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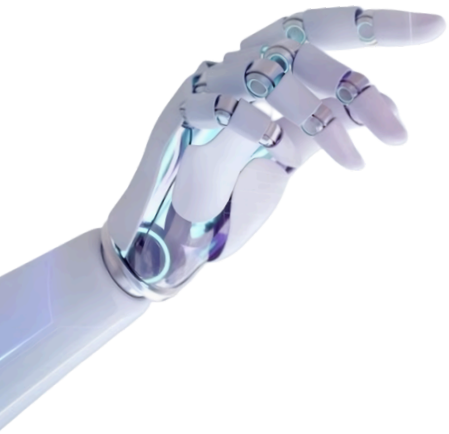
The 16th International Balkan Education and Science Congress

Abstract Book



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Organized by Trakya University, Türkiye
Edirne, 2025

October 15 - 17, 2025

AI and the Future of Education: Transforming Teaching and Learning

The XVI. International Balkan Education and Science Congress has been completed, hosted by Trakya University.

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Foreword

Dear participants,

Welcome to the 16th International Balkan Education and Science Congress. Over the past three days, we have come together to share ideas, exchange experiences, and envision the future of education and science.

Our congress began with the group exhibition *"Graduate Alumni Gathering 3,"* where the creativity of our students and academics beautifully intertwined art and science. The Deans' Panel offered valuable discussions on the sustainability and future vision of the Balkan Congresses. Following this, Prof. Dr. Selçuk Özdemir's keynote address, *"Integration of Artificial Intelligence in the Classroom: Physical Reality in Education,"* and Prof. Dr. Mario Dumančić's talk, *"AI Pedagogical Agents: Opportunities, Challenges, and Future Perspectives,"* provided inspiring insights into the evolving relationship between artificial intelligence and education.

Throughout the parallel sessions, a wide range of topics—from virtual reality and digital learning skills to value education and special education—were presented. The active participation of scholars from various Balkan universities has been one of the most valuable outcomes of this event, strengthening both scientific collaboration and cultural ties.

Science and education transcend borders and build bridges between nations. We firmly believe that this congress will continue to foster academic and cultural cooperation among Balkan countries.

We extend our sincere gratitude to all participants for their contributions, and to our Rector, Prof. Dr. Mustafa Hatipler, the university administration, and all staff members for their support throughout this process.

We look forward to meeting again at our next congress.
With our best regards,

Prof. Dr. Eylem BAYIR
Dean of the Faculty of Education, Trakya University

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IBES 2025 Congress Report

TR

Trakya Üniversitesi Eğitim Fakültesi ev sahipliğinde, 15–17 Ekim 2025 tarihleri arasında Trakya Üniversitesi Balkan Kongre Merkezi'nde düzenlenen 16. Uluslararası Balkan Eğitim ve Bilim Kongresi, "Yapay Zeka ve Eğitimin Geleceği: Öğretmeyi ve Öğrenmeyi Dönüştürmek" temasıyla gerçekleştirilmiştir. Kongre, yapay zekânın eğitim süreçlerindeki etkilerini, fırsatlarını ve etik yönlerini çok boyutlu bir bakış açısıyla ele alarak, akademisyenleri, araştırmacıları, öğretmenleri ve sanat eğitimcilerini bir araya getirmiştir.

Kongreye 15 farklı ülkeden 199 katılımcı katılmış; toplam 226 bildiri sunulmuştur. Bu bildirilerin 217'si sözlü, 9'u poster bildiri olarak gerçekleştirilmiştir. Katılımcıların büyük çoğunluğu Türkiye'den olup; Bulgaristan, Yunanistan, Kuzey Makedonya, Kosova, Sırbistan, Hırvatistan, Romanya, Rusya Federasyonu, Hollanda ve Katar gibi ülkelerden bilim insanları da kongreye önemli katkılar sunmuştur. Bu çeşitlilik, Balkanlar'daki akademik dayanışmanın güçlenmesini ve uluslararası bilimsel iş birliğinin gelişimini desteklemiştir.

Kongrede iki çağrılı konuşmacı yer almıştır. Prof. Mario Dumančić (Zagreb Üniversitesi) "AI Pedagogical Agents: Opportunities, Challenges, and Future Perspectives" başlıklı sunumunda yapay zekâ tabanlı öğretim ajanlarının eğitimdeki rolünü değerlendirmiş; Prof. Selçuk Özdemir (Gazi Üniversitesi) ise "Integration of AioT into Classroom: The Physical Reality in Education" başlıklı konuşmasıyla yapay zekâ ve nesnelerin interneti uygulamalarının sınıf ortamına entegrasyonunu ele almıştır. Ayrıca, Dr. Sertaç Arabacıoğlu (Trakya University), Dr. Sanae Okamoto (United Nations University – MERIT), Dr. Nidhi Nagabhatla (University of Ghent and UNU CRIS), Dr. Elif Ülker Demirel (Trakya University) tarafından gerçekleştirilen "Teaching Climate Change Beyond Facts: Pioneering Pedagogies, Mental Health and Science-Policy Interfaces" başlıklı panel oturumu, eğitim, iklim değişikliği, zihinsel sağlık ve bilim-politika etkileşimleri arasında disiplinlerarası bir tartışma ortamı sunmuştur.

Kongre kapsamında yapay zekâ destekli öğrenme sistemleri, kişiselleştirilmiş eğitim, etik konular, öğretmen yetiştirme, ölçme-değerlendirme, duygusal yapay zekâ, özel eğitim, dijital okuryazarlık, yaşam boyu öğrenme ve kapsayıcı eğitim gibi geniş bir yelpazede bildiriler sunulmuştur. Trakya Üniversitesi Eğitim Fakültesi Güzel Sanatlar Eğitimi Bölümü tarafından gerçekleştirilen "Undergraduate Alumni Reunion 3" sergisi ise, bilimsel içerikle sanatsal üretimi buluşturarak kongreye kültürel bir boyut kazandırmıştır.

Sonuç olarak, kongre Balkanlar ve ötesinde yapay zekâ temelli eğitim araştırmalarını güçlendirmiş, uluslararası akademik iş birliklerinin gelişmesine zemin hazırlamıştır. 16. Uluslararası Balkan Eğitim ve Bilim Kongresi, yenilikçi, kapsayıcı ve insan merkezli bir eğitim anlayışının gelişimine yön veren, bölgesel ve küresel ölçekte etkili bir bilimsel buluşma olmuştur.

ENG

Hosted by the Faculty of Education at Trakya University, the 16th International Balkan Education and Science Congress took place between October 15–17, 2025, at the Balkan Congress Center in Edirne, Türkiye, under the theme "AI and the Future of Education: Transforming Teaching and Learning" The congress offered a comprehensive platform for discussing the transformative role of artificial intelligence in education, addressing pedagogical, ethical, and technological perspectives.

A total of 199 participants from 15 countries attended the congress, where 226 papers were presented, including 217 oral presentations and 9 poster sessions. While most participants came from **Türkiye**, researchers from Bulgaria, Greece, North Macedonia, Kosovo, Serbia, Croatia, Romania, the Russian Federation, the Netherlands, and Qatar also made valuable contributions. This international diversity reflected the growing academic cooperation and scientific dialogue across the Balkan region and beyond.

The congress featured two distinguished keynote speakers: Prof. Mario Dumančić (University of Zagreb) delivered his talk titled "AI Pedagogical Agents: Opportunities, Challenges, and Future Perspectives," exploring the role of AI-driven pedagogical agents in education; and Prof. Selçuk Özdemir (Gazi University) presented "Integration of AioT into Classroom: The Physical Reality in Education," addressing the integration of AI and IoT in classroom environments. Additionally, the panel session titled "Teaching Climate Change Beyond Facts: Pioneering Pedagogies, Mental Health and Science-Policy Interfaces," conducted by Dr. Sertaç Arabacıoğlu (Trakya University), Dr. Sanae Okamoto (United Nations University – MERIT), Dr. Nidhi Nagabhatla (University of Ghent and UNU CRIS), and Dr. Elif Ülker Demirel (Trakya University), provided an interdisciplinary platform for dialogue connecting education, climate change, mental health, and science-policy interactions.

Throughout the event, participants presented studies on topics such as AI-enhanced learning systems, personalized education, ethics in AI, teacher education, assessment and feedback, emotional AI, special and inclusive education, digital literacy, and lifelong learning. The "Undergraduate Alumni Reunion 3" group exhibition, organized by the Department of Art and Craft Education, added an artistic dimension, uniting creativity with educational research.

In conclusion, the congress strengthened AI-based educational research in the Balkans, provided a platform for international collaboration, and contributed to shaping an innovative, inclusive, and human-centered vision for the future of education. The 16th International Balkan Education and Science Congress stands as a significant academic gathering with lasting regional and global influence.

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Contents

An Analysis of Speaking Skill Outcomes in the English Curriculum of Middle Schools in Turkiye

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Abstract

This study aims to conduct a comprehensive analysis of the speaking skill learning outcomes included in the English language curricula for middle school levels (Grades 5, 6, 7, and 8) in Türkiye. The research is designed within the framework of qualitative research methodology, specifically employing the document analysis method. The primary data source of the study is the English Language Curriculum published by the Turkish Ministry of National Education in 2018. Through content analysis, the speaking-related learning outcomes were examined and thematically categorized under four main dimensions: (1) Communicative Competence-Oriented Outcomes, (2) Strategic Speaking Skills, (3) Outcomes Addressing Daily Communication Situations, and (4) Creative Production-Oriented Outcomes.

The analysis revealed that the proportion of speaking-oriented outcomes within the overall curriculum objectives stands at 50.91% for Grade 5, 43.33% for Grade 6, 41.27% for Grade 7, and 41.79% for Grade 8. These figures suggest that speaking skills are accorded a significant place in the curriculum. However, a closer examination of the content indicates a notable imbalance among the thematic categories, with limited emphasis placed on strategic speaking and creative production. While communicative and daily-use language functions are relatively well-represented, the lack of diverse and cognitively engaging speaking tasks highlights the need for pedagogical enrichment.

In conclusion, although the quantitative representation of speaking skills in the curriculum appears adequate, there are substantial limitations regarding content depth, skill progression, and classroom applicability. Based on these findings, it is recommended that the curriculum be revised to include more comprehensive, learner-centered, and creativity-driven speaking outcomes, supported by authentic classroom activities to enhance students' oral proficiency effectively.

Keywords: English language teaching, speaking skills, middle school curriculum, communicative competence, content analysis

A Comparatıve Analysıs Of Female-Themed Idıoms In Turkısh, Albanıan And Macedonıan Languages

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Abstract

This study aims to present a comparative analysis of female-themed idioms in Turkish, Macedonian, and Albanian. Based on the assumption that interlingual contact influences not only vocabulary but also meaning, structure, and cultural contexts, the research investigates how idioms centered around the female image reflect socio-cultural mindsets and gender roles. Adopting a qualitative research approach, the study is structured around descriptive, comparative, and content analysis methods. Female-themed idioms were compiled from idiom dictionaries, folkloric texts, and academic sources in Turkish, Macedonian, and Albanian. These idioms were classified under two main thematic categories: "the life cycle of women" and "representations of character/traits." The idioms were analyzed in terms of their structural and semantic features, and commonalities were assessed within the framework of areal linguistics.

The analysis reveals that female-themed idioms in all three languages often portray women in idealized roles (mother, bride), confined to traditional social roles (housewife), or diminished through negative stereotypes (foolish, talkative). In addition to thematic content, notable overlaps were observed in expression patterns and imagery. Some idioms have transferred from Turkish into Macedonian and Albanian through literal translation, while others have been culturally adapted to fit local contexts. This indicates that idioms are transmitted not only linguistically but also through cultural lenses.

The comparative analysis of female-themed idioms reveals the cultural mindset patterns embedded in linguistic structures. Despite their genetically different origins, Turkish, Macedonian, and Albanian have developed similar idiomatic themes due to shared historical and cultural interactions. These findings highlight that idioms are not merely linguistic expressions but also serve as vehicles for cultural and social transmission, shedding light on the influence of interlingual contact on societal values in the Balkans.

Building on this foundation, further research can broaden the analysis by incorporating male-themed idioms alongside female-themed ones. This could yield a more holistic understanding of gender representation in idiomatic language. Such a comparative gendered approach may reveal broader patterns of societal expectations, power dynamics, and symbolic imagery tied to both masculinity and femininity in the Balkans.

Lastly, exploring the pedagogical implications of gendered idioms in language learning and intercultural communication could offer valuable insights, particularly in multilingual and multicultural educational contexts.

Keywords: idioms, women, language contact

Atatürk's Unıversıty Reform And The Establıshment Of Istanbul Unıversıty

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Abstract

Istanbul University is the oldest state university in Turkey. Its origins date back to the Sahn-ı Seman madrasas, founded in 1453 by the order of Sultan Mehmed the Conqueror. Until 1933, the institution provided education under the names Darülfünun-ı Şahane, Darülfünun-ı Osmani, and Istanbul Darülfünunu. On August 1, 1933, it was officially renamed Istanbul University. In the same year, on November 18, it began its academic life as the first and only university in Turkey.

After the proclamation of the Republic, the university, then called Darülfünun-ı Osmani, was granted scientific and administrative autonomy on April 21, 1924. In the same year, its name was changed to Istanbul Darülfünunu. During Atatürk's era, politicians and scholars in leadership positions criticized the Darülfünun for failing to cultivate individuals who could think critically, question, and engage in intellectual debate. Furthermore, the institution was accused of not playing an adequate role in consolidating the Turkish Revolution, of resisting reforms, and of lacking significant scientific research.

In 1932, by Atatürk's direct order, Professor Albert Malche of the University of Geneva in Switzerland was invited to examine the Istanbul Darülfünunu and prepare a report. Based on the recommendations of the "Malche Report," a draft bill was prepared and passed into law on May 31, 1933. Under Law No. 2252, the Istanbul Darülfünunu was abolished, and Istanbul University was established in its place on August 1, 1933. With this law, Atatürk aimed to create a modern university. Guided by Malche's report, the reform adopted the European model of administration and education.

During this reform process, a large portion of the old teaching staff was dismissed, and a new academic staff was formed, including scholars who had to leave Germany due to the Hitler regime. Thanks to these foreign academics, teaching programs were reorganized in line with Western educational standards, the university library was expanded, and both the number and quality of textbooks increased.

Keywords: Atatürk, University Reform, Istanbul University, Darülfünun, Education

Learnıng By Usıng Smart Technologıes

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Abstract

This study addresses the evolving role of smart technologies in contemporary education, with a specific focus on their application in primary school teaching and learning. The central problem explored is how to create a stimulating and effective learning environment by leveraging technological advancements that support students' cognitive and emotional development. The need to rethink traditional educational practices has become increasingly urgent as digital devices become more deeply embedded in everyday life and educational systems. A key component of this research is the concept of *stimulation*—defined here as the intentional creation of conditions that encourage motivation, active participation, and meaningful learning. In this context, smart technologies are examined as tools that can foster such stimulation by providing interactive, multimedia-rich experiences. Theoretical analysis highlights that modern smart devices (e.g., smartphones, tablets, smart TVs) combine functions of earlier technologies, offering powerful and versatile educational capabilities. Central to this study is the use of *hypermedia*, which refers to a form of digital information that integrates text, audio, images, video, animation, and hyperlinks into a non-linear, user-driven structure. Hypermedia enables flexible navigation and individualized learning paths, thereby aligning with contemporary pedagogical goals of learner-centered and differentiated instruction. The purpose of the research is to investigate how the integration of smart technologies and hypermedia-based content influences the teaching and learning processes in primary education. The study specifically focuses on the preparation of future teachers—students currently enrolled in teacher education programs—by incorporating smart technologies into their instructional training. These pre-service teachers were introduced to specific strategies designed to apply hypermedia-based stimulation within the classroom. The strategies are carefully tailored to suit different educational levels and subject areas, recognizing that the impact and application of such technologies vary based on context.

Methodologically, the study is based on theoretical research and pedagogical design, implemented within higher education environments where future primary school teachers receive their training. Through analysis of educational needs and opportunities, a structured set of strategies was developed to guide the effective use of smart technologies in lesson planning, instructional delivery, and classroom interaction. While the paper is primarily theoretical, it lays the foundation for empirical studies and practical implementation. The anticipated outcomes of this research include increased awareness among educators of how to utilize smart technologies to enhance engagement and learning outcomes. It also provides a framework for teacher training programs that aim to align with 21st-century educational demands. The contribution of this study lies in its potential to transform traditional classrooms into interactive, student-centered learning environments by equipping teachers with both the mindset and the skills necessary to integrate digital tools meaningfully. In conclusion, the research underscores the importance of preparing teachers not just to use technology, but to do so in pedagogically sound ways. The successful integration of smart technologies in education depends on strategic planning, adequate training, and a deep understanding of how digital media can be used to support developmental and educational goals. Schools—both physical and virtual—must prioritize developing educators who are technologically competent, pedagogically reflective, and capable of guiding learners through rich, interactive learning experiences.

Keywords: smart technologies, hypermedia, stimulation, teaching strategies, teacher trainining

Usıng Automatıc Judge Koduesı Platform In Teachıng And Learnıng Matrıx Programmıng : Effects On Students' Achıevements In Ipcs

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Abstract
Teaching and learning matrix programming in introductory programming courses (IPCs) is a complex task. To increase significantly students' comprehension of matrix programming, in addition to pedagogical teaching methods, we have developed and used our own Automatic Judge (AJ) Koduesi platform to teach and learn matrix programming. The research was designed as experimental study with pretest and posttest experimental−control group model, involving university students from our Education Faculty. While AJ Koduesi platform was used in the experimental group, the traditional teaching method was applied in the control group. To collect the research data, achievement pretest, posttest and a questionnaire were developed and applied. The research findings showed clearly the effectiveness of teaching and learning matrix programming by using the AJ Koduesi platform. The Automatic Judge platform positively influenced students' level of topic comprehension, which consequently improved their achievements. On a more general level, the results of this research suggested that using Automatic Judge platforms to teach and learn other difficult programming topics can be a very important factor in significantly increasing students' success in IPCs.

Keywords: automatic judge platform, Koduesi, teaching programming, learning programming, programming pedagogy

Teachers' Views on the Use of Technology-Supported Dialogical Approach in Improving English Speaking Skills

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Abstract

In the modern age, the practice of providing a foreign language solely through written communication has become insufficient, and oral communication has gained greater importance. This encourages societies to master more than one foreign language, develop verbal expression skills, and encourage individuals to learn different languages. Various regulations and changes have been made over the years to improve the quality of foreign language education. Indeed, planning a learning process that can serve the purpose within the context of changing and renewed needs with technological advancements can be a fundamental requirement. When it comes to foreign languages, motivation also emerges as a crucial factor in providing foreign language learners with programs and applications tailored to their needs, regardless of age group. In this context, current technology and applications can be used as tools to support oral communication in English, both in terms of motivation and practical applications. Numerous studies have been conducted to increase proficiency in English and to develop reading, listening, writing, and speaking skills, but it is known that there are still persistent problems, particularly in verbal communication and self-expression. In this regard, the dialogic approach can provide individual support in developing these expressive skills. Speaking practice can become more functional within the framework of the dialogic approach, which encourages learners to think individually while speaking English, develops creative thinking skills, attaches importance not only to listening but also to comprehension, and helps create collaborative working environments. The difficulties experienced in meeting the needs of individuals regarding speaking a foreign language in academic life have made this issue a situation that needs to be emphasized and solutions found.The aim of the study conducted in this context is to examine to what extent a course content prepared using a technology-based dialogic approach can improve English speaking skills.The sample of the study consists of 8 teachers working in a private school in the city center of Edirne in the 2022-2023 academic year. In the study, which was conducted using a case study, one of the qualitative research methods, the "semi-structured interview technique" was used as the data collection method, while the analysis of the obtained data was analyzed using the descriptive analysis technique. In the findings obtained from the teachers' opinions; Regarding the problems they experienced in traditional English teaching, they emphasized that when taught English with traditional methods, students quickly forget the language, cause low motivation in classes, and that the success-oriented exam system overshadows the importance of English. They stated that in order to improve English speaking skills and eliminate the obstacles in front of them, they need to get to know the language as early as possible, be exposed to it and integrate it into daily life. However, the teachers stated that they did not have any prior knowledge of the concept of the dialogic approach, but when applied effectively, it would contribute to learners' accurate communication, supporting the fact that this could be a factor in improving English speaking skills. They emphasized that the use of up-to-date technology in course content would positively affect the process and would also increase motivation for speaking skills. Unlike traditional English teaching, a course content supported by the dialogic approach and technology could positively improve speaking skills as a method that takes individual differences into consideration and can develop creative expression skills. In conclusion; They emphasized the integration of artificial intelligence-based tools into lessons, the dissemination of the dialogic approach through teacher training, the development of instructional designs that blend effective

technology integration with speaking skills, and the creation of technology-supported English speaking environments as key issues to consider for future studies.
Keywords: Dialogic approach, technology integration, teacher.

Investigation of Internet Usage Habits and Cybersecurity Awareness of Associate and Undergraduate Students at Trakya University

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Abstract

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This study aims to examine the internet usage habits and cybersecurity awareness levels of undergraduate students at Trakya University. With the rapid expansion of digital technologies in academic and social life, university students have become intensive users of online platforms, making them simultaneously beneficiaries of digital opportunities and vulnerable to cyber threats. Understanding the relationship between patterns of internet use and awareness of cybersecurity is essential for designing effective educational strategies that foster digital literacy, safe online practices, and responsible technology use.

A mixed-methods research design is employed, combining quantitative and qualitative data collection. Structured surveys and semi-structured interviews are administered to volunteer students aged 18 and above. The study begins with students from the Department of Management Information Systems and will later be extended to four additional departments following psychometric validation of the instruments. Statistical analyses are conducted using SPSS, including correlation analysis to explore associations between cybersecurity awareness and variables such as internet usage, gender, and academic discipline, alongside ANOVA to assess group differences.

It is expected that preliminary expectations might suggest frequent and diverse internet usage habits which may or may not directly correspond to higher levels of cybersecurity awareness. Instead, differences are anticipated across demographic and disciplinary variables. Psychometric validation is expected to strengthen measurement reliability, and statistical findings will provide insights into patterns of internet use and awareness levels among students, offering an evidence base for educational recommendations.

The study seeks to contribute to the field of educational sciences, particularly computer education and instructional technologies, by integrating findings on internet usage and cybersecurity awareness into a holistic framework for digital literacy education. Results are expected to inform the design of curricula, instructional modules, and targeted training programs in higher education that promote both effective internet use and cybersecurity awareness. The research also contributes methodologically through its application of psychometric analyses in educational technology contexts. This project is supported by the TÜBİTAK 2209-A Research Support Programme for Undergraduate Students.

Keywords: Cybersecurity Awareness, Internet Use, Management Information Systems, Higher Education

Teaching Virtues to Students within the Scope of Virtue Education

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Abstract

Virtue education is a comprehensive educational approach that aims to transform individuals into conscious and sensitive individuals by internalising ethical and moral values, rather than merely acquiring knowledge and skills. This approach views virtue not merely as an individual achievement but as a guarantee of social harmony and peace, and considers education to be one of the most powerful tools for instilling these values in individuals. Character education aims to support the individual's mental development while guiding their character development to transform them into conscious and sensitive individuals. Its main objectives include instilling universal moral values such as honesty, justice, respect, responsibility, and helpfulness and applying them in daily life; developing a confident and strong character that acts in accordance with ethical principles; creating sensitivity towards the environment and society and striving to find solutions to social problems; developing emotional and social intelligence; the ability to distinguish right from wrong, the ability to understand oneself and one's environment, and contributing to the construction of a peaceful and harmonious society. This educational approach is seen not only as a specific course content but as a lifelong learning process for individuals. In order to enrich this process, practical suggestions and concrete examples from daily life are presented in addition to theoretical analyses. Furthermore, this approach should be integrated into the teaching programmes of all subjects, teachers should exemplify values through their own behaviour, values should be internalised through practical activities, projects, ethical discussions and social responsibility activities, and students should be encouraged to question and develop their own thoughts and values through a student-centred approach. The active participation of families and society is also indispensable for the success of virtue education, as it is important for individuals to acquire and reinforce values not only at school but also within their families and communities. Virtues are not innate qualities but characteristics that individuals develop through learning and experience throughout their lives. Ultimately, virtue education aims to contribute to the construction of a more just, tolerant, and peaceful world. In this regard, this study aims to present the concept of virtue education and the theoretical framework of related virtues and to evaluate studies on instilling virtues in students with concrete examples.

Keywords: virtue education, values education, moral values

The Relatıon Between Tıme Managment And The Academıc Performance Of Unıversıty Students

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Abstract
The paper presents the problem of the quality of students' academic preparation. A dyadic relationship between time management skills and the quality of academic preparation has been revealed. The purpose of the study is to determine what strategy and what time management methods students apply at the stage of their preparation for taking exams at the university and to what extent this affects their academic success. As a result of the research, it was found that the largest share of the students covered in the study spend from 2 to 3 hours per day on their preparation for exams. They primarily use mobile applications as time management methods. In a strategic aspect, they allocate their time for preparation for each individual subject during the exam session. They understand the role of rational time management for the effectiveness of their academic success.
Keywords: education; academik success; time managment

Values Education through the Social Studies Course in the Century of Türkiye Education Model: Teachers' Evaluations

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Abstract

The social transformations of the 21st century necessitate the cultivation of individuals who are equipped not only cognitively, but also affectively and ethically. In this context, values education—one of the fundamental components of educational systems—plays a central role in enabling individuals to adapt to social life, make ethical decisions, and develop democratic attitudes. In Türkiye, values education has become more prominent, particularly with the curriculum reforms of 2005, and has most recently acquired a more systematic and comprehensive structure through the Century of Türkiye Education Model (TYMM) developed by the Ministry of National Education. Adopting an approach that prioritizes the holistic development of the individual, TYMM addresses cognitive, affective, and behavioral domains in an integrated manner. Within this framework, the Social Studies course stands out as one of the most suitable subjects for values education, owing to its interdisciplinary nature and close connection to social life. The Social Studies Curriculum, updated under the TYMM, aims to foster national, universal, and moral values in a holistic manner, thus providing a systematic foundation for values education.

This study aims to examine values education within the scope of the TYMM 2024 Social Studies Curriculum and to gather the perspectives of Social Studies teachers on this issue. Designed according to the phenomenological research pattern, the study seeks to explore in depth the experiences and meaning-making processes of a study group consisting of 10 Social Studies teachers with diverse demographic characteristics. The data collection tools include the TYMM 2024 Social Studies Curriculum and a teacher interview form prepared by the researchers and finalized with the input of three experts in Social Studies Education. Data obtained from document analysis of the curriculum and interviews with teachers were subjected to content analysis. The data analysis process is still ongoing, and detailed evaluations of the findings will be reported in subsequent stages.

Keywords: Century of Türkiye Education Model, 2024 Social Studies Curriculum, Values Education

6th Grade Students' Views on Values: Intervalue Civility

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Abstract
From the past to the present, civility is an important trait that reflects a person's character. In order to continue the process of existence, it aims to help individuals internalise values and move beyond discourse to behavioural dimensions and social relations. This behaviour contributes to the establishment of healthy relationships between individuals and helps to maintain social order. Civility plays a very important role in ensuring that social relationships continue in a healthy manner. It enables people to communicate with each other in a more harmonious and respectful way. The concept of values has emerged as one of the most popular concepts in recent years. Given the emphasis placed on values in our time, it would be hasty and superficial to conclude that this reflects how much importance is attached to them or how far we have progressed in this regard. The current emphasis on values can be interpreted not as an increase in the value placed on them, but rather as an increase in the need for them. In this context, this study aims to obtain the opinions of 6th grade middle school students on the value of civility, which is one of our values and is considered to be a positive trait that connects values. In line with this aim, the problem statement 'What are the opinions of 6th grade students on values?' was studied using the case study method, which is a qualitative research model. The study group consisted of sixty-six 6th grade students from a private school in Edirne. The research data were collected using the 'Our Values Interview Form' developed by the researchers. The results show that very few of the students in the study group expressed views that accurately reflected values education. While they stated that the values that enhance friendships are 'respect' and 'honesty,' they indicated that the values that undermine friendships are 'lying,' 'being rude,' 'swearing,' and 'fighting.'

Keywords: Value, values education, civility

Developıng Intercultural Competence Through Academıc Exchange - The Experıence Of Trakıa Unıversıty Students In A Wınter Program In Zhuhaı, Chına

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Abstract

This article examines the role of international academic programs in developing intercultural competence and tolerance among university students. It analyses the experiences of participants from Trakia University – Stara Zagora during a winter academic program held at the Beijing Institute of Technology (BIT), Zhuhai, China. The focus is on the importance of collaborative learning, cultural coexistence, and teamwork as key factors fostering empathy, intercultural understanding, and effective communication. The experience in Zhuhai is presented as an educational process that promotes personal and academic development through real-life interaction in a multicultural environment. This article examines the role of international academic programs in developing intercultural competence and tolerance among university students. It analyses the experiences of participants from Trakia University – Stara Zagora during a winter academic program held at the Beijing Institute of Technology (BIT), Zhuhai, China. The focus is on the importance of collaborative learning, cultural coexistence, and teamwork as key factors fostering empathy, intercultural understanding, and effective communication. The experience in Zhuhai is presented as an educational process that promotes personal and academic development through real-life interaction in a multicultural environment. This article examines the role of international academic programs in developing intercultural competence and tolerance among university students. It analyses the experiences of participants from Trakia University – Stara Zagora during a winter academic program held at the Beijing Institute of Technology (BIT), Zhuhai, China. The focus is on the importance of collaborative learning, cultural coexistence, and teamwork as key factors fostering empathy, intercultural understanding, and effective communication. The experience in Zhuhai is presented as an educational process that promotes personal and academic development through real-life interaction in a multicultural environment.

Keywords: intercultural competence, academic exchange, tolerance, Zhuhai, China, Trakia University

Implementing Cognitive and Meaningful Learning Taxonomies in Visual Art Education Methodology

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Abstract

Contemporary educational processes are grounded in theoretical frameworks that not only support student learning but also create enabling conditions for the development of essential professional skills and competencies. These conceptual foundations serve as guiding principles for defining teaching and learning standards at various stages of education and are particularly crucial for ensuring the quality of higher education—especially for future educators. Within this context, the integration of pedagogical strategies and clearly defined learning outcomes plays a pivotal role in bridging theoretical knowledge with practical experience, particularly in subjects that combine disciplinary knowledge with teaching methodology.

The successful realization of students' practical training—particularly in teacher education programs—relies heavily on the structure and coherence of the academic curriculum. To support the effective implementation of curricular goals, especially in practice-oriented disciplines such as art education, appropriate teaching strategies that align with cognitive and developmental learning objectives must be employed. In this regard, the present research explores the application of two widely recognized pedagogical models: Bloom's Taxonomy of Educational Objectives (Cognitive Domain) and Fink's Taxonomy of Significant Learning. These taxonomies provide comprehensive frameworks for designing educational experiences that foster both cognitive development and meaningful, transferable learning.

The aim of this study is to analyze how elements of Bloom's and Fink's taxonomies are integrated into the teaching strategies and curriculum design of two specific subjects: **Fundamentals of Visual Art Education with Methodology for students - future preschool and future primary school teachers.** Both courses are part of the official academic curriculum at the Faculty of Pedagogy "St. Kliment Ohridski", at the "St. Cyril and Methodius University" in Skopje. These subjects play a critical role in shaping future educators' understanding of artistic expression, pedagogical application, and methodological approaches suitable for young learners.

The research objectives are twofold: (1) to evaluate the quality and structure of teaching and learning in the selected subjects, and (2) to examine whether the current academic curriculum supports the development of students' knowledge, skills, and attitudes in a way that is consistent with contemporary educational needs and societal expectations. The study seeks to understand how effectively the curriculum promotes higher-order thinking skills, creativity, reflective practice, and the ability to transfer theoretical knowledge into practical teaching scenarios.

To address these objectives, a qualitative content analysis of course syllabi, lesson plans, and assessment methods was conducted, complemented by semi-structured interviews with faculty members and surveys administered to enrolled students. The analysis focuses on identifying specific teaching and learning activities that align with the six cognitive levels of Bloom's taxonomy—ranging from remembering and understanding to evaluating and creating—as well as with Fink's six categories of significant learning: foundational knowledge, application, integration, human dimension, caring, and learning how to learn.

Preliminary findings suggest that while foundational knowledge and application are generally well represented in the curriculum, there is room for improvement in the integration of learning experiences that promote critical reflection, personal meaning, and professional identity

formation. Moreover, the use of assessment strategies that encourage higher-order thinking and interdisciplinary integration appears to be inconsistent across the two subjects.
In conclusion, the research highlights the importance of aligning curriculum design with both cognitive and meaningful learning goals to ensure that future educators are equipped not only with content knowledge but also with the pedagogical skills and reflective capacities required in modern classrooms. These insights can serve as a valuable resource for curriculum developers and academic staff aiming to enhance the quality and relevance of teacher education programs in the arts.
Keywords: Contemporary taxonomies of educational goals, Teaching processes, Methodology of art education/upbringing, Competencies of students - future teachers and educators

21st Century Skills and Language Teaching: Goals, Content, and Assessment Dimensions of the Saarland Deutsch Curriculum for Grades 5/6

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Abstract

This study evaluates the Deutsch Gymnasium Klassenstufen 5/6 curriculum (2021) from the German federal state of Saarland within the framework of curriculum analysis. This document outlines in detail the objectives, content, methods, and assessment components of the German language course for students attending Gymnasium-type secondary schools (equivalent to grade 9 in the Turkish education system).

The aim of the study is to conduct an in-depth analysis of the curriculum in terms of its goals, content, instructional processes (approaches, methods, techniques), assessment strategies, and the student profile it intends to develop. This analysis examines both cognitive and affective learning outcomes within the framework of Bloom's taxonomy, assessing the curriculum's alignment with contemporary educational paradigms and the vision it presents for German language teaching.

This research adopts a qualitative design, specifically the document analysis method. The official Deutsch Lehrplan 5/6 curriculum document from Saarland is analyzed according to the classical curriculum analysis framework of objectives–content–process–assessment. Furthermore, the learning outcomes are categorized according to Bloom's cognitive taxonomy, and a distinction is made between cognitive and affective domains. In evaluating the intended student profile, an interpretive approach is employed, taking into account 21st-century skills.

- Objectives: The curriculum targets a holistic language education that goes beyond grammar instruction to include communication, creativity, emotional expression, and digital media literacy. Cognitively, it aims to foster higher-order thinking skills such as analysis, synthesis, and evaluation. Affectively, it emphasizes social competencies like aesthetic sensitivity, empathy, self-confidence, and collaboration.
- Content: The program is structured around four core competency areas: Writing, Reading and Media, Speaking and Listening, and Grammar and Language Use. The content is enriched through a variety of text types, inclusion of digital materials, and creative writing practices.
- Instructional Process: Teaching is guided by a constructivist, student-centered, and holistic approach. Methods include exploratory learning, creative writing, collaborative learning, and reflective practices. Notable techniques include mind mapping, freewriting, peer feedback, and szenisches Spiel (dramatization).
- Assessment: The curriculum incorporates both formative and summative assessment. Evaluation is embedded into the learning process through self-assessment, peer evaluation, and individualized error tracking tools. Digital performance tasks (e.g., emails, blogs, posters) are also included among the assessment instruments.
- Student Profile: The program aims to cultivate individuals who are not only academically successful but also creative, digitally literate, empathetic, self-regulated, and cooperative—demonstrating strong alignment with 21st-century skill frameworks.

The Saarland Deutsch Lehrplan 5/6 perceives German not merely as a school subject, but as a domain of thinking, creating, communication, and emotional expression. It presents a forward-looking instructional vision that emphasizes both cognitive and affective development. Enriched with digital media, aesthetic expression, and social communication strategies, the curriculum diverges from traditional models to offer a multidimensional learning environment.

Keywords: German language teaching, curriculum analysis, constructivist approach, Bloom's taxonomy, affective objectives, digital literacy, 21st-century skills, dramatization, self-assessment

Educational Experiences of International Students in Turkey: Challenges and Support Services

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Abstract

This study aims to examine the educational experiences of international students pursuing higher education in Turkey and the relationships between these experiences and various socio-demographic variables by identifying significant correlations. Based on data collected through a survey method, the factors affecting students' academic, cultural, and social adaptation were analyzed, and the findings were evaluated through correlation analysis. The study used data collected from 109 students, encompassing a wide range of variables such as age, gender, nationality, level of education, duration of stay in Turkey, Turkish language education status, internship preferences, and support mechanisms available at universities.

The findings revealed statistically significant relationships between certain variables. In particular, a moderate positive correlation was found between the duration of students' stay in Turkey and their academic level ($p = 0.001$; $r = 0.413$). This indicates that the length of time a student spends in Turkey is directly related to their academic progress. Furthermore, the fact that students who plan to stay in Turkey also prefer the country as their internship destination is significant, as it reflects how their future plans are being shaped within Turkey ($p = 0.001$; $r = 0.347$). Additionally, there is a significant relationship between the continent of the student's nationality and whether they have received Turkish language education ($p = 0.002$; $r = 0.293$). This finding suggests that geographical and cultural contexts have an influence on educational experiences. The observed negative correlation between gender and the place of residence in Turkey ($p = 0.002$; $r = -0.293$) indicates that male and female students tend to show different preferences regarding their living environments. Moreover, the positive and statistically significant relationship identified between age and level of education ($p = 0.001$; $r = 0.343$) reveals that as students grow older, they tend to be enrolled in higher academic levels.

The research findings indicate that the educational experiences of international students are multidimensional and not limited solely to academic performance. The presence of support services at the universities where the students are enrolled has emerged as a significant factor influencing their ability to comprehend course content. The results highlight the need for higher education institutions to develop more inclusive policies that recognize student diversity and respect cultural differences. Strengthening language education, social integration mechanisms, and career planning support systems will make the educational experience of international students in Turkey more effective and sustainable.

Keywords: Globalization in education, Support services, Cultural differences, Cultural transmission

Model For Traınıng And Assessment Of 6th Grade Gırls In Badmınton

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Abstract

Badminton is a popular and very well-known sport that is practiced by many people all over the world. The simple rules of the game, the minimal conditions for its implementation, lower costs for equipment and gear make it practically feasible in various conditions, including in the mass school.

With the increasing popularity of badminton, more opportunities for access and the most appropriate methodologies in training for practicing at school age are sought/

By offering a training program containing sports-preparatory exercises and games, we seek to solve the tasks of "Physical Education and Sports".

The aim of the study was to establish the relationship between the use of sports-preparatory exercises and games in badminton and the physical performance of students.

To achieve this goal, we set the following tasks:

1. To establish the physical performance of 6th grade girls and its development using specific motor tests.
2. To assess the influence of sports-preparatory exercises and games on physical performance within the framework of the sports-pedagogical experiment.
3. Based on the analysis of the experimental data obtained, to draw conclusions and relevant recommendations for the practice and training of badminton.

At the beginning and end of the school year, we conduct testing of 60 girls, divided into control and experimental groups with the following tests:

Test: Running 30 m (sec)
Test: Long jump from a place (cm)
Test: Throwing a solid ball 3 kg (cm)
Test: Running 200 m (sec)
Test: T-test (sec)
Test - Movement in 4 corners of the court

As a result of the interpretation of the data of the 6th grade girls at the end of the study, we can make the following generalizations:

The analysis and summary of the literary resources proves that sports teachers do not sufficiently evaluate sports-preparatory exercises and games as a factor for increasing physical performance when learning badminton. This fact limits the application of various means and methods and reflects on the final result of the training.

The quantitative and qualitative results obtained at the beginning of the experiment allowed us to assess the sports-technical preparation of the students as satisfactory. Considering this, we can summarize that the current curriculum is not effective enough. The dynamics within the framework of experimental research work are clearly expressed in the experimental group, where significant increases are highlighted as a result of optimized and targeted training, proven with sufficient guarantee probability.

The results of the experiment confirmed that there is an increase in physical performance when applying a specialized program. In the experimental group that used the new tools, it was significantly higher compared to the control group that worked with the traditional methodology. The sports-preparatory exercises and games used significantly influenced the level of technical preparation, led to greater emotionality, improved coordination abilities, led to personal satisfaction, increased self-esteem, concentration.

Keywords: physical ability, badminton curriculum, 6th grade studenfs

Emphasis on the Nature of Science in the Elementary School Curricula of Life Science, Science, and Social Studies

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Abstract

Understanding the nature of science, as a fundamental component of scientific literacy, is essential for developing students' critical thinking, inquiry, and decision-making skills. Teaching the nature of science enables students not only to acquire scientific knowledge but also to understand how this knowledge is produced, how it is shaped within socio-cultural contexts, and how it influences society. In this context, it is important to examine the extent to which the elementary school curricula of Life Science, Science, and Social Studies provide a framework for understanding the nature of science. This is particularly significant because students are first introduced to science and its nature through the Life Science course, begin engaging in scientific knowledge production processes through the Science course in the third grade, and explore science in historical and societal contexts through the Social Studies course, which begins in the fourth grade. Accordingly, this study aims to examine these three curricula, which were developed within the scope of the 2024 Maarif Model, through the lens of the Reconceptualized Family Resemblance Approach (FRA) proposed by Erduran and Dagher (2014). The study adopts the document analysis method, one of the qualitative research designs. The data were obtained from the official, up-to-date versions of the curricula and analyzed using descriptive analysis. The analysis of the curricula was conducted in three stages: (1) The introduction sections of the curricula were examined in terms of how they emphasize science and the nature of science; (2) Learning outcomes and process components were analyzed according to the dimensions of FRA; (3) Learning-teaching experiences were evaluated based on both FRA dimensions and the teaching approaches toward the nature of science identified in the literature—namely, the explicit-reflective, implicit, and historical approaches. Although the analysis is still ongoing, preliminary findings have been presented. In the first stage of the study, the introduction sections of the curricula were analyzed in terms of their emphasis on science and the nature of science. The results indicate that the 2024 Science curriculum contains a clear and strong emphasis on the nature of science. It directly addresses topics such as the nature of scientific knowledge, the fundamental characteristics of scientists, and the evaluation of the reliability of knowledge sources, while also highlighting the historical and cultural dimensions of science. The Life Science curriculum also explicitly includes the concept of "science" and emphasizes goals such as introducing students to science, developing their research skills, and engaging them in scientific processes. In this respect, the program aims to foster scientific awareness from an early age. Although science is not addressed as a direct theme in the Social Studies curriculum, the learning area titled "Technology and Social Sciences" includes the life stories of scientists, the impact of inventions on society, and the relationship between technological advances and cultural change. This offers an indirect yet noteworthy reference to science. These preliminary findings provide a foundational perspective for understanding the extent to which the nature of science is emphasized in the introductory sections of elementary school curricula. In addition, the learning outcomes and learning-teaching experiences in the curricula will be analyzed in detail based on the FRA model, thereby revealing more clearly how the teaching of the nature of science is structured in terms of content, method, and approach.

Keywords: Nature of Science, Life Science Curriculum, Science Curriculum, Social Science Curriculum

Empowering Student Agency: The Benefits and Challenges of Curriculum Co-Creation in Higher Education

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Abstract

This talk explores the potential of engaging students in curriculum co-creation as a strategy for inclusive and collaborative pedagogies. Guided by a "voice and choice" framework, Master students at the English Language and Literature Department of the University of Prishtina were invited to investigate the department's pedagogical issues, address their concerns regarding teaching and learning, provide recommendations for improvement, and contribute to the refinement of the program.

These students were engaged in a semester-long project that promoted student-teacher partnerships, aiming to challenge authority-driven modes of teaching. Through the use of scaffolding and structured guidance, the course encouraged students to embrace this innovative approach. To explore students' experiences with this approach, a longitudinal qualitative design was used. Semi-structured interviews were conducted at two different points in time, at the beginning of the project and after one year. This enabled the researchers to get a better understanding of the students' experience with this journey after having time to reflect. This was paired up with the reflection journals kept by the two course instructors.

Findings reveal that students appreciated the given opportunity to shape their learning and contribute to improving the curriculum for future cohorts. In addition, this experience strengthened the sense of student agency and ownership. However, as with any other context entrenched in a teacher-centered tradition, this approach was also characterized by many challenges. Initially, students expressed a lack of self-efficacy to influence real change. Also, they felt a sense of discomfort in sharing power with teachers, particularly because they were accustomed to viewing teachers as an authority. Further, due to their mistrust in the system and fear of retaliation by some antagonistic members of the staff, the students were reluctant to fully engage in the project and present their research findings to the staff. As a result, their ability to fully benefit from cooperative efforts to co-create curricula was hindered.

This approach fostered a sense of agency and ownership, enabling students to not only make changes to their study program but also leave a legacy that will improve future generations' educational experiences. The results of this study can provide insight into how inclusive and collaborative pedagogies may be able to challenge long-standing educational norms and gradually change the educational landscape.

Keywords: student agency, curriculum co-creation, voice and choice, student-teacher partnership

The Role Of School Textbooks In The Development Of Lınguıstıc Competence In Prımary Educatıon: An Analysıs From The Perspectıve Of Teachers In Kosovo

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Abstract
School textbooks are a fundamental pillar of the educational process, shaping students' linguistic competence and serving as a key tool for achieving curriculum objectives. International and regional research consistently emphasizes that high-quality textbooks not only develop foundational skills but also foster critical thinking, creativity, and contextual language use. In Kosovo, where textbooks remain the primary instructional resource in many classrooms, their design plays a crucial role in aligning teaching practices with the national curriculum framework.
This representative study investigates the extent to which Albanian language textbooks for primary education contribute to the development of students' linguistic competence. A mixed-methods approach was employed, combining quantitative data from closed-ended questionnaire items with qualitative insights from open-ended responses. The main instrument comprised 20 items organized into three thematic areas: textbook content, practical application, and teachers' challenges. The questionnaire was developed based on existing literature and demonstrated high internal consistency (Cronbach's alpha = 0.82). The sample included 200 primary school teachers, purposefully selected to provide a representative overview of diverse regions, teaching experiences, and school contexts.
Findings indicate that 68% of teachers consider the textbooks effective in developing basic language skills, including reading comprehension and vocabulary enrichment. However, 54% reported a lack of variety in open-ended and creative writing tasks, 58% noted limited opportunities for contextualized language use, and 52% observed excessive repetition of exercises. Teachers emphasized that these limitations constrain opportunities for discussion, argumentation, and problem-solving, ultimately hindering the full achievement of linguistic competence objectives.
It is recommended that future textbook designs incorporate a broader range of interactive and authentic language tasks, integrate real-life communication contexts, and include activities that stimulate higher-order thinking. Such targeted improvements could significantly enhance textbooks' effectiveness in supporting students' linguistic development.
Keywords: linguistic competence, school textbooks, primary education, Albanian language, teaching.

Fieldwork in the New Geography Curriculum: An Analysis of the Türkiye Yüzyılı Maarif Modeli (TYMM)

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Abstract

On April 26, 2024, the Türkiye Yüzyılı Maarif Modeli (TYMM) curriculum was introduced to the education community and began to be gradually implemented in the 2024–2025 academic year, starting with preschool, 1st, 5th, and 9th grades. As in other disciplines, major reforms were made in the geography curriculum, the most prominent of which was the change in the number of units in the course structure. In the curriculum published in 2018, geography was organized into a total of 12 units titled Natural Systems, Human Systems, Global Environment; Regions and Countries, and Environment and Society. In the new curriculum, geography is structured into a total of 7 units titled The Nature of Geography, Spatial Information Technologies, Natural Systems and Processes, Human Systems and Processes, Economic Activities and Their Impacts, Disasters and Sustainable Environment, and Regions, Countries, and Global Connections.

The fieldwork method—regarded as the cornerstone of the geography discipline and widely accepted by geographers through the notion that "the field is the geographer's laboratory"—forms the basis of this study, which examines the place and significance of fieldwork within the new curriculum. The primary aim of the study is to analyze the position and application dimensions of fieldwork in the 2024 TYMM geography curriculum.

The research method employed is document analysis. The researcher examined which units in the curriculum require fieldwork, the recommended frequency of its use, and the alternative methods and techniques suggested in place of fieldwork. The results were systematically compiled, visualized, and presented. Data analysis was conducted using MAXQDA, a software program frequently utilized in qualitative research. The data were first categorized into themes and then coded according to a coding scheme developed by the researcher, which was subsequently verified and refined by an expert.

As a result, the study evaluates and discusses the significance of fieldwork—which can be considered the foundation of geography education—within the framework of the new curriculum.

Keywords: Curriculum, Geography Education, Fieldwork, Document Analysis

Motıvatıon And Assessment Of Students In Mıtrovıca Secondary Schools

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Abstract
After the war in Kosovo, the situation in education was not that good. Considering the circumstances and consequences, a lot of work was done in this direction. Many schools in Kosovo, but also in Mitrovica, did not have their own building, so they were forced to operate two schools in one school building. Now, the medical school is in its own building, as is the gymnasium. These two schools have tried their best since students from several regions of Kosovo attend these two schools. The teachers have tried to persistently teach properly, in a way so that the students do not lack knowledge. Their motivation and evaluation have been primary, because it was necessary to motivate them because the city of Mitrovica continues to remain divided and with many problems and ups and downs. The teachers of these two schools have tried to hold extra classes just to bring these generations forward. The motivation has been maximum to arrive at a deserved and real evaluation. This union is important, because through this work I aim to positively influence education in Mitrovica and in Kosovo in general. This work will slightly alleviate the factual situation in schools and will be a modest contribution to the development of education. The part of motivation and assessment is very important because we know that today there are ways and forms of motivation, to motivate the student and there are also assessment instruments. So, it is not like before that the student was assessed only with an assessment instrument. Through this work, educational awareness for a more prosperous and progressive education will be raised. Correct and necessary results are expected from this work, where all the problems of motivation and assessment will be scientifically argued. Also, their contribution will be an added value for education in Mitrovica. This would further facilitate the development of education by giving hope even further for a brighter future for young people.
Keywords: school, teacher, student, learning, motivation, assessment.

The Relationship Between Creative Leadership Characteristics of School Principals and Error Management Culture

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Abstract

This study aims to examine the relationship between the creative leadership characteristics of school principals and error management culture according to the opinions of teachers working in public secondary schools in Edirne province. In addition, the opinions of school principals regarding the creative leadership characteristics and error management culture in schools were determined in this study. For this purpose, an explanatory design from mixed method research was used by using both quantitative and qualitative data. The target universe of the quantitative dimension of the study consisted of 1345 teachers working in public secondary schools located in nine districts of Edirne province. Simple random sampling method was used in sample selection. Criterion sampling from purposeful sampling methods was used in the qualitative part. In this context, 366 secondary school teachers and 14 school administrators were included in the study. The quantitative data of the study were collected by hand by going to secondary education institutions. The ‘‘School Administrators' Creative Leadership Characteristics Scale’’ (Uçar and Sağlam, 2019) (Appendix 2) and ‘‘Error Management Culture Scale’’ (Kurum, 2022) (Appendix 3) were used in the study. Descriptive and inferential statistics were used in the data analysis and the Pearson correlation coefficient was calculated. Qualitative data were collected through face-to face interviews. A semi-structured interview form was used during the interviews. Within the scope of creative leadership characteristics that school principals should have, proactive, entrepreneurial, effective communication skills, risk-taking, open to innovation and change, and cooperation have come to the fore. Whether these characteristics are present or not should be predicted in the selection and placement of school principals, and educational administrators should be selected and assigned from among those who have competence in this field. While the views of school principals regarding creative leadership characteristics and error management culture in schools did not show any significant difference according to gender, branch, and level of education, they showed significant differences in favor of Science High School principals according to the type of school they worked at The sub-dimensions of the creative leadership characteristics of school principals; while there is a high level of positive relationship between entrepreneurship and effective communication, openness to innovation and change, and error management culture in schools, there is a moderate relationship between the difference dimension and the error management culture. Teachers stated that school principals have taken the necessary measures to prevent the repetition of mistakes made by the school administration regarding the culture of error management in schools. It is possible to say that this makes it necessary for school administrators to actively use proactive leadership qualities from creative leadership features. In the qualitative dimension of the research, errors were defined by all managers as unintentional events that disrupt the functioning of the institutional culture. Errors encountered in the school were also stated by managers as communication errors, errors originating from personality traits, poor communication with the management, errors related to the use of financial resources and physical facilities, errors related to bureaucratic work and procedures, errors made in the education and training process, errors originating from the behavior of the personnel, errors made in occupational health and safety. It was observed that the source of errors was generally due to not caring about the work. The strategies they used in the error management culture process were as follows: creating complaint boxes, applying surveys to employees, and establishing verbal communication.

Keywords: Creative Leadership, School Administrator, Error Management, Teacher, Secondary Education Institution

Girls Secondary Schools in the Ottoman Empire in the Late 19th Century: Establishment Processes, Curriculum, and Social Perception

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Abstract

Modernization, which began in the Ottoman Empire with the Tanzimat Fermanı of 1839, necessitated the restructuring of social institutions, and the education system underwent radical changes as a result. The new educational institutions developed and established during this period were cornerstones of efforts to modernize the state and society. However, these efforts were largely male-focused, while women's participation in education emerged late and in a limited manner.

The work of the intellectuals who played an important role in the proclamation of the Tanzimat Edict paved the way for new pursuits in the field of education. The state's education policy in this period was primarily to increase the number of schools, but also aimed to encourage women's participation in social life through education. In line with this goal, girls secondary schools stand out as the first systematic and public secondary education institutions for women in the Ottoman education system.

Girls secondary schools can be considered not only as pedagogical institutions, but also as ideological areas reflecting the gender roles, perception of women and educational ideals of the period. The establishment processes of these schools, their teaching programs, teacher profiles and curriculum structures allow us to observe the roles that Ottoman society assigned to women's identity.

The aim of this study is to examine the establishment processes of girls' secondary schools, the curriculum implemented and the perception of these institutions in society in a multidimensional manner in the last period of the Ottoman Empire. Within this framework, the social impacts of education policies will be analyzed using both primary archival documents and periodicals and official yearbooks. This study aims to provide a historical perspective on the evolution of women's education in the Ottoman Empire and to provide historical context for gender debates in contemporary education systems.

Keywords: Girls Middle Schools, Education History, Ottoman Empire

School Administrators' Attitudes Towards AI-Based Student Monitoring Systems: A Qualitative Study

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Abstract

Contemporary education systems have increasingly introduced artificial intelligence (AI) technologies to support data-driven decision-making processes. Particularly in the analysis of students' academic performance, attendance records, and behavioral patterns, AI-based student monitoring systems have become a significant tool from an educational management perspective (Luckin, 2016). In this context, the aim of this study is to explore school administrators' perceptions of AI-based student monitoring systems and their attitudes toward the integration of these systems into educational strategies.

Structured according to a qualitative research design, this study involved semi-structured interviews with 15 school principals working in the Reyhanlı district of Hatay, Turkey. The interview protocol focused on themes such as the use of these systems, their impact on decision-making processes, communication with teachers and parents, and ethical concerns. The data were analyzed using descriptive analysis methods.

The findings indicate that the majority of participants view AI-based monitoring systems as beneficial and as tools that facilitate administrative processes. One principal stated: "Especially when a student is at risk of dropping out, the system gives us an early warning. This is highly valuable." However, it was also emphasized that in order for these systems to operate at full capacity, there are significant deficiencies in technical infrastructure and teacher training. Another administrator remarked: "If no data is entered, the system doesn't work. Sometimes, convincing the teacher is the hardest part."

Participants also expressed concerns regarding data security and ethical use. Some administrators indicated that they had not been sufficiently informed about the extent to which student information is centrally stored or who has access to it. At this point, the importance of digital ethics, data governance policies, and raising awareness of these issues was strongly emphasized (Williamson & Piattoeva, 2020).

In conclusion, this study reveals that while school administrators recognize the broad benefits of AI-based student monitoring systems, effective implementation requires a holistic strategy. The findings highlight the need for teacher engagement with the system, clear and transparent data policies, and ongoing training. These results offer valuable insights to guide educational technology policies and the integration of AI solutions into school settings.

Keywords: Artificial Intelligence (AI), Educational Administration, Student Monitoring, Digital Transformation, School Administrators, Data Security, Ethics

A Comparıson Of Managerıal Selectıon, Traınıng, Appoıntment And In-Servıce Traınıng Processes Between Turkey And Countrıes Wıth Hıgh Performance In Pısa

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Abstract
The PISA assessments conducted by the OECD, which non-member countries can also participate in, are a multinational evaluation program in the field of education and also provide participating countries with the opportunity to make data-based improvements. The aim of this study is to examine the selection, appointment, education and relocation policies of successful countries and Turkey according to the results of PISA, on which many discussions have been conducted. In this context, the research was limited to the examples of Germany, Denmark and Singapore. As a research method, analytical method (Bereday Model), one of the methods adopted in comparative education research, was used and literature review method was used. As a result; It has been concluded that the criteria for training, selecting and appointing school administrators of countries with an important position in PISA compared to the criteria in Turkey, there is no university-level management education, there is no different evaluation practice in appointing managers for the first time, there is no pre-service education, in-service education is not mandatory and does not meet the necessary needs, there is no graduate education requirement and no management certificate is required. Opening of management education at the university level in the process of training, selection and appointment of school administrators in Turkey, obtaining graduate education for managers and taking this situation as a basis at the selection stage, requesting a management certificate, applying different evaluation methods, pre-service and it is proposed that in-service education should be mandatory, in-service education should be revised and a school/education leader should be trained.

Keywords: PISA, education management, school administrator selection, appointment.

Examınatıon Of Leadershıp Styles Of Managers Workıng In Publıc Instıtutıons

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Abstract
Leadership plays a vital role in the success of organizations and in increasing employee motivation. The behaviors exhibited by leaders directly influence not only decision-making processes but also the shaping of the organizational climate and employee attitudes. In this context, investigating whether leadership styles differ based on individuals' personal characteristics is important for both theoretical and practical studies.
The research aims to examine the leadership styles adopted by managers working in public institutions in terms of various demographic variables (gender, age, marital status, professional seniority and education level). In the study, data obtained from a total of 228 employees were analyzed using the "Managerial Leadership Style Behavior Scale" developed by Taş, Çelik and Tomul (2007). Leadership styles were evaluated in five sub-dimensions: Autocratic, Democratic, Free, Transformational and Interactive. In the analyses conducted according to the gender variable, it was determined that the perceptions of leadership styles did not show a significant difference between female and male employees. In terms of the age variable, statistically significant differences were determined in democratic and transformational leadership styles; it was observed that especially the leadership style perceptions of employees in the 31-35 age group were higher in these styles. In terms of marital status, a significant difference was found only in transformational leadership, and it was revealed that single employees perceived this leadership style more than married employees. In the analyses conducted according to professional seniority and education level, no significant differences were found in leadership styles, however, it was observed that employees with a bachelor's degree and 11-15 years of seniority had higher perceptions of leadership styles in democratic and transformational leadership. These findings reveal that leadership styles in public institutions may partially differ according to the demographic characteristics of employees.
Keywords: public, institution, manager, leadership

The Resilient Leadership Scale (RLS): Validity and Reliability Analyses and Empirical Application

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Abstract

The literature suggests a number of characteristics that characterize resilient leaders, such as being resilient, taking risks , recovering in the face of adversity, learning from challenges and using them as personal growth, having a high tolerance for ambiguity, being adaptable, having high self-esteem, having high self-efficacy, being able to cope with challenges, being consistent, optimistic, tolerant, establishing strong social relationships, not being afraid of failure, being determined, and persevering (Masten, 2001; Patterson et al., 2009; Reed, 2018; Richardson, 2002; Ungar, 2004; Wagnild & Young, 1993). In particular, the complexity and uncertainty of daily school operations increase the likelihood that principals will encounter challenges. Therefore, we believe it is important to examine the resilience skills of school principals. Consequently, we believe that the resilient leadership skills of school principals should be measured. In this context, the following questions constitute the general purpose of the research.

1. What are the validity and reliability findings of the Resilient Leadership Scale (RLS)?
2. Does teachers' commitment to school mediate the effects of Resilient Leadership on organizational resilience?

In the context of this general objective, the aim of the study was to develop a valid and reliable measurement tool to measure resilient leadership skills in schools. The first study group within the scope of the trial application of the Resilient Leadership Scale (RLS) consisted of 269 volunteer teachers working in the Uzunköprü district of Edirne province in the 2024-2025 academic year. In order to fill in the data sincerely during the scale development process, care was taken to ensure that the trial application sample (n=269) consisted of volunteer participants. The second study group in the structural equation model studies conducted within the scope of confirmatory factor analysis and empirical verification of the RLS consisted of 237 volunteer teachers, different from the first participants. In order to determine the validity and reliability of the RLS, exploratory and confirmatory factor analyses were calculated, as well as internal consistency coefficients and item total test correlations. In the exploratory factor analysis findings, 63.56% of the total variance explained by 3 dimensions and 19 items; The findings of confirmatory factor analysis were found to yield acceptable fit values ($\chi 2[\ df\ ]=278.965$ [97]= 2.876, GIF=0.90, CFI=0.94, RMSEA=0.08, SRMR= 0.0374). In order to test the hypotheses generated in the empirical validation study of the scale, the direct relationships of durable leadership and teacher commitment with organizational resilience and the indirect connections through teachers' job commitment were examined with the structural model (SEM).

The results showed statistically significant positive relationships between the variables. In other words, we found that resilient leadership significantly explained teachers' school commitment and organizational resilience, and teachers' school commitment significantly explained organizational resilience. Consequently, the results suggest that resilient leadership practices significantly increase teachers' organizational commitment, which is a critical mechanism for enhancing schools' resilience to crises. Teacher commitment mediates the relationship between resilient leadership and organizational resilience. Many of the social spaces in which school principals lead and manage are often governed by emotions. Therefore, principals may also need to be emotionally resilient to possess the inner strength to lead. We believe that principals must be resilient to succeed and to realize one's moral and intellectual self over time. Furthermore, we suggest that school leaders should be equipped with resilient leadership

skills to meet the new challenges of change and sustain school improvement. In this context, future studies could include other positive variables such as self-efficacy, collective efficacy, workplace camaraderie, hope, and happiness to allow for a more in-depth exploration of the mechanisms of resilience.

Keywords: Resilience, Resilience Leadership, Organizational Commitment, Organizational Resilient, Scale Development

Perceptions of Quiet Quitting Among Teachers in Türkiye

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Abstract

In businesses, it is possible to encounter a recent phenomenon where employees go through their shifts doing the bare minimum that is required by their job descriptions, caused by some sort of perceived disfunction or dissatisfaction, often ignored or not even acknowledged by management. This phenomenon, identified in the literature as "quiet quitting" after the Covid-19 pandemic, is often linked with factors related to the workplace such as job conditions, job efficiency and job's effects on the personal lives of employees, and not regarded as a personal issue. Quiet quitting impacts the performance and the climate of the workplace negatively, and can halt the professional development of employees. As education institutions are restructured to be similar to businesses more and more, quiet quitting is becoming a noticeable problem in schools of all levels. Schools, where teachers are traditionally expected to be selfless and devoted to their duties and students, is also experiencing this phenomenon. In this regard, the purpose of this research is to explore the views of teachers in Türkiye about quiet quitting and uncover the reasons behind it.

This study, which is conducted within the qualitative paradigm, will adopt a phenomenological design. The study group of approximately 10 participants will be selected among teachers using maximum variation sampling, in order to have a more complete understanding of how quiet quitting is perceived among teachers of different generations and job experience. The data for the research will be gathered in semi-structured interviews, using an interview form prepared by the authors. The gathered data will be subjected to thematic analysis. It is expected from the results of the study that there will be a significant difference of knowledge and perception towards the quiet quitting phenomenon among different age and experience groups of teachers.

Keywords: Quiet Quitting, Teachers, School Administration

The Psychosocial Consequences of Overeducation According to Entry-Level Employees

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Abstract

When the increase in the supply of better-educated individuals in labor markets exceeds the increase in demand, the workforce becomes overeducated. Overeducation can essentially be considered a mismatch between job and employee, where the employee has been more educated than is required for the job. However, the literature has raised some doubts about whether overeducation can be easily interpreted as a job-employee mismatch. Accordingly, the phenomenon of overeducation, which has been observed for decades to have negative effects on individuals and society, has shaped the research agenda of many economists and social scientists. Economists first addressed the phenomenon from a human capital perspective, focusing on one of the potential consequences of overeducation: the diminishing economic returns to education. Sociological studies, on the other hand, have viewed overeducation as a form of qualification inflation, arguing that the educational qualifications required to find a job stem not from increasing technical requirements but from the fact that socialization is a hiring criterion in the dominant higher education culture. However, overeducation has potentially negative consequences for individuals, firms, and society more generally. Research in the literature has primarily focused on the economic consequences of overeducation, particularly its impact on employee wages. Furthermore, many studies have linked overeducation to variables such as job satisfaction and turnover. Research on the psychosocial consequences of overeducation is relatively scarce. Therefore, the purpose of this research is to determine the views of entry-level employees on the psychosocial consequences of overeducation.

This study will be conducted with a qualitative research and a phenomenological design. The study group, determined using criterion sampling, will consist of approximately 10–12 participants. The criteria are that the participants work in entry-level jobs and are overeducated. The data are collected via interviews. A semi-structured interview form will be developed by the researchers. Interviews are conducted either face-to-face or online. Data obtained from the interviews will be analyzed using content analysis. Consequently, individuals' inability to utilize the educational competencies they have acquired over many years in the labor market not only causes financial problems but also psychosocial problems. This incompatibility between organization and member can lead to psychological problems such as stress, anxiety, loss of self-efficacy, and dissatisfaction. Furthermore, overeducation can reduce an individual's subjective well-being. In short, overeducated employees performing jobs requiring less education than their qualifications can lead to feelings of cognitive dissonance, relative deprivation, or injustice, accompanied by social comparison processes.

Keywords: Overeducation, workforce, entry-level employees, psychosocial consequences

Designing Fulfilling Careers: The Interplay of Decent Work, Flow and Entrepreneurial Intentions

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Abstract

A growing number of studies focus on how future practitioners perceive the teaching profession as a form of decent work amidst volatile industrial demands. The status of the teaching profession as a sustainable and decent form of work remains part of an ongoing debate, particularly in light of the uncertain nature of future work demands. As innovative technologies continue to emerge, future educators are expected to respond to the ambiguous nature of the industrial demands by adopting an "edupreneurial"mindset. Although future educators' entrepreneurial intention has been examined in relation to external environmental and personality factors, the influence of their lived experiences during the teaching practicum remains underexplored. In this context, the experience of flow, a state characterized by deep immersion and positive emotional engagement, during the practicum represents an important yet empirically unexamined factor in understanding the entrepreneurial intention of future educators. Thus, this study aims to investigate the nexus of relationships between entrepreneurial intention, flow and the perception of future decent work among preservice teachers. Specifically, this study aims to determine if perceived flow mediates the relationship between preservice teachers' perceived future decent work and their entrepreneurial intention. Using a cross-sectional study design, data were gathered from 220 preservice teachers through a series of three online surveys. PROCESS Macro developed by Hayes (2013) was utilized and Model 4 was employed to determine the indirect effect. The findings indicate that there is a direct relationship between preservice teachers' perceived future decent work and their entrepreneurial intention. In addition, perceived flow experience acts as a partial mediator in the relationship between preservice teachers' perceived future decent work and their entrepreneurial intention. Future studies may test the squential mediating roles of personality factors and the flow experience in the relationship between perceived decent work and entrepreneurial intention. Future research is also recommended to conduct experimental studies testing the influence of flow experience on entrepreneurial intention.

Keywords: flow, decent work

Is a Better Life Possible? Measuring Efficiency of 34 Countries by Years with Window Analysis*

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Abstract

In our current modern age, everyone seeks to achieve a better life. The ways to increase life satisfaction, educational attainment, and student skills are related to improving the conditions of variables such as the percentage of dwellings without basic facilities, housing expenditure percentage, rooms per person ratio, quality of support network percentage, and life expectancy in years. When these variables are taken as input variables and educational achievement by percentage, student skills by average score and life satisfaction by average score are used as output variables, the efficiency scores of 34 countries are analyzed with Window analysis, which takes into account the time dimension of Data Envelopment Analysis by years. At the same time, quantitative findings on which countries should be taken as reference in which ratios in order to increase the efficiency scores of inefficient countries, considering the aforementioned variables, were analyzed separately in different years. As a result of the research, the average efficiency scores of countries increased by 0.39% points in 2016 compared to 2015, and the average efficiency scores of countries increased by 0.03% in 2017 compared to 2015. While the number of efficient countries was 20 in 2015, it decreased to 19 in 2016 and 2017. Considering all three years, Canada, the Czech Republic, Denmark, Estonia, Finland, Germany, Greece, Iceland, Israel, Korea, Mexico, the Netherlands, Norway, Poland, the Slovak Republic, Slovenia, Switzerland, the United States of America were found to be efficient countries in terms of the selected variables. The most referenced country in all three years is the Netherlands. Window analysis reveals that Luxembourg and Chile have increased their efficiency values over the years, while Turkiye, France, and Hungary have decreased their efficiency values. It is important for policymakers of countries that have decreased their efficiency values over the years to take measures to increase their efficiency within the framework of the determined variables. Data envelopment analysis provides us with information on which countries inefficient countries should take as reference in order to increase their efficiency. Considering this information, policymakers, educators, and some other practitioners can take the necessary steps. Increasing the welfare level of individuals in the country affects the outcomes of education and life satisfaction. In this context, it is important to improve the quality of home amenities, life expectancy, and support network.

Keywords: student skills, educational attainment, life satisfaction, better life index, data envelopment analysis, window analysis

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The Influence Of Body Mass On Certaın Motor Dımensıons In 2nd Grade Female From Skopje

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Abstract
Physical and health education in primary schools is an integral part of the overall upbringing and education. The aim of the teaching is to meet the needs of students for movement, increasing adaptive and creative abilities, developing positive psychological traits as well as forming health habits for a healthy and hygienic life. An essential feature of physical education is the motor activities of students in various types and forms of physical exercise. The research was conducted on a sample of 50 female respondents, 2nd grade students from the territory of the city of Skopje. The aim of the research is to determine the body mass of the students, BMI (body mass index) body height of the students and to determine the biomotor abilities: strength (static of the upper extremities, explosive strength of the legs and repetitive strength of the abdominal muscles) speed (repetitive of the upper extremities, general), determining the correlations of the applied variables, The results of the research indicate that the height and weight of the female respondents are within normal limits, In all remaining morphological variables, the students have good results. It has been noted that the respondents have great explosive strength of the legs, as well as strength of the upper extremities. In all respondents, according to BMI, a healthy body mass is observed.

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Keywords: students, body mass, bmi, strength, speed

Comparative Evaluation of Unidimensional Polytomous IRT Models Across Different Sample Sizes: A Simulation Study

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Abstract

This simulation study systematically investigates the comparative performance of three polytomous Item Response Theory (IRT) models across varying sample sizes. The Graded Response Model (GRM), Generalized Partial Credit Model (GPCM), and Partial Credit Model (PCM) were evaluated under three sample size conditions (n = 250, 500, and 1000) using a Monte Carlo simulation design with 100 replications. The simulation employed a unidimensional structure with 12 items, each containing 5 response categories. Model performance was assessed through information criteria (AIC, BIC, log-likelihood) and global fit indices (RMSEA, CFI) derived from the M2 statistic. All analyses were conducted using the mirt package in R.

Results revealed distinct performance patterns across sample sizes. At n = 250, no statistically significant differences emerged among models across any fit indices ($p > 0.05$), indicating that model discrimination is challenging with limited data. At n = 500, CFI began differentiating among models ($F = 4.233$, $p = 0.015$), with GRM demonstrating superior fit on both CFI and RMSEA. This pattern shifted at n = 1000, where CFI showed highly significant differences ($F = 6.197$, $p = 0.002$) favoring GPCM, while other indices remained non-significant. Model performance varied by both sample size and fit index type. AIC consistently favored GPCM across all sample sizes, while BIC and log-likelihood consistently favored GRM. For global fit indices, GRM showed optimal performance at n = 500, whereas GPCM exhibited superior fit at n = 250 and n = 1000. PCM demonstrated the weakest overall performance, likely attributable to its restrictive equal discrimination assumption.

Analysis of variance revealed that sample size exerted a strong main effect on all fit indices ($p < 0.001$ for AIC, BIC, log-likelihood, and RMSEA), whereas the Model × Sample Size interaction was non-significant across all indices. This indicates that while absolute fit values change with sample size, the power to detect differences among models increases substantially with larger samples. The absence of significant interactions suggests that no single model consistently outperforms others across all sample sizes, highlighting the importance of considering both sample size and specific fit criteria in model selection.

A critical finding is the inconsistency across both fit index types and sample sizes. Information criteria consistently favored different models (AIC: GPCM; BIC: GRM), while global fit indices showed sample-size-dependent preferences (n = 500: GRM; n = 250 and 1000: GPCM). This divergence underscores the necessity of employing multiple evaluation criteria and considering sample size effects rather than relying on a single index. All models demonstrated acceptable to excellent fit across sample sizes ($RMSEA < 0.05$; $CFI > 0.95$), suggesting that model choice depends on the interplay between theoretical considerations, sample size, and specific evaluation criteria.

These findings yield important implications for applied researchers. First, small samples (n = 250) provide insufficient power to discriminate among polytomous IRT models, necessitating caution and theoretical justification in model selection. Second, fit index discriminatory power, particularly CFI, increases substantially with sample size, becoming reliably informative at $n \geq 500$. Third, inconsistency between information criteria and global fit indices necessitates comprehensive multi-criteria evaluation.

This study contributes empirical guidance on sample size requirements for polytomous IRT model comparison and demonstrates differential sensitivity of fit indices. The systematic evaluation provides practical benchmarks for model selection decisions. Future research should

extend these findings to multidimensional structures, examine performance under different distributional assumptions, investigate varying response category numbers, and validate simulation results with real data. This study provides robust empirical support for informed decision-making in polytomous IRT model selection, emphasizing the critical role of adequate sample size and multi-criteria evaluation in educational and psychological assessment.

Keywords: Item Response Theory, Graded Response Model, Generalized Partial Credit Model, Partial Credit Model, Polytomous Models, Model Comparison, Simulation Study, Sample Size, Fit Indices

The Usage of Sampling Weights and Plausible Values in Multilevel Models: A Tutorial with TIMSS2023 Türkiye Data

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Abstract

International large-scale assessments play a crucial role in monitoring and evaluating the development of educational policies implemented by countries or economic regions. Rather than merely ranking countries by their achievement levels, the primary objective of these assessments is to reveal the effects of educational reforms and to inform further development. However, collecting data at the national level is a highly costly process. For this reason, sample groups are typically determined using multi-stage and stratified sampling methods. For example, in assessments such as TIMSS, data are collected at the school → class → student levels, whereas in PISA, data collection occurs at the school → student levels, and sampling weights are applied. In other words, such studies are conducted using non-random (biased) sampling methods

Sampling weights represent the proportion of specific types of participants within the population. Although biased sampling may initially seem undesirable, stratifying the sample across levels such as school and student enables the generalization of results to the national or regional population. In this context, the samples in large-scale assessments are not randomly selected. Defining these weights in single-level or multi-level analyses is critically important for the accurate generalization of findings. Otherwise, ignoring sampling weights can lead to systematic bias and negatively affect generalizability. Experts have explicitly emphasized that failing to incorporate level weights may introduce systematic bias.

Large-scale assessments are not intended to compare individual student scores directly; rather, they aim to estimate the average achievement level of the groups or national populations to which the students belong. Moreover, to reduce test burden, students only respond to a subset of the full test. Therefore, plausible values are used to estimate student achievement through common items shared across test booklets. Plausible values are random draws from the posterior distribution of the latent trait. The literature recommends using all plausible values and applying multiple imputation methods for analysis. Relying on only a single plausible value or the average of plausible values may lead to systematic bias.

This study investigates how the appropriate and inappropriate use of level weights and plausible values in hierarchical linear models (HLM) influences the intraclass correlation coefficient (ICC). The following research questions are addressed:

- How does using only student-level weights affect HLM results (ICC)?
- How does using only school-level weights affect HLM results (ICC)?
- How does using multiple imputation for plausible values influence HLM results (ICC)?

The data analyzed in this study were drawn from fourth-grade students and their teachers in Türkiye who participated in the TIMSS 2023 Mathematics assessment. Student achievement in mathematics was treated as the dependent variable. At the student level, independent variables included gender, observed disruptive behaviors in class, clarity of instruction, enjoyment of mathematics, and learning resources at home. At the school level, variables included shortages of resources for teaching mathematics, the importance placed on academic success by school leadership, and the literacy-numeracy entry levels of students. Additionally, an illustrative application was conducted using the WeMix package (Version 4.0.3; Bailey et al., 2018).

The findings revealed the following:

- Not using student-level weights reduced the ICC (from 0.127 to 0.125),

- Not using school-level weights increased the ICC (from 0.127 to 0.185),
- Not using weights at either level increased the ICC (from 0.127 to 0.159).

Regarding plausible values, while the ICC was 0.127 under ideal use (i.e., multiple imputation), it rose to 0.139 when only the average of the plausible values was used. When calculated separately for each plausible value, ICC values ranged between 0.116 and 0.136. These findings indicate that failing to define weights and not using plausible values as recommended may result in biased estimation of ICC values.

Keywords: sampling weights, plausible values, multilevel models

Unpacking the Effects of Item Format in TIMSS2023 Mathematics Assessment: Evidence from Balkan Countries

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Abstract

Items are used to assess students' knowledge and skills. Item formats can generally be categorized into multiple-choice and constructed-response types. Different item formats require different response behaviors. In multiple-choice items, there is typically one correct answer and several distractors, whereas constructed-response items do not include options. Each format has its own advantages and disadvantages. For instance, setting options for multiple-choice items can be costly, while scoring constructed-response items can be labor-intensive. Although multiple-choice items are easier to score, constructed-response items offer students the opportunity to provide original answers. Both formats can be used to assess higher-order thinking skills (e.g., reasoning), though there is still no consensus among researchers on this issue. Due to factors such as familiarity with item format, guessing, and elimination strategies, multiple-choice items may seem easier to respondents (in other words, they may have higher item difficulty). This is especially true for students with lower proficiency in the measured skill, who may engage in such behaviors and benefit from multiple-choice items. In this study, we examined the probability of correct responses to 12 mathematics items (6 multiple-choice and 6 constructed response) related to the topic of number and the domains of applying and reasoning, using Explanatory Item Response Theory (EIRT) models and the Generalized Linear Mixed Models (GLMM) procedure. The data came from students (N = 5066) in 9 Balkan countries (Albania, Bosnia and Herzegovina, North Macedonia, Montenegro, Romania, Serbia, Slovenia, Kosovo, and Türkiye) who participated in TIMSS 2023. As a remark, Croatia and Greece did not participate in TIMSS 2023. Bulgarian students did not answer the items that we analyzed. Item format was defined as a item-level predictor (multiple-choice vs. constructed response). Null model, fixed effects model, and random slopes model were compared. The random slopes model provided the best fit and explained 13.1% of the variance. Results showed that multiple-choice items were significantly easier for students overall, in other word, the probability of giving correct answers to multiple-choice items is significantly higher than constructed response items ($\beta = 4.32$, S.E. = 0.85, $p < 0.001$) and they provided an advantage particularly for students with lower mathematical ability ($\rho_{01} = -0.51$). Our findings offer insights for test developers and educators regarding the potential differential functioning of item format and interaction between item format and student ability.

Keywords: explanatory item response modeling, item format, mathematics, constructed-response

Development of a Behavioral Awareness Scale for the Use of Artificial Intelligence in Scientific Research: A Validity and Reliability Study

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Abstract

The increasing widespread use of artificial intelligence technologies in scientific research necessitates determining individual awareness levels regarding the conscious and functional use of these technologies. In this context, the primary aim of this study is to develop a valid and reliable measurement tool to assess behavioral awareness levels concerning the use of artificial intelligence technologies in scientific research.

Within the scope of the study, a theoretical framework was first determined by reviewing the current literature, and based on this framework, a pool of 36 items was created. To determine whether these items represented the relevant construct, the opinions of three academics specializing in measurement and evaluation, and an expert working in the field of ethics, were consulted. Additionally, the item form was examined by a Turkish Language and Literature expert for linguistic expression, and linguistic revisions were made in line with the suggestions. The pilot application was conducted on a sample of 302 participants with scientific research experience at the postgraduate level.

The Kaiser-Meyer-Olkin (KMO) test, performed to determine the suitability of the data for factor analysis, was calculated as 0.91, concluding that the sample size was good. Furthermore, Bartlett's test of sphericity, which tests the significance of the difference between the correlation matrix and the identity matrix, was also found to be significant ($\chi^2 = 3075.90$; sd = 351; p = 0.00). In line with these findings, it was concluded that the data were suitable for exploratory factor analysis. As a result of the exploratory factor analysis (EFA), five items were removed from the scale due to loading on more than one factor, resulting in a 28-item, three-factor structure. This structure explains 60.4% of the total variance. The first factor explains 46.42%, the second factor 7.32%, and the third factor 6.68% of the variance. The Cronbach's alpha and McDonald’s omega coefficients for the scale's reliability were calculated as 0.922 and 0.946, respectively, and were found to be at a very high level.

Consequently, this developed measurement tool has been structured as a three-factor scale (Ethical Awareness, Transparency, Functional Use) with 28 items. This scale is proposed as a valid and reliable tool that can be used to evaluate behavioral tendencies regarding the use of artificial intelligence in scientific research and to determine individual awareness levels in this field.

Keywords: Artificial intelligence, behavioral awareness, scale development, factor analysis

The healthy type of fitness in the academic preparation of rehabilitation students

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Abstract

Physical Education and Sports is a mandatory academic discipline for students in the Republic of Bulgaria with a multidirectionality of its functions - educational, health-improving and health-preventive, functional-developing, moral-educational, aesthetic-communicative, entertaining-relaxing, prestigious, etc. In the context of training in the academic environment, the academic discipline acquires characteristics of building on the basic professional training of future specialists for effective activity in various spheres of professional realization. The presentation focuses on the specifics of the relationship between the academic discipline "Physical Education and Sports" and the special training of rehabilitation students studying at the Medical College at Trakia University, Stara Zagora. The curriculum of the discipline has been introduced since the 2024/25 academic year. In this text, it is presented with its components - a thematic cycle for theoretical and practical training, means, methods, approaches, goals and expected results at the end of the one-year period of training of students. The emphasis is on the formation of the sports pedagogical competence of future rehabilitators for the application of forms of healthy fitness in working with clients in real professional practice.

The applied Model in the academic training of students in the specialty "Rehabilitator" contributes to complementing the professional competence profile of the rehabilitator and increasing his effectiveness in the implementation of his professional duties, by adding competence for performing sports and health activities - an important determinant of the quality of life of the modern person, who is practically in good health and spiritual condition - motivated for physical exercise and sports.

Keywords: curriculum " Physical Education and Sports" , sports pedagogical competence, rehabilitation students

"Innovative Assessment Methods in Albanian Language Education: Enhancing Student Engagement and Learning Outcomes"

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Abstract
The integration of **alternative assessment methods** in Albanian language education plays a crucial role in enhancing student engagement and academic performance. This study investigates the implementation of **self-assessment, peer assessment, digital portfolios, and project-based evaluations** in lower-cycle classrooms in Kosovo. The research aims to assess how these methods impact students' learning experiences and their ability to develop critical thinking and writing skills. The study involved 200 teachers from grades 2-5 in Suhareka, using structured questionnaires and document analysis as primary research instruments. Findings indicate that 78% of teachers reported that project-based assessments and creative portfolios significantly improved students' writing and analytical skills, 65% of teachers observed increased student engagement when using interactive and technology-supported assessment tools. Performance in standardized tests improved by an average of 12% when modern assessment methods replaced traditional testing. Additionally, results show variations in the effectiveness of these approaches based on factors such as teacher training, school resources, and curriculum alignment. The study highlights the need for professional development programs to equip educators with the necessary skills for implementing innovative assessment practices effectively.

Keywords: Alternative assessment, student engagement, digital tools, competency-based learning, peer assessment.

Readability Meets AI Analyzing Linguistic Complexity in Foreign Language Textbooks Using Traditional Metrics and LLM-Based Evaluation

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Abstract

The research evaluates reading text complexity in foreign language textbooks through the combination of traditional readability measures with large language model (LLM)-based assessment methods. The study evaluates reading materials through their sentence structure and lexical variety and cognitive demands to determine their level of accessibility for learners. The research aims to provide evidence-based support for choosing materials and designing textbooks in language education.

The research used fifteen reading materials from German textbooks between 2020 and 2024 which targeted A1 to B2 level learners. The researchers applied three traditional readability formulas including Flesch Reading Ease (German adaptation) and LIX and Wiener Sachtextformel to calculate sentence length and word length and the proportion of complex words. Two large language models ChatGPT and Claude performed parallel assessments of linguistic complexity for each text. The prompts required the models to evaluate each text through qualitative analysis of vocabulary diversity and idiomatic density and syntactic depth and cognitive processing demands. The AI outputs received thematic coding to identify patterns which are important for teaching purposes.

Although the results from readability scores suggested a rough alignment between textbook levels and textual difficulty, several beginner level textbooks exhibited higher than expected word density or difficult syntax. The LLMs provided informed interpretations of the texts, noting such things as idiomatic language, embedded sentences, and abstract academic words that formulas were unable to address. In 70% of cases, the results from ChatGPT and Claude concurred with the readability measures, while in 30% they showed discrepancies, most notably in texts that contained cultural complexity and indirect meaning. The AI-generated analyses afforded very fine-grained distinctions between readability as surface-level difficulty and cognitive complexity as deeper thinking.

This study shows that integrating conventional readability measures with LLM-based assessments provides a more full account of coursebooks for language teaching. This is evident from the findings whereby traditional formulas provide baseline measures of text readability through standardized numbers while the LLMs offer richness, depth, nuance, and educational relevancy. The findings also highlighted the value of using AI in the material evaluation process, and identification of language barriers that could potentially limit the understanding and motivation for learners in language courses. The approach has the potential to support similar studies across languages and educational contexts, which could help to improve the selection of texts and development of content for language courses.

Keywords: linguistic complexity, readability, textbook evaluation, AI in education, large language models

Reviving Tradition Through Innovation: BuzAr Multimedia Approach to Music Education

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Abstract

In today's educational landscape, there is a growing demand for innovative approaches that preserve cultural heritage and make it accessible and relevant to learners. This implies active collaboration between educational institutions and audiovisual archives. The Buzarovski Archive (BuzAr), founded in 2000, is a digital repository of over 3 TB of audiovisual and textual materials related to Balkan musical traditions. It features folk songs, dances, dialects, and customs, along with concert recordings, music clips, and documentary films. As of July 2025, more than 400 freely accessible videos have been published on its YouTube channel. Among the 12 playlists is the Multimedia Corpus of Macedonian Folk Songs (MCMFS), a project developed within BuzAr, whose objective is to apply participatory and creative strategies to reintroduce traditional music into the curricula of both general and music schools. The model emphasizes digitization, online accessibility, and educational integration, fostering student-centered learning and cultural engagement. The BuzAr MCMFS project reaffirms traditional songs using the advantages of the modern digital tools. In the initial phase, old and endangered audio recordings—particularly those preserved on magnetic tape—are digitized. Where applicable, material is transcribed or converted into standardized, analyzable MIDI scores using Sibelius scorewriter, including scanned existing transcriptions. Currently, the BuzAr website hosts eight electronic books containing 404 such transcriptions, all available for free download. The digitized audio and scores are then paired with new video recordings—mostly created by students encountering the repertoire for the first time—who create and share personal, flexible interpretations of the songs. The final multimedia products combine audio, video, and score into a unified format shared on YouTube and Facebook, compatible with AI tools for further educational analysis. Each song is assigned a unique identifier (UID), and all media formats—audio, scanned notation, text, and video—are linked through a CMS. Transcriptions are often illustrated with digital pen drawings or AI-generated images, enriching visual understanding. Metadata is systematically stored in an Excel database. Teachers and students are included at all stages of the process, from content creation to classroom use, promoting collaborative and interdisciplinary learning. Since April 24, 2023, when the first MCMFS video was recorded by a UKIM FM ethnomusicology student ("Oj Gjine, Gjine"), up to July 1, 2025, a total of 66 lesser-known or previously unrecorded songs have been fully processed using this methodology. Notable examples include "Bukite razvivaat brakja" (MCMFS35), sung by a high school choir; "Pladnina" (MCMFS61) interpreted by primary school student; "Glas mi se chuje" (MCMFS23), performed by experienced singer; and international contributions such as "Mome stoe na bunarot" (MCMFS31) by a vocal group from New Zealand. In addition, students enrolled in the Digital Archiving of Sound course at the UKIM Faculty of Music are introduced to the techniques of multimedia archive creation. One of the most demanding challenges remains the preparation and interpretation of two- and three-voice polyphonic a cappella singing. The BuzAr MCMFS project revitalizes traditional music through digital innovation and curricular integration, engaging students and teachers as active contributors to a public, interdisciplinary archive with freely accessible materials that promote equity in education and project-based learning. The approach has been incorporated into the official curriculum of the Bureau for the Development of Education at North Macedonia's Ministry of Education and Science for primary and secondary schools, serving as a key component of the programs and accompanying textbooks. It has also opened the door for the

introduction of elective courses aimed at deepening students' knowledge—such as the Voice of Tradition program, proposed by a Negotino primary school teacher. Ultimately, MCMFS strengthens identity, preserves heritage, and cultivates creativity through meaningful educational innovation.

Keywords: Multimedia learning, Digital preservation of cultural heritage, Student participation, Curriculum integration

A Model for an Inclusive Educational Environment Based on Drama and Play-Based Techniques

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Abstract

In the context of the growing need for transformation in teaching and learning, this study presents a model for building an inclusive educational environment through drama-based approaches and educational tales. The main goal is to explore how artistic narratives and role-playing activities support the development of socio-emotional skills, empathy, tolerance, and the active inclusion of students in the primary education stage.

The study is being conducted in a real school environment and focuses on the implementation of creative, emotionally engaging learning scenarios. The research process includes observations, structured interactions, and both qualitative and quantitative methods of data collection. Instruments such as individual and group observation protocols, an expert evaluation tool, and student-centered discussions are used to assess key social-emotional indicators.

The report will focus on selected dimensions of the model's impact, particularly related to empathy, active participation, and group dynamics. While data analysis is still ongoing, preliminary observations suggest increased student engagement and emotional responsiveness during theatrical activities and narrative-based learning tasks. The method is perceived as accessible and adaptable by teachers involved in the process.

This model shows potential for application in various educational contexts and offers an alternative approach that complements technological innovation with human presence, creativity, and shared values. The full analysis will be presented in the final version of the report.

Keywords: socio-emotional skills, theatrical-game approach, educational tales, empathy and tolerance, innovations in teaching, education of the future

Peer Educatıon For Sustaınable Lıvıng: Emphasısıng Natural Resource Conservatıon And Dısaster Rısk Reductıon

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Abstract
Natural resources across the globe are being rapidly depleted. At present, a significant portion of the global population lacks access to essential resources such as food and water, and projections suggest that this number is likely to increase in the future. Furthermore, the entire world is contending with numerous natural disasters, exacerbated by the effects of global climate change. These developments underscore the urgent need for preventive measures and, consequently, for transformative changes in lifestyle. In this context, promoting sustainable behaviours and raising awareness regarding such practices are of critical importance. In the present study, a peer education programme on sustainable living was developed and implemented to address this need. Initially, a training-of-trainers session was conducted. The trainers comprised 114 second-year students enrolled in the Medical Laboratory Techniques programme. These students received instruction on sustainable living, with a particular emphasis on the conservation of natural resources and the reduction of disaster risks. The training was delivered through four modules. Upon completion of the programme, the trainer students were organised into collaborative groups. Each group, under the guidance of the researchers, prepared its own educational materials to be used in the peer education process. The educational materials included a practical recycling activity in addition to theoretical information on sustainable living. Following the preparation of the educational materials, the peer education sessions began. Peer education was provided to 515 students enrolled in various programs at the Vocational School of Health Services. Upon completion of the training, students who received the peer education completed the Reflective Evaluation Form developed by the researchers. The data were analysed using content analysis. The results indicated that students who received peer education on sustainable living developed an increased awareness of sustainable behaviours, particularly in relation to the conservation of natural resources and disaster risk reduction—both of which constituted the core focus of the training. Students also reported that, as a result of this awareness, they intended to modify many aspects of their daily routines by adopting various sustainable practices. Overall, the findings demonstrated the positive impact of peer education on students.

Keywords: Conservation of Natural Resources; Disaster Risk Reduction; Peer Education; Sustainable Living

Mıcrolearnıng For Vocal Class Students. Innovatıve Vs. Tradıtıonal Approach Regardıng Work On The Text Of A Musıcal Pıece

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Abstract
The report will compare the traditional approach when working on the text of a music piece with microlearning as an innovative one. All the data is from a project for vocal students at the Art Academy in Plovdiv, Bulgaria, conducted together with a vocal expert and an accompanist also. The data are discussed from a linguistic point of view regarding positives and drawbacks.
Keywords: microlearning, vocal class students, music piece, traditional approach

A Model Based on Artificial Intelligence for the Classification and Personalization of Creative Thinking Education

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Abstract

Creativity is recognized as a crucial cognitive competence that forms the foundation of all processes of change and innovation. The generation of new ideas and the production of original outcomes occur through complex mental processes based on human cognitive capacity. Today, the effective and systematic development of creativity remains one of the core challenges across various fields, from education to technology. Creativity has the potential to activate an individual's cognitive, volitional, and emotional processes. In this context, creative thinking is considered the highest level of emotional well-being and is associated with self-actualization and personal growth. As a key 21st-century skill, creative thinking plays a critical role in enhancing individuals' problem-solving abilities and fostering innovative perspectives. Therefore, evaluating students' creative thinking levels and identifying their corresponding educational needs has become a primary goal of contemporary educational systems. However, there remains a lack of systematic models to classify educational needs for fostering creative thinking. This study explores the role of artificial intelligence (AI) in assessing creative thinking and planning personalized educational interventions. Utilizing AI technologies such as machine learning algorithms and natural language processing, the aim is to analyze students' creativity levels and categorize them accordingly. The proposed model functions as an intelligent system that analyzes students' written, verbal, and practical responses. Based on performance outcomes, the system offers tailored recommendations for skill development. The study discusses the design of a creative thinking assessment tool and the classification of students based on assessment results, offering development strategies tailored to each level. Additionally, it defines the prerequisites for fostering creative thinking skills in children aged 9 to 14 and provides a scientific data framework for the development of AI-supported educational systems. The findings of this research aim to contribute to the integration of AI technologies in education and offer recommendations for the advancement of personalized learning models.

Keywords: Artificial Intelligence, Creative Thinking, Students, Personalized Education

Silent Third – AI Solves a Forgotten Communication Paradox

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Abstract

This paper explores how the integration of an appropriate AI-Assistant in education offers a practical resolution to a communication paradox diagnosed in the pre-internet era and critically discussed in a previous monograph (Duridanov, 1990). With the rise of generative AI and its integration into human-machine dialogue, we revisit this paradox, originally formulated during a 1988 AILA symposium as: "Two are too few, three are too much." At the core of this paradox lies the smallest meaningful unit of communication – the dyad. When two individuals engage in emotionally charged interaction, they generate a unique interpersonal space, a shared "we-space," which tends to remain opaque to third-party observers. The emotional participants perceive the relational dynamic from within but lack analytical distance. In contrast, an outsider (such as a teacher, peer, or researcher) may maintain critical distance yet cannot truly grasp what occurs within the dyad. This asymmetry creates a structural barrier to educational insight and pedagogical intervention.

We believe that a well-calibrated AI-Assistant can transcend this limitation. Unlike a human third party, the AI has no subjective emotional involvement, enabling it to function as both **a neutral observer** and an **emotion-simulated adaptive participant**. With the capacity to monitor and analyze interactional data in real time, the AI-Assistant mediates between **emotional immediacy** and **analytical reflection** without being limited by human biases or emotional partiality. In the GenAI Age, AI models can simulate **multiple pedagogical roles**: "second teacher", peer interlocutor, and 24/7 personalized tutor. As we argue in a forthcoming publication (Duridanov, 2025, in print), these roles not only support traditional teaching but also enhance access to previously "invisible" relational dynamics in the classroom and in the school administration. The AI's ability to extract interactional and emotional cues – without itself feeling anything – offers **insight into both** the **affective** and **cognitive states** of learners and teachers.

Practically, this **multidisciplinary approach** enables AI to provide targeted, **context-sensitive feedback** aligned with each learner's rhythms, routines, and needs. Furthermore, we highlight the scalability and inclusivity of this approach: the AI-Assistant can be deployed via smartphones, offering affordable support even in under-resourced schools. It delivers short, actionable messages, relevant to various stakeholders – students, teachers, administrative staff, and parents – bridging communication gaps and reinforcing pedagogical consistency.

To evaluate this concept, we plan a pilot implementation of the AI-Assistant App in five secondary schools across different regions of Bulgaria over one school year. The project will assess both the **pedagogical impact** and the **communicational value** of the AI's embedded roles. We expect the results to demonstrate that the AI-Assistant is **not** merely a **passive tool** or **content platform**, but an **active**, **context-aware mediator** capable of addressing long-standing **blind spots** in **education**. By bridging the inner dyadic space and the outer analytical view, the AI-Assistant redefines how we can understand interaction, offering **a new pedagogical symmetry** between **human immediacy** and machine-aided reflection. In doing so, it resolves a paradox that has long challenged **communication theory** and **educational practice**.

Keywords: AI's embedded roles in education, AI-enhanced education, Context-aware tutoring, Communication paradox, Pedagogical mediation

Artificial Intelligence and Medical Humanities in Medical Education: Cognitive Allies or Pedagogical Disruptors?

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Abstract

As artificial intelligence (AI) becomes increasingly embedded in medical education, the tension between technological innovation and the preservation of humanistic values raises a fundamental pedagogical dilemma. Can AI enhance clinical reasoning and metacognitive awareness without damaging the vocational core of medicine? This study aims to evaluate how AI-driven tools such as ChatGPT can be constructively integrated into clinical training, without compromising the epistemic and ethical pillars of medical humanities.

An innovative teaching model was implemented with undergraduate clinical students during internal medicine clerkship rotations. The student cohort was divided into two subgroups. Subgroup A participated in direct patient care, conducting anamnesis, physical examination, and decision-making under specialist supervision. Subgroup B received the same anonymized clinical data set and utilized ChatGPT to analyze, synthesize, and generate positive and differential diagnosis and therapeutic plans. Both subgroups presented their findings in plenary sessions, followed by a guided faculty debriefing emphasizing reflective practice. This comparative model was grounded in principles of **Narrative medicine**, encouraging students to attend not only to pathophysiological patterns but also to narrative coherence, contextual sensitivity, and the emotional subtext of clinical encounters. The framework also incorporated elements of cognitive science—specifically, metacognition, dual-process reasoning, and bias awareness.

The qualitative feedback from students and faculty revealed several key outcomes. First, students using ChatGPT demonstrated improved structuring of diagnostic reasoning, differential diagnosis generation, and guideline-based therapeutic planning. However, they also tended to overlook contextual cues and patient individuality, resulting in algorithmically sound but humanly impoverished recommendations. In contrast, the subgroup engaged in direct clinical interaction exhibited stronger relational competencies, narrative attentiveness, and clinical empathy. Their reasoning was more contextually nuanced but occasionally less systematic.

Faculty discussions highlighted the educational value of juxtaposing these cognitive pathways: the algorithmic (externalized, probabilistic) and the narrative (embodied, interpretive). Students reported enhanced awareness of their own cognitive processes, greater confidence in evaluating digital tools critically, and a deepened appreciation for the human dimension of clinical care.

This pedagogical intervention suggests that AI, when intentionally integrated, can serve as a reflective mirror rather than a replacement for human clinical judgment. It enables learners to interrogate both the strengths and the limitations of algorithmic thinking. However, without curricular structures that prioritize narrative competence, emotional intelligence, critical thinking and ethical deliberation, there is a risk that AI may displace rather than enrich the formative experience of becoming a physician.

We strongly believe, at this moment, that we must avoid binary framings (AI vs. humanity) and instead, cultivate synergy between AI tools and narrative medicine models where digital intelligence amplifies the interpretive, moral, and human capacities essential to medicine. The offers a promising pedagogical avenue—one that does not abandon the patient's story, but anchors it even more firmly at the center of medical practice.

Keywords: Artificial Intelligence, Medical Education, Narrative Medicine, Clinical Reasoning, Medical Humanities

ChatGPT in the English Language Classroom: Boosting Student Motivation with AI

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Abstract
This study explored the perceptions of university students on the use of ChatGPT, an AI-powered conversational agent, as a tool to enhance their motivation in English writing. Given that motivation is among the key factors in language learning success, integrating interactive technologies like ChatGPT offers promising opportunities to support and engage learners. A quantitative research design was employed using an online questionnaire to collect data on students' use of ChatGPT, and their perceptions of its effectiveness, benefits, and drawbacks as a tool for English writing. A total of 197 first year students studying at various Universities in Kosovo were recruited to participate in an online survey. Structural equation modeling (SEM) was used to assess the relationship between students' use of ChatGPT and motivation to write in English. The findings suggest that ChatGPT positively impacts students' motivation by providing instant feedback, personalized guidance, and a low-pressure environment to practice English writing. Perceived benefits, particularly in relation to improving writing skills, are viewed positively by students and are closely associated with ChatGPT's overall perceived effectiveness. Students believe that the tool not only helps them refine and enhance their writing but also serves as a source of motivation, encouraging them to engage more consistently with writing tasks and continue using the platform as a supportive learning aid. While students acknowledge some drawbacks, such as reduced originality or AI-generated errors, these do not significantly diminish the tool's perceived value. ChatGPT can be viewed as a valuable supplement to traditional writing instruction, particularly if framed as a tool for enhancing writing quality and motivation rather than replacing human feedback. Therefore, understanding the evolving dynamics of AI tools is essential for maximizing their use in educational settings and effectively integrating them as valuable motivational aids in English language learning. The findings of this study contribute to the growing body of research on AI in education by offering empirical evidence on how ChatGPT influences student motivation and writing performance, particularly in the context of English language learning in higher education.

Keywords: ChatGPT, English Writing, Student Motivation, Higher Education, Learner Perceptions

Introducıng Phılosophy In Preschool: Phılosophy For Chıldren

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Abstract

Children's acquisition of basic cognitive skills such as thinking, problem solving, creativity and critical thinking at an early age is an important factor that supports their interest in learning and mental development throughout their lives. In this context, studies aimed at developing children's thinking processes in preschool period in conscious and effective ways gain great importance. The Philosophy for Children (P4C) Approach, which has become widespread in our country in recent years and aims to develop children's thinking skills holistically, stands out as one of the most comprehensive and effective methods in this field.

The name Philosophy for Children is abbreviated as P4C in the literature. In addition to Philosophy for Children, the acronym also has two other acronyms. Philosophy for Communities is one of them, as it can be applied with people and communities of all ages. Another one emphasizes critical, creative, collaborative, caring thinking and community skills (Özdemir, 2021: 4; Pritchard, 2002; Yılmaz & Bilican, 2021: 15). However, this approach has much more than just supporting thinking skills. In particular, it supports children to learn how to produce creative solutions, establish cause-effect relationships, and predict the results in the problem-solving process, while also contributing to the development of many social skills such as listening carefully, waiting for one's turn to speak, respecting others' opinions even if they disagree with them, and being tolerant (Pritchard, 2002). Mathew Lipman (1923-2010) was the first to articulate the idea of philosophizing with children, one of the approaches that best utilizes the power of questions, in the 1970s (Figueiredo, 2022; Juuso, 2007).

When "Philosophy for Children" is mentioned, the first question that comes to most people's minds is "Can children do philosophy?". In fact, until Lipman, the concepts of "Children" and "Philosophy" had never been considered together (Lipman, 1980). However, a little reflection reveals how these two concepts nourish and intertwine each other. Philosophy supports children's ability to ask questions about issues that concern them without hesitation, to discuss, to search for answers, to refuse to accept ready-made answers and to ask "Why?". It helps children to maintain their natural curiosity, to carry it forward, and to develop their research, analysis, analysis and thinking skills. Children use philosophy through the questions they ask by observing the world, people and relationships like a philosopher. In an environment where their unique philosophical attitudes are not supported, children's desire to ask questions can be suppressed. If philosophy is not nurtured by children, it may not go beyond a mere worldview. Therefore, it is necessary not to separate children from philosophy and philosophy from children due to the unity of these two concepts that feed each other (Wartenberg, 2020: 28).

In this study, it is aimed to provide an overview of the existing research that reveals the contribution of philosophy activities for children in preschool period to children's thinking and social skills. In the study, studies that contribute to the development of children's thinking skills and studies aimed at strengthening children's social skills were examined under two main headings. The studies were obtained from multiple databases using the keywords and phrases "preschool period", "philosophy for children", "thinking skills" and "social skills". Studies on preschool children, studies focusing on the philosophy for children approach, and studies published from 2010 to the present were included in the study. The findings of the literature review and the existing studies show that philosophy for children pedagogy, when implemented correctly and effectively, supports communication, collaborative thinking processes, sharing ability and empathy among children, and also contributes positively to children's problem solving, critical and creative thinking skills.

Keywords: Preschool, Philosophy for Children, Thinking skills, Social skills

"Media Literacy and Critical Thinking in the Age of AI: Preparing Students in the Classroom"

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Abstract

In the age of rapid digitalization and artificial intelligence, media literacy and critical thinking are emerging as fundamental competencies for students. With the explosion of information across digital platforms—especially social media—students are increasingly exposed not only to valuable knowledge but also to misinformation, bias, and manipulation. Therefore, the ability to critically assess sources, interpret content, and make informed decisions is vital for both their educational development and personal growth.

The aim of this study is to examine the importance of media literacy and critical thinking in the classroom and explore effective approaches for fostering these skills in school-aged students. The study is grounded in a qualitative content analysis of educational strategies and pedagogical practices that promote critical engagement with media in learning environments. Additionally, a comparative review of recent literature is conducted to identify current trends and challenges in teaching these competencies in the context of AI-driven information systems.

Preliminary findings suggest that media literacy and critical thinking are most effectively developed through interdisciplinary approaches that integrate real-world media analysis, ethical discussions, and collaborative learning. Students not only learn to recognize reliable sources and deconstruct media messages, but also begin to reflect critically on the influence of algorithms, data collection, and AI-generated content in shaping public opinion and personal beliefs.

The study concludes that equipping students with these skills is essential for their meaningful participation in the digital society. Media literacy and critical thinking should be embedded systematically into the curriculum, not as isolated topics, but as transversal competencies that support lifelong learning, active citizenship, and digital resilience.

This research contributes to the ongoing efforts to modernize educational systems and align them with the challenges of the AI era, advocating for a proactive and ethically grounded approach to classroom instruction.

Keywords: media literacy, critical thinking, artificial intelligence, misinformation, digital society, educational strategies, pedagogical practices, interdisciplinary learning, ethical discussions, collaborative learning, digital resilience, AI-generated content

AI-Supported Visual Writing and Speaking: A Holistic Instructional Design for a University Language Preparatory Program

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Abstract

In foreign language education, particularly when working with semantically open and culturally charged images, visuals have shown significant potential in fostering productive language skills and enhancing creative expression. Beyond vocabulary expansion, such images activate students' emotional, cultural, and social thinking skills, thereby making substantial contributions to meaning-oriented learning processes. In recent years, the development of AI-based tools has opened new possibilities both in the production and didactic use of such visuals. These technologies not only support individualized learning pathways for students but also provide functional assistance to teachers in content creation and feedback processes.

This paper presents an instructional project designed for university-level preparatory language students at the B1 level, aiming to holistically develop both written and oral production skills. The implementation begins with the use of visuals with high narrative potential—such as street scenes rich in cultural connotations—in group-based activities. Each group focuses on a different character within the same image and develops a text accordingly, thereby enabling the creation of multiple, individualized narratives from a single visual stimulus. This approach encourages students to employ their imagination to construct plot structures and produce expression within a narrative logic.

In the next phase, based on these texts, alternative visuals are created using AI-supported image generation tools (e.g., DALL·E), and the texts are linguistically revised with the help of AI-based writing assistants such as DeepL Write and LanguageTool. The oral production phase is enriched through discussions, comparisons, and re-descriptions across groups, thereby promoting student interaction and meaning-based language use. Each student orally represents the life, thoughts, or situations of the character developed by their group, thus integrating spoken expression with written production. The final products are presented in a digital exhibition space (e.g., Padlet) and evaluated through peer comments and voting, concluding with the selection of the best image-text match.

This study opens a theoretical discussion on the potentials and limitations of a multilayered instructional approach that integrates visuals and productive language skills through AI-based tools. The developed scenario goes beyond the instrumental use of AI by offering a pedagogical framework that supports learner autonomy, fosters creative thinking, and prioritizes meaningful communication.

Keywords: Foreign language education, visuals, AI-based tools, productive language skills, group work, digital exhibition

"Catch the Feeling!" – Teaching Emotion Words through AI-Supported Game-Based Activities in a Turkish Primary EFL Classroom

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Abstract

Early acquisition of vocabulary skills plays a vital role in the development of communicative competence in foreign language learning. In this context, the teaching of emotion-related vocabulary at the primary level offers a multifaceted approach that supports both linguistic and emotional awareness. This study presents a four-week AI-supported, game-based instructional model designed for third-grade primary school learners of English as a foreign language, focusing on basic emotion words.

The main objective of the project is to help students comprehend, recognize, and pronounce eight common emotion words in English (happy, sad, angry, scared, excited, tired, sleepy, bored) in meaningful contexts. The instruction was conducted exclusively through an interactive whiteboard due to the lack of individual digital devices. Artificial intelligence tools were used to support the teacher in creating instructional materials. Tools such as ChatGPT, DALL·E, TTSReader, and Bing Image Creator were utilized to generate weekly visuals, audio prompts, and game instructions.

The implementation was carried out in two parallel third-grade classes taught by the same teacher. While the experimental group received instruction through AI-enhanced, game-based activities, the control group followed the same content using only the textbook and traditional methods. Both groups worked with the same vocabulary list over the same period. Game-based activities such as Word Hunt, Balloon Pop, and Team Race were integrated into weekly lesson plans. These games were designed to reinforce vocabulary recognition, matching, and repetition skills, and were enriched with AI-generated visual and auditory materials.

Learning outcomes were assessed through a single post-test administered at the end of the four-week period. The test included multiple-choice and matching tasks based on the recognition of target words through visual and written prompts. The same test was applied to both groups, and the results were compared quantitatively.

The results indicated that students in the AI-supported group recognized the target vocabulary with greater accuracy, demonstrated stronger conceptual understanding, and participated more actively in class. In contrast, students in the textbook-only group showed more limited progress. The use of AI-generated materials contributed to increased attention and engagement, while game-based activities enhanced interaction and motivation.

This study demonstrates that AI technologies can be effectively integrated into primary EFL classrooms even in environments without individual device access. It also highlights the impact of methodological variation on learning outcomes, offering a concrete example of how AI-supported instruction can enrich vocabulary acquisition in early language education.

Keywords: artificial intelligence, vocabulary instruction, primary EFL classroom, emotion words, game-based learning, low-tech environments

Digital Grammar Teaching: An Experimental Study on German Learners

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Abstract

In recent years, technological developments in the computer sector have affected learning habits and learning styles to the same extent as in all areas of society. The learning styles of students in the digital age, the time they allocate for personal learning and the factors affecting their motivation have also changed.

"Motivation", which is considered one of the important factors in successful learning, plays an important role in effective learning. In this context, it can be said that the use of digital media in the classroom is of great importance because the new e-generation can have a positive impact on students' motivation to learn.

Grammar, among other language skills, is an important part of language learning and influences the learning process. Grammar teaching has been discussed many times and continues to be a controversial topic in today's digital age. Learning German is a challenging process for many Turkish students, especially when it comes to grammar topics. In this context, the use of computer-based materials can be a promising solution. This study deals with the effects of such materials on the learning behaviour of German learners in university preparatory classes in Turkey.

The aim of this study is to investigate the effectiveness of grammar teaching supported by digital exercises for Turkish-German University preparatory class students who are taught German as a foreign language. In the study structured with an experimental design, a pre-test and post-test consisting of 40 questions were applied. During the implementation process, a total of 250 digital exercises were developed for the grammar topics covered at A1 and A2 levels through digital platforms such as Quizlet and Kahoot and were regularly practised with the students.

The findings show that the digital exercises increased students' comprehension of grammar topics, increased their motivation towards the learning process and developed positive attitudes towards digital content. Participant students stated that interactive exercises made the learning process more fun and permanent.

The results reveal that digital learning tools play not only a supportive but also a transformative role in grammar teaching. Moreover, thanks to the integration of artificial intelligence-based systems into such digital platforms, it seems possible that more personalised, adaptive and data-driven language learning experiences will become widespread in the future. In this context, the study overlaps with the theme of "Artificial Intelligence and the Future of Education" and presents important findings regarding the potential of digital technologies in language teaching.

Keywords: German language teaching, digital exercises, Quizlet, Kahoot, grammar, experimental research, educational Technologies

Teaching in the Age of Technology: A Call for Human-Centered Learning

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Abstract

Whether a blessing or a curse, one thing is certain – we are living in times of profound and accelerating change, much of it driven by rapid advances in technology and artificial intelligence. Education is no exception. While many institutions remain hesitant or reactive, students are quick to embrace new tools, platforms, and ways of learning.

What, then, should education do in response? The easiest path may be to ride the wave of innovation, integrating technology into the very core of pedagogy and curriculum. This may seem inevitable – even efficient. But doing so uncritically risks turning education into a mechanized process, focused on inputs and outputs, rather than on the meaningful journey of discovery, growth, and transformation.

This article argues for a renewed commitment to human-centered learning – an approach that honors the full spectrum of human experience: intellectual, emotional, and sensory. Grounded in insights from educational psychology, it explores the growing disconnect between algorithmic, data-driven instruction and the complex and deeply human nature of learning. True understanding, after all, is not merely downloaded – it is constructed, felt, and lived.

As a counterpoint, the article revisits Suggestopedia, the pedagogical method developed by Georgi Lozanov. With its emphasis on music, aesthetics, imagination, and emotional safety, Suggestopedia treats the learner not as a processor of information but as a whole, creative being. It exemplifies how education can be joyful, immersive, and profoundly effective – precisely because it respects the emotional and imaginative dimensions of the human mind.

This article does not reject innovation – it calls for balance. Technology has its place in modern classrooms, but it should serve rather than supplant the deeply human, interpersonal aspect of the teaching process and the artistic and transformative nature of teaching. In the age of algorithms, we must protect the soul of education. The classroom should remain a sacred space – not only of instruction, but of human flourishing.

Keywords: Educational Innovation, Humanistic Psychology, Positive Psychology, Suggestopedia

The Role of Curriculum in Shaping Sustainability: Energy Conservation Education in Primary Education

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Abstract

In an era where sustainability is a global priority, primary education plays a crucial role in shaping environmentally responsible behaviors. This study explores how integrating energy conservation education into the primary school curriculum influences students' awareness and practices regarding sustainable energy use. Using an empirical approach, data was collected through surveys and classroom observations involving 150 primary school students. The research compares two groups: an experimental group that received structured lessons on energy conservation through interactive and experiential learning methods, and a control group that followed the standard curriculum without additional focus on energy topics.

Findings indicate that students exposed to energy conservation education demonstrated a significant improvement in their knowledge and daily energy-saving behaviors. Specifically, there was a 45% increase in awareness about energy sources and conservation techniques among the experimental group. Additionally, teachers and parents reported noticeable changes in students' habits, such as turning off lights when leaving a room and using electronic devices more efficiently. These results highlight the importance of embedding sustainability concepts into early education to cultivate long-term environmental responsibility.

The study suggests that integrating energy conservation topics into primary education curricula can foster lifelong sustainable habits. It recommends developing structured, engaging modules that use active learning strategies to enhance students' understanding and commitment to energy efficiency. By doing so, primary education can serve as a foundation for broader sustainability efforts within communities and future generations.

Keywords: Primary education, curriculum development, energy conservation, sustainability, environmental awareness, student behavior, active learning, sustainable habits, early education, energy efficiency.

Integrating Artificial Intelligence in Pediatric Fracture Detection through X-Rays: A Medical Imaging Approach

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Abstract

Artificial Intelligence (AI) is increasingly changing how pediatric radiology is done. Deep learning models, especially Convolutional Neural Networks (CNNs), have shown to be very effective in detecting small fractures on X-rays. This study combines a review of scientific literature with my own clinical experience to explore AI's potential to improve the diagnosis of pediatric fractures. During my internship at the University Hospital in Graz, I had access to the GRAZPEDWRI-DX dataset and observed how AI helps interpret images in real time, especially in difficult or uncertain cases. I also looked at pediatric cases from the central hospital in Tirana, Albania, to compare situations where AI is not yet used. Based on research from JSTOR and analysis of clinical images, the study shows that AI can reach over 90% accuracy, help reduce mistakes between doctors, but also has some limitations, especially in explaining how it makes decisions. The paper highlights how AI can work together with doctors, especially in places with limited resources or high pressure. Overall, this work shows that adding AI to pediatric radiology in the region could bring new ideas, faster diagnoses, and support for medical training across Southeastern Europe.

Keywords: Artificial Intelligence, Pediatric Fracture, Deep Learning, CNN, Radiology, GRAZPEDWRI¬-DX

Managıng Classroom Dıcıplıne In The Dıgıtal Socıety

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Abstract

The paper deals with a very important issue in the daily work of the teacher, namely disciplinary problems and their successful management. Disciplinary problems are always a great challenge for the teachers. How discipline problems will be managed, depends on many factors However, it mostly depends on the skill of the teacher to successfully deal with all the challenges brought by the new era, in which disciplinary problems, peer violence, as well as the neglect of the educational component are becoming a greater reality and dominance.

The subject of research is managing disciplinary problems in the class, and the purpose of the research is to examine how teachers deal with in this digital society.

For realizing purpose and tasks of the research, we used a survey sheet with closed-ended questions, on a sample of 139 primary education teachers from the entire country (R.N.Macedonia).

The survey showed that teachers need greater support for managinig classroom discipline in appropriate way. Most of them still do not use modern techniques like restitution. That is why training is needed.

The paper is part of the project managing disciplinary problems, financially supported by the Faculty of Pedagogy St. Kliment Ohridski.SS Cyril and Methodius University in Skopje.

Keywords: classroom discipline, teachers, managing, strategies

The Health State Of School Children In The Republic Of Macedonia And The Most Common Disorders

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Abstract
In order to be able to talk about good education for school children, it is necessary, first of all, to have healthy children. When talking about modern education, the priority is placed on mastering and adopting the curriculum, and very little attention is paid to the health state of children and their ability to attend classes regularly.
By monitoring systematic examinations, to determine the health state of school children and to see what the most common disorders are, with the aim of taking timely measures to preserve the health of children.
The results obtained during the systematic examinations showed that the most common health disorders of school children are caries and orthodontic anomalies, foot deformities, spinal deformities, poor posture and vision impairments, of course with different prevalence in terms of gender and age.
It is necessary to provide a healthy and safe school environment for children, as well as health education in educational institutions. The introduction of health education within the regular curriculum and the preparation of teaching staff for the goals and contents of this subject are of great importance. Only in this way will we be able to have healthy future generations, who will face the challenges of the future.
Keywords: health, students, prevention, school, protection

The Use of Artificial Intelligence in Aquaculture

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Abstract

Artificial intelligence (AI), a branch of computer science, has begun to be applied in every area of our lives. AI studies, which began in the 1950s, are currently experiencing rapid development, except during AI winters. Indeed, a search using the terms 'Artificial Intelligence' on Web of Science (07.07.2025) yielded 143,258 results. The field of education is also among the areas where AI is used. AI has a wide range of applications, from primary education to postgraduate education. Aquaculture Engineering education is a four-year undergraduate programme. Students who complete the required credits in the Aquatic Sciences Engineering programme at the Faculty of Aquatic Sciences are eligible to receive the title of Aquatic Sciences Engineer. During the education and training period, theoretical and practical lectures are given in the field of aquatic sciences. Since 2017, artificial intelligence has found application in aquatic sciences. Artificial intelligence is utilised in aquaculture and in the field of capturing images of aquatic animals. In the present study, based on Web of Science search results, the development of artificial intelligence, its application in the field of education, particularly the use of machine learning—a subfield of artificial intelligence—in aquaculture education, the challenges that may be encountered, and the future of AI in aquaculture education are examined.

Keywords: Artificial Intelligence, Aquaculture, Aquatic Animals, Learning

Supporting Roma Students' Science Learning through Model-Based Teaching Practices: The Case of the Respiratory System

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Abstract

Science education aims to help students understand scientific concepts and relate them to everyday life. However, the abstract nature of many science topics often poses challenges for students during the learning process. In this context, model-based teaching practices offer the potential to concretize abstract concepts, thereby fostering deeper and more lasting understanding. Moreover, ensuring equal educational opportunities necessitates considering disadvantaged groups. Like elsewhere in the world, Romani students in Turkey face various socio-economic, cultural, and educational disadvantages. These challenges often lead to a greater need for support in subjects such as science, which are rich in abstract content.

This study aims to examine the impact of model-based teaching practices on the meaningful learning of Romani students, a disadvantaged group, in the context of teaching the respiratory system. The research was conducted using a case study design, one of the qualitative research approaches. The study group consisted of nine 6th-grade Romani students and two science teachers from a public middle school located in a socio-economically disadvantaged region in northwestern Turkey. Data were collected through researcher observation notes, nine semi-structured interview questions with the teachers, and eight semi-structured interview questions directed at the students. The qualitative data obtained were analyzed using content analysis.

The findings revealed that model-based teaching practices increased students' interest and motivation in the course and contributed to meaningful learning by promoting active participation. In particular, Romani students were found to better comprehend abstract concepts through concrete models and demonstrated higher levels of engagement in the instructional process. Additionally, teacher interviews indicated that model-based activities enhanced classroom interaction and fostered the development of scientific thinking skills among students. This study suggests that model-based teaching practices can support the active participation of disadvantaged groups such as Romani students in science learning processes and contribute to the creation of more inclusive and equitable learning environments.

Keywords: Model-Based Teaching, Science Education, Meaningful Learning, Romani Students, Disadvantaged Groups

A Systematic Review of Studies on the Implementation of Robotics and Coding Applications in Science Education

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Abstract
With the advancements in technology and the emergence of Industry 4.0, enriching science education environments with robotics and coding applications has gained increasing importance in recent years. In this context, integrating robotics and coding applications into science instruction is recommended. This study aims to systematically review research conducted between 2015 and 2025 that incorporates robotics and coding applications in science education. A comprehensive search was conducted across Web of Science (WoS), Google Scholar, ProQuest, ERIC, TRDizin, and YÖKTEZ databases using the keywords "robotics," "coding," and "science education." Based on the inclusion criteria, 47 full-text accessible studies were selected for in-depth analysis. The studies were examined based on database source, publication year, types of robot kits used, sample level, sample size, research method, data collection tools, and dependent variables. The findings were presented descriptively. According to the databases, data from 19 studies in WoS, 15 in Google Scholar, 3 in ERIC, 4 in TRDizin, 4 in YÖKTEZ, and 2 in ProQuest were reviewed. The year 2024 was identified as the most prolific in terms of publication frequency. Among the robot kits used, Arduino sets were the most preferred due to their ease of use. Since the inclusion criteria focused on science education, middle school students were predominantly represented in the sample populations. The majority of studies involved 11 to 30 participants. Regarding research methods, 15 qualitative, 14 quantitative, and 14 mixed-method studies were identified. In terms of data collection tools, scales were most commonly used in quantitative studies, while interview forms were frequently employed in qualitative research. The dependent variables explored included skills, attitudes, achievement, motivation, opinions, scientific creativity, learning outcomes, and mental imagery. This study aims to contribute to the literature by identifying trends in the integration of robotics and coding in science education. Based on the findings, it is recommended that future reviews include additional criteria to better capture the current state of robotics and coding applications in the field.

Keywords: Science education, coding, robotics, systematic review

What Should a Green School Look Like?

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Abstract

The educational paradigm of the 21st century emphasizes not only the transmission of knowledge but also the cultivation of competencies that enable individuals to address complex, multilayered, and often ambiguous challenges throughout their lives. Within this transformative vision, sustainability has emerged as a central concept shaping the foundations of educational systems. The notion of a "green school" represents this transformation by integrating environmental awareness into pedagogical, physical, cultural, and social dimensions of schooling. The aim of this study is to explore the essential characteristics that define a green school.

Based on a comprehensive analysis of national and international literature, the study proposes a model structured around six key themes derived through content analysis:

· Physical Infrastructure and Environmental Arrangements: Green schools are characterized by environmentally friendly designs, including recycling systems, energy-efficient technologies (such as solar panels and LED lighting), rainwater harvesting systems, school gardening practices, and outdoor classrooms.

· Curriculum Integration and Instructional Approaches: Sustainable development themes are embedded within science, mathematics, social studies, and the arts. Learning processes prioritize problem-based, project-oriented, and nature-based pedagogies that encourage interdisciplinary thinking.

· Teacher Roles and School Culture: Teachers play a pivotal role in fostering a sustainability-oriented school culture. Continuous professional development in sustainability pedagogy, empowering students as environmental leaders, and promoting collaboration, harmony with nature, and ethical decision-making are essential components.

· Student Participation and Active Learning: Green schools promote active student engagement through environmental clubs, experiential learning activities (e.g., composting, mycology labs), and inclusive decision-making processes.

· Community Collaboration and Local Engagement: Partnerships with local governments, universities, and NGOs are viewed as critical for expanding the reach and impact of green school initiatives and cultivating a culture of sustainability beyond the school walls.

· Evaluation and Monitoring Mechanisms: Effective green school practices require comprehensive monitoring systems that assess not only physical changes but also pedagogical and behavioral outcomes. These include tracking students' environmental literacy, ethical awareness, and systems thinking competencies.

Findings reveal that green schools are not limited to physical transformation; rather, they represent a deep pedagogical and cultural shift in the way education is conceived and implemented. Nonetheless, structural support remains necessary in areas such as time management, teacher training, institutional coordination, and resource allocation.

In conclusion, the green school approach offers a transformative educational model aimed at nurturing individuals who not only understand the natural world but also think with it, feel connected to it, and act responsibly within it. This vision redefines education as a vital force for planetary well-being and social equity in the age of ecological crisis.

Keywords: sustainable education environments, sustainable education, science, green school, ecological school

A Study on the Views of Gifted and Non-Gifted Students Regarding the Nature of Science: The Edirne Province Example

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Abstract

This study aims to examine the views on the nature of science among students who have and have not been identified as gifted. The Science Curriculum aims to equip students with scientific process skills and foster habits of scientific thinking. In this context, it is intended that scientifically literate students comprehend the principles of scientific ethics and internalize the process by which scientific knowledge is generated by scientists, ultimately turning this understanding into a life skill (MoNE, 2018). Views on the nature of science (NOS) reflect students' understanding of how science works, how scientific knowledge is produced, and how scientists conduct their research. Determining students' views on the nature of science provides concrete data to evaluate the effectiveness of curricula and contributes to the development of scientifically minded individuals who meet the demands of the modern era. A mixed-method research design was adopted. In the quantitative dimension, descriptive and correlational survey models were employed, while the qualitative dimension included semi-structured interviews to support the quantitative findings. Initially, quantitative data were collected and analyzed, followed by qualitative data collection for deeper interpretation. The study sample consisted of 60 academically successful but non-identified gifted students from three public middle schools in Edirne, as well as 60 students identified as gifted and attending the Edirne Science and Art Center during the 2023–2024 academic year. All participants were 5th, 6th, or 7th grade students who voluntarily participated in the research. The non-identified gifted students were selected using a purposive sampling method, based on teachers' evaluations and academic achievement in science. Data collection instruments included a personal information form developed by the researcher and the "Views of Nature of Science – Elementary Level" (VNOS-E) questionnaire developed by Lederman and Ko (2004) and adapted into Turkish by Erenoğlu (2010). Data were analyzed using SPSS 26. The findings were evaluated under five key themes: the tentativeness of scientific knowledge, the distinction between observation and inference, the role of creativity in science, the subjective elements of scientific knowledge, and its empirical and logical foundations. The results indicated that gifted students demonstrated more advanced understanding in all themes, particularly in complex concepts such as creativity, subjectivity, and the observation-inference distinction. However, students without a gifted identification also showed moderate to high levels of understanding in some themes. These findings suggest that science education has the potential to foster scientific thinking skills in all students, regardless of gifted status. In conclusion, while gifted students displayed a more comprehensive understanding of NOS, students not identified as gifted also possess the capacity for conceptual growth in this area. Therefore, it is recommended that science curricula include more explicit instruction on NOS concepts and utilize structured tools like the VNOS-E to support this instruction. Integrating these elements systematically into science education could significantly enhance students' scientific literacy and understanding of how science operates. This study is part of a master's thesis and is supported by the Trakya University Scientific Research Projects Unit (TÜBAP).

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Keywords: Nature of Science (NOS), Scientific Literacy, Science Education, Mixed-Methods Research, Gifted and Non-Gifted Students

Implementing STEM projects in middle and high school: a model for interdisciplinary learning through practice

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Abstract

The dynamically changing world requires students to acquire practical skills, critical thinking and the ability to solve real-world problems. Education today must prepare students not only with theoretical knowledge, but also with skills to apply and deal with real-world problems. To meet the challenges of the modern world, education must transform from a subject-oriented to an interdisciplinary one, where students build a holistic understanding by connecting different areas of knowledge.

The complex nature of real-life and professional challenges requires educational models that transcend the boundaries between individual subjects - through interdisciplinary teaching. An interdisciplinary approach to education is the integration of knowledge and skills from different subject areas in order to better understand complex topics or real-life problems [1]. An integrated approach to education consists of the purposeful unification of knowledge, skills and methods from different academic disciplines, with the aim of: solving complex problems; better understanding real-world phenomena; developing comprehensive, connected and applicable knowledge. It is in the search for an effective form of interdisciplinary and practice-oriented learning that STEM education stands out - a modern educational approach that unites science, technology, engineering and mathematics in solving real problems. In response to the need for more up-to-date, reality-related and applicable knowledge, STEM is establishing itself as a leading educational trend, especially in middle and upper grades.

This publication examines the relevance of the STEM approach in school practice, emphasizing its role in stimulating critical thinking, scientific and digital literacy, creativity and teamwork. The basic pedagogical principles of STEM education are presented, as well as its advantages over traditional forms of teaching. Emphasis is placed on the need for integrated, interdisciplinary and practice-oriented knowledge that connects school education with the real world and the professional realization of students. The article also analyzes the challenges facing the implementation of STEM projects in Bulgarian schools, offering guidelines for their successful implementation in the classroom. The implementation of STEM projects in middle and upper grades creates conditions for active, interdisciplinary and meaningful learning through practice. The STEM approach is being established as a key step towards a more modern, engaging and sustainable education oriented towards the future.

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Keywords: STEM projects, interdisciplinary learning, middle and high school education

Integrating Biomimicry into Sustainability

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Abstract

The increasing severity of environmental problems and the depletion of natural resources have brought the concept of sustainability to the forefront in the field of education. In this context, the 2018 revision of the Turkish Science Curriculum has further emphasized the significance of sustainability education. The aim is to enable students to develop skills to adapt to changing global conditions and to raise them as environmentally conscious individuals. At this point, the biomimicry approach, which offers sustainable solutions to human-induced problems by drawing inspiration from nature, comes to the fore. This study aims to examine the integration of the biomimicry approach into sustainability education through a systematic review and a bibliometric analysis using VOSviewer to reveal topic trends over the last ten years. Keywords extracted from academic articles via Mendeley were transferred in RIS file format and visualized as graphical maps using the VOSviewer software. Initially, the Web of Science database was scanned; however, due to insufficient relevant results, additional databases such as TRDizin, Wiley, Taylor & Francis, ScienceDirect, Google Scholar, and Scopus were consulted. Studies identified using the keywords "sustainability" and "biomimicry in education" were evaluated through content analysis. In the synthesis phase, 39 studies related to science education were analyzed. Accordingly, the keywords, research methods, aims, target audiences, instructional approaches, and publication years of the studies were categorized, and the data obtained were visualized using graphical tools. The findings of the study reveal that the integration of biomimicry-based practices into educational settings contributes to raising students who are sensitive to nature, productive, and capable of developing sustainable solutions. In this context, biomimicry is regarded as a significant tool in building an environmentally friendly society of the future.

Keywords: Biomimicry, Sustainability, Science Education

Science Teachers' Views on Place-Based Education

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Abstract

Place-based education (PBE) is an instructional approach that centers the learning process around students' local environment, integrates with the local context, and is multidimensional and interdisciplinary in nature. This approach aims to enable students to learn through direct experiences, establish strong connections with their surroundings, develop environmental awareness, and foster a sense of social responsibility. The core dimensions of PBE include contextuality and the strengthening of students' relationships with their living environments. When reviewing studies conducted in our country, no research has been found regarding the extent to which this approach is incorporated into science courses or concerning the knowledge and implementation levels of science teachers. In this context, the study examines science teachers' knowledge levels regarding the place-based education approach and their views on its implementation in instructional processes.

The study was carried out using a basic interpretive qualitative research design. The study group consisted of 19 science teachers working at four public middle schools located in the city center of Edirne during the first semester of the 2024–2025 academic year. The data were collected using a semi-structured interview form developed by the researchers and shaped with expert opinions. The interview form consisted of open-ended questions aimed at revealing the teachers' knowledge levels regarding place-based education, examples of implementation, encountered challenges, and suggested solutions. The collected data were analyzed using content analysis.

According to the findings of the study, most teachers did not have direct knowledge of the place-based education approach; however, it was determined that some of them unknowingly applied this approach in their classroom activities. Teachers stated that place-based education significantly contributes to developing students' environmental sensitivity, enhancing their scientific thinking skills, and increasing the permanence of learning. Nevertheless, it was observed that the teachers did not sufficiently emphasize the dimensions of contextuality and students' relationship with their local environment. Furthermore, in order for this approach to be more effectively integrated into instructional processes, teachers expressed the need for increasing in-service training opportunities, making instructional environments more flexible according to local conditions, and aligning planning with the curriculum.

Keywords: Place-Based Education, Science Teacher, Contextuality

Creative Science Experiments as a Pathway to Engagement: A Case Study from a Rural Greek Secondary School

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Abstract

This paper presents a case study of the "10th Creative Science Experiments Contest", held for the first time in the region of Imathia, Greece, at Gymnasio Plateos, a rural lower secondary school characterized by significant socio-economic diversity. The competition, was a celebration of innovation, experimentation, and student engagement in science through hands-on, gamified, and collaborative learning experiences. The students were invited to read a story adapted to everyday life and through guided aspects of it, they were invited, with the help of experimentation, to find its solution.

Gymnasio Plateos serves a diverse student population, many of whom face structural educational barriers. In 2024–2025, the school enrolled 137 students, yet only 90 (65%) completed the academic year. Of particular concern is the high dropout rate in Grade A, where only 32 of 71 enrolled students (45%) sat for final exams. The school population includes 36% Roma students, 14% from Albanian backgrounds, and 8% Muslim Greeks, with a majority facing economic and educational challenges. These demographics reflect limited access to STEM opportunities and generally low motivation for Science and academic advancement, particularly in rural areas where university attendance is not a widespread aspiration.

The contest was organized under the coordination of the 1st Model Lyceum of Thessaloniki "Manolis Andronikos", in collaboration with schools across Central Macedonia Region. Gymnasio Plateos was selected due to its active involvement in STEAM initiatives in partnership with Aristotle University of Thessaloniki.

The pedagogical framework guiding the competition was rooted in gamification and problem-based learning (PBL). Students tackled open-ended scientific challenges using everyday materials, fostering creativity, critical thinking, and engagement. The hands-on activities aimed to transform science into an accessible and enjoyable process, leveraging low-cost experimentation to overcome infrastructural limitations. Through this structure, science learning became more inclusive and meaningful for all students, especially those traditionally underrepresented in STEM, such as girls and Roma students.

Nine teams from three schools participated, comprising 28 students (18 girls, 10 boys). In only three of them did the students seem to struggle to ensure that their formulations were close to scientifically correct opinions. Notably, three Roma students competed, one of whom reached the final phase and all of whom demonstrated academic improvement afterwards, which led to their promotion to the next grade.

The students engaged with the topics, almost all of them, for the 3 hours that the competition lasted and showed better performances in the subject of Chemistry, followed by the subject of Physics, while they showed the worst performances in the subject of Biology.

The event encouraged differentiated learning strategies, providing all participants—regardless of academic background or prior science performance—with multiple means to engage, experimenting representing, and expressing valid scientific conclusions.

The contest's design emphasized cooperative learning, engagement, and equitable participation. Student written reflections following the event highlighted themes of collaboration, problem-solving, creativity, and motivation. Many expressed a desire to participate again and emphasized the positive, inclusive atmosphere of the event.

Despite persistent challenges in fostering science interest—especially among girls and students from marginalized backgrounds—the competition demonstrated that structured, playful, and inquiry-based approaches can foster positive attitudes and academic improvement in science. The success of the event underscores the potential of experiential and contextualized science education to engage students with few prior connections to academic or scientific cultures.

This case study suggests that gamified problem-solving in science, integrated within a competitive but supportive environment, can be an effective pedagogical strategy in rural schools. It builds student agency, enhances science identity, and bridges equity gaps in STEM education.

Keywords: Science contest, gamification, PBL

Promoting Chemical Literacy Through Socio-Scientific Issues: An AI-Enhanced Teaching Approach on Food Safety

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Abstract

This study presents an AI-assisted educational design aimed at promoting critical food literacy on the topic of food additives. While many studies in food literacy focus on general nutritional knowledge or healthy eating habits, this design emphasizes the socio-scientific nature of food additives as a controversial issue situated at the intersection of science, ethics, and policy. The instructional materials were developed using generative artificial intelligence (ChatGPT-4) and iteratively improved through the reflective practice of the instructor, who also serves as the researcher. Drawing on a design-based research (DBR) approach, the instructional sequence integrates blog posts, visuals, social media prompts, and a role-based scenario to engage the public in ethical and critical discussions.

The blog post, which is publicly accessible, provides factual information on food additives (e.g., preservatives, antioxidants, sweeteners) while raising critical questions about regulatory practices and public trust. The blog post will be shared via X, Facebook and Instagram posts. Readers will be encouraged to comment, share perspectives, and answer embedded prompts to stimulate interaction. The blog post will also be disseminated via social media platforms such as X (formerly Twitter), Facebook, and Instagram to reach a broader audience and encourage public engagement. Additionally, a scenario-based role-play task invites participants to adopt one of five roles within a fictional organization including researcher (e.g. food engineer, public health researcher, etc.), ghostwriter (blogger, media content producer, etc.), communicator (journalist, teacher, etc.), system/AI developer (software developer, data analyst, etc.), or information controller (government censorship officer, content moderator for social media, etc.). Each role includes a set of questions concerning knowledge production, dissemination, and control, prompting participants to reflect on dilemmas such as scientific neutrality, information distortion, and algorithmic influence.

To evaluate the written responses produced during this role-play task, a three-dimensional rubric was developed. The rubric assesses three different features, each comprising four categories:

- Approach to Knowledge (Critical Inquirer, Adaptive Thinker, Conformist, Denier),
- Ethical Orientation (Principle-Based, Utilitarian, Contextual/Flexible, Opportunist),
- Use of Knowledge (Verifier, Interpreter, Framer, Distorter).

Each axis reflects how participants engage with, reason about, and communicate knowledge in socio-scientific contexts. The framework allows for nuanced analysis of diverse public perspectives while maintaining educational rigor. This design offers a novel example of how generative AI can support public-facing educational efforts while advancing research in chemical and food literacy. It also demonstrates how ethical reasoning, reflexivity, and public engagement can be fostered through creative narrative and role-based tasks. The study concludes with suggestions for evaluating such materials in future phases and the potential role of expert feedback in further iterations.

Keywords: Food safety, chemical literacy, socio-scientific issues, AI-assisted teaching, interdisciplinary education, science communication.

An Investigation of the Compatibility of AI-Supported Lesson Plans with the 5E Learning Model in Astronomy Education

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Abstract

This study aims to examine the alignment of lesson plans developed by pre-service science teachers using artificial intelligence (AI)-based tools with the 5E learning model (Engage, Explore, Explain, Elaborate, Evaluate), one of the constructivist instructional approaches. The research focuses on understanding how pre-service teachers structure their pedagogical content knowledge during the integration of technology into instructional design and how this process contributes to their professional development.

The process of lesson planning is not merely a sequence of activities; it encompasses a complex instructional practice that involves pedagogical reasoning, understanding of student needs, and the ability to bridge content knowledge with appropriate instructional methods. In this context, lesson plans serve as significant indicators of both pre-service teachers' professional competencies and their awareness of contemporary skills such as sustainability in education, systems thinking, and argumentation.

The study was conducted using a qualitative research design and employed content analysis. A total of 44 AI-supported lesson plans developed by pre-service science teachers enrolled in a public university in Turkiye were analyzed within the scope of an Astronomy course. The analysis was carried out using the 5E Lesson Plan Evaluation Rubric developed by Goldston et al. (2010). Based on the criteria in the rubric, the plans were scored, and the results were supported with descriptive statistics.

The findings reveal that the majority of pre-service teachers demonstrated "good" levels of planning skills. The highest performance was observed in the "Engage" phase, particularly in attracting students' interest and establishing connections with real-life contexts. However, challenges were noted in the "Evaluate" phase, particularly regarding alternative assessment methods such as self-assessment and peer evaluation. Furthermore, it was identified that the "Elaborate" phase lacked sufficient integration of creative thinking, interdisciplinary connections, and sustainability-oriented competencies. These results indicate that, despite the support of AI tools, pre-service teachers require further guidance in modeling complex pedagogical structures in a holistic manner.

Moreover, the analysis of lesson plans revealed not only individual competencies but also the potential of pre-service teachers to reflect systematic thinking, instructional decision-making, argumentation skills, and awareness of sustainability within their planning processes.

In this regard, the study offers valuable insights into the role that AI-based instructional design processes may play in enhancing pre-service teachers' pedagogical content knowledge. It also emphasizes the importance of utilizing AI tools not only for content generation but also as a means to support critical thinking and pedagogical structuring.

In conclusion, the study suggests the implementation of structured mentoring programs aimed at improving pre-service teachers' competencies in integrating technological tools with pedagogical models. Such programs should be systematically applied, particularly in the context of integrating the 5E model with artificial intelligence in teacher education.

Keywords: 5E Learning Model, Lesson Planning, Artificial Intelligence, Astronomy Education

Opportunities and Challenges of Using AI in Science Education

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Abstract

In recent years, Artificial Intelligence (AI) has emerged as one of the most influential technologies of the 21st century. Its introduction into education, and particularly into science education, brings new challenges and opens up vast opportunities. This report examines the integration of AI into science education and its potential to transform the learning process. The main aim of the study is to analyze the opportunities AI offers for improving science learning, as well as to identify the challenges related to its integration into the educational process. From a methodological perspective, the text employs an analytical approach based on a review of contemporary platforms, international reports (OECD, UNESCO), and best practices. It presents real AI tools applicable in science education and proposes a typology of their pedagogical functions. Among the main opportunities offered by AI are: personalization of learning through adaptive platforms that take into account individual progress and learning style; visualizations and simulations that facilitate the understanding of abstract concepts; hands-on learning and engagement with real scientific projects through platforms such as iNaturalist, which use AI for species recognition; development of critical thinking through simulations of scientific case studies and analysis of the consequences of environmental changes; support for students with special educational needs through accessible AI-based tools for content comprehension. Alongside these positive aspects, the report also highlights the challenges, including: ethical issues related to the use of personal data by AI systems, especially when working with children; technological inequalities and lack of internet access/devices in some regions; insufficient teacher preparation, both technically and methodologically; risk of passive learning and loss of active cognitive engagement in overly automated education; and the absence of a clear regulatory framework to govern AI implementation in educational settings. In conclusion, the report emphasizes that the true value of AI lies not in the technology itself, but in its conscious, critical, and pedagogically purposeful application. Artificial Intelligence can enrich science learning, foster scientific literacy and ecological thinking, but only if used responsibly, innovatively, and with a focus on the learner.

Keywords: artificial intelligence; science education; scientific literacy; interactive technologies; pedagogical innovation

Reflections of Inquiry-Based Chemistry Experiments on the Learning Processes of Pre-Service Science Teachers

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Abstract

The aim of the present study is to evaluate how inquiry-based chemistry experiments influence the inquiry-driven learning processes of pre-service science teachers, and to determine their views regarding this learning process. To this end, inquiry-based chemistry experiments were developed and implemented on the topics of concentration calculations and solution preparation, solubility, enthalpy change, factors affecting reaction rate, chemical equilibrium, acids and bases, indicators, and redox reactions. A total of 39 first-year pre-service science teachers participated in the study. At the outset, participants were informed about the process and the nature of inquiry-based experiments and were subsequently divided into collaborative groups. Additionally, worksheets were prepared, and participants were required to complete them during the experimental activities. Upon completion of the experiments, the participants were required to prepare laboratory reports and submit them to the instructor within a specified timeframe. As a data collection tool, the Inquiry-Based Chemistry Experiment Assessment Rubric, developed by the researchers, was used to evaluate the laboratory reports. This rubric assessed the reports across ten criteria; each rated on a five-point scale ranging from 1 (inadequate) to 5 (excellent). A second data collection tool, the Reflective Evaluation Questionnaire, also developed by the researchers, was used to obtain both evaluative data on the process and insights into the participants' perceptions. Analysis of the data revealed that the inquiry-based experiments contributed to the development of the participants in key inquiry skills such as hypothesis formulation, experimental design, and data interpretation. Furthermore, responses from the Reflective Evaluation Questionnaire indicated that the participants believed the experiments enhanced their learning, supported their academic development, encouraged research and scientific thinking, facilitated their understanding of cause-effect relationships in chemical phenomena, increased their motivation to become science teachers, and inspired them to adopt similar approaches in their future classrooms. The findings underlined the significance and value of inquiry-based approaches within teacher training programmes.

Keywords: Chemistry laboratory, chemistry experiments, inquiry-based learning

Experiences of 5th Grade Romani Students with Engineering-Design-Based STEM Activities

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Abstract

In terms of educational equity and inclusivity, supporting the participation of disadvantaged groups in science, technology, engineering, and mathematics (STEM) fields has become an important educational objective today. In this context, engineering-design-based STEM activities have emerged as an effective instructional approach that supports students' 21st-century skills. Within the scope of this study, engineering-design-based STEM activities were implemented over a period of 10 weeks as part of the 5th-grade science course, aiming to examine participants' experiences regarding the implementation process. The study was designed according to the phenomenology pattern, one of the qualitative research methods. Participants were selected through criterion sampling, a purposeful sampling method, and consisted of 14 5th-grade Romani students enrolled in a public middle school located in a socioeconomically disadvantaged region in northwestern Türkiye. Data collection tools included STEM student diaries kept by the students and observation notes recorded by the researchers. These diaries and observation notes enabled an in-depth examination of students' experiences during the activities. The qualitative data obtained from the STEM student diaries and researcher observation notes were quantified for evaluation.

Findings from the analysis of the students' STEM diaries revealed that students gained knowledge about various types of engineering, expressed satisfaction with actively participating in the design processes, and enjoyed working collaboratively in engineering-design-based STEM activities. Most students stated that they would like such activities to continue. Regarding the design process, the stages most frequently mentioned by students were problem identification, research, and designing, while in the category of enriching the instructional environment, the use of Arduino was identified as the most engaging element for students. Researcher observations also provided supporting evidence that students actively participated in the activities, enjoyed the implementations, and that engineering-design-based STEM activities made positive contributions to the learning processes of Romani students.

Based on this study, it can be argued that the dissemination of engineering-design-based STEM activities among disadvantaged student groups has positive impacts in terms of educational equity and inclusivity. For future research, it is recommended to conduct long-term follow-up studies to assess the sustainability of the gains students achieve through engineering-design-based STEM practices, and to examine more comprehensively the effects of various STEM applications at different grade levels, particularly for Romani students.

Keywords: disadvantaged students, middle school students, engineering-design-based STEM activities, learning experiences

The Effect of Engineering Design-Based STEM Activities on 5th Grade Romani Students' Views of the Nature of Engineering

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Abstract

In the 21st century, the integration of engineering design-based science, technology, engineering, and mathematics (STEM) activities into science curricula has gained prominence as a means to meet the needs of a knowledge and skills based society. Within this context, enhancing the views of Romani students—a group considered economically, socially, and culturally disadvantaged—regarding the nature of engineering is crucial for promoting equity in education and supporting their participation in STEM activities. This study aimed to examine the effect of engineering design-based STEM activities on 5th grade Romani students' views of the nature of engineering. A weak experimental one-group pretest–posttest design, one of the quantitative research methods, was employed. Participants were selected through criterion sampling, a purposive sampling method, and included 14 fifth-grade Romani students attending a public middle school in a socioeconomically disadvantaged region in northwestern Türkiye. Data were collected using the Views for Nature of Engineering – Elementary School Version (VNOE-E) scale, comprising 11 open-ended questions. To ensure the reliability of the measurement and to examine the retention of learning outcomes, data were collected in three stages: a pretest, a posttest, and a retention test administered eight weeks after the intervention. Both quantitative and qualitative data were obtained. Qualitative data from the open-ended questions were analyzed using content analysis, and the results were quantified through descriptive statistics. The findings indicated changes in students' views regarding the nature of engineering before and after the intervention. Pretest results revealed that most students did not identify engineering as a profession and tended to prefer careers such as policing. They also lacked sufficient knowledge of the definition of engineering and the engineering design process, showing minimal awareness of the latter. Although some students initially stated that engineering differed from other professions, they were unable to justify this distinction. Their definitions and drawings almost exclusively referred to limited fields, such as civil engineering. Posttest results demonstrated that students recognized engineering as a profession and learned about the existence of different engineering fields. Following the engineering design-based STEM activities, students described engineers as individuals who investigate, think critically, make discoveries, and develop designs. Fields such as electronic and computer engineering became more prominent in their definitions. Initial depictions focused on civil engineering, but later expanded to include diverse areas such as automotive, robotics, electrical-electronics, mechanical, computer, aerospace, and software engineering. Students emphasized that engineers engage intensively with technology and conduct research, and they were able to explain the distinctive aspects of engineering, including engagement with technological advancements, establishing order, planning, and design development. They also developed views that engineers strive to solve problems and thereby shape the future. By the end of the activities, all students recognized the term "engineering design process" and defined it as a process involving research and design stages aimed at producing a final product. Finally, students indicated that engineers' designs exert positive impacts on daily life, are widely utilized, and contribute to making life easier, with most emphasizing that engineers generally work in teams. Overall, the findings suggest that engineering design-based STEM activities significantly influenced disadvantaged Romani students' views regarding the nature of engineering. Students described the engineering profession in terms of investigation, design, problem-solving, and contributing to human life, highlighting that engineering possesses not

only a technical but also a societal dimension. These results provide significant implications for promoting equity in education, implementing inclusive teaching practices, and expanding access to STEM fields. Accordingly, it is recommended that engineering design-based STEM activities be further integrated into educational policies and teacher practices.

Keywords: disadvantaged students, middle school students, nature of engineering, engineering design-based STEM activities

The Effect of Out-of-School Learning Environments on STEM Attitudes and STEM Career Interests

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Abstract

This study was conducted to observe how the attitudes of gifted middle school students enrolled in Science and Art Centers toward STEM fields and their interest in STEM careers might change when they participate in out-of-school learning environments.
A mixed method combining quantitative and qualitative data collection methods was preferred in this study. Creswell and Plano Clark (2018) argue that mixed methods are used to examine a research problem more comprehensively. Quantitative data were collected using two different scales twice, as pre-tests and post-tests, while qualitative data were obtained through natural observation during the trip. The results were evaluated together. The research was conducted with 26 sixth-grade students attending a Science and Art Center in Turkey. The necessary legal permits were obtained for the research, consent forms were collected from the students for their voluntary participation, and the necessary permissions were obtained from their parents. The trip was carried out after the pre-test was administered. This trip was made to the anatomy department laboratory and the mixed reality laboratory of the university with the best medical faculty in Turkey, which is ranked between 201-250 in the QS Top Universities 2025 ranking (QS Top Universities, 2025). The students examined the materials in the laboratory, experienced mixed reality glasses, and received information from the faculty members. Student behavior and attitudes were observed and noted during the visit. The same tests were administered again after the trip.

Based on the quantitative analyses conducted within the scope of the STEM Career Interest Scale applied to the students participating in the study, a significant difference was observed between the pre-test and post-test results ($t(25)$: -3.136, $p = 0.004 < 0.05$). According to the results of the paired samples t-test conducted within the scope of the STEM Attitude Scale a significant difference was observed between the pre-test and post-test results ($t(25)$:-2.98, $p=0.006 < 0.05$). The significant differences indicate that the trip positively influenced middle school students' attitudes toward STEM and increased their interest in STEM careers. According to natural observation, the students exhibited enthusiastic, excited, and interested behavior during the trip. They experienced an interactive environment by asking creative questions to the relevant academic staff. Additionally, the attitudes the students exhibited while experiencing mixed reality glasses clearly demonstrate their high interest in technology.

This study concluded that out-of-school learning environments positively influenced students' STEM attitudes and increased their professional interest in these areas. Students had the opportunity to relate STEM concepts to daily life by experiencing laboratories used within the university and gaining new knowledge from faculty members. This field trip experience was effective on students' long-term career expectations; an increase in their interest in STEM professions was observed. The findings indicate that informal learning environments not only support students' learning motivation (Schneiderhan, Opel, & Bogner, 2021) but can also play a guiding role in their future career choices (Halim et al., 2023).

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Keywords: gifted students, STEM attitude, STEM career, field trip, interest

Implementation of Engineering Design Processes in Science Education: A Systematic Review

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Abstract

In recent years, the integration of engineering design processes (EDPs) into science education has gained increasing attention, particularly within the framework of STEM. This systematic review aims to examine how engineering design processes have been implemented in the context of science education over the past decade. Following PRISMA guidelines, a literature search was conducted using the Web of Science and TR Dizin databases for articles published between 2015 and 2025. According to the defined inclusion and exclusion criteria, a total of 115 studies (Web of Science, n = 80; TR Dizin, n = 35) were included in the analysis. The selected studies were evaluated in terms of the journals in which they were published, publication years, types of science disciplines, subject areas, instructional approaches combined with engineering design processes, sample characteristics (grade level, age, and sample size), research methods, objectives, and main focus areas. Additionally, measured variables, data collection tools, data analysis methods, and the ways in which engineering design processes were implemented were examined. According to journal analyses, the International Journal of Science and Mathematics Education stood out among the Web of Science journals, whereas the Journal of the Faculty of Education at Yüzüncü Yıl University was prominent in the TR Dizin. In terms of publication year, the largest number of studies was conducted in 2024. When sample groups were analyzed, the majority of studies involved middle school students, with sixth and seventh graders being the most frequently studied groups. Following this, pre-service teachers constituted the second-largest group, with third-year science education pre-service teachers being the most commonly included. Studies with high school students primarily involved ninth graders. Sample sizes generally ranged from 1 to 30 participants. Research designs varied: qualitative studies mainly employed case study designs, quantitative studies were mostly experimental, and mixed-method studies predominantly used sequential designs. Regarding the implementation of engineering design processes, physics was the most frequently addressed discipline, followed by chemistry and biology, with astronomy being the least studied. Within the disciplines, physics focused on force and motion, chemistry on recycling and sustainability, biology on environmental pollution, and astronomy on Earth and Sun topics. In terms of instructional approaches, STEM, design-based learning, collaborative learning, inquiry-based learning, and project-based learning were the most commonly applied, with some studies implementing more than one approach simultaneously. Engineering design process models with five, six, and nine stages were most frequently preferred. Most studies focused on engineering design processes and STEM, while student achievement, attitudes, and professional development were also highlighted as significant focal points. In qualitative studies, interviews and observation notes were the most commonly used data collection tools, whereas Likert-type scales predominated in quantitative studies. Among dependent and independent variables, the most frequently encountered influencing factors were STEM activities based on engineering design processes and EDPs themselves. The variables most often measured included students' perceptions of the activities, attitudes toward STEM, understanding of the engineering design process, and development of problem-solving skills. This systematic review provides recommendations for future research and practice. In conclusion, interest in engineering design processes in science education has increased steadily, diverse applications exist, and these processes have high instructional potential. However, there remains a need for more systematic

and sustainable investigations. The findings are valuable for identifying trends in the field and guiding future studies.

Keywords: Engineering design processes, Science education, STEM, Systematic review, PRISMA

The Effect of Interviews with Scientists on Gifted Students' Perceptions of Scientists

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Abstract

Introducing individuals to science at an early age, helping them understand and develop an interest in science, and fostering positive attitudes toward scientists by familiarizing them with scientific careers are of great importance for the future of societies. This study aims to examine the effect of interviews with scientists on gifted students' perceptions of scientists. The study adopted a quantitative research method using a one-group pre-test–post-test design, classified as a quasi-experimental approach. The sample of the study consists of 46 students enrolled in a Science and Art Center for gifted individuals located in a city in northwestern Turkey. The participants are middle school students, including 7 from the 5th grade, 31 from the 6th grade, and 8 from the 7th grade. The selection of the students is carried out using a convenience sampling method. In the study, five scientists conducting research in various fields (Balkan History, Physical Geography, Histology, Organic Chemistry, and Philosophy of Science) are brought together with the students. The students engage in interviews with the scientists on the topics ‘What is Science?’ and ‘What Do Scientists Do?’. The ‘Scientist Image Scale,’ developed by Küçük and Bağ (2012), is used as the data collection instrument. Data obtained from the pre-test and post-test administrations conducted before and after the interviews with the scientists were analyzed using the Statistical Package for the Social Sciences (SPSS). When the mean scores of students’ images of scientists were compared, increases were observed in all items related to scientists’ character/personality, private life, working conditions, gender, and physical appearance. Only in the dimension concerning the organization of scientists’ work environments, one of the two items showed an increase, while a slight decrease was observed in the other. This study highlights the necessity of addressing and positively transforming inaccurately learned images of scientists in individuals from an early age. It was concluded that such interviews can be an effective method in improving gifted students’ perceptions of scientists and in helping them plan their future careers by interacting with professionals in the field, especially considering their high potential to contribute to science and technology in the future.

Keywords: Scientist, Scientist Image, Gifted, Interview

One Design Is At Least One Problem, At Least One Solution

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Abstract

There are differences between a designed work and a compiled or commissioned work by artificial intelligence. These differences can be evaluated from the perspective of the artist, the audience and the product. The most important difference emerges in the stages of invention and creative process. In every design, the artist encounters many problems in terms of form, content, essence and reconciling them with each other, in terms of internalizing and externalizing the image in the mind and the form that has come to life in the work, and produces many solutions. In this respect, the creative process is a unique experience and the artist keeps his/her adventure in each work in mind and cannot forget it. This learning is permanent. Confronting the art audience, artists and art students with the creative nature of the artistic process will contribute to distinguishing between artificial intelligence designs and human designs. At the same time, the importance of human design, its effect on developing students, the experience they will gain from their own creative processes, their cognitive, mental and spiritual contributions, and foreseeing the direction in which the design process developing with artificial intelligence will evolve will question the feasibility points of our future artificial intelligence-supported or isolated art education. The creative process begins at the Eureka stage and continues with design and composition schemes. Many trials take place until the work is realized. The selection of the appropriate material and technique, the idea that is tried to be presented as a work, gradually come to light in an objective dimension. All of these start with a spark of emotion and thought. This spark is more than what artificial intelligence can knead. It requires original human experience, intelligence and skill to be processed. It progresses in stages. Sometimes conscious choices, changes of ideas, additions, deletions, coincidences, abstractions, stylizations, analogies come into play; sometimes environmental guidance can participate in the process. In essence, the entire creative process is related to the inner and outer nature of the artist and what is filtered from his alembic. Developments continue from the sketch stage to the selection of materials and techniques, transferring the design to the canvas or another surface, dimension, monitoring the changes made, until the process reaches its end. The artist can say that a work is finished at any moment, and this does not have to give the viewer a feeling of completion. Sometimes the work can be completed by the viewer's eyes. All of these show us that art and the work of art are a path of the heart, a messenger between the artist and the viewer. In this respect, it requires different sensitivities than artificial intelligence. In this research, based on our own experiences, artistic designs and compositions, focusing on issues in different compositions with examples on a work-by-work basis, the discovery point of the work and the development process; what kind of problems we encountered in terms of form, content, essence, application, technique and material, and what kind of solutions we produced; It was aimed to convey the developments related to the nature of the creative process first-hand and to question what kind of results could have been obtained if artificial intelligence was used. While starting from personal experiences and works empirically, literature review and work review methods were used in the context of creativity, works of masters and creative processes. What are the qualities that make art-work? Is every design product a work of art? Questions such as these were sought to be answered in the momentum of developing artificial intelligence technology and in the light of creative processes.

Keywords: Creativity, Creative Process, Eureka, Artistic Design, Artwork, Artist, Artificial Intelligence, Art Education

Course Content Draft for the Guitar Education and Accompaniment Course within the Framework of an Eclectic Approach

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Abstract

This study aims to design course content that can be applied within the scope of Guitar Education and Accompaniment I-II courses, which were included in the Music Education Bachelor's Program by the Higher Education Council (YÖK) in 2018, within the framework of an eclectic approach. In the Music Teacher Education Undergraduate Program implemented by the Council of Higher Education (YÖK) prior to 2018, it is observed that, in addition to individual instrument training, the aim was to provide prospective music teachers with basic-level instruction on instruments such as the guitar, bağlama, and recorder under the course titled 'School Instruments'. However, evaluations conducted as a result of the implementation process have revealed the need to improve the content of this course. As a result of the necessary adjustments, the School Instruments course was removed from the Music Teaching Bachelor's Program published in 2018 and replaced with the courses Bağlama I-II and Guitar Education and Accompaniment I-II, each planned for two semesters. Considering the advantages of the guitar—such as its suitability for accompaniment, ease of portability, and greater accessibility compared to many other instruments—this new revision is regarded as an important step in the music teacher education process. In addition to being a solo instrument, the guitar is also very popular as an accompanying instrument. At this point, it can be considered one of the instruments that play a major role in and reinforce the first steps taken in music, especially during childhood and adolescence. In the process of instrumental education, the integration of theoretical and practical components as a unified whole is effective in achieving an ideal learning outcome. At this point, it is considered important for music teachers who will work at the primary and secondary education levels to possess basic and intermediate-level guitar playing skills; this is regarded as significant both for managing the educational process accurately and efficiently in their professional careers, and for developing their ability to guide their students. The student's conscious awareness of what they are doing on their instrument, how they are doing it, and why they are doing it is achieved through the repetition and reinforcement of theoretical knowledge, the transfer of knowledge between different areas, and the application of knowledge in different situations, moments, and fields. The conscious use of knowledge during practice, through an approach that avoids rote memorization, will lead to instrumental mastery—regardless of the student's playing level. Based on this, this study, conducted using qualitative research methods, has created a comprehensive content aimed at developing accompaniment skills by transferring information from basic guitar playing techniques and Western music theory and harmony course content to the Guitar Education and Accompaniment I-II courses. Particular attention was paid to ensuring that knowledge and practice progressed simultaneously rather than sequentially; efforts were made to explore how the acquired knowledge could be applied across different moments and domains in a step-by-step manner. These efforts also incorporated practices aimed at learning how to teach. The content was developed within a tonal framework, and for each selected tonality, it was structured around scales, melodies, classical pieces, school music songs, and popular song patterns. Simultaneously, theoretical components such as chord progressions in the relevant tonality, cadence exercises, form and harmonic analysis, as well as deriving chords and creating accompaniments based on these analyses, were also included. Suggestions for activities and

assessment-evaluation methods were provided to support individual supplementary studies related to the course content.

Keywords: Music Teacher, Guitar Education, Guitar Accompaniment, Guitar Education and Accompaniment

An Examination of Creativity and the Creative Process from the Perspective of Artificial Intelligence

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Abstract

Today's rapidly developing artificial intelligence technologies have brought art, education, and many other fields to the brink of a radical transformation. With the deep learning revolution that began in the mid-2000s, artificial intelligence and machine learning have come to the forefront due to their social and technological impacts. While these technologies offer life-enhancing innovations, they can also bring about problems such as inequalities, power imbalances and job losses. In the field of art, artificial intelligence can support the development of creative ideas and art-science collaboration, but it also carries risks such as commercialization, reduced emotional depth, ethical violations and loss of originality. Especially in research on artificial intelligence and art, it is emphasized that the ability to imagine and blend this with emotions is unique to humans. Therefore, art is considered by most experts to be one of the areas that cannot be automated.

This research focuses on the question, "How can artificial intelligence affect art, artists, and the future of art?" Data obtained from the existing literature using document analysis, one of the qualitative research methods, were evaluated with a holistic approach. The findings are presented with direct quotes and discussions to support them; the potential positive and negative effects of artificial intelligence on art and creativity are addressed from ethical and aesthetic perspectives. The research highlights the need to evaluate the impact of artificial intelligence in the field of art not only from a technical perspective but also in a multifaceted manner within the context of the definition of art, the creative process and the role of the artist.

Keywords: Artificial intelligence, AI, art, artists, creativity.

The role of artificial intelligence in the formation of students' vocal and artistic abilities

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Abstract

This report will examine how artificial intelligence (AI) applied to the development of a young vocal singer could affect him. Initially, it will be highlighted what methods and perspectives can be used with the help of AI to form his artistic and singing abilities. Then, an analysis of the teaching program will be made and what can be changed in the educational process. More effective methods for integrating AI into lessons will be highlighted.

With the help of pedagogical experience and in order to be more informative and relevant in the use of AI, an effective program will be presented that can be applied to students. The report aims to track to what extent AI can influence the formation of a student's vocal and artistic abilities. In this way, its role in education will be highlighted. In the final stage of the report, recommendations will be made that will help improve the teaching methodology and the overall work in vocal singing lessons.

Artificial intelligence (AI) in the music sphere will be presented bilaterally - on one hand by the vocal pedagogue, and on the other by the student. It should not be forgotten that the models presented in Artificial Intelligence (AI) are ready-made solutions that have already been created by humans and are embedded as finished productions in it, and they can be used for further development and enhancement of what has been achieved. Thus, the benefit of applying intelligence can lead to bilateral creativity, which will be highlighted in this report. The question is whether this creativity generated with the help of intelligence can be copyrighted or not. The topic of advanced technological applications embedded in Artificial Intelligence and their application in vocal singing lessons will be addressed.

Keywords: Artificial Intelligence (AI); education, methodology, formation, vocal singing

An Analysis Of Four-Hand Piano Studies In Turkey From Various Criteria

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Abstract

A review of the literature reveals that four-hand piano studies occupy an important role not only in beginner piano education but also in the ongoing piano education process. Moreover, research findings indicate that four-hand piano practice, often referred to as a "duet" in the literature, makes playing and practicing the instrument more motivating compared to solo practice. Four-hand piano studies help students develop fundamental elements of making music together—such as rhythmic unity, polyphonic perception, and synchronization—while simultaneously improving pedal technique, the use of gestures and facial expressions, and breath control. In addition, four-hand piano playing has been shown to positively influence other factors including concentration, motivation and the development of empathy. In terms of its impact on performance anxiety and the opportunities it provides for peer learning, four-hand piano playing also plays a significant role in piano pedagogy. For this reason, it is important to examine studies conducted in the field of four-hand piano is important to present the existing literature and to determine trends in the field. In the relevant literature, pieces composed for piano four-hands and performed by two pianists are referred to as "duets," the performers are identified as a "duo." The French word 'ensemble' means "group," and the term "piano ensemble" refers to a group of pianists. This study aims to evaluate postgraduate studies published between 2006 and 2025 (July) in Turkey in the field of four-hand piano play, including the terms four-hand, duet, duo, and ensemble. The evaluation is carried out based on the criteria of year, department, university, institute, data collection tools, research methods, topics covered, and results achieved. In line with the stated objective, the research aims to identify the aforementioned postgraduate studies based on the relevant criteria. The research was conducted using a survey research design and bibliography-based approach, utilizing Google Scholar and YÖK databases. Conference papers, articles and theses obtained as a result of searches conducted by entering the words "four-hand piano," "duet," "duo," "piano ensemble," and "chamber music" into the databases were included in the study if they were found to be relevant to the subject. The study evaluated the current situation by identifying the areas where the relevant criteria were most significant, discussed the findings, and made various recommendations for the field.

Keywords: four-hand piano, duet, duo, piano ensemble, chamber music

Learning the Methodology of Mathematical Problem Solving in Elementary Education

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Abstract
Mathematical problems are a basic tool for acquiring mathematical knowledge and for realizing the goals of mathematical education. Therefore, it is especially important to understand the methodology of solving mathematical problems, which is related to the actual solving of a given problem, as well as how the solving of a specific problem forms knowledge in the students for solving problems.
In this paper, we will turn our attention to the methodology of solving a given problem, and we will focus on the four stages, which according to many authors, occur during the solving of a given problem, although the activities in the stages are not always given in the same order. Namely, we will separately direct our attention to the following four stages of solving mathematical problems:

- understanding the problem, which requires an elementary analysis in the function of assessing the information given in the problem, which can be basic information, specific information and nonessential information,
- developing an idea and creating a plan for solving the problem, which, in this case, is mostly limited to solving familiar problems, while the solving of unfamiliar problems is almost completely excluded. When solving familiar problems, the student should be trained to complete the following activities: identify the type of the problem, choose an appropriate algorithm and apply it to the specific problem, formulate an answer and discuss it,
- practical realization of the plan for solving the problem, a stage during which the students face the least amount of difficulty. However, students should be trained to formulate the solutions to the problems,
- additional work after the problem is solved, i.e. training the students to answer questions, such as: Is the result accurate and if so, why? (Is it possible to check it?). Which other problems can be solved using the discovered method for solving this problem? Can this problem be generalized? What else can be found in the problem, apart from the required?

We will make an effort to answer how and at what age the separate stages of mathematical problem solving should be learnt.
Keywords: mathematical problem, algorithm, mathematical model.

Designing Outdoor Learning Activities with Artificial Intelligence: A Comparison of ChatGPT-4o and Gemini 2.5 Pro in Middle School Mathematics

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Abstract

This study aims to compare the artificial intelligence models ChatGPT-4o and Gemini 2.5 Pro in the process of designing an outdoor learning activity for middle school mathematics. This comparison is significant for understanding the potential of AI-assisted educational material development and for providing guidance to teachers on leveraging these technologies. Employing a qualitative research approach, this study utilizes a case study design. During the data collection process, one of the researchers provided identical prompts to both ChatGPT-4o and Gemini 2.5 to generate an outdoor learning activity for the middle school level. These prompts were established prior to the data collection phase, informed by a literature review that considered the average number of prompts used in studies on AI-assisted mathematics activity design. Based on this review, a total of 20 prompts were used. These prompts encompassed the definition of an outdoor learning activity, a specific learning objective from the middle school mathematics curriculum, critical considerations for such activities, criteria from the Evaluation and Feedback Tool (AEFT) by Bozkurt et al. (2022), and essential information to be included in the activity. The research data were analyzed using descriptive analysis. The generated activities were evaluated based on eight components for the activity text, derived from the AEFT framework (Bozkurt et al., 2022). Each component was assessed using a 4-point scale (0: Very Low; 1: Low; 2: Moderate; 3: High). The activities were independently evaluated by two researchers, who then met to compare their assessments. Discrepancies in the evaluations were discussed until a consensus was reached, achieving full inter-rater agreement. This process was intended to enhance the study's reliability. The findings indicate that, overall, the activity designed by Gemini 2.5 received a higher score than the one designed by ChatGPT-4o. However, ChatGPT-4o was found to be more successful than Gemini 2.5 solely on the "inclusivity" component. This result suggests that Gemini 2.5 better fulfilled specific pedagogical and content-related requirements in the outdoor learning activity design process. These results demonstrate that AI-assisted tools may hold significant potential for designing outdoor learning activities. The study concludes that AI can support teachers and researchers in the development of educational materials. Based on the study's findings, further comparative studies of AI models across different subjects are recommended. Such comparisons have the potential to identify the strengths and weaknesses of various models, thereby helping educators select the most appropriate tool for their specific needs.

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Keywords: Artificial intelligence, outdoor learning, learning activity, mathematics education.

Problem Solving Approaches of Pre-Service Teachers

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Abstract

Individuals encounter numerous problem situations that they must cope with in their daily lives. Those with strong problem-solving skills are able to handle these situations more effectively and easily. In addition to everyday life, problem solving also plays an important role in all school subjects. The importance of problem solving in mathematics lessons, in particular, is undeniable. Problem solving is both one of the fundamental skills necessary for doing mathematics and an effective method for teaching mathematics. Polya (1973) emphasized that problem solving is not merely about reaching the correct answer; it is also a comprehensive mental process involving various cognitive skills. In problem solving, the individual must go through a cognitive process that includes understanding the problem statement, selecting the necessary data for the solution, solving the problem, and deciding whether the answer is reasonable (Charles, 1985). Non-routine problems are more conducive to engaging in this process compared to routine problems. Solving non-routine problems requires not only computational skills but also cognitive abilities such as organizing data, classifying, recognizing relationships, and performing a sequence of operations in a planned and orderly manner (Altun, 2002). In this context, it is highly important for middle school students to encounter non-routine problems in addition to routine ones. However, students may experience difficulties in organizing, systematizing, and using information while solving problems. They may also display incorrect approaches during the execution of solution steps and struggle with selecting appropriate strategies. At this point, the problem-solving approaches of pre-service teachers—who will be the teachers of the future—are of great importance. The purpose of this study is to examine the problem-solving processes of pre-service middle school mathematics teachers. This qualitative study was conducted with 36 students enrolled in a mathematics teacher education program. Data were collected through seven non-routine problems. In determining the problems, the literature was consulted, and attention was paid to selecting problems suitable for the use of various strategies. Content analysis was used to analyze the data. The findings revealed that pre-service teachers generally adopted a result-oriented approach, did not check the correctness of their solutions, and did not consider alternative solution paths. In other words, although they often arrived at the correct answer, they did not fully engage in the entire problem-solving process. Moreover, the accuracy rates varied across problems: 94% in the first problem, 86% in the second, 53% in the third, 25% in the fourth, 86% in the fifth, 8% in the sixth, and 47% in the seventh problem. During the problem-solving process, the strategies employed by pre-service teachers were: using variables (36%), drawing figures (24%), reasoning (17%), making systematic lists (14%), finding patterns (6%), and working backward (2%). It was also found that when the use of the variable strategy was applicable, participants predominantly preferred this approach and tended to ignore other strategies. In contrast, when the variable strategy could not be applied, they turned to other strategies. Additionally, problems with high accuracy rates were generally those in which the variable strategy was used. Overall, these findings indicate that pre-service teachers did not place sufficient emphasis on the problem-solving process. This can be considered a significant shortcoming in terms of professional development. In this context, it is recommended that future studies not only provide training aimed at developing problem-solving skills for both pre-service and in-service teachers but also design problem-solving-oriented educational programs.

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Keywords: problem solving, problem solving strategies, mathematics education

Can Chatbots Pose Good Math Word Problems?

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Abstract

The integration of artificial intelligence (AI) into mathematics education is increasingly gaining attention due to its potential to support teachers in various aspects of instruction, especially in the creation of teaching materials. One promising area of application is the automatic generation of word problems tailored to specific mathematical structures. This study explores the capabilities of four widely used AI chatbots—ChatGPT, Gemini, Copilot, and DeepSeek—in generating word problems for multi-operation equations. The aim is to evaluate the extent to which these tools can produce mathematically valid and pedagogically appropriate content that aligns with curricular goals. The research focused on three key criteria in evaluating the generated problems: (1) mathematical correctness of the word problems, (2) contextual appropriateness and realism of the scenarios, and (3) consistency between the symbolic structure of the given equation and its corresponding verbal representation. Each chatbot was prompted to generate word problems for a set of predefined equations involving two operations, such as multiplication and subtraction, or division and addition. Findings reveal that all four chatbots were generally successful in generating well-structured and contextually relevant word problems for equations involving multiplication and subtraction. However, a marked decline in accuracy and coherence was observed when the equations included division and addition. In these cases, the word problems often contained inconsistencies between the symbolic and verbal representations, misleading or ambiguous contexts, or incorrect interpretations of the operations involved. Interestingly, the nature of these errors mirrors those identified in previous research conducted by the authors on the performance of pre-servic elementary teachers in problem posing. This parallel highlights a potentially deeper issue: current AI tools may inherit or mimic human-like conceptual limitations, particularly regarding the interpretation of mathematical operations and the construction of meaningful contexts. Although AI-generated content holds promise for educational use, especially as a starting point for lesson planning or student practice, this study underscores the importance of human oversight. Teachers must critically evaluate and, if necessary, revise AI-generated materials before integrating them into instruction. Enhancing the capabilities of AI systems to handle more complex mathematical relationships could significantly improve their utility in supporting teachers and advancing problem-posing practices in mathematics education.

Keywords: Artificial intelligence; Mathematics education; Word problem generation; Multi-operation equations; Pre-service elementary teachers

Integrating Technology and Mathematics: A Study on the Quality of Prospective Teachers' Dynamic Geometry Designs

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Abstract

The integration of dynamic geometry software (DGS) such as GeoGebra into mathematics education has the potential to foster students' conceptual understanding, reasoning, and problem-solving skills by enabling interactive explorations of geometric concepts (Bowers & Stephan, 2011). However, the quality of learning opportunities provided by DGS-based activities depends largely on how teachers design and implement these tasks. The purpose of this study is to examine the mathematical depth and technological actions embedded in GeoGebra-based geometry tasks designed by prospective mathematics teachers, with a particular focus on how these two dimensions interact to promote meaningful mathematical learning.

The participants were twenty prospective mathematics teachers enrolled in the elementary mathematics teacher education program in Türkiye. Twelve participants were from Trakya University and eight from Kastamonu University*. All were in their final year of study and had completed relevant coursework in geometry and technology integration. Data were collected through lesson plans prepared by the participants as part of a teacher education course. Each participant was asked to design a lesson plan targeting middle school geometry contents that incorporated at least one GeoGebra-based activity. The dynamic geometry tasks within these lesson plans were extracted and subjected to a two-dimensional analysis based on Trocki and Hollebrands' (2018) framework. The first dimension, mathematical depth, ranges from reproducing known facts (MDL 1–2), to exploration and conjecturing (MDL 3), to generalization, justification, and proof (MDL 4–5). The second dimension, technological actions, progresses from basic drawing (A), measurement (B), and construction (C) to more advanced features such as dragging (D), identifying invariants (E), and exploring unexpected results (F).

The analysis revealed that most GeoGebra-based tasks designed by prospective teachers displayed low to moderate mathematical depth, often limited to basic actions such as drawing, measuring, and simple constructions (A–C). In these tasks, students were mainly asked to reproduce figures or record measurements, with minimal opportunities for reasoning, generalization, or proof. Medium-level tasks frequently incorporated dragging (D), yet its use was largely superficial, aimed at observing visual changes rather than exploring underlying relationships. High-level tasks—those involving generalization or proof (MDL 4–5) combined with identifying invariants (E) or exploring unexpected results (F)—were rare across both universities. Overall, participants demonstrated technical competence with GeoGebra but lacked the pedagogical strategies to design tasks fostering deeper mathematical engagement through advanced technological actions. These results are consistent with prior studies (e.g., Bozkurt & Yiğit-Koyunkaya, 2022; Gulkilik, 2023; Zengin, 2023) showing that pre-service teachers often replicate traditional textbook exercises in digital form, without fully leveraging the dynamic features of DGS to promote exploration, conjecture, and justification. This underuse points to a need for more explicit and sustained support in teacher education programs for designing technology-rich tasks. Teacher preparation programs should include scaffolded

design experiences where pre-service teachers can develop, implement, and iteratively refine DGS-based tasks.

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Keywords: Activity-design, GeoGebra, mathematical depth, prospective teachers, technological action.

Redefinition of the Super Logarithm Function Invention of the "UTW" Function

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Abstract

Tetration is defined as the hyper-4 operation following the exponentiation process. Mathematically, it is defined as the nth iteration of the base a. The süper logarithm is the inverse of tetration. It indicates how many iterations are required to reach the tetration value of a number. Tetration and other exponentiation operations are processes performed on large number sets. Large number sets are one of the pure mathematical fields widely used in areas such as big data, nanotechnology, quantum physics, biotechnology, computers, astronomy, and space sciences. Considering that the boundaries of future scientific development will be determined by new discoveries in the field of mathematics, studies that can easily calculate large numbers are important. Therefore, this study was conducted to develop a new function (UTW) that shows the super logarithm of tetration and other exponential operations and to design a program (UTW Calc) that can calculate the super logarithm of these numbers. Mathematical induction was used in the development of the UTW function in this study. To this end, the operation hierarchy defined in the UTW function was proven on pentations defined as hyper-5. Subsequently, the UTW function was defined on all subsets of super-operation numbers, demonstrating its validity for all natural numbers. In the software phase of the project, the UTWCalc program was written to obtain the süper logarithm of tetration numbers on standard computers. The Waterfall method, one of the basic programming methods, was used in the software phase of the program. The Waterfall model is a static model. The system achieves a holistic structure through the completion of sequential tasks. In general, this phased structure consists of seven phases: requirements analysis, system design, program design, coding, unit and integration testing, system and acceptance testing, operation and maintenance**.** In this study, the UTW function was developed as a function that simplifies mathematical operations by taking the logarithm of super operation numbers to reduce them and also showing how many times the super logarithm of the reduced numbers is taken. While the super logarithm notation used today only allows the super logarithm of tetration numbers to be taken, the UTW function can work on super operation numbers of any degree. Furthermore, the study did not stop at developing a mathematical function (UTW), but also developed a program (UTWCalc) that easily calculates tetration numbers using this function on a standard computer without requiring a supercomputer. With the UTWCalc program, the number 38 (816777216) is calculated on a standard computer in 56 seconds, and its super logarithm is obtained in 22 seconds. The calculated number has 6.01452075365139E+15151336 digits. The study discovered a new superlogarithmic representation function called “UTW” that facilitates operations involving supernumbers. Additionally, a new software program called “UTWCalc” was developed that can calculate superlogarithmic numbers represented by the UTW function. The reason for developing this program is that tetration numbers are too large to be calculated on a standard computer, and there is no program that can reduce and display these numbers. While existing functions can only calculate the super logarithm of tetration numbers from super operation numbers, the newly invented UTW function can easily calculate the super logarithm of other super operation numbers such as pentatation, hexation, heptation, octation, ennation, and decation. In this respect, it is thought that the UTW function will contribute to the field of pure mathematics.

Keywords: UTW, UTWCalc, Super logarithm, Super operation numbers, Googology

Caesar Encryption Method: Comparison of Different Shift Values

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Abstract

The main purpose of this study is to compare different shift values of the Caesar Cipher technique, one of the oldest methods of cryptology. In the study, by comparing the decryption times and correct solution rates of shift values with 3, 7, and 13 letter skips, it was attempted to determine which shift value produces encryption that is more difficult to break.

The research was conducted with 27 middle school 7th-grade students in three stages: preparation, experiment, and data analysis. In the preparation stage; three different Caesar cipher tables were created with 3, 7, and 13 letter skips, encryption keys were prepared for each shift value using the Turkish alphabet, and a special 50-word text explaining Caesar encryption was encrypted with 3, 7, and 13 letter skips. In the experiment stage; 27 students were randomly divided into 3 groups (9 students in each group), texts encrypted with different shift values were given to each group, students' decryption times were measured with a stopwatch, and each student was asked to evaluate the difficulty of decryption with a rating between 1-10. In the data collection and analysis stage; all data were recorded in tables, average decryption times, success rates, and difficulty scores were calculated, and finally the results were visualized with graphs and tables.

As a result of the research, it was found that students who decrypted with a 3-letter skip value obtained both the fastest results with an average of 20 minutes and the most successful results with an average of 45 correct words. This result shows that 3-letter skipping is indeed an easy level. It was found that students who decrypted with a 7-letter skip value obtained moderately successful results with both an average of 27 minutes and an average of 33 correct words. This result shows that 7-letter skipping is at a medium difficulty level. It was determined that students who decrypted with a 13-letter skip value obtained both the slowest results with an average of 42 minutes and the lowest level of successful results with an average of 30 correct words. This result shows that 13-letter skipping is indeed a difficult level. This study experimentally demonstrated that the difficulty level increases as the shift value increases in the Caesar encryption method. The 13-letter skip shift was determined as the most difficult method to break, having the longest decryption time and the lowest success rate.

Keywords: Caesar cipher, cryptology, modular arithmetic

Voicing Ethical Dilemmas: Children's Interpretations of Wordless Books through Digital Tools

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Abstract

Although ethical learning is increasingly valued in early childhood education, young children are often introduced to ethical ideas through teacher-led stories that offer clear and fixed messages. These approaches may limit children's capacity to explore ethical complexity and restrict their opportunities for independent ethical reflection. Wordless picture books, while widely used to stimulate imagination and narrative development, are rarely utilised as tools for engaging children in open-ended ethical inquiry. Meanwhile, digital tools in early childhood settings are frequently used for passive engagement rather than empowering children to create and express their own ideas. There is limited research on how digital tools can support young children's ethical thinking—especially when they are invited to interpret and narrate ethically complex, wordless visual stories. There is a need for pedagogical approaches that empower young children to interpret ethical dilemmas independently and express their perspectives using creative, developmentally appropriate digital tools. This study aims to explore how children aged 60–68 months interpret ethical dilemmas presented in wordless picture books and express their ethical reasoning through digital narration. This study was designed as a qualitative case study. The participants were twelve children aged between 60 and 68 months, enrolled in different classrooms of a public preschool in İstanbul. The data collection process involved the interactive reading of eight wordless picture books, each selected for their embedded ethical dilemmas (e.g., inclusion and exclusion, fairness, honesty, and responsibility). The implementation took place over a four-week period, with two sessions conducted each week. During group sessions, the books were explored interactively with the children, who were encouraged to observe, ask questions, and share possible interpretations of the visual narratives. Following these discussions, the children collaboratively created digital narrations of the stories using Book Creator tool. Working in small groups, they selected visuals, assigned roles, and recorded their voices to reflect their collective interpretations of the ethical dilemmas. This process enabled the children to engage in ethical reflection, group decision-making, and shared storytelling through digital expression. The primary data consisted of the children's group-created digital stories within the Book Creator application. These multimodal narratives were subjected to content analysis to identify how the children responded to the ethical dilemmas and what kinds of ethical understanding were reflected in their proposed solutions. Preliminary findings suggest that children actively engaged with the ethical dilemmas and showed the ability to produce thoughtful, cooperative solutions. In their narrations, they identified moments of exclusion, unfairness, or dishonesty and offered alternatives such as apologising, sharing, or helping. These responses indicated an emerging understanding of ethical concepts. The group narration process encouraged peer dialogue and ethical negotiation, as children discussed and revised their ideas before recording. The multimodal structure of the activity—combining visual storytelling, collective reasoning, and voice recording—appeared to deepen their engagement with ethical questions and gave them confidence in articulating their views. This study highlights the potential of combining wordless picture books with digital narration tools to foster ethical reflection in early childhood. When children are invited to co-construct ethical responses through collaborative digital storytelling, they show an ability to engage with complex ethical ideas in developmentally meaningful ways. Digital tools such as Book Creator amplify children's voices and support active, participatory learning. These findings point to the value of positioning children as ethical thinkers and digital narrators in early education. Future

research might explore how such practices can inform curriculum design and support the early foundations of ethical thinking and digital expression in young children.

Keywords: Early Childhood Education, Wordless Picture Books, Ethical Dilemmas, Digital Narration

Using Persona Dolls in Early Childhood Education to Promote Pedagogical Values

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Abstract
The Pesona Dolls Approach is an effective way to engage children in discussing important subjects or storytelling since the dolls realistically represent children, their dilemmas, a nd their feelings. Teachers in kindergarten choose scenarios for story of the doll and engage children by reaching their minds and souls, through empathy, kindness, and tolerance. Through doll stories, children can express ther worldviews, beliefs, perspectives, and biases, and the doll can help them reconsider these pedagogical values through the story made in the group. The paper draw insights from kindergarten practice by utilizing the Pesona Dolls Approach to promote pedagogical values among preeschool children.

Keywords: persona dolls, early childhood education, pedagogy, speech development, storytelling

The Effect of Orienteering Training Program on the Development of Working Memory, Problem Solving, and Cognitive Flexibility Skills of 60–72 Months Old Children

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Abstract

This study aimed to examine the effects of an orienteering training program for preschool children on the development of working memory, problem solving and cognitive flexibility skills.

The research model was designed as a sequential explanatory design from mixed research designs. A quasi-experimental design with a pre-test-post-test control group was used for the quantitative dimension, and a case study was used for the qualitative dimension. The study group consisted of 50 children aged 60-72 months attending two independent kindergartens affiliated to the Ministry of National Education in Süleymanpaşa district of Tekirdağ province. The Orienteering Training Program was applied to the experimental group twice a week for 10 weeks, while the existing pre-school education program was continued in the control group. The data of the study were collected through the Working Memory Scale, Problem Solving Skills Scale and Flexible Item Selection Task applied to the children, while the qualitative data were collected through the Parent Interview Form applied to the parents who attended the last two sessions with their children and the reflective diaries in which the children described the content of the activities and their feelings and thoughts about the activities through pictures after the training program. Within the scope of the study, Student t-test was used for quantitative two-group evaluations showing normal distribution, and dependent samples t-test was used for within-group evaluations. Mann Whitney-U was used in the evaluation of variables that did not show normal distribution according to two groups, and Wilcoxon Signed Rank Test was used in the within-group evaluations. Qualitative data were analyzed by content analysis methods.

The results revealed that the implemented Orienteering Training Program created significant differences in working memory, problem solving and cognitive flexibility skills in favor of the experimental group. Parental views also support these findings and show that awareness has been created in parents regarding the purpose and gains of the Orienteering Training Program. While it is seen that parents draw attention to themes such as learning direction concepts, problem solving, decision making, working with a team, keeping in mind and following instructions in their statements regarding the importance of orienteering for children, they stated that they observed that both themselves and an object find the location and direction more easily using spatial concepts, and that they have gains such as thinking fast, being able to move quickly and making plans while moving and solving problems. Regarding the practices they planned for the development of their children's orienteering skills, parents stated that they planned to play orienteering-like games at home, include orienteering exercises in daily activities and direct their children to orienteering sports. With the findings obtained from the pictures the children made after each session, it is seen that they have acquired the orienteering skills planned to be provided to children.

It was observed that there were significant increases in working memory, problem solving and cognitive flexibility skills of the children in the experimental group after the orienteering application. It was observed that the parents who participated in the orienteering activities became aware of what orienteering is, how it is played, its importance for children and what the gains are. When the drawings made by the children were examined, it was determined that these drawings contained the skills targeted by the Orienteering Training Program. As a result, it can be said that orienteering practices are effective practices that support the development of working memory, problem solving and cognitive flexibility skills in children.

Keywords: Preschool, Orienteering, Working Memory, Problem Solving, Cognitive Flexibility.

Constructivist Pedagogical Paradigm and Digital Technology in Early Childhood Learning – Conflict or Compromise

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Abstract
The constructivist discourse in early childhood development represents a modern theoretical pedagogical concept oriented to the child as a person who actively, authentically and contextually engages in the learning process, thereby creating his own logical and consistent constructions of knowledge. But on the other side of modern pedagogical discourses appears digital technology, which at a dizzying pace tends to penetrate all educational processes. In accordance with this challenge, the paper opens the dilemma about the need for a scientifically based complementary relationship between these two modern educational technologies. That is, this paper provides an answer of the following key research questions: 1. In which context would the application of constructivist discourse and digital technology cause a conflict in relation to the scientific assumptions of pedagogical approaches in early childhood learning and development and 2. In which context would they find themselves in a compromise relationship based on the scientific assumptions of efficient child-oriented pedagogical approaches in early childhood learning and development. In order to examine the possibilities for a complementary relationship of the two mentioned contemporary discourses, as well as the conditions in which digital technology provides educational support in constructivist learning for children, a survey and interview of experts from 6 kindergartens in the Skopje area was conducted, as well as the analysis of relevant literature and documentation. The research results in emphasizing the need to redefine and reorganize some aspects of the preschool educational process in the direction of the correct use of digital tools as a means for more efficient application of authentic and constructivist learning for children in early childhood development.

Keywords: Keywords: Constructivist learning, authentic learning, early childhood development, digital technology, educational support

Exploring Historical Heroes with Children: A Project-Based Study on Mimar Sinan and Fatih Sultan Mehmet

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Abstract

The aim of this research is to support preschool children in recognizing historical figures, Mimar Sinan and Fatih Sultan Mehmet, who left a significant mark on their city. The research also aims to help children satisfy their curiosity about these figures through inquiry-based learning and to establish meaningful connections with their lives. To achieve this aim, two separate project-based processes, centered around child-driven and curiosity-based learning, were implemented.

The study adopted a single-group pre-test post-test design, a model from the pre-experimental designs. This model was preferred as the independent variable was applied to a single group, and the focus of the research was to explore and illustrate the experiences and development of children in recognizing historical figures who left a mark on their city. In this research, data were collected using semi-structured focus group interviews and children's portfolios as data collection instruments. The study group consisted of two classes of children aged 48-72 months from kindergartens in Edirne Province. Each class was assigned as an experimental group. Parental consent was obtained for all children in the classes. The project activities were conducted over a four-week period, during which the children actively participated in inquiry-based activities. Ethical approval for the research was granted by the relevant committee at the university; throughout the research process, the implementations were carried out with attention to ethical considerations. During the data collection process, the pre-test and post-test focus group interviews with the children were recorded both audibly and in writing, and the children's work related to the project in their portfolios was evaluated. Descriptive analysis was employed for the data analysis. The interview responses were categorized, and meaningful differences were examined based on frequency; changes in the children's knowledge and opinions about historical figures were identified.

The findings indicate that project-based learning in early childhood is effective in supporting children's cognitive and emotional development regarding historical heroes. At the end of the implementation process, it was observed that children had acquired more knowledge about Mimar Sinan and Fatih Sultan Mehmet, and their interest in these figures had increased. Additionally, it was noted that children were able to make connections between their own lives and those of Mimar Sinan and Fatih Sultan Mehmet, understanding the process and forming meaningful links with these historical figures. Furthermore, the research showed that the children's curiosity and willingness to engage in research increased during the project, their time awareness developed, and they actively participated in the learning process.

The results obtained from the research process, which aimed to support preschool children in recognizing historical figures such as Mimar Sinan and Fatih Sultan Mehmet, satisfying their curiosity through inquiry, and establishing meaningful connections with their lives, show that the objectives of the project were achieved. The findings indicate that children's knowledge and interest in historical heroes who lived in the same city as them increased, their time awareness developed, and they were able to establish connections and relationships between their own lives and those of Mimar Sinan and Fatih Sultan Mehmet. These results suggest that presenting historical content through curiosity-based and project-focused approaches during early childhood can provide significant developmental benefits.

Keywords: Project-based learning, early childhood, historical heroes, Mimar Sinan, Fatih Sultan Mehmet

PISA 2022 Turkey Data on the Effect of Types of Books at Home on Students' Reading Proficiency: Correlation and Bayesian Network Analysis

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Abstract

In today's information society, the rapid development of artificial intelligence has made individuals' independent learning skills more important than ever before. A prerequisite for independent learning is reading proficiency. PISA studies comprehensively measured the reading proficiency necessary for students to become self-learners. These measurements reflect the ability to adapt to new information and engage in continuous (lifelong) learning in the age of artificial intelligence. Purpose: The aim of this study is to examine the relationship between the number of classic literature books and supplementary textbooks at home and students' reading proficiency, based on PISA 2022 Turkey data, using correlation analysis and a Bayesian network (TAN model). With the understanding that classic literature books reflect a home-reading culture, while supplementary textbooks merely focus on studying, the following question was investigated: Does students' reading proficiency benefit more from a home-reading culture or solely from a focus on studying? Method: The study group consisted of 5,388 15-year-old students remaining from the PISA 2022 Turkey sample after excluding missing data (%49.4 girls, %50.6 boys). Data Collection and Processing: In processing the PISA 2022 data, the arithmetic means of the reading scores (10 different PV values) were calculated, and students were divided into two groups (insufficient/sufficient) based on the Turkey average of 456 points. Book type was coded into four categories (none, 1-5, 6-10, more than 10). Data Analysis: First, the Spearman correlation coefficient was calculated to determine the relationship between each variable and reading scores, and then a Bayesian network analysis was conducted using the TAN algorithm in the GeNIe Modeler software. In this process, a Bayesian network was constructed through data-driven learning. TAN relaxes the assumption in the classical Naive Bayes algorithm that all features are independent, establishing additional conditional links between features and the class variable. This structure enables more realistic modeling of the statistical dependencies in the data. The accuracy rate of the model was 68.6% with an AUC value of 0.74. A calibration graph showing the conformity of the predictions to the actual results further validates the reliability of the model. Findings: Correlation analysis revealed significant positive relationships between classic literature books (r=0.401), supplementary textbooks (r=0.344), and reading proficiency. The TAN model demonstrates the decisive effect of classic books on reading proficiency. In this data-driven machine learning model, classic literature books not only had a determining effect on reading scores, but also exerted influence over supplementary textbooks. The scenarios tested in the model clearly illustrate this effect: when there are more than ten classic books at home but no supplementary textbooks, the proportion of reading proficiency is 63%. However, when there were more than 10 supplementary textbooks but no classic books at home, this ratio dropped to 34%. Conclusion and Recommendations: These results emphasize the importance of a home-reading culture in enhancing students' reading proficiency and, consequently, their independent learning skills. It can be said that this is of vital importance for cultivating individuals who produce, rather than merely consume, technology in the age of artificial intelligence. Considering the importance of the early years from birth, it is suggested that extensive campaigns to raise parental awareness of this issue would be the most effective approach. Thus, individuals can grow immersed in a reading culture and internalize reading as a natural part of their personality. These efforts could significantly contribute to providing equal educational opportunities, especially for the children of low-income, uneducated families.

Keywords: PISA 2022, reading proficiency, artificial intelligence, Bayesian network, classic book.

Artificial Intelligence-Supported Environmental Education in Early Childhood

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Abstract

Today, increasing environmental problems, climate change, natural disasters, and the onset of climate migration, among other issues, have prompted environmental initiatives around the world. In this context, environmental education is an interdisciplinary process that aims to help individuals understand nature, recognize environmental problems, develop problem-solving skills, and adopt a sustainable lifestyle. This process encompasses cognitive, affective, and behavioral dimensions. The literature emphasizes that environmental education takes a long time to develop awareness and responsibility toward the environment in individuals and stresses the importance of providing it to all individuals from an early age.

Early childhood is a period when the foundations of an individual's cognitive, social, emotional, and moral development are laid, and curiosity and learning are at their peak. It is important for children to grow up as environmentally conscious individuals from an early age. In recent years, many countries have been offering environmental education through activities that allow direct experience with the environment, such as nature walks, garden activities, recycling projects, etc., starting from the primary school level. Providing interactive environmental education with nature for school-age children is more feasible and easier to implement compared to children in the early childhood period.

In terms of the developmental characteristics and needs of young children, experience-based environmental education is quite limited. Therefore, it is necessary to provide young children with rich content that can be used to concretize difficult-to-understand concepts or events based on experience. At this stage, technology-supported education comes into play. Artificial intelligence, one of today's technological developments, can be considered a powerful tool that supports children's interactions with their environment and provides personalized, data-driven learning experiences. Artificial intelligence can adapt content according to children's learning speed and interests, making the learning process more effective and individualized. For example, augmented reality and virtual reality technologies enable children to experience environmental processes such as recycling, the water cycle, and climate change in a visual and interactive way. In the future, with the different systems that artificial intelligence will offer, children will be able to learn concepts such as the formation of natural events, ecological footprint, and energy conservation sustainability through animations and games.

In early childhood education, it is unconditionally accepted by all researchers and educators that children acquire knowledge and skills through hands-on experience. Presenting education based on experience ensures the permanence of knowledge and skills, while also enabling their transfer to different areas. However, this is not always possible under current conditions. The use of technology in education facilitates access to information and makes abstract content more concrete. From an environmental education perspective, the use of artificial intelligence serves to create environmental awareness at an early age by providing individualized, interactive, and game-based learning environments. Artificial intelligence applications that serve pedagogical purposes under the guidance of educators and parents, taking into account the developmental characteristics, attention span, interests, and needs of young children, will contribute to children's environmental awareness by enabling them to learn interactively while having fun.

This study aims to examine the use of artificial intelligence in environmental education in early childhood. This study, which aims to compile information from the literature in the field, will use the document analysis method from qualitative research methods. The document analysis method, which includes finding, reading, taking notes, and evaluating sources for a specific

purpose, will be used in the study. Within this scope, literature published between 2015 and 2025 will be searched on Research Gate, Google Scholar, Sci Space, ERIC, and Springer Link using the keywords “early childhood,” “environmental education,” and “artificial intelligence.” The scientific studies obtained will be examined using descriptive analysis methods and presented systematically.

Keywords: Early childhood, Environmental education, Artificial intelligence

The Importance of Working Memory in Early Childhood

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Abstract

Working memory can be defined as the ability to store and process the information necessary to complete a task for a sufficient period of time. Working memory is a mental workspace where incoming information is stored and manipulated simultaneously. In a sense, working memory is the key to how efficiently a listener can retain and process information. Working memory, which involves the simultaneous storage and active manipulation of information, is considered a fundamental cognitive skill that supports higher-order cognitive skills such as comprehension, monitoring, and inference, as well as basic language skills. Little is currently known about working memory in very young children because of the significant challenges that come with assessing these processes in this age range. Preschool children have a more limited knowledge base, are less verbally proficient, less literate, and more impulsive, and have more difficulty attending to stimuli in conventional behavioural tasks in the laboratory. Nevertheless, assessment of WM is possible in this age range, and a growing literature supports the validity and importance of measuring these processes in preschoolers. This study, which aims to highlight the importance of working memory in the preschool period and to explain examples of activities aimed at developing working memory, is a review study based on a literature review. The study will use the document review technique, one of the qualitative research methods. In this context, written and visual documents related to the research problem will be reviewed in order to provide a richer and more comprehensive conclusion to the relevant literature.

Keywords: Preschool Education, Working Memory, Working Memory Training

Investigating Mathematical Graphing Skills in Early Childhood

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Abstract

This study aims to examine the mathematical graphing skills of children aged 4 to 6, specifically considering the variables of gender and age. The research was conducted using a descriptive survey design, and the study sample consisted of a total of 925 children, including 467 girls and 458 boys, within the specified age range. Participants who attended seven preschool institutions in the city center of Edirne, which are affiliated with the Ministry of National Education, were selected using a purposive sampling method, whereas children who were not enrolled in any preschool programs were determined through the snowball sampling method.

Data collection for the study was carried out using a General Information Form and the Mathematical Graph Skills Assessment Tool (MAGBEDA), which was developed by Sönmez (2025) to evaluate various sub-dimensions of mathematical graphing skills. To analyze the data, an independent samples t-test was performed to determine whether there were significant differences based on the gender variable, while a one-way analysis of variance (ANOVA) was applied to identify differences related to the age variable among the children.

The results of the analyses indicated that significant differences were present in certain sub-dimensions as well as in the total score averages when examined according to both gender and age. In terms of gender, girls demonstrated significantly higher performance than boys in the Data Analysis and Graph Creation sub-dimensions, as well as in the overall scores. Regarding age, significant differences were found in the sub-dimensions of Data Analysis, Probability, Graph Creation, and Graph Reading, in addition to the total scores. Specifically, comparisons showed that 6-year-old children performed better than 4-year-olds, 5-year-olds scored higher than 4-year-olds, and 6-year-olds outperformed 5-year-olds.

These findings demonstrate that mathematical graphing skills during the preschool period vary according to both age and gender, with older children generally showing higher performance, and girls achieving higher scores in some sub-dimensions.

Keywords: mathematical graphing skills, early childhood education, gender differences, age differences, preschool children

First Impressions Matter: Preschool Children's Reactions to Mobile Application Interfaces

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Abstract

This study explores how preschool children form initial impressions of mobile application interfaces, with a focus on how interface elements—such as color, icons, navigation, and character design—affect their user experience. In today's digital childhood, mobile applications are among the most pervasive media, shaping early digital literacy and technology habits. Understanding children's perceptions of mobile interfaces is crucial for developing pedagogically sound, developmentally appropriate, and inclusive digital tools. Based on a 2021 master's thesis, this qualitative research involved semi-structured interviews with 54 children aged 4 to 12, including 28 preschoolers aged 4–6. Children were shown selected mobile applications and asked to describe their impressions, preferences, and perceived usability. Their responses were analyzed thematically and categorized into two main dimensions: pragmatic (e.g., age appropriateness, ease of use, functionality) and hedonic (e.g., aesthetics, entertainment, personalization). The focus in this presentation is on findings from the preschool group. The findings reveal that children aged 4–6 form strong and immediate visual judgments based on interface design. Colors, icons, and character familiarity played central roles in shaping their perceptions. Applications were often categorized as "for babies," "for kids," or "for big kids," and further labeled by gender: pastel or pink designs and princess characters were considered for girls, while darker tones and sports-related content were linked to boys. The children's responses also reflected gendered assumptions about parental roles in app usage: mothers were viewed as selecting educational or entertainment apps, while fathers were associated with sports and finance apps. These observations suggest early internalization of gender norms and a highly visual logic of digital classification among young users. This research highlights the importance of designing mobile applications that are age-sensitive, gender-neutral, and user-friendly for early learners. By acknowledging how design elements influence children's impressions and reinforce socio-cultural narratives, app developers and educators can support healthier digital literacy development. The study advocates for intentional, inclusive, and pedagogically grounded approaches to interface design that reflect children's perspectives and developmental needs.

Keywords: Digital childhood, early childhood education, mobile applications, user experience, gender perception

The Effect of Green Chemistry Applications Based on Creative Drama Method on Preschool Children's Environmental Awareness

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Abstract
Green chemistry is viewed as an approach that deals with the design, production, and the use of chemical substances without harming the environment and human health. Involving green chemistry in preschool education can make significant contributions to both raising children's environmental awareness and fostering their scientific curiosity. Creative drama is commonly used to develop younger children's skills, knowledge, attitude, and awareness in different subjects. The study aimed to determine the effects of using creative drama based green chemistry education on pre-school children's environmental awareness. This quasi-experimental study will be conducted during the fall semester of the 2025-2026 academic year with 40 pre-school students who are studying in a public primary school in Edirne. At the beginning of the study, students will take a test showing their environmental awareness. Then, students will be divided into 2 groups; one group will continue teaching as usual, and one group will be taking creative drama-based classes focusing on green chemistry for six weeks. During the implementation, observations and evaluations will also be conducted about students' creative drama levels and the changes in environmental awareness. Finally, a post-test showing environmental awareness will be conducted with both groups. The qualitative data obtained in the study will be analysed using content analysis, while the quantitative data will be analysed using descriptive statistics via a statistical package program. Conclusions and recommendations will be presented to determine whether there are significant changes in students' environmental awareness, and if so, what would be the reason for these changes.

Keywords: Pre-school education, Drama, Play, Green Chemistry, Environmental awareness

20 Years of Research on Social-Emotional Development in Early Childhood (2005-2025): Trends, Transformations and Current Concepts

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Abstract
Social emotional development is an area of development that encompasses children's ability to understand themselves and others, to recognize and express their emotions, and to establish healthy relationships in the social environment in which they live, and that does not lose its actuality due to the ordinary continuity of social life. In the last 20 years (2005-2025), it is seen that research in this field has differed in terms of conceptual, methodological and intervention studies. While in the early period, social emotional development research was based on individual behavior, in recent years, variables such as technological developments, diversification of cultural differences and global crises have continuously reshaped the research areas of social emotional development. The findings show that the social emotional development research conducted in recent years is more practice-oriented and system-based, and that the social relations of the individual are evaluated by considering multidimensional and different contexts. For this reason, it is important to carefully examine and make sense of the changes in social emotional development in early childhood in terms of restructuring curricula, intervention programs and educational policies.
This study is a literature review that comprehensively examines the research conducted in the field of social-emotional development in early childhood between 2005 and 2025. The current study aims to address the changes in the conceptual and methodological trends of the research conducted in the field of social-emotional development in early childhood between 2005 and 2025 over time. In the study, domestic and foreign literature will be reviewed through multiple databases and the research will be examined in detail in four periods. The findings will be evaluated comparatively. The results obtained from the research will be discussed in the context of the relevant literature and recommendations for future research will be presented for researchers, practitioners and policy makers.
Keywords: Early Childhood, Social-Emotional Development, Literature Review

Parents' Views on Artificial Intelligence-Supported Educational Applications in Early Childhood: A Comparative Analysis of Users and Non-Users

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Abstract

This study examines the views of parents of 3–6-year-old children regarding artificial intelligence (AI)-supported educational applications. It explores how parents define and perceive such applications, which AI-based tools they use, and what they expect from them for their children's development and education. It also evaluates differences between families who use AI-supported educational applications and those who do not, investigates the relationship between parents' attitudes toward AI and their use of these applications, and assesses the influence of educational background on the use of AI-based applications.

The study was designed as a case study within the qualitative research paradigm. The participants consisted of 35 mothers, selected through maximum variation sampling, one of the purposive sampling methods. The study group included 15 parents whose children benefit from AI-supported educational applications (e.g., learning with AI-based tools in the classroom) and 20 parents whose children do not use such applications, ensuring a balanced sample. Data were collected through semi-structured interviews conducted with parents of children aged 3–6 years and analyzed using content analysis.

The findings demonstrate clear differences in parents' perceptions of AI-supported educational applications. Parents who use such applications emphasized that AI tools contribute positively to their children's cognitive development, make learning processes more engaging, and provide individualized learning opportunities. Specifically, benefits were reported in areas such as language development, problem-solving skills, and attention span. However, these parents also highlighted potential drawbacks, such as the necessity of limiting usage time, the risk of screen dependency, and the possibility of reduced social interactions among children.

By contrast, parents who do not use AI-supported educational applications expressed more cautious attitudes. This group argued that traditional learning methods are more effective in early childhood, emphasizing the irreplaceable role of face-to-face interactions in pedagogy. Concerns such as lack of knowledge about technological tools, doubts about reliability, and uncertainties regarding pedagogical appropriateness were also prominent among these parents.

The results revealed that parents' educational levels created significant differences in their attitudes toward AI applications. Parents with higher levels of education evaluated AI technologies more consciously and better comprehended their pedagogical contributions, whereas parents with lower educational levels expressed more hesitation and demonstrated limited knowledge about technological innovations. This underscores the importance of enhancing parents' digital literacy to facilitate informed engagement with AI-supported education.

In conclusion, the study highlights that parental perceptions of AI-supported educational applications differ according to usage status and educational background. The findings demonstrate that integrating AI in early childhood education is not only a pedagogical matter but is also strongly associated with parents' attitudes and socio-cultural characteristics. These results emphasize the necessity of considering parental perspectives in planning and implementing AI-supported educational practices in early childhood contexts.

The significance of this study can be summarized in three main points: It makes an original contribution to the literature by comparatively addressing parents' views on AI-supported

education in early childhood; by identifying similarities and differences between user and non-user groups, it provides valuable insights for shaping educational policies and practices related to technology integration; and it shows that parental educational background and perspectives on technology directly influence the acceptance of technological tools in children's educational processes, offering important directions for future research.

Overall, the findings suggest that the conscious and balanced use of AI-supported educational applications in early childhood can support developmental outcomes. Nevertheless, awareness-raising for parents, pedagogical guidance, and the provision of reliable content are critical for the success of this process. Based on the study's results, it is recommended that future program designs for AI integration in early childhood education adopt models that actively involve parents in the process.

Keywords: artificial intelligence, early childhood, parental attitudes, educational apps, comparative analysis

Educational History Game Design Challenges: Human insights vs Generated Suggestions

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Abstract

This paper presents a comparative study on the design of educational history board games by university students and large language models (LLMs) such as ChatGPT, Gemini, and DeepSeek. The purpose of the study is to explore the creative potential of generative AI in the field of educational game design, particularly in the context of history education. A group of students was tasked with designing board games that familiarize young players with the promotion of national benefaction and its link to national history. In parallel, the same prompts were given to several LLMs to generate similar game concepts/suggestions.

The study evaluates both human and AI-generated produced designs based on criteria such as historical accuracy, creativity, aesthetic and visual design, educational value, and playability. Through this comparison, the study aims to explore the strengths and limitations of AI-generated suggestions in educational (history) game contexts, and how they differ from the human-driven process of game design. The findings reveal important insights into the role of AI in supporting or enhancing creative tasks in (history) education, as well as the potential impact of AI on pedagogy in general.

This paper highlights the evolving relationship between human creativity and artificial intelligence, suggesting avenues for future research in AI-assisted game-based learning. The results contribute to the understanding of how AI can be integrated into educational design processes, offering new perspectives on gamifying history education.

Keywords: Game design, history education, LLM-Generated, history, game-based learning

The core idea behind the student's question

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Abstract
The most comprehensive analysis and determination of the essence of the question of the teacher by A. Pecelt. In contrast to the previous definitions, it based its provisions on the knowledge-knowledge relation, then the processability and the differentiation of the question from the act of the question. "In the only sense of knowing and ignorance it seems that the constituent moment which denotes the act of question is distinguished from it and distinguishes it from other acts" (Juric, V., 1974, 44) says Pecelt, revealing the dialects the unity between the contradictions of knowledge and ignorance. It is also the essence of the question that could lead to the recognition of ignorance. The question is what determines what we do not know. According to Pecelt, two directions are established in the act of the question (Me <-> object).
In some attempts at more precisely determining the question of the question of teacher, at the last moment, we can meet such provisions, which, on the basis of definition, take the concept of the problem. The problem in the problematic situation is characterized by the very problematic itself. The question arises from the disagreement of the old experience with the newly emerging situation, and it is not simply a filling of gaps in knowledge. Such a question is not, it means, simply lacking in some part of knowing or simply understanding of ignorance. If we continue to differentiate the questions, the questions will divide those who are problematic and those who do not.
With other words, every problem situation is passed on with the question and request of the unknown, insofar as any question and request of the unknown does not have to be the act itself (act of question) to be a reflection of the problem situation. The problem situation is significant, given the fact that the new information requires us and a certain processing of the existing knowledge.
Many questions, have more character on the demand for complementing the lesser elements, the satisfaction that is achieved with a certain completeness of the knowledge. It does not exclude the possibility of knowing how to complement and problem solving. The term "problem" is more complicated than the notion of a question. According to our thinking, the problem and the question would be the following: The examination of the problem is independent to the question, because the formulated question is a reflection of the problem that has been addressed. The remaining definitions of this group, in addition to those related to the previous ones, tend to impose more on the didactic character of the questions and predominantly speak of the student's question. All the analysis from which we went into the effort to adequately address the issue of the question, especially the question about the student's question, indicate the complexity of the question as general, but also how didactics a co-methodical phenomenon. Therefore, it is necessary to share the knowledge about the issues to apply to our topic.
Keywords: teacher, question, knowledge, information, problem.

Pre-Service Teachers' Interactions with a GenAI Tool: Exploring TPACK in Science Lesson Planning

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Abstract

The aim of the present study is to investigate whether and how Technological, Pedagogical, and Content Knowledge (TPACK) emerges as pre-service teachers (PSTs) co-design a 5th-grade science lesson in collaboration with a Generative Artificial Intelligence (GenAI) tool, specifically the free version of ChatGPT.

Twenty-one PSTs attending their last semester in a primary education department participated in the study. They had to plan a lesson for the science topic "Heat and Temperature" by interacting with ChatGPT. Participants were provided with an authentic scenario of a typical primary classroom in terms of class size, student diversity, and available technological resources.

The collected data were:

(a) full interaction logs between each PST and ChatGPT,

(b) the final lesson plans, and

(c) written responses to three post-interaction reflection questions focusing on ChatGPT's pedagogical contribution, the participants' sense of agency, and their future intentions to use GenAI tools, along with one Likert-scale item evaluating the extent to which the interaction supported their pedagogical reasoning.

Interaction logs were analysed qualitatively through:

(1) deductive thematic analysis of PSTs' prompts using the TPACK framework (CK, PK, TK, PCK, TCK, TPK, TPACK), and

(2) inductive thematic analysis of the prompt–response interactions.

Participants' final lesson plans were analysed using a qualitative content analysis approach to assess how pedagogical, content, and technological elements were integrated into their instructional designs. Additionally, PSTs' reflections were analysed thematically to record their perceptions of ChatGPT's pedagogical contribution, their sense of control over the design process, and their intentions regarding future use of GenAI tools in lesson planning.

The deductive thematic analysis of participants' prompts using the TPACK framework showed that Pedagogical and Content Knowledge were the most represented domains, often in combination as Pedagogical Content Knowledge. Technological dimensions appeared less frequently, with fewer instances of Technological Knowledge and its intersections, including full TPACK integration.

The inductive thematic analysis of prompt–response pairs revealed five recurrent themes in participants' interactions with ChatGPT: (1) pedagogical reasoning and instructional planning, (2) technology integration, (3) role perception and control, (4) emotional and motivational prompts, and (5) meta-reflective prompts. These themes illustrate the varied ways PSTs engaged with ChatGPT and how their pedagogical reasoning emerged throughout the co-design process.

Most lesson plans included clear goals, student-centred activities, and relevant instructional methods. Student assessment activities were often included but not always aligned with lesson objectives. Technology was inconsistently integrated, and consideration to different students' needs varied. The findings reflect a stronger emphasis on pedagogical and content aspects than on meaningful technological use.

Analysis of participants' reflections and Likert responses showed that ChatGPT was valued for idea generation, lesson structuring, and time-saving support. Most participants reported maintaining control over the design process and expressed interest in using GenAI tools again, particularly for planning support. While ChatGPT's pedagogical contributions were appreciated, the importance of critical evaluation of its responses was emphasized.

This study highlights the potential of GenAI tools like ChatGPT to support pedagogical reasoning during lesson planning in teacher education. Participants engaged with the tool in diverse and reflective ways allowing them to extend their pedagogical thinking. The findings suggest that such tools can facilitate pedagogical exploration and scaffold early efforts to connect content, pedagogy, and technology. Notably, throughout the co-design process, participants retained a high degree of agency. Embedding GenAI into teacher preparation programs is likely to offer the possibility to foster knowledge integration, reflective practice, and responsible use of AI in education.

Keywords: GenAI, TPACK, Lesson planning, Teacher education

A Study on the Relationship Between Artificial Intelligence Literacy and Heutagogical Skills of Pre-service Turkish Language Teachers

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Abstract

The aim of this study is to examine the relationship between the artificial intelligence literacy levels and heutagogical (self-determined learning) competencies of prospective Turkish language teachers. The teacher profile required by the digital age is not limited to pedagogical competence alone; it also includes the ability to manage one's own learning and to use emerging technologies effectively. In this context, heutagogy involves the individual's capacity to plan, implement, and evaluate their own learning process, lifelong learning skills, while artificial intelligence literacy requires individuals to understand AI systems and to use these technologies ethically and consciously. The both domains can have effects learner autonomy, critical thinking, and the capacity to adapt to rapidly evolving digital environments.

In this regard, the study investigates the relationship between two contemporary and crucial competencies that pre-service teachers are expected to possess in the era of digital transformation: artificial intelligence literacy and heutagogical skills. To explore the nature of the relationship between these variables, the study employed a relational survey model, which is a quantitative research design frequently used to examine the degree and direction of associations between two or more variables within a defined population. This model is particularly appropriate for studies that aim to identify whether a statistically significant correlation exists—whether positive, negative, or nonsignificant—without manipulating the variables in question.

Within the scope of the relational survey model, the research process involved collecting numerical data from participants through validated measurement tools, followed by statistical analysis to determine the strength and direction of the relationship between AI literacy and heutagogical competencies. This design enables the researcher not only to describe the current state of these competencies among pre-service teachers but also to assess how closely they are related to one another.

The study group consists of Pre-service Turkish Language Teachersenrolled in faculties of education during the 2024–2025 academic year. Data were collected using the Self-Determined Learning (Heutagogy) Competency Scale and the Artificial Intelligence Literacy Scale, and analyzed through correlation analyses.

The findings of this study are expected to make meaningful contributions to the development of policies and content in teacher education programs. Moreover, the study offers suggestions for fostering an integrated development of digital literacy and heutagogical competencies in the field of teacher training.

Keywords: Artificial Intelligence Literacy, Heutagogical Skills, Pre-service Turkish Language Teachers, Teacher Education, Digital Transformation

Adaptation Study of the Digital Learning Competency Scale for Pre-Service Teachers

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Abstract
In light of recent developments, it has been observed that individuals increasingly carry out their learning processes through digital environments. In this context, the concept of digital learning competency can contribute to students' effective learning in digital learning environments. The aim of this study is to adapt the Digital Learning Competency Scale, originally developed and validated by Yang, Tlili, and others (2021) with a sample of 3,473 middle school students in China, into Turkish and to conduct its validity and reliability studies. The original trial version of the scale is a 5-point Likert-type measurement tool consisting of six dimensions—technology use, cognitive processing, digital reading skills, time management, peer management, and willpower management—and a total of 41 items, developed based on an extensive literature review. The scale was translated by language and subject matter experts in line with the study's objective. The resulting Turkish version was reviewed by experts in Turkish language, translation studies, educational measurement and evaluation, and Turkish education. During the scale adaptation process, exploratory factor analysis (EFA), confirmatory factor analysis (CFA), and item discrimination analyses were conducted. The findings indicate that the adapted Digital Learning Competency (DLC) scale is a valid and reliable instrument for assessing pre-service teachers' digital learning competencies. The developed scale is expected to assist teachers and subject matter experts in enhancing students' competencies and to support the planning of necessary educational interventions by identifying students' levels of digital learning competency.

Keywords: digital learning competency, pre-service teachers, validity, reliability

Creating Individualised Teaching and Learning: Perspectives and Experiences of Primary School Teachers

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Abstract

Teachers' competences for the preparation of teaching and learning represent a fundamental element of an effective educational process, especially in the context of the increasingly complex demands of modern inclusive education. Today, preparation for teaching and learning goes beyond traditional content planning. It involves considering diverse learning styles, digital tools, individualisation strategies, as well as differentiated procedures that respond to the educational needs of each student. Contemporary approaches integrated into daily planning strengthen the role of the teacher as a reflective practitioner capable of designing flexible and student-centred teaching processes. This approach aligns with the values of modern education, which emphasise personalisation, inclusivity, and collaborative learning.

The aim of this study is to explore the role of teachers as active creators of individualised learning within the framework of current primary school practice, with a focus on their competences in preparing for teaching and learning. The research focuses on how class and subject teachers perceive their role in creating and implementing support strategies, as well as their possession of the necessary competences. The goal is to determine whether statistically significant differences exist between class and subject teachers in their self-assessment of (1) the level of competences related to designing and applying individualised methods and adaptations in teaching, and (2) their collaboration with one another in developing and implementing individualised learning, as well as their collaboration with parents.

The central hypothesis assumes that there is a statistically significant difference in the perception between class and subject teachers regarding the creation and application of individualised methods and adaptations, as well as in their perception of mutual collaboration and cooperation with parents as partners in the educational process.

For the purpose of the study, a questionnaire was developed to assess the support strategies teachers apply for individualised teaching in inclusive classrooms and their self-evaluation of competences for individualised instruction. The research was conducted on a sample of primary school teachers in the Republic of Croatia (N=159), using a quantitative methodology and a descriptive-comparative method (Mann-Whitney test).

The results indicate a statistically significant difference in the perception of collaboration between the two teacher groups, particularly in the context of individualising instruction for students with disabilities and in cooperating with their parents. Since collaboration enables horizontal and vertical alignment of curricular goals, exchange of experiences, and development of joint pedagogical solutions, the development of teacher competences for modern educational approaches becomes a key component of professional practice. Furthermore, shared planning and experience exchange contribute to a deeper understanding of students' needs and to the more effective development of individualised approaches.

The findings provide valuable insights for enhancing collaborative models in primary education and for developing more effective, modern individualisation strategies in teaching and learning. Differences in attitudes and levels of competence between the two teacher groups may point to significant implications for the future development of teacher competences in creating support strategies and fostering personalised education.

Keywords: collaboration, inclusive education, individualised approach, support strategies, teacher' competences

The Quality of the Academic Performance in the Study of English of University Students

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Abstract
The report presents the level of English-language competence of pedagogical students as part of their academic preparation. Foreign language competence is ranked among the major proficiencies of future teachers in Bulgaria. The criteria for language acquisition of the students are in accordance with the European Language Framework and these were used to establish the linguistic acquisition of the students at the end of the first academic year. The purpose of the executed study was to determine the quality of the academic preparation in English of students from the specialty Primary School Education with a Foreign Language at the Faculty of Education at Trakia University. The results of a specially designed and evaluated test revealed that the students have difficulty with the correct usage of the English tense system but excelled at the reading and listening comprehension tasks. The findings showed considerable advance in academic performance throughout the first year at university.
Keywords: university education; academic success, linguistic competence

Environmental Education in Greek Teacher Training: A Comparative Curricular Analysis of Primary Education Departments

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Abstract

The urgency of the climate crisis and the imperative for sustainable development have placed Environmental Education (EE) at the forefront of educational priorities worldwide. Initial teacher education, particularly at the undergraduate level, plays a critical role in equipping future educators with the knowledge, pedagogical skills, and critical dispositions required to foster environmental literacy and sustainability consciousness in primary school students. However, the extent to which teacher preparation programs substantively embed EE remains uneven across national contexts. This study investigates how Environmental Education is represented, structured, and pedagogically framed within the undergraduate curricula of nine Greek Departments of Primary Education (DPEDs) for the academic year 2024–2025.

Using a systematic curriculum mapping methodology, the research analyzes both the official study guides (intended curriculum) and the actually implemented course offerings (enacted curriculum) across all nine DPEDs. Each identified EE course was examined along four analytical dimensions: (1) pedagogical orientation (theoretical, applied, experimental), (2) curricular status (compulsory, elective, free elective), (3) semester allocation, and (4) instructor specialization and departmental integration. The aim was to evaluate the institutional prioritization of EE, its pedagogical coherence, and the consistency with which it is offered throughout the teacher education programs.

Findings reveal significant inconsistencies between the planned and implemented curricula, with several departments failing to offer EE courses that are officially listed in their study guides. A striking example is the complete absence of EE offerings in the curriculum of the University of Patras, raising concerns about institutional neglect of environmental and sustainability education. In departments where EE courses are present, the majority are offered as electives—often unstructured or freely chosen—rather than as core, compulsory components. This elective positioning renders environmental literacy contingent on student interest or scheduling flexibility rather than institutional commitment.

The pedagogical analysis further reveals a dominant trend toward theoretical and lecture-based instruction, with limited integration of applied or field-based approaches that are essential for action competence and transformative learning. Temporal mapping of course offerings highlights a lack of coherent sequencing, with some departments placing EE early in the curriculum and others deferring it to the final semesters without clear developmental progression.

These patterns point to a broader fragmentation in the institutional treatment of EE in Greek teacher education—manifesting in unequal access, minimal standardization, and an absence of shared pedagogical vision. Notably absent from most programs is any interdisciplinary integration of EE with core scientific or social science coursework, despite the inherently cross-cutting nature of sustainability issues. Moreover, the study does not incorporate student perspectives, leaving questions open about how preservice teachers experience and perceive the value of EE during their training.

The study concludes with a call for systemic curricular reform, including the integration of EE as a compulsory and scaffolded element within all DPED programs, investment in specialized faculty, and the development of a national framework to standardize and strengthen environmental literacy across teacher education institutions. Without such structural

commitments, EE risks remaining marginal and symbolic, rather than serving as a transformative pillar of twenty-first-century teacher preparation.
This research contributes empirical insight to international discussions on curriculum coherence and sustainability in teacher education and highlights the critical need for alignment between educational policy, institutional practice, and global environmental imperatives.
Keywords: Environmental Education, Teacher Education, Curriculum Analysis, Primary Education, Greek Universities

The role of short films in the development of foreign language skills from the perspective of learners.

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Abstract

Using short films in foreign language instruction offers many advantages and opportunities for developing language skills. Short films are an excellent medium for presenting authentic language examples, improving listening comprehension, and introducing the culture of the target language. This article discusses important aspects of using short films in foreign language instruction.

Using short films contributes to a dynamic, varied, and engaging learning environment. Creative use of short films provides learners with numerous opportunities to expand their language skills and develop intercultural sensitivity.

Short films are particularly useful for teaching authentic language, exploring German-speaking cultures, and improving understanding of different speaking situations. They provide authentic language material that enhances listening comprehension, language production, and vocabulary while appealing to learners cognitively and emotionally. Additionally, they encourage reflection on cultural differences, making the learning process varied and exciting. Thus, short films make a decisive contribution to deepening learners' language skills and preparing them for real-life communication situations.

Short films are also related to the four language skills (listening, speaking, reading, and writing). Using short films in German as a foreign language lessons has many advantages, but it's important to be aware of potential challenges and develop solutions. With proper preparation and a well-chosen selection of films, as well as the creative integration of interactive tasks, teaching with short films can be an enriching and motivating experience for learners.

Keywords: DaF, short films in DaF, language proficiency

A Comparative Analysis of Teacher Training Systems in Japan, Singapore, South Korea, and Turkey

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Abstract
Education is a fundamental process that equips individuals with various knowledge, skills, and attitudes and plays a decisive role in the social, cultural, and economic development of societies. The quality of this process is directly dependent on the presence of qualified teachers. The PISA and TIMSS international student achievement assessment exams are important tools that evaluate the performance of students educated in similar and different education systems within a common measurement framework. Countries such as Japan, Singapore, and South Korea, which consistently achieve high scores in these exams, share the common feature of having strong and selective teacher training policies. These countries stand out not only for their student achievements but also for the value they place on the teaching profession and their teacher training systems. Therefore, the quality of teacher training systems is of great importance in terms of improving the quality of education and achieving international success. In this context, this study comprehensively examines and compares the teacher training systems in Japan, Singapore, and South Korea with the recent reforms in Turkey's teacher training system (e.g., the National Education Academy, postgraduate qualification programs). The study employs the document analysis design from qualitative research methods. During the data collection process, national and international reports on the teacher training systems of the countries, official ministry documents, education policy texts, and current scientific publications were analyzed. The data obtained were analyzed comparatively according to the sub-problems identified.
In the study, the teacher training institutions of the four countries, the admission requirements for these institutions, the duration and content of teacher training education, school experience and practical internships, certification systems, and the transition process to the teaching profession were evaluated comparatively. The findings and results obtained will be shared at the XVIth International Balkan Education and Science Congress.
Keywords: Keywords: Teacher Training, Comparative Education, PISA, TIMSS

Sociological conditioning of perceptions in the reflective field of the educator

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Abstract
This article examines the sociological conditioning of perceptions within the reflexive field of the teaching profession, focusing on the social factors that influence the way in which educators make sense of their practice, professional identity, and relationships. Based on the understanding that reflection is not only an individual cognitive act, but also socially situated and structured, it analyzes how teachers' perceptions are formed by the context of the educational system, cultural expectations, social origin, professional socialization, and institutional dynamics. Particular attention is paid to the mutual interweaving of the components of the perceptual environment, which forms a complex network of influences on pedagogical orientation. By understanding conceptual-theoretical frameworks and contemporary research on pedagogical identity, it is shown that the reflective ability of the educator is built and limited by his social position - at an intersection with intense emotional and symbolic load.
The study examines pedagogical reflection as a process of interaction between internally generated images and socially constructed roles, models, and representations. The focus is on socially conditioned cognitive schemes of perception and action, which influence the ability for critical distance and professional autonomy. In this context, it is revealed how social conditions function as mechanisms of adaptation or resistance to the dominant educational paradigm in the process of professional self-awareness and social interaction. These mechanisms are dynamic and related to the changing social environment, which allows reflection to acquire critical potential for continuous rethinking of pedagogical practice both at the individual and institutional levels. The drawn conclusions emphasize the need for a broader social understanding of the educator's reflective field, which would integrate both the individual and collective changes on the path of professional improvement and realization.
Keywords: pedagogical reflection, perceptions, professional identity, socialization, social position

Investigating the Behavioral Intentions of Preservice Science Teachers Towards Socioscientific Issue-Based Science Teaching

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Abstract

In recent years, science education researchers have emphasized the importance of Socioscientific Issues (SSIs) as a means of engaging students in inquiries and discussions about their own experiences of both science and societal issues. In this context, it is important to provide preservice science teachers with opportunities to design and implement SSI-based lesson plans, and to evaluate these experiences. According to the theory of planned behavior, the probability of teacher candidates' behaviors towards implementing SSI-based science teaching in their professional lives depends on the components of personal attitude, subjective norm and perceived behavioral control. The present study sets out to examine the behavioral intentions of preservice science teachers towards SSI-based science teaching as a reflection of their experiences. To this end, the following question was sought:

What are the behavioral intentions of science teacher candidates toward SSI-based science teaching in their future professional lives?

The study was conducted according to phenomenology design, which is one of the qualitative research designs. The participants of the study consisted of 21 preservice science teachers studying in the 8th semester of the science teaching program. Participants were selected using the criterion sampling method, which is one of the purposeful sampling methods, and on a voluntary basis. The process of conducting the subject of SSIs and their teaching within the scope of interdisciplinary science teaching course consists of three main stages: (1) Creating knowledge and awareness about SSI-based science teaching, (2) Designing lesson plans for SSI-based science teaching and implementing them as micro-teaching, and (3) Evaluating. As a data collection tool, a structured interview form consisting of open-ended questions prepared by the researcher using literature was used in line with the three basic components that affect the probability of a behavior occurring according to the theory of planned behavior. This form was administered in written form at the end of the instructional sessions. The data obtained were analyzed using content analysis and quantified using descriptive statistics. As a result of the research, it was determined that the preservice teachers had positive behavioral attitudes towards SSI-based science teaching, high perceived behavioral control and the intention to implement this approach. Based on the findings of the study, it is recommended that teacher educators and science education researchers who aim to investigate the impact of classroom practices understand the intentions of preservice teachers to implement SSI-based science teaching in their professional lives.

Keywords: behavioral intention, preservice science teachers, science teaching, socioscientific issues, theory of planned behavior

Technology Leadership in Education and ISTE Standards

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Abstract

With the rapid advancements in technology and digital transformation, the emergence, diversification, and expansion of many applications in today's world have significantly increased the use of technology in learning environments. The constantly changing and evolving nature of technology has necessitated the more effective, efficient, secure, and conscious ethical use of digital tools in educational settings.

Adapting to digital innovations in educational settings, developing a vision for technology use, and guiding all stakeholders in education in the correct, reliable, ethical, and legal use of technology have become crucial. Furthermore, ensuring that stakeholders in this process embrace innovations, actively use them in educational settings, create technology-supported learning environments, and provide the necessary technological tools and training have become constantly and dynamically evolving needs. To respond to these needs and adapt to the digital transformation in education, school administrators, as technology leaders, are among the most crucial elements of this process. Within the scope of all these requirements, it is crucial for school administrators to possess strong technology leadership competencies. This research aims to examine the competency framework established by the International Society for Technology in Education (ISTE) Standards for Educational Leaders, which addresses the technology leadership competencies that educational leaders must possess during the transformation of technology in education. These principles are accepted as a guiding framework in many countries and encompass standards focused on technology-enhanced transformation in education. Indeed, to adapt to the rapid pace of technological advancements, the new needs emerging in education with the development of artificial intelligence, and the requirements of the current era, ISTE aims to respond more strongly to this change by updating its standards in 2024. According to these standards, an educational leader is defined through the roles of an equality and citizenship advocate, a visionary planner, an empowering leader, a system designer, and a connected learner. This study comprehensively examines how educational leaders reflect the knowledge, skills, and attitudes required by the digital age; it also aims to raise awareness among school administrators and teachers about current competencies related to technology leadership in education and the importance of these competencies. The study aims to support the development of relevant competencies and guide their effective implementation in educational environments; it also emphasizes the importance of establishing a common vision based on collaboration in schools by encouraging the correct and effective use of technology, developing a culture of technology use that supports inclusivity and equality, ensuring continuous professional development, and enhancing student learning.

Keywords: ISTE standards, technology leader, digital transformation, educational technology

The Place of Philosophy for Children (P4C) in Education: a Review of its Implementation in Terms of Coping with Bullying and Empathy Development

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Abstract

Philosophy for Children (P4C) is not a philosophy education that covers the history of philosophy; rather, it is a method for learning correct ways of thinking. In this learning method, children gathered around a circle are presented with a stimulus that can trigger a philosophical inquiry, and then, with the help of a facilitator, they are encouraged to think, question, and investigate. In Philosophy for Children (P4C) sessions, the facilitator (trainer) is not someone who teaches; rather, s/he facilitates correct thinking and shares the environment and tools that will develop thinking skills—in other words, s/he facilitates inquiry.

In Philosophy for Children (P4C) sessions, children are positioned not as recipients of information but as active participants who use the tools to create knowledge and produce it. Children are naturally curious and have a desire to explore the world. Methods like Philosophy for Children (P4C) play a critical role in ensuring children are exposed to a specific educational system and are able to realize their potential. In this context, the aim of philosophy for children (P4C) is to show how children contribute to the world of thought and bring new perspectives. This literature review aims to examine the emergence of Philosophy for Children (P4C), the status of Philosophy for Children (P4C) implementation in Türkiye and the world, and the relationship between Philosophy for Children (P4C) and social-emotional development, including its role in coping with bullying and its implications for empathy development. Its strengths and limitations will be highlighted, and it aims to illuminate future research.

Keywords: Philosophy for Children (P4C), social-emotional development, bullying, empathy development

Preschool and Primary School Teacher Candidates' Metaphorical Perceptions of Risky Games

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Abstract
The purpose of this study is to identify the metaphors developed by preschool and elementary school teacher candidates regarding the concept of "risky play" and to examine teacher candidates' thoughts on the concept of risky play. The phenomenological (phenomenology) method, one of the qualitative research designs, was used in the study. The phenomenological approach aims to understand phenomena that individuals experience directly but do not have in-depth knowledge of (Creswell, 2016). In this method, participants are individuals who have personal experiences and knowledge about the phenomenon being studied and can express them in detail. The study group consisted of 70 teacher candidates who were enrolled in the final year of the Trakya University Primary Education and Preschool Education Undergraduate Program in the 2024-2025 academic year and who voluntarily participated in the study. In selecting participants, the criterion sampling technique was used from among the purposeful sampling methods. Accordingly, only teacher candidates who had taken courses such as child development, play, and teaching methods and who had basic knowledge of the concept of "risky play" were included in the sample. During the data collection process, participants were asked to complete the statement, "Risky play is like ... because ...". As a result of the responses obtained, a total of 70 metaphors emerged, 44 of which were unique, regarding the concept of risky play. These metaphors were examined using content analysis and categorized under five main themes. Based on the frequency distribution obtained, these themes were identified as: "Life, Responsibility, and Experience," "Adventure-Discovery and Freedom," "Danger and Uncertainty," "Excitement and Fun," and "Learning and Development." According to the research results, teacher candidates most frequently defined the concept of risky play using the "life" metaphor. This highlights the aspects of risky play that involve both danger and experience. Additionally, metaphors such as "adventure," "fire," "adrenaline," "paragliding," and "amusement park" show that these games are exciting and open to exploration for children. The "responsibility" metaphor, on the other hand, reveals that these games support children's development in the process of making their own decisions. It has been observed that teacher candidates evaluate risky play in a multifaceted manner. This situation reveals that risky play is seen not only as a physical activity but also as a learning area that supports cognitive, emotional, and social development. According to the frequency distribution obtained, the balanced and strong representation of the themes of "Life/Responsibility," "Danger/Uncertainty," and "Excitement/Fun" by teacher candidates demonstrates the multidimensional contribution of this concept to professional perception. The notable presence of the "Adventure/Discovery" theme points to the potential value of risky play in pedagogy. The relatively lower frequency of the "Learning and Development" theme suggests that this dimension is internalized indirectly but meaningfully. This study reveals the multidimensional structure of teacher candidates' metaphorical representations of the concept of "risky play." The emergence of rich metaphors in both experiential and pedagogical terms offers new perspectives on the consideration of risky play in the context of teacher education. The research findings reveal that teacher candidates have developed rich, multidimensional, and sometimes contradictory perceptions of the concept of risky play. This situation emphasizes the necessity of both pre-service and in-service education programs aimed at increasing teachers' knowledge and pedagogical competence regarding risky play.

Keywords: Preschool education, Elementary school, Metaphor, Risky play

Teacher Candidates' Practical Skills in Different Out-of-School Learning Environments

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Abstract

One of the most valuable methods of learning is for individuals to have the opportunity to apply their knowledge. This gives them the opportunity to recognize their own knowledge skills and gain new skills through experience. One of the most important elements of education is that teachers should be given the opportunity to use the knowledge they have acquired during their education and recognize their skills before starting their professional careers. One of the most suitable environments for teacher candidates to gain practical experience is outside of school. Considering the diversity of learning environments outside of school, each one has its own unique characteristics and similarities with other environments. It is also valuable for teacher candidates to know and experience these in terms of their professional careers. In addition, this experience will provide teacher candidates with the opportunity to combine the theoretical knowledge they have acquired with practical applications. In this context, the planned study required teacher candidates studying science education in the 4th grade to plan applications in different out-of-school learning environments and manage the process from start to finish with their group mates. Data were collected using semi-structured interview forms and analyzed using content analysis. When the data obtained were evaluated, it was noted that teacher candidates took on pre-professional responsibilities and gained experience in planning during the preparation stage, setting goals and outcomes, recognizing the importance of communication and cooperation during the implementation process, understanding the importance of cooperation with authorities, and experiencing the unique differences and similarities of each out-of-school learning environment as a result of the implementation. In addition, it is observed that they have gained a holistic perspective by preparing assessment tools and becoming aware of their strengths and weaknesses.

Keywords: Teacher candidate, out-of-school learning, practical skills

The Relationship Between Nature and Lyric Text in the Context of Transdisciplinarity

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Abstract
The article examines the view of students - future children's teachers - about transdisciplinarity based on a lyric text that is built on concept nature. The nature-lyrical text relationship is examined within the diagnostic procedure. It relies on diagnostics aimed at the core of text competence for teaching, which is aimed not only at private didactic knowledge in the perspective of the methodology of teaching Bulgarian language and literature, but also at interactions through text. The approaches relied on to achieve the goals are oriented towards: 1. studies with transdisciplinary focus: semiotic and semantic (the latter considered also as part of the former); 2. studies with pedagogical focus: constructivists and competent. In the context of the leading issue, the manifestations of a range of skills. The manifestations of the skill of genre identification of the provided artistic text are traced. Emphasis is placed on goal setting when planning the use of the text in pedagogical interaction. The modeling of an imaginary communicative speech situation for motivating preschool children in the process of pedagogical interaction is considered. The types of text that the recipients could create when communicating with the text are determined. Methods and techniques, including game-based ones, that could be used in the process of text perception are indicated. The ability to formulate questions based on a text with lyrical genre specificity on natural themes is tested. They indicate the options for modeling a pedagogical situation in its preparatory and final component. Emphasis is placed on transdisciplinary interactions based on textual phenomenology. The research objective is in the direction of diagnosis of the degree at mastering of professional-pedagogical competence by students as future teachers to implement an educational process for preschool children with a holistic orientation.

Keywords: text, literature, professional-pedagogical competence

Social factors in children's personality

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Abstract

In order to understand the psychological and social life of children as a whole and to comprehend their personality, alongside the phenomena and psychological processes, we must also be familiar with the qualities of personality. Through the analysis of these social factors, we aim to achieve a higher awareness among parents, educators, and teachers.

This study will highlight the reasons and influencing factors during the formation of children's personalities, examining the different roles played by social factors.

The approach method in this study is theoretical, specifically by analyzing psychosocial theories, recent research from field experts, to understand the interaction of social factors in personality formation, as well as from the perspective of socialization theory, it delves into the impact mechanism of the socialization process on the formation of children’s personality, emphasizing the close connection between children’s self-identity, emotional regulation, behavioral expression, and socialization.

This study is an additional effort in this direction, namely, to analyze the formative factors from different social perspectives, including peer relationships, the school environment, and the influence of social media.

Special attention will be given to interaction with peers through social networks (online).

Paradoxically, peers are a source of intimacy and support, but also stress and victimization. With the advent of online contexts such as social media, many interpersonal interactions have transitioned to these online venues.

The formation of a child's personality is a complex process influenced by multiple factors. The more research, analysis, and discussions there are about the interaction of these factors, the more we can help the health development of children's personalities.

Keywords: formation, personality, factors, social, children, peers, interaction

Virtual Reality Applications in Teaching Safety Skills to Individuals with Special Needs: A Literature Review

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Abstract

The objective of this study is to elucidate the impact of Virtual Reality (VR) applications employed in the instruction of safety skills to individuals with Intellectual Disability (ID) and Autism Spectrum Disorder (ASD) in national and international literature. There are numerous safety skills that have been developed to address the threats we face in everyday life (e.g., pedestrian safety, home safety) and other dangerous situations (e.g., fire safety, kidnap prevention). In order to prevent injuries and accidents, as well as other adverse outcomes associated with substandard safety skills, a number of recent studies have focused on the teaching of safety skills to children and vulnerable populations. To this end, studies in which safety skills are taught will be examined. The study will encompass articles published in national and international refereed journals between 2000 and 2025. The inclusion criteria for the study are as follows: participants must be diagnosed with I/DD and ASD; articles must be published in peer-reviewed journals; applications must be made with one of the virtual reality types in teaching; and studies must be experimental/quasi-experimental. The relevant articles will be scanned in Social Science Citation Index, Science Citation Index, the Institute of Education Science-ERIC, Academic Search Complete-EBSCO and ULAKBİM-TR databases. For studies that meet the aforementioned criteria, the following characteristics will be examined: the skill taught, the participants, the ages of the participants, the research model/design, the material used, the type of virtual reality used, the reliability data and the social validity. The results of this study will provide important information about the literature to researchers planning to teach safety skills to individuals with special needs through virtual reality applications.

Keywords: Special Education, Special Needs, Virtual Reality, Safety Skills

An Investigation into the Relationship Between Life Satisfaction and Psychological Resilience Among Students in the Department of Special Education

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Abstract

This study aims to examine the relationship between life satisfaction and psychological resilience in special education students.

A correlational survey model was used in this study. The Life Satisfaction Scale and the Adult Psychological Resilience Scale were used to collect data for the study. The data were collected online from students in the Special Education Department of the Faculty of Education at Trakya University during the 2024-2025 academic year. The data obtained in the study were analysed using SPSS 26.0 for Windows. The normality of the variables was assessed based on skewness and kurtosis values, and it was determined that these values were within acceptable limits. Accordingly, the Independent Samples T-Test was used for binary group comparisons, and the Pearson Moment Product Correlation Coefficient was used to determine the relationship between the variables. The significance level was set at .05 in the analyses.

A total of 180 students from the special education department participated in the study. The study comprised 53.3% female participants and 46.7% male participants. When the distribution by class level was examined, the students were evenly represented from the first, second, third, and fourth grades. 84.4% of the participants stated that they had chosen the department voluntarily, while 15.6% stated that they had been placed there involuntarily. An independent sample t-test was applied to examine whether the participants' life satisfaction and psychological resilience levels differed according to gender. The analysis results showed that female students' (????= 15.20, SD = 3.45) life satisfaction scores were significantly higher than those of male students (???? = 13.72, SD = 3.80) (t(178) = 2.737, p = .007). In terms of psychological resilience scores, female students (????= 80.66, SD = 11.50) had higher average scores than male students (???? = 77.42, SD = 13.70), this difference was not statistically significant (t(178) = 1.724, p = .087). Pearson correlation analysis conducted to determine the relationships between variables revealed a significant and positive relationship between life satisfaction and psychological resilience (r = .410, p < .01). Additionally, life satisfaction was positively correlated with the subdimensions of psychological resilience: relational resources (r = .424, p < .01), family resources (r = .436, p < .01), individual resources (r = .299, p < .01), and cultural/contextual resources (r = .196, p < .01). These findings reveal that life satisfaction and psychological resilience are closely related to each other and to the various sources that constitute resilience.

The study's findings reveal that the life satisfaction levels of special education students differ significantly by gender, with female students exhibiting higher life satisfaction than their male counterparts. In terms of psychological resilience scores, women had higher averages than men, but this difference was not statistically significant. A significant and positive relationship was found between life satisfaction and psychological resilience; specifically, social support elements, such as relational and familial resources, were found to be strongly related to life satisfaction. These results suggest that strengthening psychological resilience, particularly social support systems, should be a key goal in efforts to enhance students' life satisfaction.

Keywords: Life Satisfaction, psychological resilience, special education department

AI-Powered Tactile STEM for Visually Impaired Students

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Abstract

The education of visually impaired students in STEM (Science, Technology, Engineering, and Mathematics) fields, particularly in mathematics, faces significant obstacles due to the structural difficulties in understanding abstract concepts and the inadequacy of current teaching methods. The lack of materials through which students can physically experience concepts makes these subjects unengaging and challenging, especially for young children. This study presents an innovative and interactive educational solution developed to support the foundational STEM skills of visually impaired students. The project's primary objective is to transform learning into an accessible, interactive, and enjoyable process by integrating tactile and auditory methods within an intelligent system.

To achieve this objective, the project is centered around 3D-printed materials that allow students to have a concrete experience with foundational STEM subjects like mathematics and geometry through touch. The core innovative aspect of the project is the integration of these physical materials with software that provides audio feedback and guidance. The developed software includes a calculator mode and six different material-supported games designed to enhance both arithmetic and geometric competencies: Cartesian Product Game, Block Game, Angle Game, Dice Game, Clock Game, and Geometry Game. Students can interact with the system via voice commands; the system, in turn, not only executes commands but also creates a bidirectional learning environment by posing questions to encourage active participation. This holistic approach provides a personalized experience by offering different difficulty levels and also supports teachers and families with auxiliary tools, enabling the educational process to continue outside of school.

In conclusion, this project strengthens the connection that visually impaired students have with foundational STEM disciplines, provides an efficient learning environment, and advances the ideal of equal opportunity in education. This work represents a concrete step toward a more inclusive and accessible future in education.

Keywords: Mathematics Education, STEM Education, 3D Printing, Inclusive Education, Multisensory Learning

The Effectiveness of Social Stories Presented by Teachers of Children with Autism Spectrum Disorder on Values Education

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Abstract

Children with autism spectrum disorder (ASD) demonstrate inability to initiate and maintain social interaction and communication with teachers, family and peers. They mostly prefer to stay alone in their own social environment. This situation makes it difficult for them to integrate with the society. Therefore, in order to minimise the difficulties experienced by children with ASD, it becomes important to raise them as individuals who are compatible with society, self-confident, responsible and highly respected through the acquisition of values. Teachers play an important role for children with ASD to acquire values. In this respect, teachers can incorporate values directly or implicitly into the education process by utilising different teaching methods and using technology. Recently, artificial intelligence has managed to increase its popularity by becoming inevitable in human life with the rapid advancement of technology. Artificial intelligence plays an important role in the area of education today because it is an innovative technological system with potential benefits such as facilitating the achievement of learning goals of children with ASD, increasing efficiency, providing feedback quickly, providing different solutions to the problems of the environment and materials, necessary contents, being individualisable according to the personal characteristics of the student, creating student-centred learning environments. At this point, the way teachers make competent use of artificial intelligence technology will be effective in learning processes. It is predicted that teachers will use the teaching environment of children with ASD more effectively and complete content production more quickly in providing various opportunities such as behavioural monitoring and personalised learning to reveal the potential of children with ASD, increase and improve their social interactions. Studies on teachers who have difficulty in finding and applying social stories, which are among the scientifically based practices, designed appropriately for children with ASD within the scope of values education are emphasised in the literature. In this study, it is planned to present an alternative example for teachers to access and implement social stories designed for children with ASD more easily. In addition, it is also included that teachers may use artificial intelligence applications interactively according to the rules of text structure while preparing social stories for children with ASD in order to carry out the preparation of social stories in a more qualified way. In this respect, this study includes the preparation of sample social stories with prompts prepared in a practical way using ChatGPT, one of the artificial intelligence applications, and the preparation process of these samples. The content of social stories used to give children with ASD a perspective and increase their social interaction includes introduction, development and conclusion sections and descriptive, directive, affirmative and perspective sentence types. Some suggestions are given to teachers about the preparation of correct instructions for writing social stories through artificial intelligence, and it is planned to increase and enrich the diversity of social stories from artificial intelligence application to teachers according to the rules of social story writing. It is thought that teachers will offer various opportunities by producing new ideas for preschool children with ASD, especially with artificial intelligence applications as an assistive technology in preparing social stories. In this direction, it is planned that the results obtained will contribute to the convenience of teachers in learning the values of children with ASD.

Keywords: Autism Spectrum Disorder, social story, values education

Special Education Teacher Candidates' Metaphorical Perceptions of Disability

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Abstract
Ensuring the participation of individulas with disabilities in social life in equality of opportunity with other individuals and changing negative attitudes toward them achieved through education and teachers' perspectives on the perception of disability are very important at this point. In this context, the study aims to examine the metaphorical perceptions of pre-service teachers studying in the Special Education Department toward the concept of "disability". The data were collected by using the structured written opinion form containing the statement 'Disability is like ....., because .....' to all of the 1st, 2nd, 3rd and 4th year students studying in the Department of Special Education Teaching at Trakya University, Faculty of Education. Purposive sampling method was used in the research. The method of the research is a case study design from qualitative research methods and the data obtained were analysed by content analysis method. The results of the research will be presented at the XVIth International Balkan Education and Science Congress.

Keywords: Metaphorical perception, special education, disability perception

Mothers' Views About Remote Coaching to Support the Language Development of Their Children

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Abstract

Abstract

Children whose early language skills develop more slowly than their peers, despite the absence of any cognitive, sensory, or neurological cause, are referred to as "late talkers." It is not easy to predict whether child's language delay will continue or not. Therefore, it is important to monitor the child's progress. A significant proportion of late talkers may not require direct intervention, and following comprehensive evaluations, a decision may be made to monitor their language development. During this monitoring process, it is important to ensure that the child is receiving sufficient language input and to observe parent-child interactions in order to make necessary adjustments. Online interaction-based remote interventions can be used to equip parents with knowledge and skills to support their children and to provide guidance. This study aimed to explore the views and experiences of mothers of children with delayed language development regarding remotely delivered parent guidance. This research is a qualitative study designed in a phenomenological framework. The participants consisted of eight mothers who received remote parent guidance to monitor and support their children's language development. They were selected through criterion sampling. Data were collected through semi-structured interviews and analyzed using content analysis to identify themes and subthemes. Most mothers reported that, prior to receiving remote guidance, they did not have sufficient knowledge about their children's language development. Some mothers stated that they initially experienced stress when remote support for their children's language development was suggested. However, all mothers described their later experiences as positive. Positive aspects identified included the elimination of travel, the comfort of being at home, saving time, perceiving the child as less problematic, and the participation of other family members. The findings suggest that providing remote support to parents of young children with delayed language development can be considered an opportunity, particularly in terms of enabling question-asking, correcting mistakes, and reaching other family members.

Keywords: late talkers, speech delay, early childhood, remote coaching

Inclusive Education Experiences of School Guidance Counselors

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Abstract
It is becoming increasingly common for children with special needs to be included in the formal education system through mainstreaming/integration practices. In this context, studies focusing on factors that may facilitate or hinder efforts to include children with special needs are noteworthy. While existing studies often emphasize the importance of teachers' attitudes in inclusion, they reveal the necessity of additional services such as supporting students and teachers in creating positive attitudes, informing other students in the class and parents. School counselors, due to their job descriptions, are the people who play the most role in identifying and solving the problems of all students in schools. This study aims to describe the observations and experiences of guidance counselors regarding inclusion practices, with the idea that their experiences with special needs/inclusion students will be important and guiding. The study was conducted with the phenomenological pattern, one of the qualitative research methods. The participants of the study were determined by the criterion sampling method and consisted of 14 guidance counselors working in different schools in the central district of Edirne in 2024-2025. Data were collected through semi-structured interviews. Teachers were asked 10 questions in accordance with the purpose of the research. The findings indicate that school counselors; It reveals that they mostly observe social and academic problems with their inclusive students, and that classroom teachers often approach them with complaints about students' behavioral problems, reporting, and IEP preparation. Regarding the parents, the guidance counselors stated that the parents of the mainstreamed students were mostly conscious and constructive, some of them were tired and uncooperative, and that the parents of other students in the class showed a negative approach when the mainstreamed student had behavioral problems.

Keywords: Inclusive education, Guidence Counselor, Student with special needs, Teacher experiences.

Spatial Suitability in Special Education Schools: The Case of Samsun Province in the Context of Universal Design Principles

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Abstract

The literature highlights that universal design principles are not systematically integrated into the physical environments of special education institutions, and this shortcoming may adversely impact the educational experiences of individuals with special needs (Kaplan & Aksoy, 2019). Conducting studies that assess the implementation of universal design principles in special education schools across different geographical regions can offer a more holistic understanding of the physical conditions of such schools throughout Turkey. Moreover, considering the recent accessibility policies, spatial transformation projects, and national action plans for inclusive education initiated by the Ministry of National Education, it is essential to reevaluate the current state of these institutions. Considering these needs, this study aims to examine the physical conditions of special education institutions in the province of Samsun through the lens of universal design principles.

This study was conducted using the descriptive survey model, a quantitative research design (Karasar, 2022). The research sample consisted of eight special education schools and one general education school with a special education class, all located in the central district of Samsun province. These schools serve students diagnosed with intellectual disabilities and autism spectrum disorders. For data collection, the "Universal Design Checklist" developed by Kaplan and Aksoy (2019) was employed. The collected data were analyzed using frequency (f) and percentage (%) distributions. To enhance the reliability of the study, four final-year pre-service special education teachers, who were independent of the research team, participated as observers during the data collection process. In each school, five different observers independently evaluated the same 65 items. Inter-observer consistency was assessed using Krippendorff's Alpha coefficient, and the resulting values were above .80, indicating a high level of agreement.

The findings reveal that private educational institutions are highly adequate in terms of classroom features and indoor accessibility elements, acceptable in terms of garden-related features, and moderately adequate in terms of physical accessibility features, emergency exits, and emergency-related features. Additionally, the findings highlight that the most inadequate physical conditions in special education institutions are related to toilet facilities.

Overall, the physical environments of special education institutions in Samsun present positive examples of universal design, particularly in the classroom and indoor access arrangements. However, there are notable deficiencies in supporting areas such as restrooms, physical access infrastructure, and emergency preparedness. These findings suggest that accessibility should not be addressed through isolated improvements but rather through a comprehensive and holistic universal design approach.

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Keywords: Universal design, accessibility, special education schools, descriptive survey model

The Effects of Critical Thinking on Prosocial Behavior: Theoretical and Applied Approaches

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Abstract

Prosocial behaviors are important forms of social skills that enable individuals to live harmoniously within society. These behaviors include helping others, showing empathy, cooperating, sharing, and taking social responsibility. Today's educational systems focus not only on academic achievement but also on the social-emotional development of students. In this context, critical thinking skills have emerged as a central competency that supports both the cognitive and social-emotional growth of students. This study aims to comprehensively examine the effects of critical thinking on individuals' development of prosocial behaviors from both theoretical and practical perspectives.

The literature shows that critical thinking enhances individuals' moral reasoning abilities, facilitates empathy, and provides the skill to objectively evaluate different perspectives. These processes support acting with social responsibility and help individuals become more sensitive and respectful in social relationships. Critical thinking is not merely a cognitive skill but is recognized as a holistic competency encompassing social-emotional development. Accordingly, approaches aimed at developing critical thinking skills in educational settings positively influence students' prosocial behaviors.

Furthermore, supporting the social-emotional development and prosocial behaviors of gifted individuals is closely related to the enhancement of critical thinking skills. Although gifted students have cognitive advantages, they may face difficulties in social relationships and empathy. Therefore, developing their critical thinking skills helps increase their social awareness and strengthens their prosocial attitudes and behaviors. Including critical thinking-based activities tailored to the needs of gifted students in educational programs supports both their cognitive and social-emotional development, enabling them to take on healthy and constructive roles in society.

Especially philosophy-based educational methods such as Philosophy for Children (P4C), democratic classroom discussions, and applications centered around ethical dilemmas allow students to freely express their thoughts, respect others' opinions, and actively participate in collective decision-making processes. These approaches provide opportunities for students to develop social-emotional skills like empathy, responsibility, and justice, while also improving effective communication and collaboration within groups. Additionally, these methods deepen students' critical perspectives and contribute to raising socially aware and solution-oriented individuals.

In conclusion, critical thinking is emphasized as an indispensable skill in education, not only for academic success but also for social and emotional development. It is recommended that educators and program developers incorporate more activities promoting critical thinking and prosocial behaviors into curricula and create participatory, democratic, and interactive learning environments. Thus, students can grow not only academically but also as socially competent, responsible, and empathetic individuals. This will enable them to take more active, respectful, and constructive roles in societal life.

Keywords: critical thinking, prosocial behavior, gifted students, social-emotional development, philosophy for children (p4c)

A New Era in Special Education with Artificial Intelligence: Opportunities and Limitations

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Abstract

The aim of this review study is to examine the areas of application, potential contributions, and limitations of artificial intelligence (AI) technologies in special education in light of current literature. Rapid developments in educational technologies offer innovative and effective solutions, especially for individuals with special educational needs. These advancements help reduce barriers in learning processes and create more inclusive instructional environments. AI has begun to be integrated into various aspects of special education, such as personalized learning, automated assessment, behavioral analysis, learning process monitoring, and communication support systems. This integration enables more efficient, goal-oriented, and student-centered teaching practices.

According to the literature, AI is particularly used as a supportive tool in diagnosis, monitoring, and instruction for individuals with autism spectrum disorder, attention-deficit/hyperactivity disorder (ADHD), dyslexia, hearing and visual impairments, and intellectual disabilities. Adaptive learning systems offer individualized content based on students' learning speeds and styles, creating more effective instructional opportunities for learners with diverse needs. Similarly, speech recognition technologies, augmented reality applications, and alternative communication systems facilitate the active participation of individuals with language and communication difficulties in educational settings. These technologies support not only academic development but also social and emotional skills.

Despite the potential benefits of AI-based applications in special education, several significant challenges remain. These include insufficient technological competencies among teachers, lack of infrastructure and equipment, high implementation costs, data privacy concerns, and ethical dilemmas. Furthermore, the inability of AI systems to fully replicate the emotional bond and social interaction established with a human teacher can lead to reduced learning motivation for some students. In the context of Turkey, although the use of AI-based tools in special education is still limited, promising steps have been taken through pilot projects, digital platforms, and local software initiatives. However, the widespread adoption of these innovations requires more comprehensive policies and supportive practices.

In this regard, several recommendations can be made to enhance the effective and sustainable use of AI technologies in special education. First, continuous professional development programs should be provided to teachers to improve their technological literacy. In addition, guidelines on ethical use should be developed, secure infrastructures for protecting student data should be established, and access to technological tools should be expanded. Interdisciplinary collaboration in the development of user-friendly, pedagogically effective, and ethically sound AI systems can pave the way for lasting and positive changes in the field of special education. This review aims to offer a holistic perspective on the use of technology in special education and to guide future scientific research and practical applications.

Keywords: special education, artificial ıntelligence, personalized ınstruction, educational technologies, ethics and accessibility

Teachers' readiness for physical education of children with intellectual disability

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Abstract

Over the past 20 years, changes have occurred in the education of children with special educational needs. The trend is to give them the opportunity to study in an inclusive educational environment. In mainstream educational institutions, education is provided in all educational areas and in all subjects, including physical education.

Conditions must be created for children with intellectual disability to participate in physical activity together with their peers. This is a particular challenge for teachers who are not specialists in physical education and sports - preschool and primary school teachers.

The purpose of this report is to investigate the readiness of teachers to include children with intellectual disability in motor training in kindergarten and primary schools.

The study population is 723 respondents – 240 preschool teachers, 143 primary school teachers and 340 students of the Preschool and Primary School Pedagogy specialty.

We use the survey method. Respondents fill out modified versions of two questionnaires: "Attitudes toward Teaching Individuals with Physical Disabilities in Physical Education – ATIPDPE" by Kudláček and "Self-Efficacy Scale for Physical Education Teacher Education Majors toward Inclusion" – SE-PETE-D by Block.

According to the majority of respondents, the participation of children with mental retardation in physical education activities has positive consequences for those participating in them, but they do not exclude possible negative end results. Teachers tend to agree that inclusion in general physical education has negative consequences for them.

The lack of qualification in the field of adapted physical activity, experience in inclusive physical education and appropriate conditions for its implementation makes participants unsure of their skills to plan and conduct motor training that includes a child with intellectual disability.

A large proportion of current and future preschool and primary school teachers do not feel sufficiently prepared and competent to implement the inclusion of children with intellectual disability in motor training. This makes their inclusive attitudes less positive and their inclusive self-efficacy with an average degree of expression.

Keywords: attitude, self-efficacy, adapted physical activity, inclusive physical education

Evaluation of Disability from the Perspective of Families with Children with Special Needs and Religious Officials with a Multicultural Perspective: The Example of the Rhodopi Province of Greece

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Abstract
This study aims to examine the perception of disability regarding the disabled individuals living in the Rhodopi Province of Greece from the point of families and religious officials with multicultural perspective. The research has been designed according to the phenomenology pattern, which is one of the qualitative research methods. The study group was selected according to the snowball sampling technique. In this regard, the study group consists of 20 participants including the parents with disabled children both from the majority and minority who have lived together for centuries and religious officials from both sides. Demographic information form and semi-structured interview form were used as data collection tools. The data obtained were analyzed using content analysis.
According to the resultsobtained from the analysis, it was determined that the majority and minority participants' opinions about disabled individuals were positive. When looked at the differences between the groups, it is seen that while the parents from the majority have a more negative attitude, parents from the minority adopt a more positive perspective. It has been determined that positive perspective is prevalent among religious officials. It has been observed that the participants defined disabled individuals as social model. As for the differences between the groups, it was observed that while minority families made definitions that are not in line with the general classification, majority families and religious officials defined in terms of the social model. It has been determined that the majority and minority participants' opinions about the participation of individuals with disabilities in society are in the direction of unconditional participation. Only the parents from the majority were in favor of preconditioned participation. Majority and minority participants stated that individuals with disabilities are perceived as socially excluded within society. On the other hand, priests expressed their opinions in favor of social acceptance. When asked whether the disabled individuals can be educated or healed with treatment, participants on both sides were of the opinion that these individuals can be educated. Regarding the same question, parents from the majority with disabled children and imams are of the opinion that they can be partially educated. Participants reported that their interactions with people from different ethnic groups did not influence their perceptions of disability. However, families from the minority with disabled children are of the opinion that they are affected. In addition, it has been determined that all participants explained their religion's perspective on disabled individuals based on religious belief and that their religion favors accepting disabled individuals.

Keywords: Disability Perception, Western Thrace, Minority, Multiculturalism

* Adopted from the doctoral thesis titled "Evaluation of Disability Perception from a Multicultural Perspective: The Example of Rhodopi Province, Greece".

Measurement and Evaluation within Special Education: A Literature Review

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Abstract
Special education aims to provide equitable and effective learning opportunities for students with diverse needs by addressing cognitive, emotional, social and physical differences. In this field, measurement and evaluation serve as fundamental processes for identifying individual needs, guiding instructional planning and monitoring students progress over time. They promote both educational equity and quality by ensuring that teaching strategies are responsive, inclusive and adapted to each student's abilities and challenges. This literature review draws on national and international studies to examine the competencies of teachers working in special education, the challenges they face and their professional support needs related to measurement and evaluation. The studies reviewed cover a range of topics, including the selection and use of appropriate measurement and evaluation tools, the adaptation of measurement and evaluation techniques to different learning profiles and the correct interpretation of results. Frequently reported challenges include insufficient knowledge of measurement and evaluation methods, limited time, large class sizes and limited access to professional guidance. In addition to identifying these challenges, the literature highlights the importance of professional development approaches that integrate theoretical knowledge with practical experience. Opportunities such as in-service training, seminars and enhanced guidance support are emphasized as important in developing teachers competencies in designing, implementing and interpreting measurement and evaluation processes. Collaborative learning environments and peer support networks are also highlighted as valuable strategies for strengthening teacher competencies. This literature review synthesizes findings from a wide range of sources to provide a comprehensive overview of the topic and support ongoing efforts to strengthen measurement and evaluation practices in special education.

Keywords: Special education, measurement and evaluation, teacher competencies

Examining the Stress and Social Support Perceived by Parents of Children with Special Needs

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Abstract

Every child is eagerly awaited by their parents, and during this process, various expectations arise within the family regarding the child to be born. If the child joining the family has special needs, this can cause the family's expectations to change and lead to intense anxiety and stress. Children with special needs are provided with special education services to enable them to live as independent individuals in society and meet their needs independently. Although some of them benefit from this service, many of them cannot act completely independently due to their disability. At this point, it is believed that the biggest supporters of these individuals are their parents. While parents strive to provide their children with all kinds of support during this process, parents of children with disabilities also face various difficulties in terms of their children's care, education, treatment, and upbringing. This study aims to examine the stress and social support levels perceived by parents of children with special needs in terms of various variables. The research sample consisted of 289 parents of children with special needs aged 6-18. The data collection tools used in the study were the "Perceived Stress Scale," the "Multidimensional Perceived Social Support Scale," and the "Demographic Information Form." The data obtained in the study were evaluated using the independent sample t-test and one-way analysis of variance (ANOVA). The results of the study revealed that the monthly income of parents of children with special needs affected their perceived stress and perceived social support. No significant differences were found based on the child's educational status or whether the parent was the mother or father.

Keywords: parents with children with special needs, perceived stress, perceived social support

Examining the Relationship Between Special Education Teacher Candidates' Playfulness Tendencies and Their Professional Self-Efficacy Perceptions

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Abstract

Educational policies developed to train special education teachers become official when supported by enacted laws and regulations. The latest regulation, which serves as the basis for the operation of special education in Turkey, was published in 2018. Article 57 of this regulation assigns various duties to special education teachers, and these duties are defined as follows: "Teachers are obligated to plan and teach the courses assigned to them in accordance with the principles specified in the curriculum, conduct relevant practices and experiments, participate in the educational, teaching, and social activities of the school outside of class, and fulfill the duties specified in the relevant legislation on these matters." In addition to the academic courses offered to undergraduate special education students, there are also courses designed to help them develop social independence. These courses are expected to develop skills such as self-expression, effective communication with others, problem-solving, critical thinking, active listening, establishing cause-effect relationships, and creative thinking. Based on the fact that play is a learning tool, that children learn about the world through play, and that they can best express themselves through play, it is stated that play is the most effective way to learn these skills. Therefore, the competence of special education teachers, who are the primary focus of special education, is considered crucial. Therefore, special education teachers are expected to not only possess the necessary knowledge and skills related to play but also to enjoy play. This study was conducted to examine the relationship between the playfulness tendencies of special education teacher candidates and their perceptions of professional self-efficacy across various variables. In the study conducted with the participation of 165 special education teacher candidates studying at a state university in Turkey, the relational (correlational) screening model, which is one of the quantitative methods, was used. In the data collection process of this study, which was conducted in the 2024-2025 academic year, the "Demographic Information Form" prepared by the researchers, the "Adult Fun Tendency Scale" developed by Shen, Chick, and Zinn (2014) and adapted to Turkish by Yurt et al. (2016), and the "Teacher Self-Efficacy Scale" developed by Tschannen Moran and Woolfolk Hoy (2001) and adapted to Turkish by Çapa et al. (2005) were used. According to the findings of the study, teacher candidates' playfulness tendencies were generally moderate to high, and no significant differences were found in these tendencies based on gender, grade level, or type of high school they graduated from. Significant differences in playfulness tendencies were observed based on their place of residence. Teacher candidates' perceptions of professional self-efficacy were generally high, and they felt competent in the areas of student engagement, instructional strategies, and classroom management. Significant differences in professional self-efficacy perceptions were limited based on gender, grade level, and type of high school they graduated from. However, it was observed that candidates from rural areas had lower self-efficacy perceptions in the area of student engagement. Finally, a positive and significant relationship was found between playful tendencies and perceptions of professional self-efficacy. This suggests that playful motivations and interests can enhance teacher candidates' professional confidence. Consequently, the high playful tendency of special education teacher candidates can be considered a factor supporting their perceptions of professional self-efficacy. This suggests that utilizing playful approaches and fostering playful characteristics in education processes can be beneficial in enhancing candidates' professional competence.

Keywords: Special education teacher, playfulness, professional self-efficacy

University Supervisors' Opinions on the Preparation Process of General Education Teacher Candidates for Inclusive Education

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Abstract
In Turkey, the education of students with special needs is legally guaranteed and integrated into general education. An examination of the number of students receiving inclusive education over the years reveals a gradual increase in this number. For inclusive education to be successful, collaboration between other education stakeholders is crucial, as is the provision of supportive special education services. Effective preparation of general education teachers, one of these stakeholders, for successful inclusive practices during their undergraduate education is also crucial. Although general education teacher candidates take some theoretical courses, both elective and compulsory, on teaching students with learning disabilities and their learning needs during their undergraduate education, they must also be able to apply the knowledge they acquire in these theoretical courses to bridge the gap between theory and practice before entering the teaching profession. The role and support provided by university supervisors in developing general education teacher candidates' skills in applying theoretical knowledge to practice is crucial. The relevant literature indicates that general education teachers lack sufficient experience in inclusive education during their undergraduate education. At this point, the teaching practice process is crucial for teacher candidates to experience the theoretical knowledge they acquired before entering the profession in a practical context and to acquire the necessary skills. This allows general education teachers to gain experience in planning and delivering instruction for typically developing children, as well as in planning and delivering instruction for students with special needs from a holistic perspective. Thirteen university supervisors from different departments participated in the research voluntarily, and during the research process, the practicing university supervisors were asked to share their opinions about the preparation of general education teacher candidates for inclusive education and the support and guidance that should be provided to the candidates during the teaching practice process. The participating university supervisors' opinions were collected online using an open-ended survey form developed by the researchers. Participants' responses were collected in writing via Google Forms. The data collected during the research process was analyzed using the MAXQDA 24 data analysis program using descriptive analysis. In the study, it was determined that the majority of the university supervisors did not have any experience in preparing teacher candidates for inclusive education during the teaching practice process and that they needed support by being trained on the subject as university supervisor. The experienced university supervisors' opinions focused on the social acceptance of inclusive students and the need to make arrangements to ensure their participation in music lessons. The university supervisors also expressed their opinions on the importance of inclusive education in the teaching practice process.

Keywords: Inclusive education, teaching practice, university supervisors, teacher candidates

The Future of Artificial Intelligence in Special Education: Opportunities, Risks, and Ethical Challenges

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Abstract

Artificial intelligence (AI) is a rapidly developing technology with the potential to bring significant changes, particularly in special education. This paper discusses AI's contributions to the education of individuals with special needs, teacher training, ethical responsibilities, and the necessity for legal regulations. Like in many other fields such as healthcare, finance, transportation, industry, agriculture, security, media, and public administration, AI stands out in education through applications such as speech recognition, writing assistance, natural language processing, and personalized learning. These technologies offer important opportunities for individuals with various disabilities, enabling more active participation in the educational process. However, ethical issues such as the privacy of student data, biases in algorithms, system transparency, and students' awareness of content must be carefully addressed. Therefore, it is essential for teachers and prospective teachers to be trained to use AI consciously and ethically.

There are differing opinions on AI's presence in education; while some view this technology as a threat, others believe it offers great opportunities when used appropriately. These debates resemble those that emerged during previous technological innovations. Generative AI tools such as ChatGPT, Claude, and Gemini have the potential not only to produce information but also to assist in organizing written content and supporting cognitive development. However, the lack of sufficient representation of individuals with special needs and educators in the development of such systems poses challenges in terms of inclusivity. For this reason, all stakeholders must be included in the AI development process. In addition, prospective teachers should acquire AI literacy skills and be made aware of ethical principles, transparency, safety, and critical thinking. In conclusion, AI in special education embodies both powerful opportunities and responsibilities. This This presentation will address the significance of such technologies for individuals with special needs, explore how they can be structured in both general and special education settings, discuss the requirements for teacher training, and offer policy recommendations based on potential needs that may arise.

Keywords: Artificial Intelligence, Special Education, Teacher Training, Ethics, Individualized Instruction

An AI-Supported, 5W1H-Based Adaptive Reading Comprehension System: A Research Proposal for Children with Special Needs

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Abstract

This study aims to develop and evaluate an artificial intelligence–supported system that both assesses and immediately scaffolds reading comprehension in children with special needs. The system presents short stories aligned with each learner's grade or reading level and evaluates comprehension through 5W1H (who, what, where, when, why, how) and inference questions. For question types in which the learner shows difficulty, the subsequent reading provides selective, in-text supports—including boldface, color highlighting, margin icons, connective/causal cue marking, and text-to-speech (TTS)–assisted prompts—and these adaptations are dynamically updated based on response accuracy.

The technical stack comprises: (i) Turkish-specific morphological analysis and extraction of person, location, and time entities to enable question–answer span alignment; (ii) hybrid scoring of short constructed responses (rule-based plus semantic similarity), with human verification for low-confidence cases; (iii) item difficulty calibration via Rasch modeling and the Partial Credit Model (PCM) to support partial-credit rubrics; and (iv) a contextual bandit–based decision engine that learns in real time which support is most effective for a given learner while balancing exploration and exploitation.

The evaluation adopts single-case experimental designs (SCEDs)—specifically, multiple-baseline across participants and alternating-treatments arrangements—to estimate functional relations at the individual level. Primary outcomes include total and subscale scores on 5W1H items; secondary outcomes include reading time, hint level, user experience, and social validity ratings from teachers and caregivers. Analyses will also report item–person maps, threshold ordering, fit indices, and inter-rater agreement for human-validated scores, alongside maintenance and generalization probes.

Design features align with Universal Design for Learning (UDL) and WCAG 2.2 accessibility guidelines (e.g., high contrast, alternative input, TTS controls, AAC-friendly icons) and follow established data-privacy and ethics procedures. The expected contribution is a rigorously validated, teacher-friendly platform that integrates measurement and instruction, personalizes supports to the learner's specific comprehension needs, and yields actionable analytics for educational decision-making.

Keywords: special education; reading comprehension; 5W1H; artificial intelligence; single-case experimental design; adaptive learning

The Relationship Between Personality Traits and Social Media and Online Shopping Addiction

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Abstract
This study aimed to examine the relationship between personality traits and behavioral addictions such as social media addiction and online shopping addiction. For this purpose, the predictive power of personality traits such as extraversion, agreeableness, self-discipline, neuroticism, and openness to experience on the sub-dimensions of social media addiction (virtual tolerance and virtual communication), and the sub-dimensions of online shopping addiction (salience-tolerance, mood swings, withdrawal, relapse, and conflict) was examined. The study, conducted using a relational screening model, employed a random sampling method. The study sample consisted of 312 participants, 259 female and 53 male, aged 18 and over. Data were collected using the Five-Factor Personality Scale, the Social Media Addiction Scale-Adult Form, the Online Shopping Addiction Scale, and a Personal Information Form. In the data analysis, multiple linear regression analysis was used to examine the effects of personality traits on social media addiction and online shopping addiction. An independent samples t-test was used to examine the personality traits of male and female participants. One-Way Analysis of Variance (ANOVA) was used to determine differences between age groups. The results of the data analysis showed that the neuroticism personality trait predicted the scores for virtual tolerance and virtual communication, which are sub-dimensions of the social media addiction scale, as well as the total scores of this scale. The neuroticism personality trait was also found to statistically significantly predict the total scores of the online shopping addiction scale, as well as the scores for the sub-dimensions salience-tolerance, mood swings, withdrawal, and relapse. Furthermore, the agreeableness personality trait scores were found to be a significant predictor of the total and sub-scale scores of social media addiction, the total scores for online shopping, and the scores for the salience-tolerance, mood swings, withdrawal, relapse, and conflict sub-dimensions of this scale. The self-discipline subscale of the personality trait predicted total scores for social media addiction and virtual tolerance subscale scores. It was also found that this personality trait was a significant predictor of total scores for online shopping addiction, as well as scores for the salience-tolerance and mood modification subscales. Analyzing the data, it was also observed that there was a significant difference between men and women in terms of the personality traits of self-discipline and neuroticism, with women scoring significantly higher on the self-discipline and neuroticism personality traits than men. Finally, considering the age variable, participants aged 30 and over differed significantly from all other age groups in terms of the total social media addiction score and the virtual tolerance and virtual communication subscales. Accordingly, participants aged 30 and over had lower social media addiction levels than other age groups. Similarly, although there was no statistically significant difference in online shopping addiction among participants aged 30 and over, their mean scores were lower than those of all other age groups. This finding can be interpreted as individuals under the age of 30 constitute a more risky group in terms of social media and online shopping addiction.

Keywords: Personality traits, social media addiction, online shopping addiction, adult.

Examining the Levels of Cyberbullying and Cybervictimization Among Vocational High School Students Based on Gender, Grade, and Internet Usage Habits

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Abstract

This study aimed to examine the levels of cyberbullying and cybervictimization among vocational high school students based on variables such as gender, grade, average daily internet use, purposes of internet use, and purposes of social media use. The study employed a descriptive survey model, a type of survey model. The study sample consisted of 266 vocational high school students (153 male and 113 female) who were randomly sampled and completed face-to-face. 109 students were in their first year, 91 in their second year, and 66 in their third year. Data were not collected from the fourth-year students because they were unable to attend school due to internship obligations. The Cyberbully/Victim Scale was used in the study. The scale is a 5-point Likert-type scale, measuring total cyberbully and cybervictim scores using the same questions in two different categories (it happened to me and I did it). Additionally, the scale has three subscales: Sexual Bullying in the Virtual Environment, Blocking and Harming in the Virtual Environment, and Rumor-Spreading in the Virtual Environment. A Personal Information Form developed by the researcher was also used in the study. This form consists of single-choice questions measuring gender, grade, average internet usage time, purpose of internet usage, and purpose of social media usage. Data analysis primarily determined whether the data were normally distributed. Accordingly, all data except social media usage purpose were normally distributed. Therefore, an Independent Samples t-test was used to examine the difference between cyberbully/victim scores between genders in normally distributed data. One-Way Multivariate Analysis of Variance (MANOVA) was used to examine the differences between grade levels, duration of internet usage, purpose of internet usage, and cyberbully/victim scores. Nonparametric alternatives were used in tests for social media usage purposes that did not show a normal distribution. According to the findings, male students' cyberbullying, cyber obstruction, and harm (bully category) scores were significantly higher than female students'. Female students' cyber obstruction and harm (victim category) scores were significantly lower than male students'. Furthermore, participants with an average daily internet use of 5 hours or more were significantly different from those with less daily internet use in terms of obstruction and harm (bully and victim). Finally, the item "finding new friends" as a social media use purpose differed significantly from other social media use purpose items, such as watching and following others and playing games on social media networks, in the sub-dimension of sexual bullying in the virtual environment. No differences were found by grade level in the study.

Keywords: Cyberbully, cyber victim, internet usege, vocational high school

Mapping the Landscape of Digital Well-Being among Adolescents: A Scoping Review

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Abstract

Engagement with digital technologies exposes adolescents to potential risks affecting their mental health, social relationships, and overall well-being, while simultaneously offering avenues for learning, social connection, and entertainment. Digital well-being has emerged as a framework to understand how individuals sustain balanced and healthy interactions with digital environments that support their overall well-being. However, research on adolescent digital well-being remains fragmented, marked by inconsistent definitions, limited validated measurement tools, scattered evidence on contributing factors, and minimal synthesis of intervention outcomes. This scoping review maps the current state of research by examining how digital well-being is conceptualized, identifying self-report instruments and their psychometric properties, synthesizing contributing factors, and reviewing interventions and their outcomes. Following PRISMA-ScR guidelines, a comprehensive literature search was conducted across PsycINFO, PubMed, Scopus, ERIC, and Web of Science using keyword combinations including "digital well-being," "adolescent," "youth," "measurement," "contributors," and "intervention." Peer-reviewed studies published between 2015 and 2025, involving participants aged 10–19 and explicitly addressing digital well-being, were included. A total of 24 studies met the inclusion criteria. Findings show that digital well-being is variably defined, most often grounded in positive psychology or self-determination theory, yet lacking conceptual consensus. Few self-report instruments exist without robust validation. Commonly identified contributors include psychological factors, relational dynamics, and contextual elements. Only a limited number of interventions were identified, the majority emphasizing digital literacy or self-regulation skills, and few provided rigorous evaluation or long-term follow-up data. This review underscores the fragmented nature of digital well-being research, emphasizing the need for standardized definitions, psychometrically sound measurement tools validated across diverse adolescent populations, and evidence-based interventions to promote digital well-being among adolescents.

Keywords: digital well-being, adolescents, self-report instruments, interventions

Mind in the Digital Age: Digital Amnesia Patterns In Higher Education

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Abstract

The growing reliance on digital devices has significantly impacted individuals' ability to remember information. Digital amnesia is defined as the tendency to store information on devices rather than remember it. Despite growing interest in digital amnesia in the literature, there is a notable lack of valid and reliable measurement tools to assess this phenomenon. In this context, the main objective of this study is to translate a psychometrically valid and reliable scale for assessing digital amnesia symptoms in university students into Turkish and examine its construct validity.

The research was conducted in two phases. In the first phase, 30 university students (19 women and 11 men; ages 20–25, M = 21.81, SD = 1.38) with strong English and Turkish language skills were evaluated for linguistic equivalence. The linguistic equivalence level of all items was found to be within an acceptable range. In the second stage, data were collected from 858 university students (467 women and 391 men; age range: 18–38, M = 20.41, SD = 2.16). Confirmatory factor analysis (CFA), reliability analyses, and criterion-related validity analyses were conducted. The data were analyzed using SPSS 27 and AMOS 24 software.

CFA results showed that the three-factor structure of the original scale (digital distraction, digital dependency, and digital detox) was preserved. However, two items were removed from the scale because their factor loadings were below .30, leaving 18 items in the final scale. The model's fit indices were found to be acceptable. The scale's overall reliability coefficient was .80, while the subscale coefficients were .79, .72, and .61, respectively. Regarding criterion validity, positive and significant correlations were observed between the nomophobia and smartphone addiction scales and the digital amnesia scale.

The findings reveal that the Turkish version of the Digital Amnesia Scale is a valid and reliable tool for assessing university students. Theoretically, the scale sheds light on the cognitive effects of digitalization. In practice, it gives educators and mental health professionals a useful way to identify students at risk. It is well-known that excessive use of digital devices is associated with a gradual deterioration of cognitive abilities. Thus, this scale could potentially inform interventions aimed at promoting healthy digital habits and enhancing cognitive resilience, particularly among university students.

Keywords: digital amnesia, nomophobia, smartphone addiction, validity, reliability

Technological transformation in psychological counseling: Reflections of virtual reality in Türkiye

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Abstract

This study aims to compile and evaluate research on virtual reality (VR) applications in mental health within the Turkish context. The goal is to provide a comprehensive overview of current practices, assess their effectiveness, identify existing gaps in research and implementation, and offer guidance for integrating VR into psychological counseling and education processes.

A systematic search was conducted in Google Scholar, ULAKBIM, DergiPark, and the YÖK National Thesis Center databases using keywords such as “virtual reality,” “mental health,” “psychological counseling,” “therapy,” and “intervention,” along with their Turkish equivalents. Twenty-six studies meeting the inclusion criteria were reviewed. These studies included experimental, quasi-experimental, and controlled designs, with diverse sample characteristics and age groups. The VR-based interventions assessed involved exposure therapies, behavioral activation, emotion regulation, and social skills training.

The reviewed studies showed that VR-supported interventions effectively reduced symptoms of anxiety, depression, and trauma. Improvements were also observed in emotion regulation and anger management, as measured by both physiological indicators and self-report scales. In some domains, VR interventions yielded outcomes comparable to traditional methods, highlighting their complementary role. Particularly among university students, VR applications were effective in addressing social and exam-related anxieties.

VR technology is gaining momentum in psychological counseling practices in Türkiye. While current findings are promising, there is a need for standardized intervention protocols, long-term effect evaluations, and broader research across clinical populations. Future studies should focus on large-scale and longitudinal designs. Moreover, integrating VR-based methods into counselor education programs is recommended to better prepare future professionals. Developing VR interventions targeting the mental health needs of university students is a crucial step toward enhancing innovative and accessible psychological support.

Keywords: virtual reality, psychological counseling, intervention, mental health

Turkish Adaptation Study of the Meaning in Life in Children Questionnaire

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Abstract

The Meaning in Life in Children Questionnaire (MIL-CQ), originally developed by Shoshani and Russo-Netzer (2017), consists of 21 items and evaluates children's perception of meaning in life in three sub-dimensions: Attitude, Creativity, and Experience. This study aims to adapt the MIL-CQ into Turkish and examine its psychometric properties based on Viktor Frankl's concept of the "meaning triangle" from logotherapy theory. Most of the meaning in life scales in the literature have been developed for adolescents and adults, highlighting the lack of a valid and reliable measurement tool for children. In this context, the present study is significant in adapting a valuable tool that can validly and reliably assess children's sense of meaning in life within a cultural context. According to Frankl, meaning in life derives from three fundamental sources: creative, experiential, and attitudinal values. This tripartite approach overlaps with the questionnaire's sub-dimensions and enables a holistic evaluation of children's perception of meaning in life. Developed based on Frankl's theory of the search for meaning, the MIL-CQ is expected to contribute to understanding children's psychological resilience and well-being processes. The questionnaire may form a foundation for psychological interventions and educational programs that support the development of meaning in life and will allow for a more detailed examination of the relationship between children's sense of meaning in life and psychological well-being.

During the adaptation process, necessary permissions were first obtained from the original developers. Then, five experts in language and the relevant field translated the questionnaire from English into Turkish, and three experts performed the back-translation. A pilot study was conducted with 20 fourth-grade students to finalize the items. Required approvals were obtained from the university ethics committee and the Ministry of National Education. The study data were collected by the researcher through face-to-face administration with students aged 9 to 12 attending primary and secondary schools in the central district of Edirne during the second semester of the 2024–2025 academic year. The data will be analyzed using Mplus and SPSS programs, and findings will be discussed in light of relevant literature.

Keywords: Meaning in Life, Positive Psychology, Child Psychology

Online Peer Mentoring and Its Effects on University Students: A Review on Psychological Resilience, Social Belonging, and Academic Motivation

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Abstract

Emerging adulthood, defined as the age range from 18 to 29, represents a pivotal transitional phase characterized by extensive identity exploration, significant role modifications, and an increased susceptibility to psychological stressors (Arnett, 2000). Research indicates that university students experience elevated levels of anxiety, depression, and stress when juxtaposed with the general populace (Auerbach et al., 2018; Grøtan et al., 2019), potentially compromising their academic performance and overall well-being (Awadalla et al., 2020). In light of these challenges, peer mentoring—whereby more seasoned students extend guidance to their less experienced counterparts—has surfaced as a potent mechanism for bolstering both academic and socio-emotional growth (Stigmar, 2016; Gehreke et al., 2024).

Mentoring paradigms are generally categorized into developmental (characterized by trust and long-term engagement) or instrumental (focused on goal attainment and structured frameworks) (Karcher & Nakkula, 2010; Schenk et al., 2020) and can be deployed in various formats, encompassing one-on-one, group, face-to-face, online, or hybrid models (Andersen & West, 2020). The onset of the COVID-19 pandemic catalyzed the proliferation of online mentoring, thereby dismantling geographical constraints and enhancing access to supportive networks (Shashikala et al., 2022). In this context, the present review systematically investigates the various types and effects of mentoring programs, with a particular emphasis on the impact of online peer mentoring on university students' academic motivation, psychological resilience, and social belonging.

Recent empirical findings suggest that structured online programs provide clearer objectives, well-planned content, and ongoing feedback mechanisms, in contrast to spontaneous interactions (Omondi et al., 2024), and have demonstrated efficacy in facilitating academic transitions (Uwimana et al., 2024). Online peer mentoring has been empirically shown to bolster motivation, cultivate a heightened interest in learning, reinforce goal-setting behaviors, and enhance course engagement (Vania et al., 2022), while simultaneously yielding positive outcomes in both group-based (Smith & Burton, 2013) and one-on-one formats (Hardt et al., 2022). In addition to academic outcomes, it alleviates anxiety, augments self-efficacy, and amplifies perceived emotional support (Robinson Jr., 2025), thereby contributing to enhanced life satisfaction and resilience during uncertain times, such as the COVID-19 pandemic (Nzama, 2023; Ontong et al., 2022; Mercier et al., 2024). Regarding social belonging, online mentoring facilitates integration into the university community, cultivates secure environments for emotional exchange, and aids in the development of a positive academic identity, particularly among underrepresented student populations (Stoll et al., 2023). Although certain studies propose that face-to-face formats may foster more robust interpersonal connections, online models remain indispensable for expanding access and promoting inclusivity (Risquez, 2011; Gehreke et al., 2024).

In summary, the prevailing evidence indicates that online peer mentoring ought to be regarded not simply as a temporary response to crises but as a flexible and sustainable strategy within higher education (Parmar et al., 2025). It is advisable to institutionalize structured mentoring programs alongside monitoring mechanisms, incorporate psychological support modules, devise targeted interventions for disadvantaged students, and create tailored systems for graduate education. Regular mixed-method evaluations will be essential for ongoing enhancement. In conclusion, online peer mentoring serves as a multifaceted support mechanism that advances academic achievement, psychological resilience, and social belonging, while

simultaneously nurturing a culture of digital solidarity and inclusive learning within higher education.

Keywords: Mentoring, mentoring program, online peer mentoring

Healing with Nature: The Role of Nature-Based Interventions in Psychological Well-Being

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Abstract

In recent years, nature-based psychological practices have received increasing attention due to their potential to support individuals' psychological well-being. The restorative effects of human–nature interactions are explained through theoretical frameworks such as the Biophilia Hypothesis, Attention Restoration Theory, and Stress Reduction Theory. These approaches suggest that natural environments can enhance quality of life by reducing stress, improving mood, and promoting psychological well-being. Nature-based interventions are implemented in various forms, including guided nature walks, horticultural therapy, forest bathing (shinrin-yoku), animal-assisted interventions, and school-based nature programs. Research indicates that these practices can improve attention, self-regulation, and emotional control in children and adolescents, while supporting stress management in adults. Some studies also suggest that nature-based interventions may have a positive long-term impact on overall life satisfaction. Existing literature shows that, within the Turkish context, studies on nature-based psychological practices are limited and long-term effect evaluations remain insufficient. This study aims to systematically examine the applicability and effectiveness of nature-based approaches—particularly in interventions with children and adolescents—for psychological counselors and other practitioners.

This study will conduct a systematic literature review following the PRISMA-ScR guidelines. Peer-reviewed articles published in Turkish or English between 2010 and 2025, investigating nature-based psychological interventions implemented in different countries, will be retrieved from the PsycINFO, PubMed, Scopus, ERIC, and Web of Science databases. Theses and graduate projects will be excluded. The keyword combinations include: "Ecotherapy," "Eco-therapy," "Nature-based therapy," "Wilderness therapy," "Horticultural therapy," "Nature therapy," "Nature interaction," "Nature-based intervention," "Outdoor Education," "Forest Therapy," "Nature-assisted therapy," "psychological well-being," "stress," "anxiety," and "depression." Inclusion criteria require studies to employ experimental or quasi-experimental designs and to incorporate a nature component in the intervention.

This systematic review is expected to highlight the potential of nature-based psychological interventions in supporting individuals' psychological well-being and to identify gaps in the field. The findings are anticipated to inform both the academic literature and practical applications, contributing to the more effective and widespread integration of nature-based approaches.

Keywords: Psychological well-being, Nature-based intervention, Ecotherapy, Stress

Socio-psychological parameters of blended learning

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Abstract

There is a growing discussion about blended learning. In the post covid era (pce) it is considered by some a method that can address and enrich autonomous learning behaviors, using social interaction and playfulness as factors of motivation for both learners and teachers.

And yet a significant part of the discussion omits the diversifications and sociocultural gaps enlisted in pce, assuming there is only one definition about it. Covid itself evolved in an environment anything but neutral, where social, cultural, financial evolutions marked an epoch of blistering changes under the blended spectrum of multiculturalism, new technologies and neoliberalism, influencing the actual covid experience and the post covid syndromes evolved ever since.

Having a background in intercultural education and an actual involvement in related social movements, in our paper we discuss the plasticity of motivation and achievement blended learning can offer or deprive.

Using the method of bibliographic review and considering experiences we have had 'in the field', we pose questions such as:

blended learning and migration/refugee

blended learning and economic/technological gap

blended learning and its gender dimension

We conclude that blended learning, despite its potential, is shaped and practiced on western middle-class learning styles that also dominate formal education, despite the advances that have been made.

Although the issue is left open, we suggest ways to address it using 1. Strategies evolved in intercultural and digital education 2. newer adult education strategies that can be integrated into formal education such as ‘futuring’, adapted, however, for broader groups experiencing social exclusion.

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Keywords: blended learning, sociocultural gaps, intercultural approaches, 'futuring'

Intercultural Encounters – A Challenge for Albanian Migrants in Germany

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Abstract

Albanian migrants in Germany are a constitutive part of various levels of social circles. Their aim is to integrate into all areas of life while preserving cultural values and adapting to new ones. Communication, as the primary factor in this integration process, should be understood as a necessary mechanism of adaptation.

This article therefore deals with divergent sociolinguistic communication practices in Germany, the cultural influence on communicative acts, and the perception of these processes by Albanian migrants. The starting point is the friction points observed in practice, particularly regarding German virtues such as directness and punctuality, which can seem foreign or even challenging from the Albanian perspective.

The aim of this article is to highlight interpersonal communication as an expression of divergent practices within German-speaking societal circles. Communication, as a daily process, cannot be viewed in Germany separately from today's cultural diversity. For Albanian-speaking migrants who seek to build a future there, communicative integration into German social structures is a primary goal.

This sociolinguistic phenomenon, which plays a role in the integration process, is influenced by German cultural virtues. However, not all constitutive structures actively involved in daily life are easily recognized or perceived. Therefore, this article focuses on interactive practices, the direct style of communication, and the parameters of perception in communication processes between German-speaking locals and Albanian migrants.

The German-speaking world offers diverse perspectives and opportunities for a stable future. In this context, cultural diversity is enriched daily. The fundamental requirement to become an integral part of these developments is adapting to the rules, principles, disciplines, and customs of the local population. Among the most important concepts in this regard are character virtues such as directness and punctuality/functionality, which form the core of this analysis.

Interpersonal communication is of particular importance and contributes to the progress of these processes and the achievement of goals for immigrants living in Germany. Albanians are an integral part of this reality. They are part of the active and routine everyday life of German society. The interactive and situational communication between them leads to different perceptions—until the moral rules of the Germans are internalized and properly directed, enabling shared life to proceed in a synchronized way in terms of interpersonal and situational communication, and to develop without significant obstacles.

Keywords: Integration; Intercultural context; Communication standards; Moral rules; Connotation

Artificial Intelligence and Social Work: Applications, Challenges, and Prospects

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Abstract

This literature review provides an in-depth examination of the applications, challenges, and prospects of artificial intelligence (AI) in social work, drawing on recent scholarly publications from Greece, Turkey, and the international context. The review covers a wide range of technological applications, such as decision support systems for social workers, risk prediction algorithms (predictive analytics), natural language processing (NLP) tools for text analysis and categorization, and robotic interventions for supporting vulnerable groups. Through thematic categorization of the research, the advantages of AI in enhancing the effectiveness, accuracy, and personalization of social services are highlighted.

Particular emphasis is placed on the ethical and deontological challenges accompanying the introduction of such technologies. Issues such as transparency, privacy protection, avoidance of algorithmic bias, and the risk of reproducing social inequalities emerge as key concerns. The literature proposes specific models and frameworks, such as the EPIC model (Ethics, Participation, Integrity, Competence) and risk assessment methods, for the responsible and ethical integration of AI into social work practice.

At the same time, the non-negotiable significance of the human factor is underscored, as professional judgment, empathy, and interpersonal relationships cannot be fully replicated by machines. The need for continuous training of social workers, the development of interdisciplinary collaborations, and the establishment of clear institutional frameworks are identified as critical prerequisites for the successful application of AI in the field. In conclusion, AI can serve as a powerful tool for social work, provided it is applied responsibly and with respect for the values of the profession. The integration of AI into case management in social work shows significant potential for improving services, but it requires a strong institutional framework and ongoing training for professionals. Success depends on striking a balance between technological and human intervention.

Keywords: social work, artificial intelligence, ethics, algorithmic bias, decision support, predictive analytics

Analysis of the 5th Grade Social Studies Textbook in Terms of Art Literacy and Aesthetic Value

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Abstract

Social studies enables individuals to understand their social experiences, cultural heritage, and value systems from the past to the present; art, on the other hand, expresses this accumulation through aesthetic means, adding an emotional and creative dimension to the learning process. In this context, art in social studies education plays an important role in providing students with an aesthetic perspective, supporting their intellectual development, and enriching their cultural accumulation. The 2024 Social Studies Curriculum also emphasizes the importance of students becoming art literate through social studies education and includes the concept of art literacy. The content structure of the course supports art literacy and is positioned to contribute to students' development of different perspectives. Thus, the social studies course goes beyond mere knowledge transfer and also serves the development of aesthetic sensitivity and cultural awareness.

The 2024 Social Studies Curriculum defines arts literacy as a competency that encompasses defining the concept of art, examining, describing, and analyzing works of art, forming judgments, evaluating art in its cultural, historical, and social context, establishing the relationship between art and society, and developing artistic practice. In the program, literacies are structured at three levels that students are expected to achieve. The first level, awareness, refers to the processes of recognizing, understanding, being aware of, and developing sensitivity to the basic information, terms, concepts, and facts that appear in the type of literacy. The second level, the functional level, aims to enable students to recognize the holistic relationships between this knowledge, terminology, concepts, and phenomena. Finally, the action level encompasses the process of transforming acquired knowledge into action and applying it. The MEB 2024 Model incorporates the Virtue-Value-Action Framework, which contributes to the dynamic structure of teaching, along with trends for students to transform their skills into action. In particular, the fundamental virtues of Aesthetic Value (sensitive to beauty, mature, selective, elegant, moderate, aware of and using artistic abilities) support the holistic development of students. The purpose of this study is to reveal the reflections of the 5th grade Social Studies textbook in the context of the art literacy levels (awareness, functionality, and action) defined in the 2024 Social Studies Teaching Program and the fundamental virtues of Aesthetic Value. In this regard, the textbook was examined based on the three levels of arts literacy and the fundamental virtues of aesthetic orientation. Since the research was conducted based on the 2024 Social Studies Curriculum, data were collected through document analysis. The obtained data were analyzed using a descriptive analysis approach. The research found that the dimensions of arts literacy were most frequently included in the Learning to Live Together learning area. It was determined that the dimensions of arts literacy were least frequently included in the Our Living Democracy learning area. It was found that the dimensions of aesthetic values were most frequently included in the Our Shared Heritage learning area. It was determined that the Maturity dimension was given the most emphasis among the aesthetic value dimensions. It was determined that the Grace dimension was given the least emphasis. Various research and application recommendations were presented based on the research results.

Keywords: Social Studies textbook, Art literacy, 2024 Social Studies Curriculum

Geography Teachers' Views on Scientific Publication Tracking: The Case of Edirne

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Abstract

The purpose of scholarly research in education is to enhance the quality of teaching, to examine the causes of existing problems, and to propose solutions. Teachers are among the professional groups who are expected to follow such research closely, as it provides essential tools for improving instruction and guiding professional practice. One of the most important elements in sustaining teachers' professional development is keeping up with current scientific publications in their field. However, teachers differ in their access to these publications, the frequency with which they read them, and the ways they utilize research findings.

The aim of this study is to explore the views of geography teachers working in Edirne province regarding scientific publications in their field. Specifically, the study investigates the strategies teachers employ to access and track research, the challenges they encounter, and the perceived contributions of research to their professional development.

The research employs a qualitative design. Data will be collected through semi-structured interview forms developed by the researcher and validated through expert review. The collected data will be analyzed using MAXQDA, a widely used software in qualitative research, and subjected to content analysis. Categories will be created based on teachers' publication-tracking practices, their motivations, strategies for accessing research, and the obstacles they face.

It is expected that the findings will reveal the current situation of geography teachers regarding the tracking of scientific publications and contribute to a better understanding of their professional development processes. This study is also expected to fill a gap in the literature by addressing teachers' perspectives on scholarly publications, their tracking practices, and the challenges of access.

Keywords: geography education, professional development, academic Studies

Comparison Of Piri Reis's Aegean Coast Maps With Google Digital Maps

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Abstract

In this study, the drawings of the Aegean coastlines found in sections 47a, 73b, 74a and 80a of Piri Reis's work Kitab-ı Bahriyye, written approximately 600 years ago, (from the shores of Çanakkale to the Gulf of İzmir Çandarlı) and the Aegean coastline of the same region as defined on digital maps obtained through the Google Maps application. The aim is to study the similarities and differences in the general characteristics of the coastlines and to outline the extent of any geographical changes along the coastlines. The study utilized document analysis, one of the qualitative research methods. Findings were obtained through cross-referencing various documents (articles, journals, theses, encyclopedias, websites, etc.), particularly Piri Reis's maps and Google Maps. First, since Piri Reis's maps are not to scale, sketches of the maps were made and transferred to graph paper. Sketches were made of the images taken from Google Maps, the coastal areas were reduced to graph paper using the scale used in Piri Reis's maps, and the maps were compared. The maps on pages 47a, 73b, 74a, and 80a of Kitab-ı Bahriyye were photographed separately and added to the research. Subsequently, since the Piri Reis maps in our possession are in Ottoman Turkish, the names of the settlements in the relevant sections of Kitab-ı Bahriyye were translated from Ottoman Turkish into modern Turkish. In Kitab-ı Bahriyye, each region described by Piri Reis on pages 47a, 73b, 74a, and 80a has been assigned a number. The coastline map of the same region was traced on Google Maps, and the same numbers were used as on Piri Reis's map. Subsequently, the coastal changes in Piri Reis's and Google's digital maps were analyzed. In the study, the 71 regions depicted by Piri Reis along the Aegean coastline were examined, and 18 of these were excluded because they corresponded to the coastlines of the Aegean Sea islands. The researchers evaluated their findings from the study in three dimensions. Accordingly, 12 regions where the coasts were not different from each other, 20 regions where they were partially different, and 21 regions where the coasts were different from each other were identified. When the results were evaluated, it was determined that the coastline drawn by Piri Reis in his famous work Kitab-ı Bahriyye 47a, 73b, 74a, and 80a maps was significantly different from the same region's Google digital maps. This study offers the opportunity to re-evaluate Piri Reis's maps using contemporary technical knowledge by matching them with digital maps. Focusing on the analysis of spatial information in Piri Reis's maps and changes along the coastlines, this study demonstrates that Piri Reis possessed geographical knowledge beyond his era. The results obtained shed light on future similar research, and it is expected that more in-depth studies will be conducted on the philosophical dimensions of Piri Reis's maps.

Keywords: Kitab-ı Bahriyye, Google Maps, Piri Reis

A Study on the Effect of Gamification in Education, MitTürk-Bodun Game

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Abstract

Teaching the heroes featured in the tales and stories written in a nation's epics, passing them on to future generations, and thus ensuring the continuity of society is important. Gamification in education is one of the methods used to ensure lasting learning in students. In this study, a modular game was designed that combines Turkish language and digital design courses with the aim of teaching the stories and heroism of mythological creatures and characters in Turkish mythology. MitTürk_Bodun is a modular game designed as a desktop game. During game development, the game's components (rewards, badges, challenging battles, gift-giving, unlocking game features, leadership), mechanisms (challenges, chance factor, cooperation, feedback, rewards), and dynamics (rules, stories, progression, goals, player relationships) were first defined. The Canva web 2.0 tool was used in the game design, while the Canva AI story creation program was used to create the game cards. In addition, the Blender program was used to design the mythological characters earned in the game, and the Ender V3 Ke 3D printer was used in the printing stage of the mythological characters. To measure the game's impact on learning, pre-tests and post-tests were administered to the students. The effectiveness of the MitTürk_Bodun game in terms of education and teaching was examined during the testing phase of the game, which was structured according to the project design method. In the testing phase, a single-group pre-test-post-test experimental design, one of the quantitative research methods, was used. A pre-test was conducted on 20 middle school students to determine their level of knowledge about characters and creatures in Turkish mythology. Subsequently, a post-test was administered to the same group of students after they played the MitTürk_Bodun game. The levels of significance between the pre-test and post-test average scores of the 20 students were examined. Using the SPSS Statistics 26 program to analyze the data, it was concluded that there was a significant difference between the students' pre-test and post-test average scores. Research shows that Turkish legends and epics have positive effects on children's mental, emotional, social, and moral development stages. Therefore, teaching Turkish youth about the mythology of Turkish society and the heroism of the characters and creatures in these myths at an early age is important for young people to decipher their own social value codes. In this study, a modular game called MitTürk_Bodun was designed, which dramatizes the characteristics and stories of characters in Turkish mythology. The game provides students with a fun, active, and engaging educational and teaching environment. In this regard, the study is expected to contribute to the fields of Turkish, History, and Literature education.

Keywords: Turkish mythology, gamification, game-based learning, digital design

Movement as a learning tool in teaching music in primary schools

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Abstract

The connection between music and movement is primarily determined by the temporal nature of both phenomena. Movement is at the core of music itself, but also of numerous musical syntagms which can define and provide the interpretation of tools for musical expression (musical flow, melodic motion, rhythmic movement, interval movement). Musical activities are inseparable from movement in all aspects - performance, creation and perception of music. The above facts unambiguously and logically imply the use of movement in the process of music education in primary schools. The positive effects and benefits of applying an approach that combines music and movement are particularly pronounced in the initial stages of learning, at preschool and early school age. The aim of this paper is to point out the possibility of using movement as a didactic tool in teaching music in the third and fourth grades of primary schools. The research tasks are focused on two aspects: 1) the role of movement in the process of acquiring musical concepts through the field of music performance and 2) the application of movement in the process of perceiving musical elements in the field of music listening. Based on previous research, the primary importance of movement is emphasized in the preparatory phase of introducing concepts in the field of rhythm, in the phase of determining and distinguishing pitches, in testing pupils' knowledge, and in the field of listening to music for the purpose of developing the ability of analytical listening and perception of musical phenomena. This paper presents specific examples of the application of movement in the process of learning music in accordance with the current curriculum content in the Republic of Serbia. The above-mentioned examples indicate that methodological approaches coincide with the elements of well-known methods of Carl Orff, Zoltan Kodály, and Émile Jacques-Dalcroze, although these methods are not officially applied in Serbia. The presence of movement-based elements in various approaches to the acquisition of musical concepts confirms the natural connection between music and movement and the importance of their integration in pupils' music education. Therefore, we conclude that movement as a didactic tool can be applied in teaching young learners in a broader socio-educational space, with minimal adaptation to the individual curriculum guidelines of different countries.

Keywords: movement, acquisition of musical concepts, teaching music, young learners

The setting of teacher-parent communication within the framework of digital technology

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Abstract
Teacher-parent communication has a special significance in education and the educational impact on the personality of students. In today's school reality, teacher-parent communication, among other things, takes place through the use of various digital tools, platforms, etc., which more or less influence the method, processes, and outcomes of the communication itself, indicating certain needs, opportunities, strengths, and weaknesses. Not every education system has equal or highly developed digital capabilities, systems, platforms, etc., which affects both the digital experience and professional training of teachers, but also their ability to properly and effectively use digital technology when communicating with parents. The challenges of the aforementioned issues are recognized in achieving quality, targeted communication and partnership with parents. Today, the establishment of teacher-parent communication through the use of digital technology is becoming an increasingly topical issue in pedagogical science, initiating the need for more substantial research into certain aspects of it, especially if a number of other factors that directly and indirectly influence it are taken into account.
The research problem concerns the consideration of certain aspects, advantages and difficulties of teacher-parent communication through the application of digital technology within education. The research methods are descriptive in nature, using certain approaches. Content analysis, a survey, and a semi-structured focus group interview with primary education teachers were applied. The sample is stratified, comprising 186 primary school teachers. The results indicate certain aspects that are important for the advancement and further scientific treatment of teacher-parent communication within the framework of digital technology. The conclusion of the research indicates the need for permanent research and the introduction of modern knowledge, approaches and, above all, cooperation of all relevant parties and factors in achieving quality in teacher-parent communication when using digital technology.
Keywords: teacher-parent communication, digital technology, teacher, primary education

The Effect of Project-Based Learning Activities Based on Collaborative Learning on Students' Academic Grit and Metacognitive Awareness

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Abstract
Project-based learning is a learning method that enables students to actively participate in the learning process by researching, investigating, questioning, accessing information, and using the information they have acquired to create new products within a comprehensive framework. This method can be applied in classroom settings with individual student participation, as well as in group settings that require collaboration. In collaborative work, students can work together to maximise both their own learning and that of their group mates. The combined use of project-based learning and collaborative learning methods, which enrich the learning process, can make the learning experience more effective and inclusive. In this context, "collaborative project-based learning" can be described as a learning method in which students work together on a specific project. In this context, the study examined the effect of collaborative learning-based project-based learning activities on students' academic motivation and metacognitive awareness. The study used a pre-test-post-test control group experimental design. The study was conducted with three groups, including two experimental groups and one control group, and the study group consisted of a total of 95 third-year students. During the implementation process, collaborative project-based learning activities were applied to the experimental group 1, individual project-based learning activities were applied to the experimental group 2, and traditional teaching methods were used in the control group. The data collection tools used were the 'Academic Grit Scale' developed by Rojas, Reser, Usher, and Toland (2012) and adapted into Turkish by Bozgün and Basgül (2018) and the 'Metacognitive Awareness Scale' developed by Sperling, Howard, Miller, and Murphy (2002) and adapted into Turkish by Karakelle and Saraç (2007) were used as data collection tools. The analysis of the research is ongoing, and the results will be shared at the XVIth International Balkan Education and Science Congress.
Keywords: Keywords: Project-Based Learning, Collaborative Learning, Academic Grit, Metacognitive Awareness

Adapting Daily Life Problem-Solving Skills to Teaching Processes

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Abstract

Daily life problem-solving skills constitute a group of fundamental competencies that are often overlooked in modern education systems but are most needed by individuals throughout their lives. This skill set has a unique theoretical framework that distinguishes it from other skill definitions in the literature, such as basic life skills or 21st-century skills. It refers to an individual's ability to effectively, creatively, and sustainably solve any situation they encounter, from simple daily tasks such as grocery shopping to complex social issues. These competencies enable individuals to manage their lives more efficiently by making logical and conscious decisions and to coexist harmoniously with their environment. This set of skills encompasses various sub-competencies such as critical thinking, creative problem-solving, effective communication, interpersonal relationship management, self-awareness, empathy, and emotion management. Practical skills such as time management, resource management, entrepreneurship, and teamwork also play a vital role in this context. These components are interdependent, and when used together, they significantly increase individuals' problem-solving capacity, making them more competent and collaborative. Additionally, these skills support broader areas of social responsibility, such as compliance with social contracts and protecting the environment and health. The development of problem-solving skills for daily life should be supported by concrete, real-life practical examples rather than abstract theoretical knowledge. This practical approach enables individuals not only to understand the skills but also to experience how to use them in their lives. The aim is to instil these competencies in individuals from childhood onwards, as they are critical for coping with different types of problems at every stage of life, from difficult decision-making processes in adolescence to health management in old age. This skill set prepares individuals not only for academic success but also for making successful decisions in their professional lives, adapting to social life, and establishing healthy communication in family relationships. Its integration into educational processes enhances individuals' quality of life by enabling them to be more flexible and prepared for the ever-changing conditions of the world, thereby contributing to both their personal and social development. Therefore, the systematic teaching and development of these skills is a fundamental investment that enables individuals to overcome the challenges they will face throughout their lives. In this regard, this study aims to evaluate the concept of daily life problem-solving skills and the theoretical framework of related skills, as well as the adaptation of these skills to educational processes using concrete examples from daily life.

Keywords: skills, skills training, daily life problems

Artificial Intelligence in Primary Education

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Abstract

Recent educational policies and strategic frameworks increasingly recognise the need to align the teaching and learning process with the dynamic technological transformation of contemporary society. In this context, digitalisation has not only changed the forms of communication and information processing but has also created new possibilities for adapting the educational environment to the evolving cognitive needs of students. Information and communication technologies (ICT), once considered supplementary, are now embedded in the daily experience of learners and educators alike.

Primary education, which plays a formative role in shaping the learner's cognitive, emotional and social development, is particularly sensitive to innovations in educational practice. This paper explores the potential for integrating digital educational resources based on artificial intelligence (AI) into the learning process at the primary level. The aim is to examine how AI-driven tools can support teachers in delivering content more effectively and how they can be used to promote pupils' engagement, autonomy and individual learning progression.

The application of AI in education involves not only automating routine tasks, such as assessment or classroom management, but also providing adaptive learning experiences tailored to the specific needs and pace of each child. Intelligent tutoring systems, speech recognition software, machine learning algorithms for personalised feedback, AI-generated content, and virtual classroom assistants are some examples of tools that are increasingly accessible for educational use. These resources can offer immediate support, suggest differentiated tasks, and assist in overcoming learning difficulties, especially in inclusive classrooms where learners' needs vary significantly.

Despite the promising opportunities, the implementation of AI in primary education must be approached with careful pedagogical planning. The perceptual and cognitive characteristics of young learners require that technology be used in age-appropriate and developmentally sensitive ways. Pupils in early grades often rely on visual and tactile stimuli, short instructions, and a high degree of teacher mediation. Therefore, AI tools should not replace human interaction but rather complement it by facilitating the teacher's role as a guide and facilitator of learning.

Effective integration of AI-based resources in the classroom involves considering not only the technological functionality of the tools, but also their alignment with curricular goals, teaching strategies and pupils' developmental stages. Moreover, the professional development of teachers is key. Educators must be equipped not only with digital competencies but also with the capacity to critically evaluate and select AI-supported materials that correspond with pedagogical aims. Emphasis must be placed on ethical considerations, data privacy, and the avoidance of algorithmic bias, especially when young children are involved.

This article presents examples of digital platforms and applications that are currently suitable for the primary education context, such as AI-powered storytelling tools, adaptive reading programmes, and language learning assistants. The discussion is grounded in current academic literature and practical observations from classroom settings. It highlights the importance of using AI not as a replacement for traditional methods but as an enhancer of teaching effectiveness and learner motivation.

The use of artificial intelligence in primary education holds significant promise for transforming the learning process in ways that align with the digital realities of children's lives. When pedagogically grounded and responsibly implemented, AI tools can enrich the educational

experience, support inclusive practices, and contribute to building digital literacy from the earliest school years.

Keywords: artificial intelligence, primary education, digital educational resources, teaching and learning process, inclusive practices, teacher support

Systematic Review of Technology-Supported Turkish Language Teaching Research at Primary School Level

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Abstract
This research is a systematic analysis study examining the use of digital educational tools in primary school Turkish language education in Türkiye between 2015-2024. Conducted based on the need to systematically examine the role of technological tools in developing Turkish language skills during the integration process of the digital age into the education system, this study aims to systematically compile the uses of artificial intelligence applications, Web 2.0 tools, assessment-focused digital platforms, and other educational technologies in the four basic language skills areas (listening, speaking, reading, writing). In accordance with the inclusion and exclusion criteria determined in the research process, systematic literature review was conducted in Google Scholar, YÖK Academic, and YÖK Thesis Center databases, searching for concepts such as "Turkish, listening, speaking, reading, writing, technology, digital tool, Web 2.0 Tool" etc. As a result of the search, 86 studies were accessed, and these were examined by title, abstract, methodology, and study groups to determine the studies to be included in the research scope. When including studies in the scope, the criteria were that they should be research conducted at primary school level with technological tools for the four basic language skills, targeting primary school students, primary school teachers working in primary schools, and primary education pre-service teacher 73 studies meeting these criteria were identified and the research was conducted with these studies. The research revealed which language skills digital educational tools focus on, technological trend changes in the 2015-2024 period, and the characteristics of the most frequently preferred digital tools. According to the research results, the language skills that studies focused on were, in order: reading, reading+writing, listening+speaking+reading+writing, writing, speaking, and finally listening skills. It was found that digital tools (digital storytelling, Kahoot, Wordwall, Augmented Reality) are used more frequently in primary school Turkish teaching to increase students' language skills and academic achievement. The impact of the pandemic in 2021 led to distance education tools, and after 2023, more advanced technologies such as artificial intelligence and AR came to the forefront. Considering these developments, it was observed that digital literacy has become a new research area. The research results are expected to serve as a guide for teachers and researchers by comprehensively evaluating the current state of the digital transformation process in primary school Turkish teaching in Türkiye and presenting the current situation of Turkish teaching from a holistic perspective. Increasing studies on speaking and listening skills in the context of technology and language skills is presented as a recommendation.

Keywords: Digital Educational Tools, Primary School Turkish Teaching, Language Skills

An Investigation of Western Thrace Primary School Teachers' Question Writing Levels for Reading Comprehension

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Abstract
This research aims to systematically examine the question writing levels regarding reading comprehension skills of 10 primary school teachers who teach Turkish to bilingual students in the multilingual and multicultural educational environment of the Western Thrace region. The study was designed as a basic interpretive qualitative research design. The research process systematically consists of three main phases: in the first phase, participating teachers were asked to write reading comprehension questions for two separate texts, one informative and one narrative, in order to determine their current question writing levels and competencies. In the second phase, an interactive and applied training program was implemented, conducted over an online education platform for 3 weeks, covering the five basic levels of Barrett's Taxonomy (literal comprehension, reorganization, inferential comprehension, evaluation, and appreciation). In the third and final phase, they were asked to write new questions for the texts used before the implementation to evaluate the effectiveness of the training program. During the data analysis process conducted using descriptive analysis, the questions written by teachers before and after the training were categorized according to Barrett's Taxonomy levels and examined in depth. These analyses reveal the development levels and level distributions of teachers' question writing skills. As a result of the research, it was concluded that primary school teachers showed small quantitative but large qualitative development, that 20 different subcategories were used in questions written for informative texts and there was a distinct transition toward higher-level skills in Barrett's Taxonomy, and that their question writing skills for narrative texts developed from literal comprehension toward the appreciation level.

Keywords: Question Writing, Primary School Teacher, Reading Comprehension, Turkish Language Teaching

Comparison between Tertiary-Level EAP Learners' Vocabulary Size and Lexical Demands of Exam Texts: A Lexical Coverage and Threshold Perspective

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Abstract

This study investigates the alignment between the vocabulary size of tertiary-level English for Academic Purposes (EAP) learners and the lexical demands of reading exam texts. Previous research suggests that understanding 95% of the words in a text is necessary for general comprehension, while 98% coverage is recommended for fluent and independent reading. These thresholds correspond to approximately 5,000–6,000 and 8,000–9,000 word families, respectively. Since a gap between learners' vocabulary size and texts' lexical demands may hinder comprehension and compromise the validity of assessment outcomes, this study investigates how much exam texts overlap with learners' vocabulary size. Firstly, lexical coverage percentages of ten texts at the B1 (four) and B2 (six) levels were analyzed with the Lextutor Compleat Web VocabProfile (2.6) based on the 20,000-word family frequency list of the British National Corpus (BNC-20K). Therefore, the lexical accessibility level of the texts and the word family level required to reach it (e.g., 5K, 6K) were determined. Then, the scores for two separate administrations of Vocabulary Size Tests (VST1 and VST2) for the same learner group (N=18) were calculated. The four exam texts used in the fall semester were at the B1 level, and VST1 was administered this semester. VST2 was administered together with the six B2-level texts in the spring semester. The 95% coverage threshold was adopted to compare whether the learners' vocabulary sizes were sufficient to understand the exam texts. The proportion of learners achieving 98% coverage was also described because this level is widely accepted as the benchmark for fluent and independent reading. By analyzing whether the learners passed the 95% and 98% coverage thresholds in both semesters, the extent to which the texts in question were accessible to the relevant learner groups was evaluated. A binary outcome for each learner was coded: 1 = achieved ≥95% coverage, 0 = did not achieve <95% coverage. A Cochran's Q test was conducted to examine whether there was a statistically significant difference in the proportion of learners who met the coverage threshold across the ten exam texts. According to initial findings, all B1 texts generally reach 95% coverage in the 4K–5K range, indicating that the texts are mainly accessible to learners. Similarly, B2 texts mostly reach 95% coverage at the 4K level. This suggests that B2 texts are not much more complex regarding vocabulary size but may be at a higher level regarding structural features or conceptual difficulties. On the other hand, to reach 98% coverage (i.e., fluent and independent reading), a relatively high vocabulary size (e.g., 10K–20K) is required in both B1 and B2 texts. The results highlight the role of aligning lexical difficulty in assessment texts with learners' vocabulary sizes to ensure accessibility and fairness in L2 reading comprehension.

Keywords: vocabulary size, L2 reading assessment, lexical coverage, lexical threshold, Lextutor VocabProfile Compleat, English for academic purposes.

Vocabulary-Based Instruction with ChatGPT: Material Development, Vocabulary Acquisition and Speaking Promotion Using the Example of "100 Seconds of News"

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Abstract

This paper addresses the question of how current video content can be used effectively in German as a foreign language (DaF) lessons to promote listening comprehension with the help of the generative AI tool ChatGPT. The short news videos published by ARD entitled "Tagesschau in 100 Sekunden" serve as an example. These videos enable learners to engage with current social issues, which both increases interest in the lesson and promotes the ability to understand what is heard and reflect on its content.

The study specifically utilized ChatGPT's ability to create transcripts in a very short time. Whereas transcripts used to be time-consuming to create manually by teachers, they can now be generated in a short time and prepared for various didactic purposes. Based on these transcripts, cloze texts at the appropriate language level, targeted word lists, comprehension-promoting questions, and discussion prompts can be efficiently developed. This leads to a noticeable reduction in the workload for teachers and offers learners diverse, differentiated, and level-appropriate learning opportunities.

In addition, ChatGPT not only serves as a time-saving tool, but also acts as a creative and versatile partner in the creation of teaching materials. Particularly noteworthy is the ability to adapt content to different learning levels, open up individual learning paths, and develop topic-related exercises that are precisely tailored to the needs of the students. This supports internal differentiation in the classroom and promotes flexible lesson planning.

Although the "Tagessschau in 100 Sekunden" was examined from various educational perspectives in the dissertation, this paper focuses on the use of ChatGPT for transcription and the development of AI-supported language learning materials.

This paper is based on a doctoral study conducted at the Faculty of Social Sciences at Trakya University.

Keywords: ChatGPT, Vocabulary instruction, Material development, Listening comprehension, Speaking skills

The potential of AI-supported feedback in German as a foreign language writing instruction: The use of ChatGPT to promote text type-oriented writing skills

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Abstract

This article examines the extent to which AI-supported feedback can support the writing process in German as a foreign language instruction. It is based on an empirically grounded dissertation in which text-type-oriented writing training was developed and implemented in a university preparatory class in Turkey. Building on Hayes' writing process model (2012) and Bachmann and Becker-Mrotzek's three-circle model (2017), the central phases of writing were systematically taught. While Hayes describes writing as a cognitive process with recursive planning, formulation, and revision steps, the model by Bachmann & Becker-Mrotzek focuses on the interlocking of text type knowledge, writing strategies, and communicative requirements. In particular, awareness of text types proved to be a fundamental factor in the training for the quality of argumentative texts.

Complementing the dissertation, this article explores how the AI-based language model ChatGPT could be used as a tool for generating feedback. Using exemplary prompts, it analyzes how ChatGPT responds to learner texts, how it evaluates argumentative structures and linguistic coherence, and whether it provides helpful suggestions for revision. It discusses potential benefits such as immediate feedback, orientation toward text patterns, and grammatical corrections, as well as limitations in terms of depth of focus and contextual understanding.

The aim of this article is to position AI not as a substitute, but as a complementary didactic tool in writing instruction. Finally, implications for the reflective use of ChatGPT in the university context of German as a foreign language instruction are outlined.

This work was written as part of a dissertation conducted at the Social Sciences Institute at Trakya University entitled "Förderung der Schreibkompetenz im DaF-Unterricht. Ein textsortenorientierter Ausblick für universitäre Vorbereitungsklassen".

Keywords: Artificial intelligence, writing promotion, German as a foreign language teaching, feedback, text type competence

AI in the Classroom: Rethinking Essay Writing and Foreign Language Didactics with Pre-Service Teachers

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Abstract

The rapid advancement of artificial intelligence (AI) is transforming foreign language education, particularly in translation and essay writing. This study investigates tertiary-level students' perceptions, attitudes, and experiences regarding integrating AI tools in their English and German language learning process, focusing particularly on writing tasks. Special attention is given to how students engage with AI-powered tools such as machine translation services (e.g., Google Translate, DeepL) and generative AI models (e.g., ChatGPT, Grammarly) and the perceived benefits and concerns these tools bring. The aim is to inform future pedagogical practices and curricular decisions by understanding the implications of AI use for language acquisition, creativity, and critical thinking.

A survey-based approach was employed to collect data from tertiary-level pre-service teachers studying at the class-teacher and preschool teacher departments. The instrument captured students' usage patterns of AI tools for essay writing, their levels of trust and concern, and their general attitudes toward the role of AI in education. Descriptive statistics and confidence intervals were used to analyze the extent of AI use, while correlation analysis assessed the relationship between students' preferences for AI and actual usage behavior.

Descriptive statistics indicate that 59% of students use AI tools for essay writing, with confidence intervals confirming that the usage varies between 50.2% and 68.1%. A majority of students (70%) express trust in AI tools, a figure significantly higher than the 52% who are concerned about a potential loss of creativity. This suggests a prevailing acceptance of AI despite pedagogical concerns. Interestingly, the correlation between students' preference for AI and their actual use is weak ($r = -0.119$ for essay writing), indicating that AI tool use occurs largely independently of personal learning preferences.

The findings underscore the growing relevance of AI in foreign language education and its acceptance among future educators. While students recognize the practical benefits of AI, such as instant feedback and enhanced language proficiency, they are also aware of potential risks, including diminished writing autonomy and creativity. These insights emphasize the need for well-designed pedagogical frameworks that balance AI-assisted learning with the development of independent language skills. As AI continues to evolve, understanding students' experiences is vital to ensuring its responsible and effective integration into English and German language instruction, with broader implications for educational practices globally.

Keywords: AI, Essay Writing, Foreign Language Didactics, Pre-Service Teachers of Education

Implementing Drama in Foreign Language Education: A Textbook-Based Exploration within German Language Teaching

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Abstract

This study explores the use of dramatic approaches in teaching German as a foreign language, focusing on how contemporary textbooks either support or hinder such practices. Although the benefits of using drama in foreign language education are widely acknowledged, limited research exists on the extent to which textbooks facilitate drama-based activities. This study aims to address that gap by analyzing two widely used textbooks in Türkiye: one published by Klett Verlag and the other approved by the Turkish Ministry of National Education. In addition, the study seeks to offer practical guidance for future teachers on how to successfully integrate drama into the classroom using current teaching materials.

The research adopts a qualitative approach based on document analysis. The textbooks examined—Klasse! A1 (Klett, 2022) and the 9th grade textbook published by the Turkish Ministry of National Education (2023)—were analyzed in terms of their features supporting drama activities, such as role play, dialogues, and scenario-based exercises. A descriptive content analysis method was used to identify and categorize these features. The evaluation also investigated how flexibly the identified content could be adapted for use in classroom drama activities.

The findings reveal that Klasse! A1 offers a broad range of easily applicable, drama-based resources, including structured role-play tasks and dialogues enhanced with visual supports. In contrast, the Ministry textbook contains only a limited number of components that allow for drama integration and requires significant adaptation by the teacher. Despite this shortcoming, it provides a foundational framework that can be creatively expanded. Teacher candidates benefit more from resources that explicitly include drama-friendly features; however, even traditional materials can be re-purposed effectively through appropriate pedagogical techniques.

Drama clearly serves as a powerful tool in language teaching for fostering communication skills and emotional learning outcomes. However, the extent to which drama can be integrated into teaching practices largely depends on the flexibility and scope of the pedagogical materials used. This study highlights the need for greater coherence between curriculum design and drama-based instructional approaches, offering concrete recommendations for teacher education programs to support such integration.

Keywords: drama-based learning, textbook analysis, foreign language teaching, German as a foreign language, teacher education

„Baba culture“ meets stereotype in German as a foreign language lessons: Intercultural comparison of educational methods in Kaya Yanar's Made in Germany

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Abstract

This article examines the role of humor in German-Turkish youth literature and the media, with a particular focus on the humorous portrayal of cultural identity. Since the 1990s, a shift has been emerging in which cultural themes in literature, film, and television are increasingly treated in a playful and humorous manner. Culture clash comedies and humorous portrayals in youth books and series offer young people important opportunities for identification by presenting cultural diversity as a strength. The starting point of this study is Kaya Yanar's trend show Made in Germany, which humorously presents intercultural comparisons. This study aims to contrast humorous clichés and intercultural challenges based on stereotypes that shape the collective image of multicultural identity. In this context, this study is based on the action-oriented approach and attempts to present didactic suggestions for German as a foreign language teaching at the B1/B2 level. Particular attention is paid to parental upbringing styles in different cultures. The representation of the parents in the analyzed episode is qualitatively evaluated and visually presented using document analysis. This document analysis aims to contrast the educational values of different cultures in German as a foreign language classes and to promote cultural learning in German as a foreign language classes. The study demonstrates that humor not only enriches the learning experience but also represents an effective means of addressing cultural differences in a playful and reflective way.

Keywords: German as a foreign language classes, humor, cultural learning, youth media, Kaya Yanar

The interconnection of syntactic functions and semantic roles of the object in the Albanian language

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Abstract

The treatment of semantic-syntactic relations of the object in the Albanian language allows for an in-depth examination of how meaning (semantics) affects and is reflected in the grammatical structure (syntax) of the object. The object is not merely a structural element, but carries a specific semantic role in relation to the verb and its action. The study of semantic-syntactic relations is important for explanatory grammar, that is, for deeply understanding the functioning of language, for teaching and automatic language processing, as well as for linguistic comparisons.

This study aims to examine in detail the semantic-syntactic relations of the object in the Albanian language, treating the object as a unit that carries various semantic functions beyond its traditional grammatical role. At the center of the analysis is the role played by verb types and the semantic relationships that arise between the verb and the object, as well as the way these relationships are structured in the syntactic construction of the sentence. The fundamental objective is to clarify how meaning (semantics) and structure (syntax) interact to form stable and meaningful units in linguistic communication. Thus, in this field, we will address the meaning of semantic roles and their connection with syntax, the type of verb and the relations with the object, the type of object and semantic realization; syntactic transformations and semantic changes, semantic-syntactic ambiguity.

In this research, the theoretical and comparative analysis of contemporary and traditional linguistic literature has been intertwined with concrete analyses of examples taken from corpora of the Albanian language. Objects have been identified and classified and the role they play in the telicity of verbs has been examined.

The analysis showed that the object in Albanian cannot be understood merely as a structural element, but as an essential link that connects the action of the verb with other parts of the sentence and with the overall pragmatic context. Several types of semantic-syntactic connections have been identified that are conditioned by the lexical nature of the verb and by the context, as well as transformations that modify the role of the object or influence its interpretation. It was also found that the absence of a systematic approach to these relationships can lead to difficulties both in automatic language processing and in teaching.

The study highlights the importance of treating verbs according to their valences and their impact on the acquisition of the object, as well as emphasizes the significance of the object as a dynamic unit that carries different semantic roles depending on the structure and context. This deepened understanding contributes to the construction of a more comprehensive explanatory grammar and to the improvement of teaching methods for Albanian as a mother tongue and a foreign language. Additionally, the findings have special value for linguistic and interlingual comparisons, especially for linguistic comparisons between traditional grammar and generative grammar.

Keywords: object, semantic-syntactic relationships, verb types, semantic roles, syntactic transformations.

AI-Powered Conversational Agents in ELT: Rethinking Language Instruction

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Abstract

The integration of artificial intelligence (AI) into education has opened new perspectives on how language learning can be supported through technology, particularly via the use of chatbots and conversational agents. This paper investigates how these tools can be utilized in English Language Teaching (ELT), focusing on their classroom applications, advantages, and limitations. Since language learning requires regular, contextual, and interactive practice, AI-driven conversational agents offer learners a flexible, non-judgmental, and adaptive platform for supporting communication in English.

This study aims to investigate how chatbots and conversational agents can be effectively employed in ELT to support language development—particularly in improving learners' speaking, writing, grammar, and vocabulary. As conversational AI continues to evolve, it offers new opportunities for enhancing English language instruction. The paper provides a comprehensive overview of their role in ELT, highlighting both educational benefits and practical challenges. It also draws on theoretical insights from second language acquisition (SLA) to present recommendations for teacher training and curriculum design.

This study adopts a theoretical and descriptive approach, using a narrative review of existing literature in SLA, educational technology, and AI in education. It is based on interactionist and sociocultural theories of SLA, along with principles of personalized and adaptive learning. The paper also includes examples of classroom applications on the use of chatbots in ELT, drawn from current studies found in the literature.

Findings from the literature indicate that chatbots can significantly enhance language learning by providing real-time, personalized feedback, reducing anxiety in speaking tasks, and offering additional practice opportunities outside the classroom. These tools are especially effective in supporting learners who need additional speaking practice, or are reluctant to participate in face-to-face activities. They also contribute to vocabulary building, grammar reinforcement, and writing development through interactive feedback and dialogue simulations. Moreover, when used as writing assistants, they can support sentence-level accuracy and contribute to generating and organizing ideas. Despite these advantages, several challenges remain. Some chatbots may provide incorrect or oversimplified language input, and they often lack contextual and cultural awareness. Furthermore, their effectiveness depends on how well they are integrated into instructional design and whether teachers are sufficiently trained to use them. Concerns about over-reliance on technology and reduced human interaction also need to be addressed in the design of AI-supported educational models.

Chatbots and conversational agents represent a promising innovation in the field of ELT. When appropriately selected and integrated into effective teaching practices, they can serve as beneficial tools to language teaching by promoting learner autonomy, increasing motivation, and building learner confidence. However, their effective use depends on addressing challenges related to linguistic accuracy, ethical concerns, and teacher preparedness. This study concludes that while chatbots cannot replace human teachers, they can enhance ELT practices when used as part of a blended, student-centred learning environment. The paper offers recommendations for integrating chatbot tools into both pre-service and in-service teacher education programs, as well as for designing ELT curricula that incorporate AI technologies to support learners' communicative development.

Keywords: Artificial Intelligence (AI), Chatbots, Conversational Agents, English Language Teaching (ELT), Second Language Acquisition (SLA)

From Textbook Data to a Generalizable Lexical Analysis Model: Frequency, Corpus Alignment, and Artificial Intelligence Applications in German Language Teaching

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Abstract

This study conducts an in-depth lexical analysis of Mein Schlüssel zu Deutsch, a German language textbook used at B2.1 level in Turkish high schools. The primary objective is to determine vocabulary overlap with the Deutsch Heute corpus from the Datenbank für Gesprochenes Deutsch (DGD), a reference database for contemporary spoken German. The study analyzes frequency values and distribution patterns to evaluate the textbook's potential for enhancing students' communicative competence, questioning the functionality of instructional materials in spoken language contexts.

A secondary aim involves assessing artificial intelligence models' ability to classify textbook vocabulary according to Common European Framework of Reference for Languages (CEFR) standards, providing practical insights for educators and material developers.

The study employs a quantitative research design based on document analysis. All German words in Mein Schlüssel zu Deutsch were systematically examined using text mining techniques. The textbook content was digitized, and word frequency was calculated using AntConc, an open-source lexical analysis software. Inflected word forms were normalized to base forms to ensure objective evaluation of lexical units.

The resulting dataset was cross-referenced with the Deutsch Heute corpus from DGD to measure lexical overlap and divergence. Key analytical parameters included word frequency and corpus alignment through descriptive statistical comparison, assessing how well textbook content corresponds to authentic spoken German.

Additionally, the ChatGPT-4o model was prompted to classify the 20 most frequent textbook words according to CEFR levels (A1–C1).

The analysis revealed minimal overlap between textbook vocabulary and contemporary spoken German. Of 62,564 unique words identified, only 2,067 (3.30%) were common to both the textbook and DGD corpus. Furthermore, 57,015 words (91.13%) appeared in DGD but not in the textbook, while 1,415 words (2.26%) were exclusive to the textbook.

ChatGPT-4o classified the 20 most frequent textbook words as follows: 2 at B2 level, 3 at B1, 5 at A2, and 10 at A1. These results indicate significant divergence from lexical patterns found in DGD. Verbs, formulaic expressions, and everyday words commonly used in spoken language were largely absent, suggesting the textbook's vocabulary structure is insufficient for contemporary spoken communication needs.

The findings demonstrate that only 3.30% of textbook vocabulary overlaps with commonly used words in contemporary spoken German, indicating minimal reflection of authentic language use. This lexical mismatch may hinder students' preparedness for real-life communication.

The study emphasizes the importance of including high-frequency, functional vocabulary from spoken language alongside grammatical accuracy and thematic coherence in instructional materials. For curriculum developers and textbook authors, this provides strong pedagogical feedback that current, usage-based, and communicatively authentic content should be prioritized.

The comparative analysis revealed notable discrepancies between publisher-assigned vocabulary levels and ChatGPT-4o classifications. The AI model consistently assessed words at lower levels, particularly among basic and high-frequency items, indicating systematic differences between human-based and AI-based classification approaches.

This research advocates for data-driven reassessment of vocabulary selection in foreign language education, offering an empirically grounded framework to support lexical competence development. The significant gap between textbook content and authentic spoken language usage suggests that current materials require substantial revision to better prepare students for real-world communication scenarios.

The study contributes to foreign language pedagogy by highlighting the necessity of corpus-based approaches in material development and the potential role of AI in vocabulary classification, while emphasizing the critical importance of aligning educational content with authentic language use patterns.

Keywords: Textbook evaluation, spoken German, corpus comparison, lexical frequency, foreign language teaching

Maximizing Second Language Acquisition Through Study Abroad: Strategies, Challenges, and Pedagogical Support

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Abstract

This review investigates the role of study abroad programs in the development of L2, focusing on the importance of immersion in the relevant language environments and cultures. It analyzes the impact of SA on learners' social expectations, interactions and their language acquisition outcomes with regard to institutional and programmatic support. Although study abroad programs have considerable promise in facilitating the L2 acquisition, evaluations of their effectiveness show that many personal and contextual factors, including the quality of the program, social participation, and preparatory work, impact outcomes. The chapter stresses that the strategic design of the curriculum, learner interactions, and structured pre- and post-visit activities aimed at appropriate and purposeful engagement and competence development are critical in leveraging SA learning opportunities.

Keywords: study abraod, transnational mobility, second language acquisition, exchange students

Second Language Anxiety: A Comprehensive Review of Its Effects, Sources, and Management

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Abstract

This review provides an in-depth examination of the multifaceted nature of anxiety in second language learning, emphasizing both its psychological and pedagogical dimensions. It investigates how anxiety influences learners' academic performance, motivation, self-perception, and overall engagement in the language learning process. A central theme of the review is the distinction between facilitative anxiety, which can act as a motivator that enhances focus and effort, and debilitative anxiety, which hampers performance and inhibits communication. The review delves into the underlying causes of language learning anxiety, highlighting a combination of physiological responses (e.g., increased heart rate, sweating), emotional states (e.g., fear of negative evaluation, low self-confidence), and situational variables (e.g., classroom dynamics, testing conditions, and peer pressure). Drawing on a broad range of empirical studies, it outlines how anxiety differently affects the core language skills—speaking, listening, reading, and writing—often placing a heavier burden on productive skills like speaking, where learners are more vulnerable to judgment and error correction. Moreover, the review underscores the importance of reliable measurement methods for assessing L2 anxiety. These include self-report instruments such as the Foreign Language Classroom Anxiety Scale (FLCAS), observational data, and emerging tools like physiological monitoring to capture real-time anxiety indicators. Understanding the sources and manifestations of anxiety is presented as a necessary step for targeted pedagogical intervention. Special attention is given to the classroom environment and instructional approaches, recognizing their potential either to exacerbate or alleviate anxiety. Supportive teaching practices, such as positive feedback, learner autonomy, peer collaboration, and the incorporation of low-stress communicative activities, are shown to play a crucial role in reducing harmful anxiety levels. In conclusion, this review advocates for a more comprehensive and empathetic approach to second language teaching—one that acknowledges anxiety not as a fixed learner trait but as a dynamic and manageable factor. By translating research insights into classroom strategies, educators can better support learners in overcoming emotional barriers and achieving greater success in their language development.

Keywords: Second language acquisition, language learning anxiety, foreign language learning, coping strategies psychological factors

Cultural Awareness or Cultural Generalization? Breaking Points of Meaning in Turkish and Greek Foreign Language Teaching with ChatGPT

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Abstract

This study examines the impact of large language models, which are becoming increasingly prevalent in foreign language teaching, on the transfer of cultural meaning in the context of Turkish and Greek. Specifically, it evaluates the generalizations and meaning shifts that emerge in teaching culturally loaded expressions, considering the structural and cultural characteristics of these two languages. By acknowledging that language is not merely a collection of words but is shaped by cultural references, social codes, and historical contexts, the study explores to what extent AI-based tools can reflect this depth.

The study investigates how idioms and metaphors, which carry significant cultural meaning, are addressed in the process of second language acquisition in Turkish and Greek. It analyzes how such expressions are produced and explained by AI-supported language models like ChatGPT, using examples. Observational evaluations were conducted to identify similarities, differences, and breaking points in meaning transfer, framed within a comparative approach alongside current discussions.

While AI-based language tools provide formally accurate responses in the target language, they exhibit limitations in understanding and conveying the context of culturally significant expressions. In languages like Turkish and Greek, which possess deep cultural connotations, this issue often leads to incorrect generalizations, especially through direct translation of idiomatic expressions or neglecting cultural codes. This results in learners perceiving meaning superficially and weakening their connection with the target culture.

In culturally rich languages like Turkish and Greek, foreign language teaching requires not only linguistic proficiency but also the development of cultural awareness. Although AI-supported tools are valuable in this process, the risk of cultural generalization must be considered, and these tools should be supported with pedagogical guidance.

In this regard, the integration of human-led cultural interpretation alongside AI applications emerges as a key component for effective language education.

This study discusses the impacts of AI on meaning transfer, particularly in the context of comparative Turkish–Greek language teaching.

Keywords: Foreign language teaching, cultural awareness, Turkish, Greek, artificial intelligence, idioms

The impact of Confidence, Social Anxiety, and Classroom Environment in English Language Learning

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Abstract

This study examines the influence of confidence, social anxiety, and classroom environment on participation among secondary English language learners in Kosovo. Data were collected from 200 students using a Likert-scale survey assessing self-reported confidence in using English, social anxiety related to peer evaluation, and perceptions of the classroom environment. The study aims to explore how these psychological and environmental factors interact to shape students' willingness to participate in classroom activities, which is a crucial aspect of effective language acquisition.

Findings indicate that students with higher confidence and more positive perceptions of their classroom environment experience lower social anxiety and demonstrate greater engagement in discussions, collaborative activities, and other learning tasks. Although many students report confidence in sharing their ideas in English, hesitation during public speaking remains prevalent, suggesting that confidence is highly context-dependent and may vary across different classroom situations. Furthermore, social anxiety was found to be more strongly associated with fear of negative evaluation from peers than with fear of ridicule, highlighting the significant role of self-perception, peer feedback, and classroom dynamics in shaping student behavior. Notably, supportive feedback, constructive interactions, and a positive learning environment were shown to enhance confidence while reducing anxiety, emphasizing the value of inclusive and responsive teaching strategies. These findings suggest that educators can foster active participation by designing lessons that encourage collaboration, provide consistent positive feedback, and create psychologically safe environments. By addressing both psychological and environmental dimensions of learning, teachers can not only improve students' language performance but also enhance their emotional comfort, motivation, and long-term engagement. Overall, this study highlights the importance of integrating confidence-building and anxiety-reducing strategies into English language classrooms to promote more effective and inclusive language learning experiences.

Keywords: confidence, social anxiety, classroom environment, second language acquisition

Investigation of the Use of AI Tools ChatGPT and Gemini in Pronunciation Teaching in German as a Foreign Language Lessons

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Abstract

This study discusses the possible applications of artificial intelligence in teaching pronunciation in German as a foreign language (GFL) instruction. In this context, the analysis examines whether and how selected artificial intelligence tools can be utilized to provide support. The practical basis of the work is provided by exemplary materials and empirical data drawn from the thesis practice of the completed dissertation, "Teaching German Phonetics to Learners with L1 Turkish". The study aims to contribute to the further development of GFL teaching in Türkiye.

To carry out the study, comparative use is made of the artificial intelligence tools ChatGPT and Gemini. In this way, the scope of the investigation should be neither too broad nor too narrow. Furthermore, the teacher's perspective is used to limit the scope of work when evaluating the possible implementation. In other words, the authors of this abstract describe the adoption of the two tools for the research purposes in question. Additionally, as previously mentioned, the completed dissertation "Teaching German Phonetics to Learners with L1 Turkish" provides the practical foundation for this study. The target group of the dissertation is learners of GFL at Turkish universities who are native speakers of Turkish. As part of its thesis practice, selected characteristics of Standard German that may be problematic for Turkish learners to acquire were addressed, along with strategies for learning pronunciation. The effectiveness of the designed pronunciation training program was tested with subjects. This work, on the other hand, investigates whether and how the AI tools ChatGPT and Gemini can contribute to its further development. Thus, the scope of the study encompasses both theoretical and practical levels, including the evaluation of learners' pronunciation performance. In the theoretical and practical examination of the topic, prompts developed by the authors of this study are entered into both tools. The aim is to compile theoretical knowledge (e.g., additional sources) and practical application options (e.g., additional exercises) for the selected teaching units on pronunciation and strategy teaching. Furthermore, it is examined whether selected language recordings of subjects, which were made during the thesis practice of the dissertation, can be automatically annotated by AI tools, specifically, whether they can be provided with corresponding transcription symbols. The prompts used and the work results achieved are documented.

The comparative usage of ChatGPT and Gemini in the context of teaching pronunciation to learners of GFL with Turkish as their mother tongue reveals that both artificial intelligence tools generally prove helpful for teachers. Additional exercises, also in new variations, can be created for the teaching units used in the thesis practice of the dissertation, "Teaching German Phonetics to Learners with L1 Turkish". Moreover, both tools are useful for teaching theory. Regarding the evaluation of pronunciation performance, ChatGPT performs better, as it can automatically generate annotations in the form of TextGrid files that can be opened with the speech analysis software Praat. In comparison, this option is not available with Gemini. Finally, it should not be forgotten that the information provided by both tools must be checked by the teacher for accuracy and effectiveness, modified if necessary, and adapted accordingly for application in GFL teaching. The exact scope of integrating the research results into the pronunciation training program developed through the realization of the dissertation should be investigated and further elaborated in future research.

Keywords: German as a Foreign Language (GFL), pronunciation teaching, pronunciation features of Standard German, pronunciation learning strategies, Turkish learners of German

Drama as a Reinforcing Technique in Teaching English

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Abstract

This paper examines the role of drama as a reinforcing technique in English language teaching, with particular attention to its effects on linguistic, cognitive, and affective domains. Building on previous research, drama fosters motivation, fluency, adaptability, and communicative competence through embodied and student-centered learning. Recent empirical studies further demonstrate its positive impact on vocabulary acquisition, grammar, listening, speaking, and intercultural understanding. When language is situated within meaningful contexts, drama activities such as role-play, improvisation, and story enactment promote authentic interaction, perspective-taking, and cognitive empathy. These practices enhance retention and communicative spontaneity.

The paper also addresses the increasing integration of technology and artificial intelligence into drama-based pedagogy. Tools such as augmented reality and applications driven by artificial intelligence create immersive and adaptive learning environments. These technologies enhance student participation and broaden the pedagogical scope of drama. Artificial intelligence supports collaborative playwriting, improvisation, and connections between writing and drama. However, challenges remain regarding technical access, teacher preparation, and ethical considerations. In this context, the teacher's role evolves from traditional facilitator to a mediator who combines embodied learning with digital engagement. This shift requires both pedagogical creativity and technological literacy.

Drama continues to serve as an effective method for reinforcing English language learning by integrating emotional engagement with linguistic practice. Integration with emerging technologies provides opportunities for increased interactivity, personalization, and creativity. This study contends that balanced and reflective teacher mediation is necessary to fully realize the benefits of drama and technology in language education.

Keywords: Drama-based learning, English language teaching (ELT), process drama, augmented reality (AR), artificial intelligence (AI), technology-enhanced learning

Tracking Syntactic Complexity in Thesis Statements: A Corpus-Based Longitudinal Analysis

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Abstract

This paper presents the quantitative findings of a doctoral study on how undergraduate English students develop thesis statements in argumentative essays across four years of study. Three learner corpora (beginning of Year 1, end of Year 1 and end of Year 4) were compiled, analyzed and compared to a benchmark corpus of native English student writing. The analysis focused on key measures of sentence complexity including thesis statement occurrence, placement, sentence type and syntactic sophistication.

Results show a gradual increase in sentence sophistication, with notable improvement in the use of complex and compound-complex sentences and more frequent use of connectors and modifiers. However, progress was uneven, and by Year 4 the thesis statements were still shorter, less varied and more reliant on coordination than those in the native benchmark corpus. These findings highlight the slow trajectory of syntactic growth in high-stakes academic writing and the challenges learners face in reaching native-like proficiency. The study demonstrates the value of corpus-based methods for tracing micro-level linguistic development while also identifying persistent weaknesses in L2 thesis statements, which in turn highlights areas where instruction can be directed to foster further development and complexity.

This paper presents the quantitative findings of a doctoral study on how undergraduate English students develop thesis statements in argumentative essays across four years of study. Three learner corpora (beginning of Year 1, end of Year 1 and end of Year 4) were compiled, analyzed and compared to a benchmark corpus of native English student writing. The analysis focused on key measures of sentence complexity including thesis statement occurrence, placement, sentence type and syntactic sophistication.

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Keywords: corpus linguistics, english language teaching, teacher training, writing skills

International Collaboration and Community Interpreting Practices in Disasters

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Abstract

The world is a planet where disasters or disasters that closely affect the living creatures living on it occur. Disasters are events that people are unable to find solutions in their own living spaces and normal life is interrupted, out of control, causing great loss of life and property. These events are usually caused by nature's own movements. Disasters may be unavoidable events; however, it is possible to be a resilient society against disasters. The way to do this is to take precautions and increase the level of awareness of the society through awareness training.

Countries where disasters occur are often unable to cope with the destruction caused by the disaster alone. In these cases, international co-operation and support gain great importance. Many international organisations established for disasters come to disaster areas and provide not only search and rescue services but also various social aids. In order for these organisations to work effectively and beneficially, a common communication language is needed. Accurate and effective linguistic communication contributes greatly to the rapid and efficient delivery of international aid to disaster-affected communities. In this respect, Disaster Interpreting in Disaster (ARF), a community interpreting-based practice, has been developed. ARÇ has played an important role by providing linguistic communication services to international foreign aid teams, especially in major disasters that have occurred in Turkey in recent years.

The aim of this study, which is based on a literature review, is to emphasise that accurate and effective linguistic communication is an indispensable element for the timely and effective provision of all kinds of services in the international solidarity process in disaster situations. In this context, it is argued that the use of community interpreting, which is carried out verbally, in disaster conditions, provided that the necessary disaster training is received before the disaster, will both contribute positively to the international solidarity process and mediate the establishment of a healthy communication between international teams with different cultural backgrounds and local people.

Keywords: Translation, Community Interpreting, Disaster, Disaster Awareness

Bridging Scientific Gaps: How Primary School Teachers Can Use ChatGPT to Support Science Education

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Abstract

The primary objective of this study is to investigate the integration of ChatGPT into primary school science education, with a focus on its potential to bridge educational gaps and enhance the overall learning experience for students. The study emphasizes the transformative role of artificial intelligence (AI) in making complex scientific concepts more accessible and engaging for young learners. By leveraging ChatGPT, educators can create a more interactive and personalized learning environment that fosters students' curiosity and develops their analytical skills. The paper aims to provide insights into how AI can support teachers in creating tailored educational experiences that cater to the diverse needs of their students, ultimately promoting a positive attitude towards science subjects, which are often perceived as challenging or intimidating.

The study employs a qualitative research approach, synthesizing existing literature and empirical studies on the application of AI technologies in educational settings. It discusses the rapid adoption of ChatGPT, highlighting its accessibility and effectiveness in promoting self-directed learning among students. The analysis includes a detailed examination of project-based learning (PBL) as a significant methodology where AI can facilitate creativity and collaborative exploration of scientific concepts. The paper also addresses the ethical considerations surrounding the use of AI in education, emphasizing the importance of developing tools that are free from biases and respect data privacy. Furthermore, it advocates for the training of educators to effectively harness the capabilities of AI, ensuring that its benefits are realized in classrooms while mitigating potential risks associated with its use.

The study's findings indicate that integrating ChatGPT into primary science education can significantly enhance student engagement and understanding. Evidence suggests that AI can support various stages of PBL, fostering deep understanding and innovation in science education. The paper presents examples of how ChatGPT can provide tailored feedback and interactive resources, which are crucial for cultivating a positive attitude towards science subjects. By transforming complex scientific concepts into accessible learning experiences, ChatGPT not only enhances students' curiosity but also encourages them to explore scientific ideas collaboratively. The results highlight the potential of AI to personalize learning experiences, enabling teachers to tailor science curricula to meet the individual needs of students, thereby enhancing overall engagement and comprehension.

In conclusion, the thoughtful incorporation of ChatGPT into primary science education represents a pivotal advancement in educational practices. The study advocates for a balanced approach that addresses ethical considerations surrounding AI usage, emphasizing the necessity for educators to be trained in effectively utilizing these technologies. By integrating ChatGPT, educators can empower themselves and enhance students' understanding of science, laying a solid foundation for their future academic endeavors. The paper emphasizes the significance of ongoing research and development in the field of AI in education, suggesting that further investigation is necessary to fully comprehend the long-term effects of AI on teaching and learning. Ultimately, the integration of ChatGPT is positioned as a strategic method for enhancing science education, fostering a more engaging and supportive learning environment that prepares students for the complexities of the scientific world. The findings suggest that, with proper implementation and consideration of ethical implications, AI can play a transformative role in shaping the future of education, making science more relatable and enjoyable for primary school students.

Keywords: ChatGPT, Science Education, Artificial Intelligence (AI), Personalized Learning

The Role of Artificial Intelligence in Supporting Personalized Learning in Macedonian Language Instruction

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Abstract
Artificial intelligence (AI) is increasingly being integrated into educational environments to support personalized and adaptive learning. In higher education, AI-based tools offer opportunities to enhance student engagement, provide ongoing support, and deliver individualized feedback. This study explores the role of an AI-powered chatbot (Schoolai) in the context of Macedonian language and expression instruction at the university level. The participants in this study are students enrolled in a primary education program, i.e., future primary school teachers, which adds relevance as they are gaining early experience with digital tools that can support classroom instruction. The purpose of the study is to examine whether the use of such a tool contributes to improved student outcomes and deeper understanding of course material. The research employs a comparative design involving two student groups: the experimental group, which used the chatbot throughout the semester, and a control group from the previous academic year, which followed the same curriculum without access to AI tools. The chatbot was used as a supplementary learning tool, providing explanations, practice tasks, and writing support tailored to student needs. Data collection includes exam results, written assignments, and informal feedback from students regarding their experiences with the chatbot. A mixed-methods approach is used, combining quantitative analysis of academic performance with qualitative interpretation of student perceptions. While final statistical results are still being processed, preliminary observations suggest increased student engagement and more autonomous learning behavior in the experimental group. The study aims to contribute to the understanding of how AI can be meaningfully integrated into the teaching of humanities subjects, where such tools are still relatively underused. It also seeks to provide insights into the pedagogical value of chatbot-supported learning, especially in courses that rely on expression, language structure, and written production.

Keywords: Artificial intelligence, Personalized learning, Chatbot, Macedonian language, Higher education

Pedagogical Use of Artificial Intelligence Tools in Foreign Language Learning Advising: A Case Study

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Abstract
Contemporary technological advancements necessitate the adoption of new methods and tools in foreign language education. In particular, artificial intelligence provides personalized and effective support by being integrated into learning processes. This study aims to examine the pedagogically appropriate and conscious integration of AI tools into foreign language learning advising and its potential effects. In this context, it investigates how AI supports personalized learning pathways and adds value to traditional advising approaches. The research is designed as a qualitative case study based on three advising sessions conducted within the course "Learning Advising and Coaching in Language Education II," offered in the Master's Program in German Language Education at Trakya University. The participant consists of a volunteer third-year student from the German Language Teaching Department at Trakya University. The student was included in the advising process due to specific challenges encountered in developing German writing skills. During the advising sessions, AI tools were employed in a structured and controlled manner within the advising framework to develop strategies aimed at addressing the student's writing difficulties. These tools were integrated to assist the student in analyzing errors, practicing writing, and improving time management skills. Data were collected through detailed observations conducted during the sessions and post-session evaluations. While the observations focused on the student's interaction with AI tools, learning motivation, and progress throughout the advising process, the post-session evaluations revealed both the advisor's and the student's perceptions and levels of satisfaction. The positive feedback from both the advisor and the student, along with their high motivation throughout the process, indicates that AI-supported advising is effective and sustainable. This indicates that AI-supported advising can offer effective and sustainable support in foreign language learning processes. The study reveals that the conscious and goal-oriented integration of AI technologies into language learning advising can contribute meaningfully to autonomous learning approaches in the digital age. It is also anticipated that such integration may enable learners to define their own learning paths and develop more effective learning strategies.

Keywords: Foreign language education, learning advising, writing skills, personalized learning, artificial intelligence, pedagogical integration, case study

Integrating Literary and Musical Heritage into Contemporary Education with the Support of Artificial Intelligence: Challenges, Opportunities, and Methodological Implications

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Abstract

The integration of intangible cultural heritage, particularly literary and musical traditions, into contemporary education is increasingly relevant in the context of global digital transformation. As formal education systems strive to equip students with critical thinking skills, cultural awareness, and digital competencies, there is a growing need to bridge traditional content with innovative methodologies. This paper explores the potential of artificial intelligence (AI) to support and enhance the implementation of literary and musical heritage in primary school teaching practice.

The starting point premise is that AI technologies can serve not only as tools for content delivery but also as creative collaborators in the interpretation, analysis, and production of heritage-based educational materials. By utilizing AI for tasks such as text analysis, generation of literary commentary, interactive storytelling, or music composition and analysis, educators can offer students more immersive and interdisciplinary learning experiences. At the same time, such integration raises important pedagogical, methodological and ethical questions regarding authenticity, creativity, and the preservation of cultural identity.

The main objectives of this study are to examine the educational value of incorporating literary and musical heritage into the curriculum, by identifying relevant AI tools and platforms that can support such integration, as well as to find an examples of specific methodology models for the interdisciplinary use of literature, music, and AI in the classroom.

The research employs a qualitative and exploratory methodology. It includes a literature review of current practices in heritage education and the use of AI in teaching practice, followed by examples of institutions that have implemented technology-supported heritage projects.

This paper contributes to the broader field of digital and heritage education by offering a conceptual framework and practical guidelines for the implementation of AI-enhanced cultural learning. It advocates for a balanced approach that respects the integrity of cultural content while embracing the pedagogical possibilities of new technologies. Ultimately, it positions artificial intelligence not as a replacement for human interpretation of heritage, but as a medium through which students can more actively engage with the richness of literary and musical traditions in a contemporary, meaningful, and creative way.

Keywords: cultural heritage, artificial intelligence in education, literary heritage, musical heritage, interdisciplinary teaching, digital pedagogy, student engagement, creativity, cultural identity

NatureGPT: A Generative AI-Based Tool for Biodiversity Awareness and Environmental Education

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Abstract

The aim of this study is to develop an AI-based application called NatureGPT in order to enhance biodiversity awareness and support environmental education processes. Understanding and recognizing various animal and plant species play a crucial role in biodiversity education and is widely regarded as important measure of one's knowledge of biodiversity. The integration of digital tools into educational settings has become increasingly important to enable individuals who live in close connection with technology to engage more deeply with nature and to understand biodiversity in a more interactive manner. In this context, the NatureGPT application has been designed to help users identify plant and animal species observed in their surroundings, acquire information by asking questions about these species, and develop greater awareness and sensitivity toward nature.

NatureGPT is an application that allows users to identify plant and animal species they encounter in their surroundings through visual recognition and receive AI-powered information about these species. It tries to accomplish this goal by leveraging modern AI systems such as text to speech (TTS), speech to text (STT) and vision-capable multimodal chatbots. The graphical interface is provided both in the format of a website (https:www.nature-gpt.com/en) and an installable mobile application (for android devices). The main page of the program contains a section that lets the user upload a photo of a species or take one from their device's camera to identify. When a photo is uploaded, it is sent to the NatureGPT server for processing, converted to base64 encoding for AI readability, and then forwarded to an external model provider's endpoint for identification. After the image is identified and the related text is generated, the species name identified by the AI model and a brief description of it is shown to the user. Then, a TTS model is used to convert the text to speech and the speech is played automatically. After identification, the user can chat with the identified species.

The NatureGPT application enables users to identify plant and animal species they encounter in their surroundings through visual recognition. The application delivers a user-friendly interface that supports multi modal inputs to help people identify different species and raise biodiversity awareness and support environmental education processes. The ability to casually talk back and forth with the AI chatbot that acts like the species identified encourages active participation in the learning process and offers a more personalized and in-depth learning experience.

The NatureGPT application is a digital learning tool aimed to enhance biodiversity awareness and support environmental education processes. In addition to identifying species through visual recognition, it enables users to ask questions about the species via conversations with multimodal AI chatbots. In this respect, NatureGPT has the potential to offer a new approach to learning processes related to environmental topics. The impact of the NatureGPT application on students' biodiversity awareness and its contribution to environmental education can be evaluated through future studies.

Keywords: artificial intelligence; biodiversity education; species identification

VR in Education: A New Dimension of Learning

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Abstract

Today, technology is bringing about revolutionary changes to education. One of the most striking examples of this is the use of virtual reality (VR) technology in the classroom. VR aims to enable individuals to transition from the physical to the virtual environment by stimulating various sensory organs. Certain devices facilitate this transition by enabling applications to function. These devices vary depending on their purpose. Virtual reality devices are worn by individuals to facilitate this transition. There are also stimulus systems, known as 'virtual reality hardware', that enable individuals to perceive their feelings and emotions in the virtual environment. Activities that are difficult to perform in the real world can be carried out through VR applications, saving time and money. In educational environments, virtual reality can make learning more effective and engaging by enabling users to interact within a computer-generated environment. Students can explore virtual worlds, conduct experiments and gain a better understanding of complex concepts. VR applications facilitate a better understanding of complex concepts, increase student motivation and make the learning process more enjoyable. The aim of this study is therefore to examine the use of such applications in education. The study will examine this through a literature review. There are many areas of application for VR in the literature, and mixed results have been obtained regarding its benefits. VR technologies are used for four different purposes. These include simulation, training, access to limited resources and distance learning. Simulation allows users to explore historical sites that cannot be experienced in any other way. 'Training' provides educational opportunities, such as flight simulation, to develop skills. Access to limited resources provides a chemistry laboratory environment, while distance learning creates a classroom environment that is not limited by the student's physical location. Studies examining the results of their use in these different situations generally conclude that they have a strong and positive effect on education. However, some studies have also reported negative effects on technology anxiety, cognitive skills, creativity levels, learning attitudes, student satisfaction, and participation. Some studies have also indicated that using virtual reality alongside traditional educational methods as a teaching and learning tool has positive results for cognitive, skill-based and emotion-based learning outcomes. Given the inevitability of technological progress, it is believed that integrating these developments into education will improve learning outcomes for individuals and contribute to societal well-being through students.

Keywords: Virtual Reality, Education, Virtual Reality in Education

AI as a virtual bridge between math and foreign languages in preschool education

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Abstract

The following paper studies the implementation and the key aspects of AI in education focusing on preschool education and its application in kindergartens.AI features are considered to be virtually unlimited, regarding the possibilities in classroom. These can be used to create engaging fairytale's animation according to children's preference and imagination, which empowers them imagine, design and create things at very young age, consequently they improve their creativity using such an advanced digital tool. Recently AI emerged and has been actively playing a significant role in education including preschool education. This innovation provides new approach regarding integration of math skills and foreign language learning in a universal and interactive educational process. AI creates dynamic environment where children solve math problems while concomitantly acquire new words in different foreign languages, through game apps, interactive platforms and adaptable training systems. Synergy between math and foreign languages appears to foster not only the development of reasoning, but also language skills as well as cognitive flexibility in young learners. Algorithms are able to adapt learning materials according to pupils' particular learning pace and interests, encouraging curiosity along with confidence and establishment in one's competence. Moreover, AI facilitates understanding of vague math concepts and new words' pronunciation through audio-visual prompts. Such approach has evidently served in favor of bi and poly lingual education in early age, as well as, in developing abilities to solve math problems and multicultural communication. AI provides us with individualised training scenarios, such as math games where characters speak different languages, sing songs which are related to counting and new vocabulary. Therefore, a conclusion has been made, that AI definitely has the potential po serve as an efficient bridge between math and foreign language learning in kindergartens creating fun and creative environment for young learners. Given, carefully selected and didactically grounded solutions, technologies have the ability to simultaneously develop math skills and language competency even at the earliest possible stage of children' education.

Keywords: AI, math, foreign languages, interactive games, creativity, kindergarten, preschool education

An Investigation of Pre-service Primary School Teachers' Artificial Intelligence Literacy Levels

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Abstract
The use of artificial intelligence (AI) in education is becoming increasingly widespread, making it crucial to determine the AI literacy levels of pre-service teachers. This study aims to examine the AI literacy levels of pre-service primary school teachers based on various variables, including gender, grade level, frequency of internet use, and prior AI-related education. Using a quantitative survey research design, the study's sample consists of 179 pre-service primary school teachers enrolled at Trakya University. The data were collected using the AI Literacy Scale, originally developed by Wang et al. (2022) and adapted into Turkish by Çelebi et al. (2023), via a Google Form. Prior to the analyses, normality tests were conducted, revealing that the data met the assumptions for parametric tests. Consequently, independent samples t-tests and one-way ANOVA analyses were utilized to test the research hypotheses. Descriptive statistics revealed that the overall mean score for AI literacy among the pre-service teachers was 5.28 on a 7-point Likert scale. This finding suggests that the participants' AI literacy levels are generally above the intermediate level. The results of the hypothesis tests indicated that the AI literacy scores of the pre-service teachers did not show a statistically significant difference based on any of the examined variables. Specifically, gender ($p=0.926$), grade level ($p=0.181$), daily internet usage ($p=0.518$), and frequency of AI tool use ($p=0.169$) did not have a determining effect on their literacy scores. Similarly, having a prior AI-related education ($p=0.078$) did not create a significant difference in scores. These findings suggest that the pre-service teachers in the sample possess a similar AI literacy profile, which is above the intermediate level, regardless of their demographic characteristics and technology usage habits.
Note: This study was supported by the Scientific and Technological Research Council of Türkiye (TÜBİTAK) under the 2209-A University Students Research Projects Support Program, with application number 1919B012425261.
Keywords: AI Literacy, Pre-service Teacher, Primary School Teaching, AI in Education

WordMemo: An AI-Supported Digital Application Model in English Language Learning

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Abstract
The purpose of this paper is to present our project *"WordMemo: Vocabulary Development Application"*, which I designed for individuals who wish to improve their English vocabulary in an easy and effective way. vocabulary is one of the main components of learning a foreign language (Ankara et al., 2024). Therefore, vocabulary is highly important for learning a language. This application enables users to automatically generate a virtual word list instead of manually recording the words they have learned on their computers or on paper. At the same time, the application allows for a more effective learning process by instantly translating words encountered on the screen and displaying their synonyms. Preliminary research has shown that while there are many vocabulary development applications designed for mobile phones, there are very few tailored for computer users. Furthermore, it has been observed that existing applications do not possess a feature that allows words to be selected directly from the screen and transferred into the application. Since the application we have designed includes such a feature, it is considered to enhance the functionality of the learning process. In addition, this project is significant in that it demonstrates the potential use of AI-supported digital applications in foreign language education and serves as an example for future projects in this field. In the development of the project, Python(General Python FAQ, t.y.) was used as the programming language. The interface was designed with PyQt5(*Introduction — PyQT Documentation v5.15.7*, t.y.)., and translations were carried out using DeepL Translate(About-DeepL Documentation. n.d.), which operates with deep learning. The recognition of text extracted from the screen was achieved through Tesseract(*Various Documents Related to Tesseract OCR*, 2007), an AI-powered tool. The result is an advanced application powered by artificial intelligence. Within this application, users are provided with the opportunity to learn new words, reinforce them through repetition, perform translations, and measure their progress. Our project has also served as an example of how AI-supported digital applications, which are becoming increasingly widespread, can be effectively utilized in language learning.

Keywords: Foreign Language, Education, Software, Artificial Intelligence

Jackson Pollock and Traditional Marbling Art

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Abstract

The main objective of this research is to investigate the relationship between the traditional Turkish art of marbling (ebru) and the modern art movement of abstract expressionism, focusing particularly on Jackson Pollock's action painting technique. Throughout art history, traditional practices have often influenced modern artistic expressions, either directly or indirectly, creating visible continuities between seemingly distant cultural and temporal contexts. This study aims to examine whether Pollock's characteristic "dripping" technique shares technical and conceptual similarities with marbling, an art form developed centuries earlier in Anatolia. Beyond identifying aesthetic parallels, the research also seeks to contextualize the role of automatism in both traditions, emphasizing how unconscious and spontaneous processes manifest in visual outcomes. A further objective was to quantify these similarities through the application of machine learning, thereby producing measurable data to support the theoretical discussion. A mixed-methods design was adopted, integrating qualitative and quantitative approaches. In the qualitative phase, document analysis was conducted on the historical development, techniques, and aesthetic principles of marbling and abstract expressionism. This provided a conceptual framework for comparing the two traditions. In the quantitative phase, a machine learning approach was implemented using Google's Teachable Machine platform. A dataset was created, comprising 225 marbling images and 225 abstract art images, collected primarily from the Kaggle database, for a total of 450 training samples. The model was trained to classify images into two categories: marbling and abstract art. For validation, 50 independent images (25 marbling, 25 abstract) were tested, yielding an overall accuracy rate of 98%, confirming the model's reliability. Jackson Pollock's 46 works were then introduced into the trained model as test data. Classification percentages were generated for each painting, indicating the degree of similarity to marbling or abstract expressionism. The analysis revealed significant overlap between Pollock's paintings and marbling art. Of the 46 works examined, 22 were classified as more closely resembling marbling, while 24 aligned more strongly with abstract expressionism. Among the paintings, Lucifer, Reflection of Big Dipper, and Number 1 were identified as entirely consistent with marbling, each achieving 100% similarity. Several additional works, including No 5 (1948), Number 17, Mural, The Deep, and Ocean Greyness, showed more than 95% similarity to marbling. On the other hand, works such as Blue (Moby Dick), Easter and The Totem, Going West, Portrait and a Dream, Stenographic Figure, The Tea Cup, and The Moon-Woman Cuts The Circle were classified as 100% abstract expressionist. Paintings with intermediate similarity levels, such as Convergence (65% marbling, 35% abstract) and Greyed Rainbow (57% marbling, 43% abstract), demonstrated that both traditions could coexist within a single work. A clear pattern emerged: paintings dominated by purely gestural dripping were consistently closer to marbling, whereas those containing figurative or symbolic elements were classified as abstract expressionist. These results provide empirical evidence of the strong technical and visual parallels between Pollock's practice and marbling. This study highlights the cyclical and interconnected nature of artistic production across time and culture. Although no direct evidence suggests that Jackson Pollock was familiar with marbling, his works exhibit remarkable visual and technical similarities to this centuries-old tradition. The findings emphasize that marbling should not be restricted to the category of decorative arts but rather reconsidered as an expressive form that anticipates or parallels modern abstract practices. Furthermore, the application of machine learning demonstrates the potential of digital tools to provide objective, data-driven insights in the field of art history and aesthetics. Overall, the

study contributes to a deeper understanding of how traditional artistic practices can resonate within modern art movements and underlines the importance of re-evaluating marbling within a contemporary global context.

Keywords: Jackson Pollock, marbling art, abstract expressionism, action painting, automatism, machine learning

Negative Features of University Students' Use of Artificial Intelligence – Socio-Pedagogical Aspect

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Abstract

Connecting the negative features of the use of artificial intelligence understood as risky behaviours with the university student population viewed through the prism of social pedagogy opens up important perspectives. In the context of artificial intelligence, the focus is on how its use can lead to dysfunctional behavioural patterns in students and how social pedagogy can be positioned towards these challenges. Accordingly, the aim of the research was to investigate certain negative features of the use of artificial intelligence by students in the form of risky behaviours, i.e., considering the social-pedagogical aspect.

The research involved students of the University undergraduate study of Early and Preschool Education, Faculty of Educational Sciences, Juraj Dobrila University in Pula, Croatia. The qualitative research used a semi-structured interview designed for the purpose of conducting this research. Framework analysis was used as a procedure for qualitative data analysis.

The results showed that the negative features of the use of artificial intelligence by university students can be grouped into three categories, which include academic disrespect, psychological and social risks, and security and ethical challenges. A more detailed analysis of the responses showed that the discourse of university students in the observed categories was related to a lack of autonomy and responsibility, reduced critical thinking and avoidance of independent learning, reduced social interaction and isolation, distorted self-image and reduced self-esteem, anxiety, addiction, unethical decision-making, unequal access, failure to protect personal data and the spread of disinformation.

The article contributes to the recognition of artificial intelligence as a potential source of specific risky behaviours and thus consequently enables proactive action to create a more ethical and supportive academic environment. Higher education institutions should develop clear policies and guidelines for the use of artificial intelligence in an academic context, educating students about the consequences of violating these rules even before the problem arises.

Keywords: university students, socially unacceptable behaviours, artificial intelligence, risks to academic and professional success, psychological and social risks, ethical and security challenges

Moral Dilemmas in Education When Using AI

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Abstract

Moral dilemmas are ethical situations in which the decision-maker is faced with options for action, each of them has negative moral consequences. Moral dilemmas have always existed in education, but they are transformed under the influence of the introduction of AI technologies and are an extremely difficult aspect of forecasting the development of the education system in modern methodologies for forecasting complex social systems. The moral dimension implies the presence of a certain regulation. With regard to AI technologies, such regulation exists in many countries, for example, the Code of Ethics in the Sphere of AI has been adopted in the Russian Federation.

Ethical and legal regulation of the introduction of AI technologies in education records both general restrictions discussed regarding the use of AI technologies in any sphere of society, and those specifically manifested in the field of education. The general problems may include the problems of the ontological uncertainty of AI (the problem of AI subjectivity - in the Russian Federation, we talk about AI as a technology or a tool, although there are discussions about the autonomy of AI as a subject of education), the problem of the availability of "transparent" (or "trusted") AI, the problem of the absence of discriminatory consequences of the use of AI, confidentiality of information and liability for violating it.

The dilemma of individual autonomy and public good should be discussed in education, since AI exacerbates the contradictions between the inviolability of private life and the understanding of education as a public good. The mandatory requirement for confidentiality of information, the definition of access modes to the information with which AI works, and the recommendations it gives are issues that require a strict mechanism, since the subject of information includes minors.

Development of technologies with insufficient knowledge about the risks and potential threats of AI technologies in education require additional discussion of scientific ideas about human nature, the status of a child and childhood in the digital world, the very essence of education and its moral dimension.

Thus, moral dilemmas in education when using AI can be focused on the following issues:

- the relationship between the common good and individual autonomy of subjects of education
- the relationship between the confidentiality of information and public welfare within the national education system; a special case of the problem of depersonalization;
- the problem of care and efficiency (AI as a working tool for students and teachers can be extremely effective right now, but is its use a true concern for oneself from the point of view of the humanistic potential of education for the uncertain future?);
- the relationship between equality in access to education for all and the technological advantages of those who have access to more advanced AI tools;
- the problem of justice (a special case is the relationship between the moral status of students who use AI as a tool for cheating and students who do not use AI and study honestly;
- the problem of educational results, which can be expressed in grades here and now, or in real residual knowledge and skills of students (real hard skills, what remains with a person and forms his nature as a skilled specialist);
- the problem of assessing students' knowledge by a teacher - who does the teacher really assess
- the student or the result of the AI's work (new interpretation of the Turing test)?

In addition, in education, with the introduction of AI technologies, the dilemmas of goals and means, responsibility, free will, technologized morality, creativity, tunnel, virtuality and dependence, etc. are arising.

Keywords: AI in education, moral dilemmas, ethics of education, educational good

Comparing Automated and Human Measures of Grammatical Accuracy in EFL Student Essays

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Abstract

The assessment of grammatical accuracy is fundamental in second language writing. While human expert judgments are invaluable, they often face challenges like subjectivity and high resource demands, making large-scale feedback difficult. Conversely, automated writing evaluation (AWE) tools offer efficient and consistent feedback, yet their alignment with human assessment requires critical examination. This study addresses this gap by comparing automated and human evaluations of grammatical accuracy in L2 writing, aiming to understand the practical utility and limitations of AWE tools in real-world educational settings.

We analyzed 267 integrated argumentative essays written by 90 English Language Teaching students in a Turkish English as a Foreign Language context. Grammatical accuracy was calculated computationally using a widely-recognized piece of software, and manually by experienced human raters who followed a consistent error coding scheme. Both methods provided grammatical error counts and errors per 100 words. Human ratings underwent correlation analyses to ensure reliability. Subsequently, automated and human measurements were statistically compared using paired-samples t-tests to identify mean differences, and correlation analyses to assess the strength of their relationship.

The analysis will reveal specific patterns of convergence and divergence between automated and human assessments, providing quantitative insights into their respective strengths and weaknesses regarding L2 grammatical accuracy measurements. These findings will offer evidence concerning the consistency and potential discrepancies between these two assessment approaches.

The study's findings are expected to inform educators, researchers, and AWE developers about the practical implications of utilizing automated tools for grammatical accuracy assessment in language learning. This research contributes to fostering more informed pedagogical decisions and guiding future technological applications in L2 writing evaluation.

Keywords: Automated Assessment, Grammatical Accuracy, Human Assessment, EFL, L2 Writing

AI as a Tool to Enrich Drama Practices in Language Teaching: Instructional Design for A1-Level German Learners

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Abstract

This study investigated the presence and quality of drama-based activities in a German language textbook (Deutschgenie A1.1) currently published by the Turkish Ministry of National Education (MEB). The study also considered how artificial intelligence (AI) tools may generate suggestions to enhance and diversify drama activities within language education. By identifying existing gaps in the research, the study sought to analyze how AI-supported suggestions might fill these gaps for the purposes of learning and learners' agency, and communicative competence. Using qualitative content analysis, the study first identified and categorized the drama activities (e.g., role play, simulation, improvisation) in the selected textbook, and considered intended learning outcomes. Then, a couple of models (e.g., ChatGPT, Claude) were prompted to produce recommendations for drama-based instruction for beginner and pre-intermediate learners. The study compared the outputs from the AI tools in terms of pedagogical depth, feasibility, creativity, and suitability for the curriculum goals. The findings indicated that the drama activities included within the MEB textbooks are limited, usually presented as optional, and rarely presented with details. The AI-generated prompts had promising possibilities to enhance these resources. Specifically, in a unique contribution, Claude presented multiple detailed and realistic scenarios for mundane contexts, and included "slow speech" tone, and utilization of strategic pauses, to lower students' anxiety, which is typical of many applied linguistics for learning matters. Claude emphasized intelligibility over fluency, as well as the need to use realia and visual materials. Claude also addressed privacy and ethical considerations during role plays by utilizing fictional identities. In contrast, ChatGPT generated game-oriented and modular implications such as "Command Game" or "Auction Game", that were grounded in the textbook learning outcomes, and easily adaptable through materials like structured lesson plans, structured tables or cards. GPT emphasized student engagement and active roles as well as examples of matrix dialogue to support repetition of vocabulary. Both outputs were similar in multiple ways: they covered A1 level topics such as greetings, daily routines, shopping and preferences; they addressed the four skills (listening, speaking, reading and writing); there were interactive suggestions for role plays; and there were suggestions for a supportive classroom approach. More than these similarities, both models - when specifically prompted for supermarket shopping scenarios that aligned with A1 level objectives, produced remarkably similar designs that should be considered educationally robust. Each model generated a "Customer & Cashier" role-play game that described each typical role to, polite expressions, paired dialogues, and turn taking activities. Each generated a suggestion to create a supermarket atmosphere to lend authentic support for "real" shopping for a customer. In addition, both models provided - through prompts - a step-by-step lesson plan, that comprised warm-up, list writing, assigning roles, enacting their role, and reflecting on their enactment. In total, both ChatGPT and Claude provided examples of spontaneous simulation or unexpected situational comedy as a pathway to increased student engagement with the role plays. Overall, both models produced outputs that were high-quality and pedagogically valid. Claude emphasised comprehensive, structured design; GPT demonstrated a dynamic, student-centered approach. The interplay of the two different models illustrate how systems of AI can provide convergence with the same task of instruction from multiple and different angles. In conclusion, engaging with AI-generated suggestion for drama can be a way forward for MEB-based German textbooks, and help fill pedagogical gaps, personalize the textual content and engage students. While these outputs indicate systematic design intentions with traditional education materials

for AI-enriched drama delivery, the pedal posit is also agreeable for practical uses of the AI systems to enhance communicative competence, creativity and learners' confidence, for potential significance for curriculum development and teacher learning considerations.
Keywords: Detachable AI in language education; Drama-based teaching; MEB German textbooks; communicative competence; blended or systemic instructional design.

The Future of Language Education: AI-Generated Listening Materials for German Learning with CEFR Integration

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Abstract

This study examines if the reading texts in Turkish Ministry of National Education-approved secondary school German textbooks are at the Common European Framework of Reference for Languages (CEFR) levels indicated by publishers. In addition to examining the CEFR levels, the study also intends to facilitate listening comprehension by creating audio recordings of the texts with generative AI tools to assist students and teachers in their language learning.

Four different textbooks (Deutschgenie A1.1, Deutsch Macht Spaß A2.1, Mein Schlüssel zu Deutsch B1.1 and B2.1), each representing a different CEFR level (A1.1, A2.1, B1.1, B2.1), were sampled, and three texts were taken from each of the four books, equaling twelve texts. The texts were chosen from three different parts of the books: the early units, the middle units and the final units. The CEFR level of the texts was evaluated using the opinion of two experts and a language model, ChatGPT, based on vocabulary range, grammatical difficulty, textual coherence and communicative adequacy. The twelve texts were converted into podcasts, using NotebookLM, and the CEFR levels of the audio files were also analysed, to evaluate congruence with the original texts.

ChatGPT evaluations clustered with the levels declared in the textbook in 6 of 12 instances (50% of the evaluations), and expert evaluations clustered in a higher degree of agreement across levels. Overall and specifically with the ChatGPT evaluation, there was a tendency for the developer and others, to award the learners a higher rating than the textbooks stated CEFR levels, primarily rates A1 and A2. Secondly, the NotebookLM-generated podcasts were quite often rated at correspondences to C1-C2 levels, which indicates that the notebook LM is of greater use for creating materials for more advanced, learners. Finally, the podcasts produced from the generated content included naturalistic features, for example, discourse markers and hesitation phrases, which was adding to both the authenticity of the podcasts as well as the complexity of the output. The evaluations of the NotebookLM podcasts signalled that often the outputs were located above the language level of the originals from which the podcasts were produced.

The study results indicated that there was an inevitable mismatch between claimed CEFR levels from textbook publishers and those established through human and AI analysis. Although large language models, such as ChatGPT and NotebookLM, can save teachers countless hours of time generating materials and analysis at speed, teachers must be diligent with what they generate as the scores were at times inconsistent and more difficult. In the end, the study supported the need for teachers to take time with material selection and that AI based tools can supplement the teacher's pedagogical decisions, but not replace them. Provided that essential improvements are made in areas such as fine-tuning, algorithmic transparency, and ethical design principles, and assuming that language instructors are meaningfully integrated into the process of podcast creation, AI-generated audio materials can be developed not only for selected CEFR levels but across the entire language proficiency continuum. Such an inclusive and pedagogically sound implementation would require interdisciplinary collaboration and ongoing evaluation to ensure that the produced content aligns with both linguistic complexity and learner needs. Therefore, further empirical research is needed to explore the pedagogical validity, usability, and level-appropriateness of AI-assisted audio materials in diverse instructional settings.

In the future, AI-based tools may potentially serve as reasonably effective material generation resources for language teaching professionals, provided that they demonstrate sufficient pedagogical responsiveness and user-friendliness.

Keywords: artificial intelligence, German textbooks, language proficiency assessment, listening materials, large language models

Artificial Intelligence in Early Childhood and Primary Music Education

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Abstract
The rapid development of artificial intelligence (AI) is increasingly influencing the field of education, including music education at the early childhood and primary levels. This paper aims to explore how AI can be functionally and pedagogically integrated into the music teaching process, with a special focus on its potential to personalize learning, enhance creativity, and enrich children's interactive experiences with music. The analysis focuses on AI-based applications that provide dynamic environments for developing core musical skills such as active listening, rhythm, singing, and creativity, while highlighting the transformative role of technology in supporting contemporary teaching practices. At the same time, it addresses the pedagogical and ethical challenges associated with the use of such technologies in early education, as well as the need for professional development among music educators. The paper argues that, when used thoughtfully and critically, AI can serve as a powerful tool for deepening musical experiences in early education without replacing the essential role of the teacher as the leader of the creative and educational process.

Keywords: artificial intelligence, music education, early childhood, teaching, technology, personalized learning, musical creativity

The Use of Artificial Intelligence Tools in Teaching German as a Foreign Language: Opinions of Pre-Service Teachers

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Abstract
The 21st century's rapid developments in technology and computer systems have led to the increasing prominence of artificial intelligence. Artificial intelligence tools, which have human-like intelligence features, affect many fields from economy to transportation, from health to education. In particular, artificial intelligence tools such as ChatGPT, Gemini and Bing are frequently used by educators and students today. These technological developments affect the field of education in general and foreign language teaching in particular and cause changes. In Turkey, German is commonly taught as the second foreign language after English as the first foreign language in educational institutions. Pre-service German teachers utilize artificial intelligence tools to improve both their productive language skills (speaking and writing) and passive language skills (reading and listening) and to increase their general foreign language level. This study aims to determine the views of pre-service German teachers on the use of artificial intelligence tools in teaching German as a foreign language. In line with this goal, the study seeks to answer the question "What are the views of pre-service German teachers on the use of artificial intelligence tools in teaching German as a foreign language?". The method of the study was determined as a descriptive analysis method within the framework of a qualitative approach. The sample of the study consists of 100 students (1st, 2nd, 3rd and 4th grades) studying in the Department of German Language Teaching at Trakya University Faculty of Education. The data were collected through an opinion form developed by the researchers by taking expert opinion. The data obtained were evaluated by thematic content analysis method. The findings of this study present in detail the views of pre-service German teachers on the potential advantages and disadvantages of artificial intelligence tools. This information can provide an important understanding of how they affect students' foreign language development and foreign language learning strategies and contribute to the development of effective strategies for language teaching.

Keywords: German as a Foreign Language, Artificial Intelligence, Prospective German Teachers, Opinion Taking, Qualitative Study

Design and Assess a Professional Development Program on AI, Robotics, 3D Design and 3D Printing for Early Childhood Education to Empower Educators Include Active Citizenship for Sustainable Development

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Abstract

This paper presents the design and assessment of a professional development program titled "Training Kindergarten and Primary 1st Grade Teachers with Robotics and Digital Tools in Natural Sciences, Sustainability, and Active Citizenship." Designed in response to the increasing need for digital transformation in early childhood education, the program aimed to foster pedagogical innovation through the integration of emerging technologies and active, socially responsive teaching methodologies. It provided a structured yet flexible training experience for in-service teachers, emphasizing cross-curricular design, sustainability, and civic engagement.

The program was implemented from March 6 to May 17, 2025, encompassing 30 hours of blended learning. Its structure reflected a well-balanced combination of learning modalities: 4 hours of synchronous theoretical sessions delivered via Zoom, 8 hours of in-person, hands-on workshops that emphasized collaborative design and practical application, and 16 hours of asynchronous engagement on the Moodle platform. The asynchronous component featured curated educational resources, readings, assignments, and a final submission of an original teaching activity. To close the program, a 2-hour live online dissemination session was held, enabling participants to present their work, reflect on their learning, and exchange ideas with peers.

The assessment framework for the program was both formative and summative. It included pre- and post-program surveys, participant reflections, peer review of project work, and qualitative analysis of the final activity plans. Data collected indicated high levels of satisfaction and engagement among participants. Teachers reported increased confidence in using robotics, AI, and 3D design tools in their classroom practices. Moreover, they appreciated the emphasis on integrating digital tools into broader educational objectives, such as promoting sustainability and active citizenship.

Notably, the hands-on workshops were highlighted as one of the most impactful elements of the program. These sessions allowed participants to apply theory into practice by co-designing interdisciplinary activities rooted in real classroom needs. Educators were encouraged to develop learning scenarios that combined storytelling with robotics and environmentally responsible practices. These projects not only enhanced their technological fluency but also reinforced collaborative, inquiry-based, and student-centered pedagogies.

The asynchronous component further supported differentiated learning by allowing participants to proceed at their own pace, revisiting materials and refining their projects in alignment with their professional context. The Moodle platform also facilitated peer interaction and resource sharing, reinforcing a sense of community among educators.

A particularly innovative aspect of the program was its socio-pedagogical framing, which positioned digital tools not merely as technical instruments, but as enablers of civic

participation, ecological awareness, and creative expression. By combining digital design and robotics with themes such as sustainability and storytelling, the training addressed both curricular and societal challenges, aligning closely with 21st-century learning goals.

Participants expressed a strong interest in follow-up activities, including ongoing professional learning communities, mentorship opportunities, and advanced training modules. They also recommended the issuance of micro-credentials or digital badges as formal recognition of their newly acquired skills.

In conclusion, the program demonstrated a scalable and impactful approach to professional development in the field of early childhood and primary education. Its blend of synchronous and asynchronous elements, combined with a focus on interdisciplinary integration and real-world applicability, created a rich learning environment that supported both individual growth and collaborative innovation. The findings suggest that professional development models that incorporate emerging technologies, sustainability, and civic themes can significantly enhance teacher preparedness and motivation, leading to more inclusive, engaging, and future-oriented classroom practices.

Keywords: Professional Development, Early Childhood Education, Robotics, 3D design, Active Citizenship

Artificial Intelligence Education in Mathematics in Primary School-Attitudes and Knowledge of Students-Future Teachers

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Abstract

One of the distinctive features of education at the current stage is its digitalization and the widespread use of information and communication tools at all stages and levels. In recent years, artificial intelligence has become one of the most influential and dynamically developing areas in modern technologies. Its use in mathematics education in grades 1-4 poses fundamental challenges – to what extent AI is appropriate and necessary to apply at this age, and how to engage children in appropriate, productive mathematics activities. That is why the attitudes and preparation of student-future teachers to use it adequately in their methodological work are of essential importance.

The article systematizes and presents the results of a survey conducted with students from the Faculty of Pedagogy, Thracian University-Stara Zagora, during the period 2024-2025 regarding their knowledge and skills of artificial intelligence and its application in mathematics education in primary schools.

The survey results show that students do not have the necessary knowledge and skills to use artificial intelligence in education in mathematics and indicate a need to develop curricula for students in pedagogical specialties that support the development of their professional competencies and competences.

Artificial intelligence presents new opportunities for enhancing the learning process, particularly in primary education, where foundational learning is established through methods tailored to the age and individual characteristics of students. In mathematics education through adaptive educational platforms, digital assistants, and intelligent systems for tracking progress, artificial intelligence can support not only students, but also teachers in organizing a more effective, motivating, and child-friendly learning process.

Keywords: artificial intelligence, educations in mathematics, primary school

Artificial Intelligence Literacy for Preservice Teachers: Methods and Approaches for Professional Development Activities

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Abstract

Artificial intelligence has moved beyond a tool for the future and has become one of the transformative elements of today's education system. Within the context of the professional development of preservice science teachers, AI literacy is one of the most concrete indicators of this transformation. AI literacy is a fundamental skill that encompasses individuals' competencies in understanding, effectively using, creating, and evaluating artificial intelligence technologies. Thanks to this competency, individuals can grasp the functioning of AI tools, effectively integrate these tools into instructional processes for pedagogical purposes, design original teaching materials, and evaluate all these processes from a critical and ethical perspective. Therefore, teachers acquiring this competency as part of their professional development will make significant contributions to effectively using these tools and developing ethical awareness, critical thinking, and pedagogical competence.

This study examines current studies on artificial intelligence integration in the professional development process of teachers, within the context of methods and approaches applicable to teacher professional development. The findings reveal that AI literacy is supported in teachers' professional development, particularly through case-based learning approaches and the TPACK framework. These approaches shed light on the significant contributions they can offer to teachers, not only in terms of their ability to use technological tools but also in gaining pedagogical sensitivity and ethical awareness through AI literacy. Another prominent approach in the literature is the critical-exploratory approach, which demonstrates that teachers' AI literacy can be developed with an active, critical, and collaborative approach. This approach stands out by reducing teachers' cognitive load while simultaneously strengthening their pedagogical creativity, critical awareness, and social impact. However, a significant portion of the reviewed research indicates that activity-based applications, such as AI-supported lesson planning, development of teaching scenarios, reflective thinking activities, case analyses, and collaborative learning environments, are more prominent than a holistic and continuous professional development approach.

In conclusion, research sheds light on the fact that teacher professional development in artificial intelligence is a multi-layered process that should be approached holistically, encompassing not only the technical use of a tool but also its inherent pedagogical, ethical, and societal dimensions. In this context, it can be said that the use of systematic teacher training programs, case-based learning practices, or strong technological-pedagogical integration models in the process is crucial for preservice science teachers to develop as critical, reflective, and innovative practitioners.

Keywords: Preservice Science Teacher, Artificial Intelligence Literacy, Teacher Professional Development

POSTERS

The Magic of Children's Drawings: A Window into Their World

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Abstract

Children's drawings are far more than decorative expressions or playful activities. They represent a profound communicative medium through which young learners externalize their thoughts, emotions, and conceptual understanding. Long before linguistic mastery is fully developed, visual representation provides a crucial channel for meaning-making, allowing children to explore and construct knowledge in ways that transcend verbal limitations. Each line, shape, and color choice serves as an interpretive cue, offering educators and researchers valuable insights into a child's perception, imagination, and socio-emotional state.

From a constructivist perspective, children's art exemplifies the core principle that knowledge is not passively received but actively constructed. When children engage in drawing, they are not merely copying visual stimuli - they are synthesizing experiences, experimenting with symbolic representation, and problem-solving in real time. This process nurtures critical cognitive skills, including spatial reasoning, perspective-taking, and abstract thinking, while simultaneously fostering creativity, emotional intelligence, and self-confidence.

Furthermore, the act of artistic creation supports holistic development by integrating sensory, motor, and cognitive domains. It provides opportunities for reflection, narrative construction, and the negotiation of meaning within both individual and collaborative contexts. Importantly, the educator's role within this framework is not to dictate form or content but to create an environment rich in materials, encouragement, and open-ended inquiry—conditions that empower children to explore, imagine, and express authentically.

The analysis of children's artwork also contributes to research-informed practice. Drawings can serve as qualitative data for understanding developmental trajectories, socio-cultural influences, and the impact of learning environments. They may reveal how children interpret family relationships, cultural symbols, or abstract concepts, thus providing a multi-layered view of early cognitive and emotional processes. In international and multicultural contexts, such as Qatar, children's drawings can reflect the interplay of cultural identity, language exposure, and educational philosophy, highlighting both universal developmental patterns and context-specific nuances.

In addition, art-based inquiry fosters resilience and emotional well-being. By providing a safe, non-verbal space for expression, drawing enables children to process experiences, manage stress, and build adaptive coping strategies. When educators validate children's artistic expressions, they reinforce a sense of belonging and self-worth—essential components for lifelong learning motivation. This aligns strongly with 21st-century educational goals that emphasize creativity, critical thinking, and emotional literacy as integral competencies for future-ready citizens.

Recognizing children's drawings as developmental artifacts reframes art not as a supplementary activity but as a vital pedagogical tool within constructivist education. By valuing these visual narratives, we honor children's agency, respect their diverse ways of knowing, and sustain a learning culture that is exploratory, hands-on, and deeply human-centered.

Keywords: Childrens Art, Constructivist Learning, Creative Expression, LearningThrough Art, Future Creators

Strength Abilities in Some Auxiliary Exercises As Predictive Factors For Bench Press Results Of Competitive Powerlifters

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Abstract

In this article, the authors studied the relationships between some specific auxiliary powerlifting exercisesand maximal strength generated in a classic multi-joint competitive resistance exercise – the bench press. Subjects were male competitive powerlifters. Besides the strictly sport-specific movements – squat, bench press and deadlift – powerlifters use specific auxiliary resistance exercises to develop maximal and/or explosive strength. The competitive exercises are technically complex and require the development of the so-called maximal strength and strength-speed abilities. Irrespective of the fact that training methodologies in powerlifting do not differ much among different training schools, the strength abilities and physical development of athletes of similar qualification may vary significantly. 17 athletes participated in the study, all of them competitors at the national level. Linear regression equations were estimated between estimated 1RMs in four auxiliary powerlifting exercises (power-rack bench press, board press, close-grip bench press and wide-grip bench press) and maximal strength in the bench press. We calculated statistically significant Pearson correlation coefficients and coefficients of linear regression between the performance in the studied auxiliary exercises and maximal muscle strength in the bench press. The studied parameters proved to be statistically significant predictors of maximal strength in the bench press. These results (in conjunction with the high values of adjusted R squared of the regressions) indicate that the constructed statistical models explain a relatively high proportion of the variation in the results. These findings can be used in training practice as guidelines for training changes to improve sports performance.

Keywords: auxiliary exercises, maximal strength, powerlifters, bench press

Strength Abilities in Some Auxiliary Exercises As Predictive Factors For Squat And Deadlift Results Of Competitive Powerlifters

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Abstract
In this article, the authors studied the relationships between some specific auxiliary powerlifting exercises and maximal force generated in two classic multi-joint resistance exercises – back squat and deadlift. Subjects were male competitive powerlifters. Besides the strictly sport-specific movements – squat, bench press and deadlift – powerlifters use specific auxiliary resistance exercises to develop maximal and/or explosive strength. The competitive exercises are technically complex and require the development of the so-called maximal strength and strength-speed abilities. Irrespective of the fact that training methodologies in powerlifting do not differ much among different training schools, the strength abilities and physical development of athletes of similar qualification may vary significantly. 17 athletes participated in the study, all of them competitors at the national level. Linear regression equations were estimated between estimated 1RMs in four auxiliary powerlifting exercises (weighted hyperextensions, weighted reverse hyperextensions, belt squat and box-squat) and maximal strength in back squat and deadlift. We calculated statistically significant Pearson correlation coefficients and coefficients of linear regression between the performance in the studied auxiliary exercises and maximal muscle strength in back squat and deadlift. The studied parameters proved to be statistically significant predictors of maximal strength in the deadlift and squat. These results (in conjunction with the high values of adjusted R squared of the regressions) indicate that the constructed statistical models explain a relatively high proportion of the variation in the results. These findings can be used in training practice as guidelines for training changes to improve sports performance.

Keywords: auxiliary exercises, maximal strength, powerlifters, squat, deadlift

Artificial Intelligence and Science Education: A Meta-Synthesis Study

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Abstract

Within the context of the accelerating diffusion of generative AI technologies across diverse educational spheres, science education stands out as an especially promising field for empirical study and instructional innovation. This meta-synthesis integrates and re-evaluates qualitative evidence from 17 peer-reviewed publications published between June 2024 and June 2025 in Web of Science database, which investigate how AI is understood, applied, and experienced in K–16 and tertiary science education settings. Drawing on Noblit and Hare's interpretive meta-synthesis methodology, I applied iterative line-by-line coding, constant-comparison thematic clustering, and reciprocal translation to develop higher-order syntheses that extend beyond the parameters of single investigations. The corpus extends across seven thematically interconnected domains: science educators' developing interpretations of AI, AI-augmented pedagogical approaches (e.g., AR-integrated 5E inquiry models, chatbot-facilitated guided learning), artificial intelligence-assisted instructional planning informed by pedagogical-content frameworks, algorithm-driven graphical representations and simulated models, AI-enhanced research writing and graduate thesis formulation, automated assessment platforms with integrated feedback delivery, and the development of culturally responsive instructional tasks through large language models. The study sample includes in-service and pre-service science teachers, primary and secondary learners, undergraduate researchers, and, notably, AI-generated artefacts, underscoring a methodological turn toward the systematic analysis of machine-generated content. The studies collectively associate AI integration with tangible gains in student achievement, increased writing fluency, and elevated situational motivation, alongside the optimization of formative assessment and rubric-based evaluation. Yet, three recurrent cross-cutting tensions emerge. First, maintaining curricular coherence proves challenging: although AI-produced explanations demonstrate scientific validity, they at times diverge from established national science standards and fail to align with grade-appropriate benchmarks. Second, equity challenges become evident in access—through deficits in digital infrastructure and the exclusivity of premium subscription models—and in outcomes, including algorithmic bias and the use of linguistically complex content beyond students' reading levels. Third, teachers express a loss of professional autonomy when AI recommendations lack transparency or when institutional directives favour automated processes over instructional deliberation. The synthesis highlights two nascent structural configurations apparent in the growing body of evidence. Publication output has increased threefold within eighteen months, though the distribution of thematic focus remains inconsistent. Nearly half of the studies focus on teacher perceptions and AI-driven assessment, while culturally responsive design and longitudinal investigations are strikingly sparse. Moreover, methodological selections align closely with participant characteristics. Studies examining perceptions tend to privilege educator-centered interviews and survey methodologies. Research with a performance-focused orientation frequently omits human actors, instead scrutinizing AI artefacts independently, thereby risking a disconnection between technological assessment and classroom realities. The study asserts that the ethical and instructionally purposeful adoption of AI in science education rests upon three foundational systemic commitments: continuous, context-embedded professional learning aimed at empowering educators to co-create AI-driven instructional processes; multi-dimensional evaluation systems that align algorithm-driven analytics with human-oriented indicators of educational progress and wellbeing; and policy frameworks, reflecting developing international AI governance standards, that enforce transparency, bias evaluation, and human oversight mechanisms. By responding to these imperatives, researchers

and practitioners can harness the demonstrated advantages of AI while counteracting its potential to reinforce inequities and erode educators' professional autonomy.

Keywords: Artificial Intelligence, Meta-Synthesis, Science Education, AI-Augmented Pedagogy

Artificial Intelligence in Art Education: New Possibilities for Visual Expression and Creativity in Schools

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Abstract

The integration of Artificial Intelligence (AI) in education is reshaping how teachers facilitate creativity and how students express themselves, particularly in the field of visual arts. This paper explores the role of AI-based tools—such as image generators, style transfer software, and creative assistants—in supporting students' visual thinking, imagination, and art-making processes.

The study draws on both theoretical perspectives and practical experience in Bulgarian preschool and primary education. A special focus is placed on a creative project in which students used AI tools to transform their hand-drawn sketches of clothing into realistic digital dress designs. This process fostered students' design thinking, creative autonomy, and confidence.

The aim is to analyze the opportunities and challenges of using AI in art education. A qualitative approach is applied, including classroom observations, student artworks, and teacher interviews. The findings suggest that AI can significantly enhance engagement and motivation, while also raising important ethical questions related to originality, authorship, and critical thinking.

In conclusion, the use of AI in art education provides not only technical tools but also fosters new pedagogical strategies. Art classes evolve into dynamic environments where students act as creators, analysts, and interpreters of visual messages. This transformation encourages intercultural projects, collaboration, and idea exchange—elements that are increasingly vital in the context of globalization and digital literacy.

The presented study highlights the importance of integrating new technologies into the educational process, particularly in the field of art. Artificial intelligence is emerging as a valuable partner in creative learning, opening new horizons for both students and educators. This transformation sets the direction toward a more flexible, engaging, and future-oriented education.

Keywords: art education, artificial intelligence, visual design, creativity, visual literacy

Integrating Artificial Intelligence in STEM Education: Innovations for Transforming Teaching and Learning

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Abstract

The application of Artificial Intelligence (AI) in STEM education is a great opportunity to change traditional educational models and build teaching and learning environments that are future-ready. AI-enabled equipment is becoming more and more reachable, its employment in learning is providing new ways that students can interact with scientific materials and educators can plan, carry out, and evaluate their work. This article investigates how AI is executed within interdisciplinary STEM situations to help the development of new ideas, increase the participation of students, and help learning that is based on questions.

Relying on actual practices in STEM centers concentrating on teacher education and educational innovation, the research describes changes coming from the combination of AI and immersive technologies as well as action activities. At these centers, prospective teachers are given plentiful examples of AI programs as well as intelligent agents, for instance, adaptive learning platforms, virtual laboratories, machine learning-based simulations, and AI-supported assessment tools. The use of these technological innovations in instructional design can allow for the collection of personalized feedback, the facilitation of the differentiated instruction of students, and the development of learning environments that are more responsive. This paper also highlights the importance of additional technologies such as virtual and augmented reality (VR/AR), 3D printing, and interactive digital platforms. The means of these tools are the same as the of AI to enable experiential learning that is both immersive and data-informed. Many teachers participate in the creation of interdisciplinary STEM lessons in which students model scientific processes, produce prototypes with 3D printers, and visualize complicated systems by means of virtual simulations. This hands-on application of technology does not only deepen conceptual understanding but furthermore equips educators with digital competence and confidence in using innovative tools in the future of their classrooms.

The educational framework upon which this paper is built is primarily focused on active learning, creativity, and real-world problem solving. Teachers are motivated to take on design thinking strategies, help collaborative learning, and create learning situations that mirror real-life scientific inquiry. AI here, for instance, becomes a learner's co-facilitator by offering personalized content presentation as well as formative assessment, which provides information to both teachers and students. Another issue discussed in the article are the opportunities and matters present when AI is incorporated into the educational scene. This includes, for example, data privacy, digital equity, ethical concerns, and the changing role of the teacher. AI is not set to be the force that takes over human educators but instead, it is a mean that extends the learning process and makes personalizing and being creative in the classroom more available.

Keywords: Artificial Intelligence, STEM Education, Innovative Technologies

Sports activities and quality of life of primary school students

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Abstract
The basic aim of the study was to investigate the quality of life of primary school students with regard to their involvements in sports activities. The research was conducted in February 2025 on a sample of 62 third and fourth grade students, average age 9.44 years.The KIDSCREEN-10 Quality of Life Questionnaire was used for the research. All students, regardless of their involvement in sports activities, positively assessed their quality of life. The greatest satisfaction with the quality of life was expressed in a positive relationship with parents and following classes. Also responsible for the positive experience of quality of life are the items of the questionnaire describing the possibility of having fun with friends, positive perception of personal health and a high level of energy. In addition to the above, good physical fitness, use of free time, and a positive school environment with a low level of loneliness contributed to a satisfactory assessment of quality of life. However, although assessed with a low value, a partial experience of sadness is present in students in this group, so attention should be paid to this.

Keywords: KIDSCREEN-10 questionnaire, male and female students, physical activity

Literature and AI: how AI changes reading, interpretation, and perceptions of literary texts

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Abstract

Until recently, literature classes held a significant place in the education and upbringing of younger generations — they equipped students with the ability to read, interpret, and understand poetic expressions of truths about life, morality, norms, and humanity. Literary characters served as role models, and the messages conveyed through literary works functioned as guidance for a dignified life. The core activities of both teachers and students were reading and engaging in discussions about the texts, which introduced students to the hidden world of literature and illuminated the meanings that lay beneath the surface of the words.

Technological changes and the dominance of visual media have made the written word less engaging and have contributed to the reading crisis that has been present since the early 21st century.

The declining interest in reading and interpreting literary texts is, among other things, a consequence of numerous changes in society and education. Various curriculum and textbook reforms, the introduction of new teaching models, and the rise of media content have not contributed to improving the quality of literature instruction.

This paper analyzes how artificial intelligence can be utilized to support literature lessons in lower grades of primary education. The examples of creative and problem-solving activities will demonstrate how AI can be used as a tool to enhance reading competencies, leading to fuller comprehension and interpretation of all components present in literary texts. The development of thinking skills and emotional intelligence is stimulated via philosophical and problem-based discussions with students. The paper indicates that AI activities, when properly directed and didactically designed, can modernize and enhance literature classes while simultaneously opening new methods for teachers to connect with their students in the contemporary world.

Keywords: AI in education, literature classes, problem-solving model, lower grades of elementary school

Creatıng Textbooks for The New Generatıons of Students: Structure, Content and Functıon

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Abstract

Modern education sets high standards in achieving educational objectives. In this context, the contemporary textbook plays an irreplaceable role in implementing high-quality educational processes. Considering the changes in learning methods, the development of digital literacy, and critical thinking among students, there is a growing need for a new type of textbook—functional, methodologically oriented, and pedagogically grounded. Today, the textbook is not just a source of information but a tool that stimulates student activity, independent thinking, and acquisition of functional knowledge.

For the textbook to effectively fulfill its function, its structure i.e., the appropriate composition of its structural elements is of crucial importance. Likewise, the quality of the textbook depends on the way the teaching content is presented. Specifically, this refers to the manner of presentation that facilitates easy memorization of facts, understanding of concepts, laws, rules, and definitions, and encourages logical and critical thinking.

This paper addresses the importance of the structure and content of the textbook as factors that influence the quality of education. It explores how the grouping of content, visual and textual organization, clarity of goals, and the didactic-methodological apparatus affect the learning process. Special emphasis is placed on the functionality of the textbook: whether and how successfully it activates the cognitive and affective capacities of students, whether it fosters skill development, understanding, and argumentation, and whether it adapts to their needs and interests.

The research indicates that textbooks should move away from stereotypical and reproductive presentation of material. Instead, they should offer clear structure, interactive content, and stimulation for critical thinking. Creating textbooks for the new generation of students means integrating didactic-methodological logic with contemporary pedagogical trends in order to create conditions for quality and lasting knowledge.

Keywords: textbooks, functional knowledge, structure, content, function, didactic-methodological apparatus

PANELS

Teaching Climate Change Beyond Facts: Pioneering Pedagogies, Mental Health and Science-Policy Interfaces

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Abstract
This multidisciplinary session investigates the intertwined challenges of climate change impacts, tourism pressure, community well-being, pro-environmental behavior change and science-policy interfaces. The session features four expert panelists sharing their insights that move from on-the-ground impacts to practical solutions across multiple sectors.
The session starts by examining the lived impacts of climate-induced stressors and overcrowding on community well-being, sense of belonging, and quality of life in places struggling to cope. This grounds the discussion in the tangible consequences for vulnerable populations.
Next, perspectives from behavioural science are introduced, focusing on the effects of climate change on individual and societal psychology. This segment outlines behavioural science strategies to enhance mental health and resilience in the face of escalating environmental uncertainty.
The third presentation shifts to the educational perspective, highlighting the transformative role of science education in climate change awareness and resilience building. Specifically, it explores the Green STEM approach for empowering students and teachers.
The session concludes with a look at science and policy interfaces, emphasizing the need for strengthening the mental health component within climate resilience policies. This segment will share concrete examples of good practices at the policy level.
In sum, this session offers a comprehensive framework for understanding and addressing the complex crisis of climate resilience and mental well-being, integrating insights from community studies, psychology, education, and public policy.
Note: This study is based on a panel session organized within the 16th International Balkan Education and Science Congress, held in Edirne, Türkiye. The panel was conducted in line with the core outputs of COST Action CA23113 – CliMent (Climate change impacts on mental health in Europe), Working Group 4 (WG4).
Keywords: Climate Community Resilience, Mental Health, Education, Science-Policy Interfaces

KEYNOTE SPEAKERS:

AI Pedagogical Agents: Opportunities, Challenges, and Future Perspectives

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Abstract

The release of ChatGPT in late 2022, the first widely accessible and user-friendly generative artificial intelligence (GenAI) tool, generated a profound global response and simultaneously triggered an intense race among leading technology companies to develop new models and applications of GenAI. Since then, the rapid proliferation of diverse tools and platforms has been observed across almost every domain of social and professional life. The current trajectory of development is increasingly shifting from large language models toward autonomous and effective AI agents, whose long-term educational, ethical, and societal implications are yet to be fully realized.

Within this context, pedagogical agents—autonomous AI-based systems specifically designed to provide personalized, adaptive, and interactive support for learning and teaching—are gaining prominence as an important field of research. Their potential lies in enabling individualized learning pathways, delivering timely feedback, fostering student motivation and engagement, and supporting teachers through automated progress monitoring and data-driven insights. These systems promise not only to enhance traditional pedagogical practices but also to stimulate the emergence of new educational paradigms. Nevertheless, the implementation of pedagogical agents entails a range of critical challenges. Ethical issues such as transparency, accountability, and data privacy, along with risks of algorithmic bias, raise pressing concerns. Moreover, pedagogical risks include the possibility of diminishing critical thinking and fostering an overreliance on automated guidance by both learners and educators. This paper aims to provide a systematic analysis of the opportunities and advantages of pedagogical agents, while also discussing the key ethical and pedagogical challenges associated with their integration. The analysis draws on recent scholarly literature and reviews the ongoing development of AI agents in educational contexts.

Keywords: pedagogical agents, artificial intelligence, generative artificial intelligence, learning, teaching, educational technology

Integration of AioT into Classroom: The Physical Reality in Education

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Abstract

Learning necessitates practice. In the realm of science, this means hands-on engagement with real materials. It's a well-established fact that given the opportunity to practice with tangible resources, individuals can deepen their understanding and significantly improve knowledge retention. However, a global challenge exists within education systems regarding this very practice, especially in science education. Even when science teachers have access to laboratories or materials for experiments, they may opt for abstract, intangible teaching methods, such as lecturing or simply drawing on a whiteboard. Numerous studies reveal that K-12 students visit science laboratories a mere 3-5 times during a 40-week academic year.

IoT devices communicate with each other to make our living spaces more comfortable, secure, and energy-efficient. As in other industries, the integration of IoT-based technologies into classrooms has significant potential to enhance education:

- Reducing the teacher's pre-lesson preparation time
- Eliminating the drudgery of teachers
- Conducting easy, fast, large number of low-cost science experiments
- Opportunity to conduct science experiments with real materials in both distance education and face-to-face education

Can smart technologies, which have revolutionized all other sectors, be used in classrooms to increase the comfort of teaching and learning for teachers and students?

Back Cover

This Book of Abstracts includes the abstracts presented at the 16th International Balkan Education and Science Congress. All contributions have been prepared in accordance with internationally recognized principles of scientific publication ethics. Any responsibility arising from plagiarism, data fabrication, falsification, or other ethical violations rests solely with the authors.

All abstracts included in this volume have undergone a double-blind peer review process conducted by at least two independent experts in the relevant field, ensuring academic quality and scientific rigor.

This publication serves as a scholarly record of the congress and aims to promote academic exchange and collaboration among researchers in the fields of education and science across the Balkan region and beyond.

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