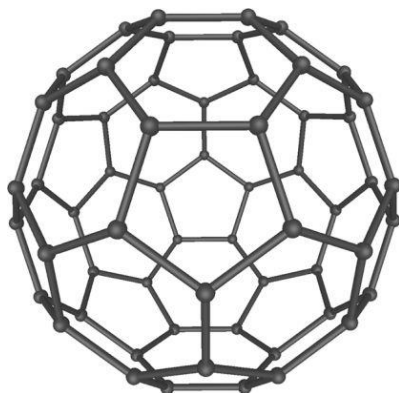**J. Selye University – Komárno**

Trnava University in Trnava

XXXVIITH DIDMATTECH 2024

New methods and technologies in education, research and practice

ABSTRACTS

2024

Editors: PaedDr. Krisztina Czakóová, PhD.

Prof. Ing. Veronika Stoffová, CSc.

Graphic editor: PaedDr. Krisztina Czakóová, PhD.

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The aim of conference

The aim of the scientific professional conference XXXVIIth DIDMATTECH 2024 is to introduce the latest findings from the field of the science of materials and technologies, including educational, information and communication technologies, and enable the participants to present the results of their own scientific research and professional activities with a special focus on the didactical aspects of education.

The conference was designed mainly for teachers who teach subjects in the area of technologies, informatics, mathematics, physics, electronics, sciences and others at different schools and use modern digital technologies and ICT in education, also for doctoral, postgraduate, and for talented students.

Program

Wednesday, 9th of October:

09:30 – 10:45 Registration
11:00 – 11:30 Welcome Speech; Open Ceremony
11:30 – 13:15 Plenary Session
Moderator: prof. Ing. Veronika Stoffová, CSc.

> *Dr. hab. Márta Turcsányi-Szabó, PhD.: Enjoyable Learning for Everyone!*
> *RNDr. Ján Skalka, PhD.: Virtual Learning Environment for Programming Learning*

13:15 – 14:45 Lunch
14:45 – 16:00 Oral presentations
Conference session moderator: doc. Ing. Ildikó Pšenáková, PhD.

> *Norbert Annuš: Identifying mathematical difficulties of primary school students using AI-based educational sortware – invited speaker*
> *László Halász: Asking the right questions to university students in understanding AI usage in programming edu-cation*
> *Márk Csóka: Evaluating programming topics for high schools – invited speaker*

16:00 – 16:30 Coffee Break
16:30 – 17:45 Oral presentations
Conference session moderator: doc. dr hab. inż. Elżbieta Sałata, PhD.

> *Ladislav Rudolf: The Use of Statistical Methods in Edu-cational Research*
> *Milan Pokorný: ICT in teaching mathematics of future primary school teachers*
> *Ildikó Pšenáková – Karin Melicherčíková: MS Power-Point in Flipped Classroom*

18:15 – 22:00 Welcome Party

Thursday, 10th of October:

09:20 – 10:15 Oral presentations
Conference session moderator: doc. Ing. Ladislav Rudolf, CSc.

> *Dávid Paksi: Developing Interactive Tools for the Teach-ing of Modelling and Simulation – invited speaker*
> *Agnieszka Molga: Advanced 3D modelling techniques: Nurbs curves and surfaces*

10:15 – 10:45 Morning Coffee Break
10:45 – 12:00 Visit to the robotics laboratory UJS
12:00 – 13:15 Oral presentations
Conference session moderators: dr. inż. Agnieszka Molga PhD. & dr. inż. Jacek Wołoszyn, PhD.

Elżbieta Salata – Maria Gagacka – Justyna Bojanowicz: Organisational Aspects of Teacher Agency in Crisis Situ-ations: Expectations and Reality
Natália Shumeiko: Exploiting the potential of AI in teaching English: Some scientific aspect
Bence Pásztor – Gergely Kocsis: The dangers of using internet among primary school students in Slovakia

13:15 – 14:45 Lunch
14:45 – 16:00 Oral presentations
Conference session moderator: dr. Justyna Bojanowicz, PhD.
Jacek Wołoszyn: Classification of microorganism based on microscopic images
Gergely Kocsis: Comparing photogrammetry apps for small object capture in the Classroom
Veronika Stoffová – Krisztina Czakóová: A look back at the DIDMATTECH conferences in Komárno

16:00 – 16:30 Afternoon Coffee Break
16:30 – 17:25 Oral presentations
Conference session moderator: prof. Ing. Veronika Stoffová, CSc.
Zoltán Horváth: Involving master students in projects ini-tiated by companies – an implementation of the third gen-eration research university principle (invited speaker)
Olga-Erzsébet Horváthné Hadobás: How do we use AI support to learn and teach programming?

17:25 – 17:45 Closing Session

Friday, 11th of October

09:00 – 13:30 Komárno sightseeing – Visit of interesting places (Fortress, European court and others) according to the wishes of the participants. Smaller groups can also be created with different programs.

Content – Obsah

List of papers not presented

Invited lecture 1

Dr. hab. Márta Turcsányi-Szabó, PhD.

*Department of Media and Educational Informatics of Faculty of Informatics,
Eötvös Loránd University in Budapest, Hungary*

MÁRTA TURCSÁNYI-SZABÓ – associate professor at the Department of Media and Educational Informatics of Faculty of Informatics Eötvös Loránd University (FI ELTE) in Budapest. She studied at ELTE and the American University in Cairo. She obtained his PhD degree in 1999 in the field of mathematics and computer science and Dr.hab. degree in 2023 at the FI ELTE. She is lecturer of the Doctoral School of Education at ELTE, supervisor of the Doctoral School of Informatics. Number of doctoral students under her supervision is 11. Thanks to his work, the ICT-themed lessons of the general teacher training programs at ELTE have been renewed. He founded the T@T lab, the purpose of which is to create an experience-oriented model employment research centre equipped with innovative tools, where learning-promoting technology environments are created by combining 21st century ICT tools and appropriate pedagogical methods. The centre provides space for research, development, testing and evaluation of prototypes, implementing the results in teacher training, popularizing and disseminating them more widely. He is a member of the editorial board of several scientific journals. He participated in several successful international and domestic tenders. The greatest international success she achieved in 2014, when IELA, the International eLearning Society, chose the pedagogical project "Preparing for Smart Learning" as the best of the learning projects supported by mobile devices. She performed and performs many academic functions and held and holds high positions at ELTE. She is the holder of many foreign and domestic awards, honours and recognitions.

Topic:

Enjoyable learning for everyone!

Élményalapú tanulás mindenkinek!

Zážitkové učenie pre každého!

Our present era concerning education can be characterised as involving the compulsory learning of a huge amount our compulsory knowledge that causes a lot of stress and shying away from learning itself. In relation to the mass of problems to be solved in our present life, we cannot afford to lose the next generation of active problem solvers, so we need to make changes that could motivate the growing up generation to be involved actively in society in all fields. One of these factors could be an enjoyable motivation to inquiry itself in different areas, making learning experiential related to relevant domains in relation to generational challenges.

Our STEAM Kucko lab at the Faculty of Informatics, Eötvös Loránd University, has been constantly developing such methodologies in practice, using it in university education, teacher training, and dissemination it all over the country in form of live projects and competitions launched towards public education.

The presentation explained how these projects were built into courses at university, reaching public education initiating a sustainable innovation: https://docs.google.com/presentation/d/1fZ22v4voN8vh_TxUjcGXpfEnH cIfUx04-BjXiyiO15U/edit#slide=id.p

The demonstration concluded with some conceptual conclusion in relation to experiential and enjoyable learning at different levels: https://prezi.com/p/nuv6eyzv5wk1/?present=1

Invited lecture 2

RNDr. Ján Skalka, PhD.

Faculty of Natural Sciences and Informatics, Constantine the Philosopher University in Nitra, Slovakia

JÁN SKALKA – head of Department of Informatics FNS&I. Received a master's degree in mathematics and informatics education from the Department of Informatics, Constantine the Philosopher University in Nitra, Slovakia. He defended the Ph.D. thesis in the research study program of technology of education from the Constantine the Philosopher University in Nitra in 2004. Since 2000, he has been an assistant professor and an associate professor at the Faculty of Natural Sciences and Informatics, Constantine the Philosopher University in Nitra. He is currently a member of the Knowledge Discovery Research Group. He is the author of many textbooks. He has recently dealt with the support of electronic education in the form of microlearning. His research interests include information systems implementation and integration, blended learning and e-learning applications in education, programming learning and teaching, and developing applications to support education.

Topic:

Virtual Learning Environment for Programming Learning

Virtuálne vzdelávacie prostredie pre učenie programovania

Virtuális tanulási környezet programozás tanuláshoz

The ability to prepare algorithms to solve problems and rewrite them into program codes is one of the necessary skills for finding work in the IT sector.

Although pupils have been developing algorithmic skills since the first years of primary school, many fail to establish it to write programs. In higher education programming, language courses are still the most challenging courses for which students fail. The current approach to solving this problem is based on adapting the educational methodology to the habits of current students. The approach used to obtain information for young Generation Z programmers is based primarily on using smartphones, the limited amount of information displayed, and providing immediate feedback. An ideal tool for teaching programming at universities, which can eliminate some beginner's difficulties when set up correctly, is automated assessment supported by microlearning lessons and the possibility of using generative AI to explain frequently repeated questions. The lecture aims to present the possibilities currently offered by virtual educational environments and to share experiences with their use.

Presentations

ÁLTALÁNOS ISKOLÁS DIÁKOK MATEMATIKAI NEHÉZSÉGEINEK FELTÁRÁSA MESTERSÉGES INTELLIGENCIA ALAPÚ OKTATÓSZOFTVEREKKEL

Norbert ANNUŠ, SK

Absztrakt: A digitális oktatás és az IKT eszközök alkalmazása jelentős változásokat hozott az oktatásba, különösen a COVID-19 járvány idején. A mesterséges intelligencia és az adaptív tanulási rendszerek egyre fontosabb szerepet játszanak a személyre szabottabb tanulás támogatásában, valamint az egyéni nehézségek azonosításában. A tanulmány célja, hogy ezen technológiákat felhasználva feltárja a diákok alapszintű matematikai műveletekkel kapcsolatos nehézségeit. A kutatás során olyan oktatási szoftvereket, mint az ALEKS és a Mathia, hasonlítottunk össze a saját fejlesztésű Learn with M.E. alkalmazásunkkal, amely képes azonosítani a diákok nehézségeit, és pontos, időben készült jelentésekkel támogatja az oktatók munkáját. A tanulmány célja ezen szoftverek hatékonyságának összehasonlítása a tanulók egyéni problémáinak feltárásában. Az eredmények azt mutatják, hogy a Learn with M.E. hatékony eszköznek bizonyul az oktatás személyre szabásában, miközben az oktatóknak részletes és hasznos visszajelzést nyújt a diákok teljesítményéről. A tanulmány javaslatokat is tesz további fejlesztési irányokra, amelyek még tovább növelhetik az IKT eszközök hatékonyságát a matematika oktatásában.

Kulcsszavak: matematikai nehézségek azonosítása, oktatószoftverek, Learn with M.E., ALEKS, Mathia.

IDENTIFYING MATHEMATICAL DIFFICULTIES OF PRIMARY SCHOOL STUDENTS USING ARTIFICIAL INTELLIGENCE-BASED EDUCATIONAL SOFTWARE

Abstract: The implementation of digital education and ICT tools has brought significant changes to education, particularly during the COVID-19 pandemic.

Additionally, artificial intelligence and adaptive learning systems are playing an increasingly important role in supporting personalized learning and identifying individual difficulties. The aim of this study is to utilize these technologies to identify students' difficulties related to basic mathematical operations. In the research, educational software such as ALEKS and Mathia were compared to our own developed application, Learn with M.E., which is capable of identifying students' difficulties and providing accurate, timely reports to support educators' work. The purpose of this study is to compare the effectiveness of these software tools in uncovering individual student problems. The results show that Learn with M.E. has proven to be an effective tool for personalizing education while providing detailed and useful feedback to teachers regarding student performance. The study also offers suggestions for further development directions that could enhance the effectiveness of ICT tools in mathematics education.

Keywords: mathematical difficulties identification, educational software, Learn with M.E., ALEKS, Mathia.

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HOGYAN HASZNÁLJUK AZ MI TÁMOGATÁSÁT A PROGRAMOZÁS TANULÁSÁHOZ ÉS TANÍTÁSÁHOZ?

Olga Erzsébet HORVÁTHNÉ HADOBÁS, HU
Veronika STOFFOVÁ, SK

Abstrakt: A cikkben bemutatjuk a mesterséges intelligencia (MI) eszközeinek alkalmazását a programozás tanulásának és tanításának folyamatában. Kiegészítettük a hagyományos programozás oktatást az új MI lehetőségek prezentálásával és alkotó felhasználásával. A cikkben ismertetjük a körülményeket, a hallgatóknak kifejtett etikai és jogi relevanciákat, valamint a kiválasztott MI eszközök jellemzőit. Bemutatjuk ezeknek az eszközöknek a hatékonyságát éppúgy, mint az előforduló félreértelmezéseket és hibákat is. Kiválasztott eszközeink a zGitHub Copilot, a Gemini 1.5 Flash 8k és a ChatGPT40 voltak, amelyeket különböő programozási platformokon mutattunk be a hallgatóknak. Megvizsgáltuk azt is, hogy ezek az eszközök milyen minőségű, mennyire ötletes vagy mennyire optimális kódot generálnak. Kutatásunk célja annak a megállapítása, hogy a hallgatók tudásszintjét, és programozási készségük, logikai gondolkodásuk fejlődését növeli-e és ha igen, milyen mértékben az MI eszközök támogató felhasználása. Mindvégig azt tartottuk szem előtt, hogy az MI ne helyettesítse a hallgató munkáját, hanem támogassa a programozás tanulásának és tanításának folyamatát. A kurzus során célunk volt, hogy a hallgató megszerezze az MI „társprogramozó" alkalmazásának új készségét, hiszen az új eszközök hatékonysága kiaknázandó és felelősségteljes alkalmazásuk elkerülhetetlen. Ennek érdekében nagyobb hangsúlyt kell kapjon a helyes minták bemutatása, a programok értő olvasása, az előforduló hibák keresése és felismerése. Ehhez kulcsfontosságú a számítógépek működéséhez, a programok helyességéhez és a programozási nyelvi elemekhez kapcsolódó fogalmak pontos megértése és szabatos alkalmazása a képzés során.

Kulcsszavak: MI eszközök, programozás tanítása és tanulása, kódgenerátor, kód asszisztens, LLM.

HOW DO WE USE AI SUPPORT TO LEARN AND TEACH PROGRAMMING?

Abstract: In the article, we present the application of artificial intelligence (AI) tools in the process of learning and teaching programming. We supplemented traditional programming education with the presentation and creative use of

new AI opportunities. In the article, we describe the circumstances, the ethical and legal relevance explained to the students, and the characteristics of the selected AI tools. We present the effectiveness of these tools as well as the misunderstandings and errors that occur. Our chosen tools were GitHub Copilot, Gemini 1.5 Flash 8k and ChatGPT40, which we introduced to the students on different programming platforms. We also examined the quality, inventiveness, and optimal code generation of these tools.

The purpose of our research is to determine whether the students' level of knowledge and the development of their programming skills and logical thinking are increased, and if so, to what extent by the supportive use of AI tools. All along, we kept in mind that the AI should not replace the student's work, but support the process of learning and teaching programming. During the course, our goal was for the student to acquire the new skill of using AI as a "co-programmer", since the efficiency of the new tools must be exploited and their responsible use is inevitable. In order to do this, greater emphasis should be placed on the presentation of correct samples, the understanding reading of programs, and the search for and recognition of errors that occur. The key to this is the precise understanding and correct application of concepts which related to the operation of computers, the correctness of programs and programming language elements during training.

Keywords: AI tools, teaching and learning programming, code generator, code assistant, LLM.

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ASKING THE RIGHT QUESTIONS TO UNIVERSITY STUDENTS IN UNDERSTANDING AI USAGE IN PROGRAMMING EDUCATION

László HALÁSZ, Gábor KISS, SK

Abstract: As artificial intelligence (AI), particularly generative AI, becomes increasingly integrated into educational environments, it is important to understand how university students use these tools, especially in programming courses. This research shows the importance of asking appropriate questions to university students to thoroughly investigate their behaviors and viewpoints regarding AI. We examine multiple studies to understand how these questions can influence the assessment of AI's role in educational contexts. This paper clarifies the complexity of student behavior about the use of AI in programming curricula, based on recent research on chatbot and AI integration in education.

Keywords: Generative AI, Education, Ethical Use, Programming, Chatbots

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EXPLOITING THE POTENTIAL OF ARTIFICIAL INTELLIGENCE IN TEACHING ENGLISH: SOME SCIENTIFIC ASPECTS

Natália SHUMEIKO, SK

Abstract: Teaching English by leveraging the capabilities of artificial intelligence (AI) requires changing, improving, or adjusting approaches to teaching in higher education institutions to meet students' needs. Recent research by Zhi & Wang (2024), Woodrum (2024), Tsai et al. (2024), Li et al. (2024), Al-Shallakh (2024), Tang (2023), and Fu et al. (2023) explores the AI horizon in education. The current study, in turn, contributes to exploring the potential of AI and exploiting this potential for teaching English. Ask yourself: How can AI help learners in learning English? Here are some resources: ChatGPT, Duolingo, Rosetta Stone, Grammarly, and Quizlet. They are potential "helpers." One more question arises: Are they the "genuine helpers"? Let's just say that an overview of scientific materials related to the current study shows that researchers recognize the benefits of AI. For example, ChatGPT, which is praised as a tool for enhancing traditional EFL teaching methods (Mohamed, 2024), generates human-like stories, making them ideal (of course, after some adjustments and additions made by the teacher) for use in lessons, for training purposes, as material for completing interactive dialogues, making up different types of questions and answering them, and completing answer explanations (Khiem et al., 2024; Lee et al., 2024). Duolingo employs the gamification strategy and exploits the capabilities of AI to tailor the lessons to the needs of any particular group of students, deliver tests and track progress. Rosetta Stone offers immersive learning techniques and speech recognition. Grammarly aids in improving grammar, spelling, punctuation, and style. Quizlet – a "helper" in preparing two-sided flashcards, quizzes, and AI-powered games. However, ethical considerations (e.g., data security), the substantially diminishing opportunity for face-to-face communication in a foreign language, in particular English, and the potential overreliance on digital tools – are high-priority issues that need to be addressed, including by consolidating international scientific efforts in this direction. This study offers practical recommendations (e.g., Grammarly provides instant feedback on grammar or spelling correctness, thereby helping in developing the necessary English language proficiency, and, as Puri & Setiamunadi (2023) pointed out, *"Grammarly is a very helpful tool in writing"*) for integrating AI-powered features into English teaching, emphasizing the role of AI in providing

resources for preparing the younger generation of students for communication and work in a digital world where AI exists.

Keywords: artificial intelligence, English, education, teaching.

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EVALUATING PROGRAMMING TOPICS FOR HIGH SCHOOLS

Márk CSÓKA, SK

Abstract: The growing need for digital literacy and computational thinking prompted many educational systems to integrate programming into high school curriculum. Despite different countries try to accomplish success in teaching programming with various practices, there are no straightforward solutions yet. This paper seeks to evaluate and expand the topics suitable for high school programming, with Python as preferred programming language. The evaluation process considered the contents of ISCED 3B educational framework and the time limitations of Informatics classes. In addition, the difficulty, interest and engagement generated by the topic were prominent factors to examine. The topics highlighted in this paper are the following: generative art, web scraping and (data) visualization. The mentioned topics are actual, have multiple supporting libraries and provide constant feedback during programming. To support our claim, study materials were designed and tested in high school environment. The collected feedback helped identify shortcomings, refine the existing topics, and expand the list of potential topics. A standardized questionnaire was used to evaluate the students' opinions, and the results are discussed in the paper.

Keywords: generative art, web scraping, programming, visualization

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UŽITÍ STATISTICKÝCH METOD V PEDAGOGICKÉM VÝZKUMU

Ladislav RUDOLF, CZ, Milan BERNÁT, SK, Václav TVARŮŽKA, CZ, Jan VANĚK, CZ

Abstrakt: Statistické metody hrají klíčovou roli v pedagogickém výzkumu, neboť umožňují objektivně analyzovat a interpretovat data získaná při studiu vzdělávacích procesů a výsledků. Příspěvek se zaměřuje na význam a aplikaci statistických metod v pedagogickém výzkumu, přičemž ukazuje, jak mohou být tyto metody využity ke zkoumání efektivity různých výukových postupů, hodnocení vzdělávacích intervencí, a identifikaci faktorů ovlivňujících učení. Diskutovány jsou základní statistické postupy, jako jsou statistiky, korelace, regresní analýzy, t-testy a statistické hypotézy, které se často používají při porovnávání výukových skupin a posuzování intervenčních programů. Důraz je kladen na význam správné interpretace statistických výsledků a jejich praktické uplatnění pro zlepšování kvality vzdělávacích procesů. Příspěvek rovněž upozorňuje na časté chyby při použití statistických metod a zdůrazňuje důležitost pečlivého výběru vhodných statistických nástrojů pro různé typy pedagogických výzkumů. Téma má poskytnout pedagogům a výzkumníkům praktický přehled o možnostech využití statistiky pro zlepšení výukové praxe a podložených rozhodovacích procesů.

Klíčová slova: statistická metoda, pedagogický výzkum, regrese, hypotéza, výsledek.

THE USE OF STATISTICAL METHODS IN EDUCATIONAL RESEARCH

Abstract: Statistical methods play a key role in educational research, as they enable the objective analysis and interpretation of data obtained from studying educational processes and outcomes. This paper focuses on the significance and application of statistical methods in educational research, demonstrating how these methods can be used to examine the effectiveness of different teaching methods, evaluate educational interventions, and identify factors influencing learning. Basic statistical procedures, such as statistics, correlations, regression analyses, t-tests, and statistical hypotheses, which are commonly employed to compare teaching groups and assess intervention programs, are discussed. Emphasis is placed on the importance of correctly interpreting statistical results and their practical application in improving the

quality of educational processes. The paper also highlights common errors in the use of statistical methods and stresses the importance of carefully selecting appropriate statistical tools for various types of educational research. The aim is to provide educators and researchers with a practical overview of how to effectively use statistics to enhance teaching practice and support data-driven decision-making.

Keywords: statistical method, educational research, regression, hypothesis, result.

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IKT VO VYUČOVANÍ MATEMATICKÝCH PREDMETOV PRE BUDÚCICH UČITEĽOV NA PRVOM STUPNI ZÁKLADNEJ ŠKOLY

Milan POKORNÝ, SK

Abstrakt: V príspevku sumarizujeme skúsenosti s vyučovaním matematických predmetov pre študentov učiteľstva pre primárne vzdelávanie v akademickom roku 2023/2024. Zameriavame sa na vyučovanie štyroch predmetov: Matematika v primárnom vzdelávaní 1; Matematika v primárnom vzdelávaní 2; Základy teórie grafov; Celé, racionálne, reálne čísla. Tieto predmety boli vyučované blended learningom, ktorý je kombináciou e-learningu a prezenčnej formy výučby. V príspevku sa zameriavame na názory študentov na zvolenú metódu výučby a na vplyv metódy výučby na výsledky študentov denného a externého štúdia.

Kľúčové slová: blended learning, e-learning, vyučovanie matematiky, videoprednášky, online learning.

ICT IN TEACHING MATHEMATICS OF FUTURE PRIMARY SCHOOL TEACHERS

Abstract: In the contribution, we summarize our experience of teaching mathematics courses to students of Primary school teaching in the 2023/2024 academic year. We focus on four courses: Mathematics in Primary Education 1; Mathematics in Primary Education 2; Basics of Graph Theory; and Integers, Rational, Real Numbers. The subjects were taught by blended learning, which is a combination of e-learning and face-to-face teaching in a classroom. In the contribution, we focus on the students' views on the chosen teaching method and on the impact of the teaching method on results of full-time and part-time students.

Keywords: blended learning, e-learning, teaching mathematics, video lessons, online learning.

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DEVELOPMENT OF FINE MOTOR SKILLS USING THE PAPER CUTTING METHOD IN PRESCHOOL CHILDREN

Václav TVARŮŽKA, Ladislav RUDOLF, Jan VANĚK, CZ

Abstract: The aim of this article is to describe the impact of systematically incorporating the activity of paper cutting on the development of fine motor skills in preschool children. To assess the children's progress, a test involving cutting along a straight line and a curve on A5-sized paper was used, with diagnostics of cutting errors and cutting technique, conducted three times—at the beginning, middle, and end of the research. Fine motor skills are crucial for the development of other abilities, such as graphomotor skills and self-care activities. This study examines how regular use of scissors affects motor skills and bilateral coordination, including defects. The results show that regular exercises lead to improvements in hand-eye coordination and strengthening of upper limb muscles [1].

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MS POWERPOINT IN A FLIPPED CLASSROOM

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Abstract: When creating educational materials in the form of video recordings intended for teaching through the flipped classroom method, various software tools can be used, including Microsoft Office PowerPoint. Newer versions of this program allow not only the recording of the presentation itself but recording of speech as well, which can effectively complement the presentation. Essentially, this results in a video recording that can be used by students for home preparation in flipped classroom teaching. In this article we briefly characterize the flipped classroom method, we present some of our experiences with teaching using this approach and describes the process of preparing educational materials using PowerPoint.

Keywords: MS Power Point, Flipped Classroom, Educational Material, Video Recording

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DEVELOPING INTERACTIVE TOOLS FOR THE TEACHING OF MODELLING AND SIMULATION

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Abstract: This study presents the usability of a teaching aid developed for the education of Modeling and Simulation (MS). The tool was specifically designed for use in a university environment to address the lack of interactive learning materials. The application supports students in creating various models and running simulations in an interactive setting. The goal was for students to independently acquire knowledge and to ensure that the material is retained at a deeper level. The application provides a visual representation of the simulation results and allows for dynamic modification of parameters, aiding users in understanding the modeling process.

Keywords: modelling, simulation, learning tool, teaching aid

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ZAAWANSOWANE TECHNIKI MODELOWANIA 3D: KRZYWE I POWIERZCHNIE NURBS

Agnieszka MOLGA, Jacek WOŁOSZYN, PL

Abstract: Autorzy artykułu przedstawiają kluczową rolę krzywych i powierzchni NURBS w nowoczesnym modelowaniu komputerowym. NURBS umożliwiają precyzyjne i gładkie odwzorowanie skomplikowanych kształtów, co jest szczególnie istotne w projektowaniu przemysłowym, motoryzacyjnym, lotniczym i architektonicznym. W artykule przedstawiono porównanie modelowania NURBS z innymi metodami, takimi jak modelowanie podziałów i modelowanie parametryczne, oraz omówiono zalety i wyzwania związane z ich zastosowaniem.

Słowa kluczowe: krzywe NURBS, powierzchnie NURBS, modelowanie 3D, modelowanie wielokątów, modelowanie podziałów, modelowanie parametryczne.

ADVANCED 3D MODELING TECHNIQUES: NURBS CURVES AND SURFACES

Abstract: The authors of the article present the key role of NURBS curves and surfaces in modern computer modeling. NURBS enables precise and smooth reproduction of complex shapes, which is particularly important in industrial, automotive, aviation and architectural design. This article compares NURBS modeling with other methods, such as partition modeling and parametric modeling, and discusses the advantages and challenges of their use

Keywords: NURBS curves, NURBS surfaces, 3D modeling, polygon modeling, division modeling, parametric modeling.

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ORGANIZACYJNE ASPEKTY SPRAWSTWA PEDAGOGICZNEGO W SYTUACJACH KRYZYSOWYCH-OCZEKIWANIA I RZECZYWISTOŚĆ

Elżbieta SAŁATA, Justyna BOJANOWICZ, Maria GAGACKA, PL

Abstract: W ostatnich 5 latach współczesne społeczeństwa stanęły w obliczu różnych sytuacji kryzysowych pojawiających się z coraz większą siłą i częstotliwością. Mają one różne źródła, ale niezależnie od przyczyn odbijają się na funkcjonowaniu jednostek, grup społecznych instytucji i całego systemu społecznego. Dotykają tak drażliwej tkanki społecznej jaką jest edukacja powodując wiele poważnych problemów dla systemów nauczania i wsparcia młodych ludzi. Konsekwencją tych gwałtownych i głębokich przemian społecznych jest obniżenie poczucia dobrostanu i bezpieczeństwa uczniów, zmiany w ich relacjach, wartościach i stylach życia. Postpandemiczna szkoła pokazuje konieczność szerokiego instrumentarium wsparcia uczniów w trudnościach psychospołecznych, znaczące oczekiwania w tym zakresie kierowane zarówno do nauczycieli jak i innych podmiotów z otoczenia szkół. Równocześnie uwydatniają braki wsparcia zarówno uczniów jak i nauczycieli w tej sferze. Deficyty w tym obszarze podkreślają nieodzowność pogłębionych badań nad nowymi formami funkcjonowania szkół w warunkach kryzysowych. Celem prezentowanych badań była próba określenia roli organizacyjnych czynników podnoszenia poziomu sprawstwa nauczycieli w obszarze wsparcia uczniów w trudnościach psychospołecznych i ich wpływ na przekonania o adekwatnej w stosunku do potrzeb zdolności wsparcia wychowanków w obliczu nowych sytuacji kryzysowych. Ocena tego organizacyjnego wsparcia skonfrontowana została z przekonaniami dyrektorów placówek, w których nauczyciele są zatrudnieni. Podstawą empiryczną prezentowanych analiz są badania ankietowe przeprowadzone w maju i czerwcu 2024 roku na próbie nauczycieli i dyrektorów szkół podstawowych i ponadpodstawowych województwa mazowieckiego. Wyniki badań opracowano w programie statystyka. Wnioski wyprowadzone na podstawie wyników badań i rekomendacje dotyczące organizacji wsparcia metodycznego nauczycieli mogą być pomocne w zakresie umacniania ich kompetencji i podnoszenia poczucia sprawstwa.

Słowa kluczowe: sytuacje kryzysowe, sprawstwo pedagogiczne, wsparcie uczniów w trudnościach psychofizycznych.

ORGANISATIONAL ASPECTS OF TEACHER AGENCY IN CRISIS SITUATIONS: EXPECTATIONS AND REALITY

Abstract: Over the past five years, contemporary societies have faced various crisis situations that have arisen with increasing intensity and frequency. These crises stem from diverse sources but universally impact the functioning of individuals, social groups, institutions, and the entire social system. They affect the sensitive fabric of society, namely education, leading to significant challenges for teaching systems and support for young people. As a consequence of these abrupt and profound social changes, there has been a decline in students' sense of well-being and security, along with alterations in their relationships, values, and lifestyles. The post-pandemic school illustrates the necessity for a broad array of support mechanisms for students facing psychosocial difficulties, highlighting significant expectations directed towards both teachers and other stakeholders in the educational environment. Concurrently, these challenges expose the gaps in support available for both students and teachers in this domain. Such deficiencies underscore the need for in-depth research into new forms of school operation under crisis conditions. The aim of the presented research was to attempt to define the role of organisational factors in enhancing teachers' agency in supporting students facing psychosocial difficulties and their impact on beliefs regarding the adequacy of their ability to assist students in the face of new crisis situations. The assessment of this organisational support was juxtaposed with the beliefs held by the heads of the institutions employing these teachers. The empirical basis for the analyses presented comprises survey research conducted in May and June 2024 among a sample of teachers and school directors from primary and secondary schools in the Mazowieckie Voivodeship. The results of the research were processed using statistical software. The conclusions drawn from the findings and the recommendations regarding the organisation of methodological support for teachers may prove beneficial in strengthening their competencies and enhancing their sense of agency.

Keywords: crisis situations, pedagogical causation, support for pupils with psycho-physical difficulties.

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AZ INTERNETHASZNÁLAT VESZÉLYEI A SZLOVÁKIAI ALAPISKOLÁS DIÁKOK KÖRÉBEN

Bence PÁSZTOR, Gábor KISS, Krisztina CZAKÓOVÁ, Gergely KOCSIS, Ondrej TAKÁČ, SK

Absztrakt: Az internet mindennapi életünk szerves részévé vált ez alól az alapiskolás fiatalok sem képeznek kivételt. A gyerekek egyre több időt töltenek a világhálón, ami jelentős hatással van a fejlődésükre. Az online tér számos pozitív lehetőséget kínál számukra, legyen szó tanulásról, kapcsolattartásról vagy szórakozásról. Ugyanakkor a folyamatos online jelenlét komoly veszélyeket is rejt magában, amelyek kihívás elé állítják a fiatalokat. A gyerekek, akik még csak most tanulják a digitális kompetencia alapjait, különösen sebezhetőek a negatív online élményekkel szemben. Egy felmérés kimutatta, hogy a szlovákiai diákok túlnyomó többsége nem osztja meg ezeket a kellemetlen tapasztalatokat tanáraival. A tanulmány célja, hogy rávilágítson az információbiztonság oktatásának fontosságára, és felhívja a figyelmet arra, hogy az informatika oktatás keretein belül nagyobb hangsúlyt kellene fektetni az internetbiztonság témakörére.

Kulcsszavak: Szlovákia, információbiztonság, internethasználat, alapiskola, oktatás

THE DANGERS OF USING INTERNET AMONG PRIMARY SCHOOL STUDENTS IN SLOVAKIA

Abstract: The internet has become an integral part of our everyday lives, and primary school students are no exception to this trend. Children are spending more and more time online, which has significant impact on their development. The online space offers them many positive opportunities, whether it's learning, socialising or having fun. At the same time, being online all the time also brings with it serious risks that challenge young people. Children who are still learning the basics of digital literacy are particularly vulnerable to negative online experiences. A survey has shown that the vast majority of students in Slovakia do not share these unpleasant experiences with their teachers. The aim of this study is to highlight the importance of information security education and to draw attention to the need for a stronger focus on internet security in IT education.

Keywords: Slovakia, information security, internet usage, primary school, education

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KLASYFIKACJA MIKROORGANIZMÓW NA PODSTAWIE ZDJĘĆ MIKROSKOPOWYCH

Jacek WOŁOSZYN, Agnieszka MOLGA, PL

Streszczenie: Technologia uczenia maszynowego, szczególnie głębokie sieci neuronowe, otwiera nowe możliwości w różnych dziedzinach nauki, w tym biologii i medycynie. Jednym z kluczowych zastosowań tych technologii jest analiza obrazów mikroskopowych, która umożliwia automatyzację i znacząco poprawia dokładność identyfikacji oraz klasyfikacji mikroorganizmów. Artykuł ten przedstawia nowoczesne podejście do segmentacji i klasyfikacji mikroorganizmów na podstawie obrazów mikroskopowych, oparte na modelach stworzonych przy użyciu biblioteki TensorFlow. Omówiono proces, obejmujący przygotowanie danych, trening modelu oraz jego zastosowanie w automatycznej analizie obrazów. Przedstawiona metodologia nie tylko przyspiesza badania, ale także zwiększa dokładność identyfikacji mikroorganizmów, co ma bezpośrednie zastosowanie w diagnostyce laboratoryjnej, badaniach biologicznych i opiece zdrowotnej
Słowa kluczowe: segmentacja, klasyfikacja, Tensorflow, modelowanie, uczenie maszynowe.

CLASSIFICATION OF MICROORGANISM BASED ON MICROSKOPIC IMAGES

Abstract: Machine learning technology, particularly deep neural networks, is opening up new possibilities in various fields of science, including biology and medicine. One of the key applications of these technologies is microscopic image analysis, which enables automation and significantly improves the accuracy of identifying and classifying microorganisms. This article presents a modern approach to the segmentation and classification of microorganisms from microscopic images, based on models created using the TensorFlow library. We discuss the process, which includes data preparation, model training, and its application in automatic image analysis. The presented methodology not only accelerates research but also increases the accuracy of microorganism identification, which has direct applications in laboratory diagnostics, biological research, and healthcare.

Keywords: segmentation, classification, TensorFlow, modeling, machine learning.

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COMPARING PHOTOGRAMMETRY APPS FOR SMALL OBJECT CAPTURE IN THE CLASSROOM

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Bence PÁSZTOR, Gábor KISS, SK

Abstract: This study presents a comparative analysis of the 3D models generated by three different photogrammetry applications, focusing on the quality and accuracy of the resulting 3D scans. The applications examined in this study include Luma AI: 3D Capture, Polycam 3D Scanner & Editor, and the so called 3D Scanner App. All of these apps are widely accessible via the Apple App Store and Google Play. We tested Luma AI and Polycam on an Android smartphone, while the 3D Scanner App was tested on an iOS device due to its use of LIDAR technology, which is available on Pro Apple models. The applications were intentionally tested under favorable lighting conditions to scan small mineral samples, and their results were compared. Based on this analysis, we also explored the educational potential of these applications.

Keywords:

artificial intelligence, luma ai, polycam, photogrammetry, 3D modeling

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OHLIADNUTIE ZA KONFERENCIAMI DIDMATTECH V KOMÁRNE

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Abstrakt: Článok uvádza prehľad a stručnú charakteristiku konferencií DIDMATTECH, ktoré boli realizované na Univerzite J. Selyeho v Komárne. Cieľom je ohliadnuť sa za históriou tejto jedinečnej konferencie, poukázať na dôležité a významné postavenie Univerzity J. Selyeho v jej vývoji. Zámerom je tiež pripomenúť si osoby a osobnosti, ktoré najviac prispeli k jej úspechom, zamyslieť sa nad jej pozitívami, ale poukázať aj na zatiaľ nevyužité možnosti. Hodnotí sa hlavne priebeh, výsledky, prínos a ohlasy na tie ročníky konferencie, ktoré sa realizovali v Komárne a ďalšie, na úspešnom organizovaní a realizovaní ktorých UJS mala významný podiel.

Kľúčové slová: conferencia DIDMATTECH, XIX. DIDMATTECH 2006, XXV. DIDMATTECH, XXXVII. DIDMATTECH 2024.

A LOOK BACK AT THE DIDMATTECH CONFERENCES IN KOMÁRNO

Abstract: The article provides an overview and brief description of the DIDMATTECH conferences that were held at the J. Selye University in Komárno. The aim is to look back at the history of this unique conference, to point out the important and significant position of the J. Selye University in its development. The intention is also to recall the people and personalities who contributed the most to its success, to reflect on its positive aspects, but also to point out the untapped opportunities. The main assessment is made of the course, results, contribution and responses to those years of the conference that were held in Komárno and others, in the successful organization and implementation of which the UJS played a significant role.

Keywords: conference DIDMATTECH, XIX. DIDMATTECH 2006, XXV. DIDMATTECH, XXXVII. DIDMATTECH 2024.

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INVOLVING MASTER STUDENTS IN PROJECTS INITIATED BY COMPANIES – AN IMPLEMENTATION OF THE THIRD GENERATION RESEARCH UNIVERSITY PRINCIPLE

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Abstract: This study demonstrates how company-initiated projects can enhance master's programs, applying the third-generation research university model focused on education, research, and innovation. By integrating industrial departments and project labs, the initiative fosters task-oriented collaborations, emphasizing skill development over revenue generation. Projects address real-world needs, adhere to state-of-the-art standards, and ensure benefits for universities, companies, and society.

Each project involves 10–15 PhD and MSc students, guided by lecturers, with tasks tailored to individual expertise. The "Project Lab" combines a 16-credit course with a 30-credit thesis, enabling students to manage complex, large-scale systems, supported by grants and business planning opportunities. Regular consultations and structured methodologies ensure effective teamwork and consistent knowledge transfer.

Participants gain critical skills in collaboration, decision-making, project management, and ethical responsibility, preparing them for leadership roles while contributing to academia, industry, and society.

Skills and Innovations Developed Through Industry-Initiated Project Work:

This study highlights advanced skills and knowledge gained by master's and PhD students through project-based learning in industry-initiated programs. Students validate research results, measure solution effectiveness, and use advanced tools for teamwork, project management, and application-specific testing.

Projects have included the analysis and refactoring of Erlang programs since 2006, addressing challenges in telecommunications and cybersecurity. Outcomes include new software for corporate use, successful PhD theses, and contributions to green computing. Other projects focus on programmable networks for 5G/6G, low-latency robotics, and innovative services, resulting in patents and Horizon Europe grants.

Additional projects include 3D detection for self-driving cars, smart tire applications for autonomous vehicles, and human-centered AI. These involve collaborations with industry leaders such as Siemens and Philips, addressing diverse areas like smart factories, rehabilitation, and assistive technologies for

children with disabilities. The program emphasizes research excellence, innovation, and real-world impact.

Innovative Research Projects in Medical Imaging, Interdisciplinary Fields, and Agricultural Informatics:

This summary showcases diverse research initiatives involving master's and doctoral students. Projects in medical image processing have advanced diagnostic imaging technologies, improving CT, MRI, and SPECT image quality through innovative software solutions for motion correction and reorientation. Interdisciplinary projects include adaptive testing for detecting atypical childhood development and digital humanities tools like HypereiDoc for processing epigraphic texts. Agricultural informatics focuses on livestock behavior, weight estimation, and bee colony health monitoring, bridging academia and industry.

The CodeChecker initiative emphasizes open-source licensing, industrial applications, and international collaboration, resulting in high visibility and reduced student drop-out rates. These projects integrate research, education, and innovation, producing new scientific results, joint publications, leadership experience, and sustainable business models.

Keywords: Third generation research university, software engineering education, team work, research and development projects.

MESTERHALLGATÓK BEVONÁSA CÉGEK ÁLTAL KEZDEMÉNYEZETT PROJEKTEKBE: A HARMADIK GENERÁCIÓS KUTATÓEGYETEMI MODELL MEGVALÓSÍTÁSA

Absztrakt: Ez a tanulmány bemutatja, hogyan gazdagíthatják a cégek által kezdeményezett projektek a mesterszakos képzéseket a harmadik generációs kutatóegyetemi modell alkalmazásával, amely az oktatás, kutatás és innováció egységére épül. Az ipari tanszékek és projektlaborok révén a program feladat-orientált együttműködéseket alakít ki, amelyek a készségek fejlesztésére helyezik a hangsúlyt a bevételszerzés helyett. A projektek valós problémákra reflektálnak, a legkorszerűbb szabványoknak felelnek meg, és előnyöket nyújtanak az egyetemek, cégek és a társadalom számára.

Minden projektben 10–15 PhD- és MSc-hallgató vesz részt, oktatók irányításával, egyéni szaktudásukra szabott feladatokkal. A "Project Lab" program egy 16 kredites kurzust és egy 30 kredites diplomamunkát ötvöz, lehetővé téve a hallgatók számára komplex, nagyléptékű rendszerek kezelését, pályázati és üzleti lehetőségek támogatásával. Rendszeres konzultációk és

strukturált módszertanok biztosítják a hatékony csapatmunkát és a folyamatos tudástranszfert.

A résztvevők kritikus készségeket sajátítanak el, mint az együttműködés, döntéshozatal, projektmenedzsment és etikai felelősségvállalás, amelyek vezetői szerepekre készítik fel őket, miközben hozzájárulnak az akadémia, az ipar és a társadalom fejlődéséhez.

Készségek és innovációk az ipar által kezdeményezett projektek során:

A tanulmány kiemeli az ipari projektekben részt vevő mesterszakos és PhD-hallgatók által elsajátított készségeket és tudást. A hallgatók validálják a kutatási eredményeket, mérik a megoldások hatékonyságát, és fejlett eszközöket használnak csapatmunka, projektmenedzsment és tesztelés során.

A projektek közé tartozik az Erlang-programok elemzése és újraírása (2006 óta), amely telekommunikációs és kiberbiztonsági kihívásokkal foglalkozik. Eredményeik között új vállalati szoftverek, sikeres PhD-disszertációk és a zöld informatika előmozdítása szerepel. Egyéb projektek a programozható hálózatokra (5G/6G), alacsony késleltetésű robotikára és innovatív szolgáltatásokra összpontosítanak, szabadalmakat és Horizon Europe támogatásokat eredményezve.

További témák a 3D-s érzékelés önvezető autók számára, okos gumiabroncsok fejlesztése, valamint emberközpontú mesterséges intelligencia. Siemens és Philips cégekkel való együttműködések révén a projektek a gyárak, rehabilitáció és gyermekek számára készült segítő technológiák területén is eredményeket hoztak. A program kiemeli a kutatási kiválóságot, az innovációt és a gyakorlati hatást.

Innovatív kutatások az orvosi képalkotás, interdiszciplináris területek és agrárinformatika terén:

A tanulmány az orvosi képalkotás területén végzett projekteket is bemutatja, amelyek javították a CT, MRI és SPECT képek minőségét új szoftveres megoldásokkal. Interdiszciplináris kezdeményezések közé tartozik a gyermekkori fejlődési rendellenességek adaptív tesztelése és a digitális bölcsészeti eszközök, mint a HypereiDoc, valamint az agrárinformatikai projektek, például az állatállomány viselkedésének és méhélettani állapotának elemzése.

A CodeChecker projekt hangsúlyozza a nyílt forráskódú licencelést, ipari alkalmazásokat és nemzetközi együttműködéseket, amelyek magas láthatóságot és csökkent hallgatói lemorzsolódást eredményeztek. Ezek a projektek integrálják a kutatást, az oktatást és az innovációt, új tudományos eredményeket, közös publikációkat és fenntartható üzleti modelleket hozva létre.

Kulcsszavak: Harmadik generációs kutatóegyetem, szoftvertechnológiai képzés, csoportmunka, kutatás-fejlesztési projektek.

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List of papers not presented

A MESTERSÉGES INTELLIGENCIA INFORMATIKA-OKTATÁSMÓDSZERTANI ASPEKTUSAI

Zsuzsanna SZALAYNÉ TAHY, HU

Absztrakt: Az elmúlt öt évben a mesterséges intelligencia megjelenése és térnyerése új oktatásmódszertani kérdéseket vet fel. A mesterséges intelligencia beépül a digitális írástudás hagyományos eszközeibe és új eszközök alapja. Új kompetenciaterület az MI-műveltség, ami kihat az informatika (digitális írástudás és digitális kultúra) oktatásának tartalmára és módszereire. A mesterséges intelligencia működési elvének figyelembevételével írjuk le az MI-műveltséget, ennek oktatási módszerét, tekintetbe véve a mentális, kognitív képességek és a digitális kompetenciák fejlesztési céljait, az etikai és jogi szempontokat is.

Kulcsszavak: mesterséges intelligencia, kritikus/kritikai gondolkodás, informatikaoktatás, digitális kultúra oktatása, alkalmazás, módszertan.

METHODOLOGICAL ASPECTS OF ARTIFICIAL INTELLIGENCE IN TEACHING INFORMATICS

Abstract: The emergence and growth of artificial intelligence over the past five years has raised new questions about educational methodology. Artificial intelligence is embedded in traditional digital literacy tools and is the basis for new tools. AI-literacy is a new competence area that will impact on the content and methods of Informatics (digital literacy and digital literacy) education. We describe AI-literacy by considering the principles of artificial intelligence. and present example of its teaching method, considering the development of mental, cognitive and digital competences, as well as ethical and legal aspects.

Keywords: artificial intelligence, critical thinking, informatics education, digital culture education, application, methodology.

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TRENDY VO VZDELÁVANÍ: ENVIRONMENTÁLNE LABORATÓRIUM

Melánia FESZTEROVÁ, SK

Abstract: Študijné programy na univerzitách orientované na pregraduálnu prípravu budúcich učiteľov zabezpečujú študentom nadobudnutie nielen teoretických vedomostí, ale aj praktických zručností. Príspevok predstavuje obsah predmetu „Environmentálne laboratórium v primárnom a sekundárnom vzdelávaní" pre bakalársky stupeň štúdia. Prezentuje e-learningový kurz s navrhnutými experimentami pre žiakov základných škôl. Zameriava sa na vybranú zložku životného prostredia - vodu prostredníctvom analyzovania a porovnávania jej vlastností a znečistenia. E-learningový kurz nielen navrhuje chemické experimenty k predmetu, ale rieši tiež aktuálne problémy súvisiace s jej ochranou.

Kľúčové slová: vzdelávanie, učiteľ, chémia, životné prostredie, voda.

EDUCATIONAL TRENDS: ENVIRONMENTAL LABORATORY

Abstract: Study programs at universities orientated towards the undergraduate preparation of pre-service teachers ensure that students acquire not only theoretical knowledge but also practical skills. This paper presents the content of the course "Environmental Laboratory in Primary and Secondary Education" for the bachelor's degree. It presents an e-learning course with designed experiments for primary school pupils. It focusses on a selected component of the environment — water, by analysing and comparing its properties and pollution. The e-learning course not only proposes chemical experiments for the subject but also addresses current issues related to its protection.

Keywords: education, teacher, chemistry, environment, water.

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MIXTURE RULE FOR THERMOGRAVIMETRY, DILATOMETRY AND THERMOMECHANICAL ANALYSIS

Igor ŠTUBŇA, Marek MÁNIK, SK

Abstract: The mixture rule for thermogravimetry, thermodilatometry and Young's modulus was derived. A raw mineral mixture used in ceramic industry was used as an example for this derivations. The mixture rule for Young's modulus was derived for two different arrangements of fictive prisms made from the minerals components. The formulae formally equivalent to Reuss modulus and Voigt modulus were obtained.

Keywords: mixture rule, thermogravimetry, thermodilatometry, elastic modulus

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STOCK INVENTORY WITH USING DRONES

József UDVAROS, Veronika STOFFOVÁ, SK

Abstract: The traceability of the products and stocks of the large warehouse is now a factor of fundamental importance. Inventory management plays a prominent role in this, as every stored product represents value. From a strategic point of view, it is essential to introduce appropriate practices in inventory management in order to ensure efficient knowledge and management of flows. In addition, certain tasks of inventory management, such as inventory and order picking, require significant human resources. Innovation in the framework of "Logistics 4.0" offers process development through automation and technological support of people's work. Among the promising technologies are unmanned aerial vehicles (drones), which are gaining ground in inventory control. Drones can be used to monitor inventory in a number of ways. In addition, QR code product identification enables quick and accurate identification, further increasing efficiency during the processes carried out in the warehouse.

Keywords: Stock inventory, drones, path planning, swarm of drones, QR code.

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OPTIMIZING SIMULATIONS USING SELECTED PROGRAMMING TECHNIQUES IN EDUCATIONAL ENVIRONMENTS

Roman HORVÁTH, Jana FIALOVÁ, SK

Abstract: This paper explores the optimization of interactive animation-simulation models (IASM) through selected programming techniques aimed at improving their performance and usability in educational environments. By applying selected methods such as algorithmic optimization, we enhance the real-time capabilities of simulation systems. The focus is on improving responsiveness, scalability, and resource efficiency in educational applications that require interactive simulations of selected phenomena. Additionally, the study addresses challenges related to integrating preferred programming languages and tools to achieve seamless functionality across platforms. The results demonstrate how some programming practices contribute to more effective, engaging, and adaptable learning tools that cater to both students and educators in diverse educational contexts.

Keywords: Simulation Optimization, Educational Technologies, Programming Techniques, Algorithm Optimization, Cross-platform Development.

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TRAINING OF UNIVERSITY TEACHERS THROUGH SELF-PACED COURSES

Andor ABONYI-TÓTH, Szilvia TÓTH-MÓZER, HU

Abstract: "The Education Development and Talent Support Department" at Eötvös Loránd University (ELTE) started its operation in 2016. The department is responsible for conducting and coordinating analyses of educational development, promoting the use of digital technologies and the expansion of distance learning opportunities, initiating and facilitating inter- and multidisciplinary educational activities and coordinating the implementation of the talent management programme.

Various training courses are announced for university teachers, which take place both in person and online. In 2021, the training portfolio was expanded with self-paced courses. In our article, we present the purpose, structure, and requirements of these special courses, supplemented with statistical data and instructor feedback.

Keywords: Self-paced course, e-learning, methodology, certificate, statistics.

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NOVÁ KURIKULÁRNA REFORMA VO VZDELÁVACEJ OBLASTI ČLOVEK A SVET PRÁCE

Ľubomír ŽÁČOK, SK

Abstrakt: Odborná štúdia je zameraná na problematiku prebiehajúcej školskej reformy v regionálnom školstve. V prvej časti štúdie uvádzame genézu rozvoja technického vzdelávania v SR. Následne venujeme pozornosť zmenám vo vzdelávacej oblasti Človek a svet práce na primárnom a nižšom stupni vzdelávania. V poslednej časti štúdie uvádzame prierezové gramotnosti prepojené s danou vzdelávacou oblasťou.

Kľúčové slová: vzdelávacia oblasť Človek a svet práce, technika, kariérová výchova, podníkavosť a iniciatívnosť, žiak, kurikulárna reforma.

NEW CURRICULUM REFORM IN THE EDUCATIONAL FIELD OF HUMANS AND THE WORLD OF WORK

Abstract: The professional study is focused on the issue of the ongoing school reform in the regional education system. In the first part of the study, we present the genesis of the development of technical education in the Slovak Republic. Subsequently, we pay attention to changes in the educational field Human and the world of work at primary and lower levels of education. In the last part of the study, we present cross-sectional literacies linked to the given educational field.

Keywords: educational field Man and the world of work, technology, career education, entrepreneurship and initiative, pupil, curriculum reform.

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USING MOBILE TECHNOLOGIES IN UNIVERSITY EDUCATION

Milan ŠTRBO, SK

Abstract: Nowadays technologies and its developing in higher education made a number of changes, which affected the ways of teaching and learning. The aim and purpose of this study was to investigate students, whether they use mobile technologies in higher education in order to design successful teaching interventions. For the purpose of this research a questionnaire was designed aiming to investigate the actual daily habitual use towards mobile technologies for their university education purposes. The survey was used to collect data from 97 undergraduate students from Trnava university in Trnava. Data were collected during winter semester 2022/2023 academic year. The conclusions indicate that majority of students use mobile technology for self-directed learning rather than within classroom or for subject-specific studies. Conductors believe that the findings of current research could help authorities to lay the ground for mobile-based learning in universities.

Keywords: Mobile learning, mobile technologies, higher education, learning, students.

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