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Book of Abstracts

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with technical support by Geert Vernaeve

Abstracts

of the concept. Computer algebra is a tool, a fantastically powerful tool, but only to the extent that it is consciously used to interpret the computer's "responses" correctly and to consciously find the methods that are most appropriate for a specific task, technical application, and in the computer program we need to "correctly" ask our questions , "translate " into the language of mathematics the task to be solved in real life, or the task to be fulfilled in the technical question and finally the result obtained is properly interpreted and "reversed" into the language of real life or technical application. The principle of white box mathematics means that computer algebra helps those who use it not only to help them solve tasks, but also to further develop them, to raise new questions and, ultimately, to a higher level of understanding and application of mathematics, see Buchberger [2002].
Buchberger [1990] Bruno Buchberger: Should students learn integration rules? Sigsam Bulletin, Vol. 24(1). Pp. 10-17.
Buchberger [2002] Bruno Buchberger: Computer Algebra: The End of Mathematics? ACM Sigsam Bulletin, Vol. 36. No1. March 2002.

Developing algorithmic thinking within STEM education for the preparation of future primary school teachers using robotic toys

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The development of algorithmic thinking for children in primary education is usually a task within the subjects of mathematics, informatics, but also involves other science subjects. With programmable robotic toys such as BeeBot, Botley, etc. children can be taught algorithmic thinking already in kindergarten. However, teachers must have sufficient knowledge of how to use these digital tools in STEM education to successfully integrate them at all levels of education. At Comenius University, we carried out research with future primary education teachers and examined their uses of robots in classrooms for a semester. We will report on the influence of robotic toys on teachers' and students' their motivation, creativities in a constructivist educational environment.

Use of augmented reality in STEAM education at primary school

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Nowadays, children are constantly surrounded by mobile technologies. Children use them from an early age. Some teachers perceive them negatively, but they can assist in teaching if we use them appropriately. This work presents findings of some possibilities for using mobile technologies, especially the augmented reality application Quiver usable in teaching in primary education. The method used for this research is quality research observation and we used semistructured interviews with children. The aim of the unstructured observation were proceedings of the teaching process via his/her teaching, the teacher began to consciously support the pupils' digital literacy development through augmented reality. The results of the pre-research form the base for the direction of the further study concerning the augmented reality in teaching practice. The paper focuses on the educational potential of augmented reality for support in primary education. The chapter presents the opportunities that augmented reality brings to primary education. The author gives a brief overview of selected application suitable for primary school children. She then focuses on application Quiver, which used in a research project in Primary school. The research shows that children are more motivate or not with application with augmented reality and if their estimation improves. The research aim is to create a model for didactic support to develop digital literacy of children in primary education through augmented reality in STEAM education. The main aim is to find out the impact and benefits of augmented reality on development of childrens' digital literacy and imagination. In the research I observed pupils in the digital environment of Quiver application. This application helps pupils visualize mathematical objects and many other things that are difficult to imagine. The author observed students' behaviour during using application and whether they were motivated by their work.

Usage of online platforms in education of mathematics in Transcarpathia at the beginning of quarantine

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Distance learning and e-learning as concepts have been in our minds for a long time. In March 2020, they suddenly gained great importance due to the introduction of quarantine and were immediately put into practice. It had to be applied in the everyday lives of teachers and students with surprising speed.
The goal of this research is to assess and demonstrate how teachers overcome the difficulties of mathematics education in distance learning. For this purpose, a month later after the beginning of distance education, I conducted a questionnaire survey among 20 teachers of mathematics in Transcarpathia with several different work experiences and who teach in several educational institutions. They were asked how education went on during quarantine, how they chose the platforms and methods needed to hold their lessons, what the checking and testing process was, what advantages and disadvantages they faced in distance learning.

Prospective elementary teachers' first experiences on designing Geogebra learning activities: Potentials and challenges

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The integration of technology in learning is increasingly popular and inevitable, especially during the Covid-19 pandemic. In mathematics education, dynamic mathematics software, such as GeoGebra, has been used as a pedagogical tool in learning mathematics from primary school to university, thus supporting teachers' competencies on using technologies as instructional mathematical learning becomes crucial. Therefore, the present study explores prospective elementary teachers' first experiences designing GeoGebra learning instruction. Thirty-eight prospective elementary teachers work in small groups of 2-4 members to discuss and design learning activities based on GeoGebra. We present some examples of their projects aiming to explore some potentials and challenges from integrating GeoGebra as a pedagogical tool to support students' learning.

Forming the concept of function at the intersection of mathematics and physics

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The recent school reform in Poland has introduced some significant changes. The phenomenon of lack of correlation between mathematics and physics teaching in the context of concept of function which has been relocated to the secondary school level of mathematics, but is needed in the teaching of kinematics at the elementary school level of physics was the subject of our analysis in the article (Sajka,Rosiek, 2019). We posed two constructive recommendations on how to get out of this impasse. First was that mathematics teachers should teach the needed propaedeutic of the notion of function before (or at the same time) physics education starts in primary school (7th grade in Poland). This should be done purposefully during mathematics classes, with extreme care taken in regard to choosing the proper examples, including those based on movement analysis, and not only on statistical analysis, as recommended by the Polish Ministry of Education. Secondly, the optimal solution seems to be cross-curricular teaching, so that physics and mathematics teachers can introduce mutually-related issues, both emphasizing what is important from the standpoint of their science. This solution is in line with idea of STEM education - an issue which has recently been explored by researchers. In this presentation we would like to demonstrate chosen results of our research on attempts to implement these recommendations, combining our first and second conclusion. Our research involved a teacher teaching both physics and mathematics. In the presentation