexts of each classroom, and for the production of data it will rely on interviews, recordings, field diaries, and participant observation. The theoretical foundation will be anchored in the human-beings-with-media construct (Borba & Villarreal, 2005) and in Paulo Freire's concept of dialogue (Freire, 1987) so that the data analysis will have a look at the data from these theoretical lenses. The proposal then aims to contribute to the discussion about the relationship between digital technologies and dialogue as a liberating education for the Mathematics classroom.

References:

Borba, M. C.; Villarreal, M.V. Humans-With-Media and the Reorganization of Mathematical Thinking: information and communication technologies, modeling, experimentation and visualization. New York – United States: Springer, 2005.

Freire, P. Pedagogia do Oprimido. 17a. ed. Rio de Janeiro, Paz e Terra, 1987.

Kristinsdóttir, B.; Hreinsóttir, F.; Lavicza, Z.; Wolff, C. E. Teachers' noticing and interpretations of students' responses to silent video tasks. Research in Mathematics Education. 2020. DOI: https://doi.org/10.1080/14794802.2020.1722959

Keywords: Silent Videos Tasks. GeoGebra. Dialogue. Human-Beings-with-Media. Multimodality.

Impact of gamified problem-sheets in Seppo on self-regulation skills

Edina-Timea Opris, Iuliana Zsoldos-Marchis & Egri Edith

Babes-Bolyai University, Romania

zaira.ortiz@unican.es

Abstract: Problem-solving competency is important not only in many careers, but also in everyday life. Successful problem solvers regulate their cognitive processes and emotions. Our research aimed to study the impact of gamified problem sheets designed in Seppo on self-regulated learning skills (SRL). The intervention was carried out with second-year students from the specialization of Primary and Preschool Pedagogy. The research tool was a self-regulated problem-solving scale used as pre- and posttest. In the experimental group gamification was for 6 weeks. The game had 3 levels and the players could choose exercises from any level they wished. The results show that gamified problem-sheet helped students to stay motivated, made the problem solving more enjoyable, but decreased some of their self-regulated processes during problem solving, as checking the correctness of the solution, searching for more solutions for the same problem, or self-efficacy. This decrease could be explained by some psychological theories and the game elements and rules of the Seppo gamified problem-sheets used in the intervention. Based on the conclusions the role of some gamification aspects in developing different self-regulated processes can be identified and the importance of a careful design of gamified problem-sheets is highlighted.

Keywords: gamification, problem-solving, self-regulated learning, Seppo platform

Solution strategies of pre-service teachers when dealing with a division-related task

María Sanz Ruiz, Zaira Ortiz-Laso & Jose Manuel Diego-Mantecón

Universidad de Cantabria, Spain

msr889@alumnos.unican.es

Abstract: Kilpatrick (2001) describes mathematical proficiency based on five indicators: conceptual understanding, procedural fluency, strategic competence, adaptive reasoning, and productive disposition. Previous research shows that both students and pre-service teachers rely heavily on algorithms in contraposition to conceptual knowledge when solving mathematics-related tasks, and in particular when dealing with problems involving divisions. Kaasila et al. (2009) investigated Finnish students' and pre-service teachers' understanding of division by asking the following question: "We know that 498:6=83. How could you conclude from this relationship (without using long-division algorithm) what 491:6=? is?" In our study, we asked the same question to 172 Spanish pre-service teachers and evaluated whether their answers display Kilpatrick's indicators of mathematical proficiency. The results lead us to conclude that Spanish pre-service teachers generally do not have an adequate understanding of division with most of them failing to solve the task, which is consistent with the results of Kaasila et al. A profound analysis showed that the correct answers mainly related to adaptive reasoning and productive disposition rather than to conceptual understanding of division.

References:

Kaasila, R., Pehkonen, E. & Hellinen, A. (2009). Finnish pre-service teachers' and upper secondary students' understanding of division and reasoning strategies used. Educational Studies in Mathematics, 73(3), 247-261. https://doi.org/10.1007/s10649-009-9213-1

Kilpatrick, J. (2001). Understanding mathematical literacy: The contribution of research. Educational Studies in Mathematics, 47(1), 101–116.

Keywords: mathematical proficiency, division, solution strategies, pre-service teachers.

The Implementation of the Educational Application <colette/> into STEM Education: Introduction of the Task Families Draw-o-Bot and Building Cubes

Eva Schmidthaler, Corinna Hörmann, Marina Rottenhofer, Zsolt Lavicza & Barbara Sabitzer

Johannes Kepler University, Austria

eva.schmidthaler@jku.at

Abstract: Innovation with regard to new teaching and learning methods in STEM education has a high priority at Austrian schools, especially in terms of digitization. In addition to the use of the latest technologies in STEM teaching, such as educational applications (learning apps), the focus on the dissemination of computational thinking (CT) is particularly important. In this talk, the task families (TF) "Draw-o-Bot" and "Building Cubes" of the new <colette/> app for STEM, especially mathematical education, are introduced. The abbreviation <colette/> stands for "Computational Thinking Learning Environment for Teachers in Europe", and the development of the mobile app, the accompanying webpage and material for teachers is part of an Erasmus+ program. On the one hand, teachers can use the already existing tasks from different task families in their lessons to promote CT, or independently with the webpage, produce their own tasks, for themselves or other users. Currently, blockly-based coding tasks from the implemented TF "Building Cubes" and "Draw-o-Bot" are available for all users. Now, students are able to program the height of a pyramid or the path of a robot. Furthermore, via mobile Augmented Reality (mAR) function, the self-coded results can be clearly displayed and independently controlled by all users. In addition, further exercises on how to <colette/> utilize unplugged are also presented. Moreover, the current state of the development and research of <colette/>, possible advantages and employment in the classroom, especially mathematics, are also discussed.

Keywords: educational application, learning app, mathematics, STEM, teacher.

A pilot study on investigating primary school students' eye movements while solving compare word problems

Ágnes Bartalis, Imre Péntek & Iuliana Zsoldos-Marchis

Babeș-Bolyai University, Romania

agnes.bartalis@ubbcluj.ro

Abstract: One of the most difficult types of arithmetic word problems in primary school is compare problems. Among these problems, the most problematic are those in which the relational term is not consistent with the arithmetic operation required for the solution. This study investigates how 10–11-year-old primary school pupils' read and interpret compare word problems. The consistency effect and the differences between successful and unsuccessful problem solvers are mainly studied using eye-tracking technology. The results show that students are more successful in solving CL problems than IL problems. As regarding eye movements during reading and solving the problems, fixation duration on the relational sentence and on numbers is longer in the case of IL problems than in the case of CL problems. Compared to successful problem solvers, unsuccessful solvers fixate longer on the statement and relational sentence of IL problems, but not on numbers, relational term, and pronominal reference word.

Keywords: compare problem, primary school, eye-tracking, consistency effect

Aesthetic approach for a mathematical formula: in case of Surface area of a Sphere

Mintzu Jeong

Johannes Kepler University, Austria

jeong.miinju@gmail.com

Abstract: When we introduce a formula such as the surface area of a sphere to 7th graders, we get in a dilemma. because it is impossible to make them have relational understanding without dealing with integral and mensuration by parts. Some school math is introduced to students as a tool to solve practical problems. In this situation, how the formula is derived is not a concern for the teacher or the students. We have to be happy with the instrumental understanding. Nevertheless, we want to introduce the formula somehow reasonable or make sense to students. For this reason, we often use the method of peeling off an orange or apple. In this paper, we will introduce new 3D objects to help students appreciate the formula.

* 3D objects and explanation for the formula

https://gumisflatland.tistory.com/436

Keywords: # 3D objects, #aesthetic approach, # instrumental knowledge.

Escaping Math Problems with MATH-DIGGER

Carla M.A. Pinto*, Jorge Mendonça, Lurdes Babo, Ricardo Queirós, Mário Cruz, Fernando Carvalho, Luís Afonso

Polytechnic Institute of Porto, Portugal

Zsolt Lavicza, Eva Ulbrich, Mathias Tejera

Johannes Kepler University, Austria

Deolinda Rasteiro, Cristina Caridade

Polytechnic of Coimbra, Portugal

Konstantinos Petridis, Christos Nikolopoulos, Ioannis Vardiambasis, Vangelis Kokkinos

Mediterranean Hellenic University, Greece

Peter Galambos, Anna Sudár

Mistems, Hungary

Selay Kocadere, Selen Galiç, Melike Nur Konglu, Ozgun Sefik, Selin Urhan

Hacettepe University, Turkey

*cap@isep.ipp.pt

Abstract: The Erasmus+ project "MATHematics Digital Escape Rooms - MATH-DIGGER" was delineated to entrust students in their learning path.

In the MATH-DIGGER platform, students are invited to learn Mathematics in a stimulating and challenging way, by solving puzzles, quizzes, and other problems, in a limited amount of time, to escape a virtual room. All the proposed problems will be based in real-life case studies. MATH-DIGGER intends to strengthen students' essential skills, including critical thinking, digital competences, entrepreneurship, communication, teamwork, negotiation and persuasion, problem solving, leadership, organization, perseverance and motivation. An effort will be made to empower female students in the STEM and STEAM scientific areas. A secondary outcome will be given at the level of Math curricula development, by including these educational games, and new assessment tools.

Keywords: MATH-DIGGER; Escape Rooms; Erasmus+ project

Changing students' attitudes toward mathematics through creative STEAM projects designed and executed by them (SMART PROGRAM)

Einav London

Babes-Bolyai University, Romania

einav london42@gmail.com

Abstract: In recent years the interest in learning mathematics decreased as students do not consider mathematics important for their future and they do not perceive its value. The study reveals the relationship between mathematics and the students as an IKEA effect, that is, when the students go through the process of creating an object and investing thought and time in it, they will perceive it as worthy, as having significant value, and they will desire it more than a ready-made object.

To achieve this perception of valuable mathematics students got complex tasks (project), based on questions from the mathematics study material combined with each student's fields of interest. The aim of the research is to test if these projects contribute to a positive attitude towards learning mathematics. A one-group pretest-posttest research design was used. In the research 25 students were involved. During creating the projects, formative technological environments were created through design and handiwork, learning in groups, discourse, and meaningful feedback.

The results show that the students developed positive perceptions of mathematics. While creating the original projects the students showed motivation and responsibility for their learning, and developed a sense of confidence/competence and design thinking that led to creativity and innovation.

Keywords: STEAM, project-based learning, , learning mathematics by creation / hands-on activities, IKEA effect in learning mathematics, attitude towards mathematics.

The Future of Learning and teaching in Higher Education Institutions

Ziva Sabag Vanunu

Babes-Bolyai University, Romania

zivasab@gmail.com

Abstract: This paper summarizes a comparative study that examines the characteristics of learning and teaching as reflected in 20 scenarios of future higher education that were developed in five studies conducted during 2015-2020. The study examines the scenarios using a qualitative method and analyzes the different perspectives, aimed to identify the main trends that will form the principles of learning and teaching in the future. The study examined two main aspects: a. What are the characteristics of higher education institutions? b. What are the students' expectations from the learning process? The research findings pointed out five common principles: A. Learning from anywhere at any time (flexibility). B. Use of technology and innovation C. personal development of skills and abilities on-demand. D. The principle of free choice and customization. H. Distributed accreditation (representing a variety of education channels and professional experience throughout life).

Keywords: education; future scenarios; higher education; learning, teaching.

Towards STEAM teaching practices through higher education PjBL programs with focus on technology, transdisciplinarity and mathematics

Laura Frentescu Tordai & Carmen Crețu

Alexandru Ioan Cuza University, Romania

laura.frentescu@gmail.com

Abstract: This research proposal analyses the effects of the integration of transdisciplinarity, technology, and connections to mathematics into STEAM lesson planning practices of preservice teachers from different faculties. A webpage is used in order to display the lesson plans, thus allowing all preservice teachers to access the content created by their colleagues and even comment and rate.

During one semester students worked in a Project Based Learning Setup.

Initially, in our meetings, they received information and examples of STEAM education activities, inspired from real-world situations. Then they were shown live tutorials on how to use different technologies and how to integrate their content on the course webpage. Their task was to conceive an activity, presented in a structured manner but not in the classical "easy to find on google lesson-plan-format", linking to other disciplines, one of them being mathematics, and including a practical or interactive learning sequence. They had to provide resources for the teacher such as theoretical background, presentation, needed materials, examples and evaluation application.

At each following meeting, they received feedback and brainstorming with the whole group was facilitated in order to enrich the activity.

After implementing this new methodology for the 3rd year students we want to analyze the effects by (1) exploring preservice teachers' attitudes about integrated STEAM pedagogy (2) Assessing TPACK on preservice teachers (3) Identify perceptions of the benefits, perception of experience and student engagement in Project Based Learning (4) Identify artifact performance in PjBL

Students from other faculties that attended the course but with a different syllabus (without creating a transdisciplinary web-lesson-plan) will be our control group.

Known instruments like questionnaires, open-ended questions, and focus groups will be applied.

Keywords: STEAM education, lesson plans, preservice teacher training, transdisciplinarity, technology, mathematics

Design Principles of Educational Comics Design with Socioscientific Issues Based on the Experts and Teachers Opinion Perceived Well-being of In-Service School Teachers

Fadhlan Muchlas Abrori

Johannes Kepler University, Austria

fadhlan1991@gmail.com

Abstract: As a multimodal form of media, educational comics have pictures and words that stand out more than other types of media. Furthermore, the story's topic must be considered concerning the intended audience. This study presents the design factors I refer to when producing comic design instructional ideas and story material. This study employed a qualitative methodology and questioned only those participants who volunteered to be interviewed. The selection of participants was based on snowball sampling considering other variables, including participant competence and teaching/work experience. The participants involved in the interview were three biology lecturers, three mathematics lecturers, two elementary school teacher education lecturers, two comic enthusiasts, and three senior teachers. Transcripts of the interviews were then coded and categorized into themes. Some of the interview design ideas were split into two groups: the choice of colors and the use of comic book elements (e.g., panels, word balloons, gutters, onomatopoeia, etc.). Furthermore, in terms of content, it includes the complexities of socioscientific topics, position-taking, argumentative activities, and cross-curricular connections. The findings of this investigation will be used as the foundation for developing the comic prototype in my Ph.D. thesis.

Keywords: Educational comics, socioscientific issues, design, content

Perceived Well-being of In-Service School Teachers

Roxana-Madalina Cristea & Lavinia Şuteu

Babes-Bolyai University, Romania

roxana.cristea@ubbcluj.ro

Abstract: Well-being is a core topic in today's effective organizations, and schools are not an exception. When it comes to teachers, the issue has greater importance since they hold a role model position. Therefore, this study aims to investigate the level of teachers' overall mental well-being indicating psychological functioning, positive affect, resilience, and protective factors. Demographic and well-being data were collected from ninety kindergartens and secondary school teachers. The subjective well-being was rated using a five-point Likert-type scale, namely The Warwick-Edinburgh Mental Well-being Scale. The results show a high score of teachers' perceived well-being with no significant relationship with the teaching level, job, or local area status. In light of these results, mixed-method future research on teachers' well-being is discussed, focusing on the school organizational culture dimensions, subjective norms, and teacher role expectations.

Keywords: well-being, in-service teachers, school organizational culture, resilience

Examining the characteristics of parental engagement

Anett Rusznák & Kocsis Zsófia

University of Debrecen, Hungary

rusznak.anett@gmail.com

Abstract: The importance of parental involvement has been the subject of much international research. The term parental involvement can be understood as parents' involvement in school or as parents' investment in their children's education. The extent of parental involvement can be examined from the parents' perspective as well as from the perspective of the institution. Some of the factors influencing parental involvement are related to parents' social and economic status and their level of education. In our research, we seek to answer the question of what forms parental involvement takes and how parental involvement is manifested in different secondary schools. We conducted our research in Hajdú-Bihar, Szabolcs-Szatmár-Bereg and Borsod-Abaúj-Zemplén counties. Our current questionnaire survey sample consists of 209 parents. In our study, we found substantial differences in parental involvement between school types.

Keywords: parental cooperation, parental involvement, parent involvement in secondary school

The effect of the intervention with teaching applications of mathematics on students' achievement, and attitudes towards mathematics

Abdallah Asley & Iuliana Zsoldos-Marchis

Babes-Bolyai University, Romania

abedallh_asley@yahoo.com

Abstract: Teaching applications of mathematics is not a widely used in practice. Teaching applications of mathematics is very important, because it arise students' interest for mathematics, motivates students for learning and shows to students the importance of mathematics (Asli and Marchis, 2021).

The purpose of this study is to examine the effect of the intervention with teaching applications of mathematics in other disciplines on students' mathematics achievement and their attitudes towards mathematics.

The research was conducted in 2021-2022 in Israel. 4 classes and 4 teachers from High School participated in the study Each class was divided into 2 groups and are taught by 2 teachers at the same time, one group a control group and the other an experimental group. The research instruments are the translated and adapted version of

Tapia's (1996) mathematics attitude scale and mathematics achievement tests.

The results of the study showed that teaching applications of mathematics had a positive effect on students` attitudes towards mathematics and achievement in mathematics.

Keywords: applications of mathematics, attitudes towards mathematics, mathematics achievement.

Connecting culture to geometry - problem based learning across subjects

Rusmir Hosic[1], Eva Ulbrich[1], Mathias Tejera[1]. Ben Haas[1]. Zsolt Lavicza[1] & Yves Kreis[2]

Johannes Kepler University, Austria[1]

University of Luxembourg[2]

rusmir.h@hotmail.com

Abstract: Symbols are used to visualise and understand abstract mathematical concepts. According to Duval (1999), visualisations are the core of understanding mathematics and creating a visualisation involves reasoning and construction. This is also common in culture, for example, in religions where internalisation and externalisation are used for reflection (Vicini, 2017) that might be a visualisation such as geometric art.

We want to create learning situations for problem based learning useful for various subjects (i.e., mathematics, history, culture, arts) in primary school based on geometrical shapes.

Geometrical shapes are among symbols used in human beliefs (e.g., the cross in Christianity, the star of David in Judaism or the wheel of law in Buddhism) and can be found on buildings and several school books. Visualisations, e.g. in Islam, can be based on polygons, stars or rosettas (Abdullahi & Embi, 2013).

Lesson plans combining cultural subjects such as history or art with mathematics are not common, but we believe there is a visible connection with geometric art. Therefore, we aim to find out whether teachers from subjects with a cultural background are interested in such lesson plans and which attributes they should have to combine the subject, geometry and technology in a maker-centred learning experience (Michael & Jones, 2020).

We plan on a qualitative approach, first introducing an activity and then interviewing primary school children and their teachers for their perceptions and learnings. For a first orientation of attributes and teacher needs, we created an activity to develop bookmarks in 2D and 3D using chequered paper and the 3D modelling software TinkerCAD for over 50 primary school students. The lesson plan and comments of the student's teachers hinting towards attributes will be presented, and future steps will be discussed.

Keywords: Primary School, visualisation, geometry, culture, problem-based learning