

POSSIBILITIES OF 3D PRINTING IN THE FUTURE OF MATHEMATICAL EDUCATION

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Abstract: In the presentation we showcase the implementation of 3d printing in mathematical lessons in Petro Kuzmjak school in Serbia in 2019. Beside developing students mathematical competences, we have also developed different students skills. One of the most important is that 3d printing develops creativity. Presentation also provides insight how 3d printing was applied in the global pandemic by teachers in Europe.

3d printing, mathematics, creativity

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MATHEMATICAL ARGUMENTATIONS FROM A LONGITUDINAL PERSPECTIVE - IDENTIFYING TYPES, PROBLEMS AND RELATIONS TO GIFTEDNESS

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Abstract: The development of argumentative skills in the context of a deeper mathematical understanding is an important aspect of learning mathematics (Hanna, 2000). So, argumentative skills are even important for the support of mathematical giftedness, whereas the long-term relations of giftedness and argumentative skills remain unclear. Longitudinal studies on the cognitive development of children (e.g. Piaget, 2002) do not explicitly focus on mathematical argumentation, but lead to the presumption that changes in arguments can be observed within the age span of nine to twelve years.

This qualitative longitudinal study focuses on this presumption and documents the mathematical argumentation products of 37 mathematically gifted children. Within a 18-months period, the children worked on arithmetical reasoning tasks in individual interview settings. For each child, the study involves four interviews (t1, t2, t3, t4), which span the children's age from ten to twelve (Group 1, n=11) respectively nine to eleven (Group 2, n=13) and eight to ten years (Group 3, n=13). The changes in the argumentation products are analysed on the levels Structure in accordance to Toulmin (2003), Content, Independency and Validity.

The results provide an insight into the stability and variability of the characteristics of the children's arguments. The results in the categories Content and Validity allow the suggestion that typical changes occur overall children and groups. A typological analysis allows the classification of six different types in terms of their stability and variability in the named categories. After characterising the types, they are assessed in terms of possible problems with argumentations. Further they are presented in the context and relation to other characteristics of mathematical giftedness in order to formulate a statement on the relation of both aspects.

Argumentation, Giftedness, Toulmin

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EXPLORING CHALLENGES & SCOPES FOR THE ADAPTATION OF ONLINE CLASSES OF HIGHER EDUCATION DURING EMERGENCIES OF COVID-19: BANGLADESH PERSPECTIVE.

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Abstract: Like other emergencies, COVID- 19 has created a hassle towards continuity of educational development along with other fields of regular activities. During this pandemic, the tertiary education system of Bangladesh has partially been transformed to online. which has become a challenge due to low technological and pedagogical support. Both learners and educators are facing some issues to adapt to this technology oriented pedagogy but it has come up with some scopes for stakeholders too. The purpose of the study is to investigate the challenges that learners and facilitators are facing for conducting online classes, to explore the scopes of teaching and learning and to find ways to overcome the challenges as well. Mixed method of approach has been followed towards collecting data from teachers and students of private and public universities of Bangladesh. The study comprised of surveying of 472 students, a semi-structured interview of 6 teachers, and an FGD of 8 students from different universities. The findings revealed that, lack of compatibility and adaptability, absence of positive mindset, scarcity of financial support, lack of proper learning tools and inappropriate environment are salient challenges of participating in online classes for students. In addition, the issues like the absence of experiences of conducting online class, unlikely cost, poor bandwidth and disruption of internet service, and lack of pedagogical knowledge for distance mode teaching-learning activities are the key challenges for teachers. However, both students and teachers are being accustomed to online platforms gradually and moving towards new dimension to complement existing educational practices.

This study has, therefore, implications for policy makers, educationists and stakeholders in both private and public sectors to minimize the challenges of distance learning as well as boost technology based skills and capacity to the teachers and learners.

It is recommended that, further research may be conducted to ascertain the effect of online classes during the emergencies on students' academic performance.

Pandemic Covid-19, Education in emergencies, Pedagogy, Technology, Distance learning.

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DESIGNING ARTS-INTEGRATED MATHEMATICS LEARNING TASKS USING GEOGEBRA

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Abstract: Often students learn mathematics in a didactic environment where they do not see the relevance of mathematics, especially in the arts. There are students who cannot visualize how mathematics can be represented in algebraic, numerical or/and graphical forms. The designed learning tasks aimed to make the connection of learning mathematics in these various forms through the use of GeoGebra. Thus, the research aims are to design GeoGebra learning tasks to address the concern on students' acquisition of conceptual understanding in mathematics and also to bring relevance to them by relating to the arts. Students will be interviewed to find out about how their mathematical reasoning, beliefs and creativity have changed. The findings will be coded using Grounded Theory. At the end of this research, a theoretical model on designing arts-integrated mathematics learning tasks using GeoGebra, will be developed.

Mathematics reasoning, mathematical beliefs, arts integration, GeoGebra

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THE VIEWS OF STUDENTS ABOUT GAMIFICATION IN AN EFL CONTEXT

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Abstract: Gamification, as an emerging instructional method in educational settings, is one of the best ways to provide a meaningful context for language learners. In the current study a gamified English lesson was designed using various game elements and 36 college students took part in it for 5 weeks. The course was planned in accordance with the learning objectives by embedding game elements including story, level, point, badge, progress, leaderboard, team and achievement. Students monitored their progress on a profile card. Instagram was used as a web tool to conduct the gamified course. The aim of the study was to explore the students' views and suggestions towards a gamified lesson, and their perceptions of achievement. Data was collected through an open-ended questionnaire and content analysis was used to determine the students' opinions. During this process, member check was conducted in order to avoid misinterpretations and enhance validity. Findings revealed that students' perceptions of achievement were positive. 97% of them believed that gamification affected their success in a positive way. Students thought gamification made the class interesting. They also believed that it motivated them to participate in classes, supported their learning, and created a fun and competitive environment. They said they liked gamification because it provided them a feeling of flow, they were able to socialize with classmates and it was conducted on a social media platform they were using on a daily basis. 92% of the students stated that they preferred gamification in this class and 72% of the students said that they also want other classes to be gamified. From the students' views it can be said game elements were perceived positively and they associated badges, rewards, progression, points and leaderboard with competition. Story, reward and progression were associated with fun; achievements with participation; and team with sociality. Badges were also associated with motivation and sociality; and progress was associated with interest and fun. To conclude, students' perception towards gamification and game elements was positive and they were satisfied with the environment that gamification created.

gamification, education, game elements, gamification design, EFL

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A STUDY OF TRANSDUMERATION PROCESSES MEDIATED BY GEOGEBRA

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Abstract: This article results from emerging discussions of an ongoing doctoral investigation in the field of Mathematics Education. The text articulates a problem resulting from questions arising from academic master's research in Mathematics Education developed by the first author. In this study there are notes for the multiple representations of data as a didactic advantage of the use of GeoGebra to teach statistics. In the dialectics of a didactic situation, to answer questions related to statistical objects, the multiple representations of data were used by the students in the elaboration of arguments about the properties of the objects. Based on this didactic advantage observed in dialectics, the doctoral research in development focuses on the investigation of the processes of change of data representation. These processes have to do with a type of statistical thinking, Transnumeration. Initially, we are seeking to formalize an understanding of aspects that, present in a software, justify and can allow the teaching of statistics. Knowing these aspects, we will seek to identify them in GeoGebra, as we can sustain our analysis of Transnumeration processes based on these aspects observed in the software. For these analyses, the research foresees the need to apply sequences of activities, which will seek to understand possible implications of GeoGebra for Transnumeration. Still in a phase of studies surrounding our theme, we elucidate that, in this research, to contribute in the field of study, we are conceiving statistical thinking as the mental strategies used by the individual to make decisions at every stage of an investigative cycle. The activities planned are part of this investigative cycle that, with the contribution of GeoGebra, conjecture the possibility to identify and analyze the Transnumeration processes.

Statistical Thinking, Transnumeration, GeoGebra.

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