GLOBETS 2026 Conference

28-31 October 2026

in collaboration with Atatürk Teachers' Training Academy, TRNC

GLOBETS 2026

10th International Conference on Education, Technology, and Science

28-31 OCTOBER, 2026

ATATÜRK TEACHERS' TRAINING ACADEMY, TRNC

KEYNOTE SPEAKERS



Osman CANKOY

Middle East Technical University
(Northern Cyprus Campus)

TRNC

Hakan SARI

Necmettin Erbakan University

Turkey

For information, visit our website: https://globets.net/

GLOBETS 2026

CONFERENCE PROGRAM
&
ABSTRACT BOOK

From the President of the Conference,

Dear Esteemed Guests, Participants, and Friends of GLOBETS,

It is with great excitement and pride that we welcome you to GLOBETS 2026, where innovation, knowledge, and collaboration come together to shape the future of education, technology, and science. Each year, we gather brilliant minds and dedicated professionals to share, inspire, and advance our fields, and this year is no exception.

Behind the scenes, our team has worked tirelessly to create a conference program that is both stimulating and relevant to the challenges and opportunities we face today. Their passion and dedication are reflected in every detail, ensuring that GLOBETS continues to be a platform where high academic standards and warm, meaningful connections thrive.

As we embark on these few days together, we extend our deepest thanks to our distinguished keynote speakers, the GLOBETS committee, and all of you, our invaluable participants. Your contributions, whether through research, discussion, or simply being present, make this conference a success and a beacon of collaborative progress.

We hope this year's conference will leave you with new insights, lasting connections, and a renewed sense of purpose. Thank you for being a part of GLOBETS 2026, and we look forward to shaping the future together.

Warmest regards,

Prof. Dr. Semra Mirici
President of GLOBETS 2026

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CONFERENCE PROGRAM

28-31 October 2026
Nicosia, TRNC

ROOM ONE (Plenary Session) **1st Day: 28th October 2026, Wednesday**		
Hours	**Event**	
10:00- 12:00	**CONFERENCE REGISTRATION**	
12:00 - 13:30	**COFFEE BREAK**	
13:30 - 14:30	**Opening Speeches**	**Prof. Dr. İsmail Hakkı Mirici** GlobELT Conference Chair
		Prof. Dr. Güner Konedralı President of the Turkish Republic of Northern Cyprus Atatürk Teacher Training Academy
14:30-14:45	**COFFEE BREAK**	
14:45- 15:45	**First Keynote Speaker: Dr. Marija Mijuskovic** "Reaching Different Learners: Rethinking Mentorship as Mediation in Differentiated EFL Classrooms" *Chair: Prof. Dr. Arda Arıkan*	
15.45 - 16.00	**COFFEE BREAK**	
16.00 - 17.00	**Second Keynote Speaker: Prof. Dr. Belgin Elmas** "Teaching Between Yin and Yang: Balance, Struggle, and Meaning in ELT" *Chair: Prof. Dr. İsmail Hakkı Mirici*	

ROOM TWO (PARALLEL SESSIONS) 1st Day: 28th October 2026, Wednesday		
Day 1 Session 1	***Chair: Prof. Dr. Yüksel Altun***	
	Presenters	**Titles**
17.20 -17.40	Yüksel Altun Dilay Dinçdemir	Graduate Chemistry Education Students' Experiences with a Locally Developed Generative AI-Supported Learning Platform: A Case Study within the TPACK, SAMR, and PLC Frameworks
17.40 - 18.00	Şeyma Ulukök Yıldırım Duygu Sönmez	Exploring the Relationship Between Pre-service Science Teachers' AI Literacy, AI Self-Efficacy, and AI Readiness
18.00 - 18.20	Dilara Uçar Kuş Duygu Sönmez	Self-Regulated Learning in Educational Research: A Bibliometric Analysis
18.20 – 18.40	Beril Akın Salman	COP31 in Türkiye: From Paris Commitments to Climate Action

ROOM THREE (PARALLEL SESSIONS) 1st Day: 28th October 2026, Wednesday		
Day 1 Session 1	***Chair: Prof. Dr. Nusret Kavak***	
	Presenters	**Titles**
17.20 -17.40	Havva Yamak Sevtap Sinanoğlu	Creativity Skills in Science Education: A Bibliometric Analysis
17.40 - 18.00	Nazan Çoker Nusret Kavak	The Effect of Flipped Learning on 11th-Grade Students' Academic Achievement in the Topic of Gases
18.00 - 18.20	Alev Doğan Burçak Ata	Climate Change Literacy Scale for Pre-Service Teachers: A Validity and Reliability Study
18.20 – 18.40	Elif Kargalıoğlu Elif Tuğçe Saçal Hikmet Türk Katırcıoğlu	A Comparative Examination of Augmented Reality Research in Education in Türkiye and China through Document Analysis

2nd Day: 29th October 2026, Thursday	
Hours	**Event**
10:00- …..	Girne Tour
19.00…..	Gala Dinner (Les Ambassadeurs Hotel) Note: Bus transfers to Girne will depart from in front of the Lefkoşa Teachers' Academy.
CLOSING THE SECOND DAY	

3rd Day: 30th October 2026, Friday

ROOM ONE (PLENARY SESSIONS) 3rd Day: 30th October 2026, Friday	
Hours	**Event**
11:10- 12:10	**Keynote Speaker: Prof. Dr. Hakan Sarı** "New Developments and Improvements in Special Education in Turkiye: In the Light of Legal Framework" *Chair: Prof. Dr. Semra Mirici*
12:10 - 13:30	**LUNCH**
13:30 - 14:30	**Keynote Speaker: Prof. Dr. Osman Cankoy** "Life is Mathematics" *Chair: Prof. Dr. Semra Mirici*
14.30-14.40	**COFFEE BREAK**

ROOM FOUR (PARALLEL SESSIONS) 3rd Day: 30th October 2026, Friday		
Day 3 Session 1	***Chair: Dr. Aygil Taş***	
	Presenters	**Titles**
10:00- 10.20	İpek Maaşoğlu Aşkın Kiraz	The Position of Migrant Students in the Global Power Relations and Educational Regimes
10.20 - 10.40	Joyce Pittman	Against All Odds: Cultivating Transformative Values for 21st-Century Global Citizens
10.40 - 11.00	Aygil Taş	Examining Pre-service Teachers' Experiences in a Life Studies Measurement and Evaluation Module through Digital Reflective Journals
11.00 - 11.10	**COFFEE BREAK**	
Day 3 Session 2	***Chair: Dr. Şeyda Sarı Yıldırım***	
	Presenters	**Titles**
14:40 - 15.00	Umut Albayrak	Interdisciplinary Music Integration in Primary Education: An Examination of Trends in the Literature
15.00 - 15.20	Şeyda Sarı Yıldırım	Examining Teachers' Perspectives on the Challenges of Foreign Language Teaching for Learners with Specific Learning Difficulties
15.20 - 15.40	Merve Halitoğlu Zehra Altınay	An Examination of the Views and Experiences of Educational Supervisors Working in Northern Cyprus Regarding the Educational Supervision Process
15.40 - 16.00	Enise Küçük Dervişe Amca Toklu Münevver Kata	Views of Preschool Teachers on Multicultural Education Practices
16.20 - 16.30	**COFFEE BREAK**	

Day 3 Session 3	*Chair: Assist. Prof. Dr. Yasemin Sorakın*	
	Presenters	**Titles**
16:30 - 16:50	Merve Özdemir Semra Mirici	A Design- and Modeling-Based In-Service Training Approach: The Recombinant DNA Design Workshop
16.50 - 17.10	Serdar Emre Ünsal Türker Kurt	Decision-Making and Decision-Making Processes in Educational Administration
17.10-17.30	Yasemin Sorakın Nedime Naz Cannur Meliz Kenanoğlu	An Evaluation of Primary School Teachers' Knowledge and Awareness of Children's Rights
17.30 - 17.50	Aycan Kibar Erdoğan Semra Mirici	The Effect of a Virtual Reality-Supported Cell Laboratory Design Workshop on Biology Preservice Teachers' Instructional Design Skills

ROOM ONE (PLENARY SESSION) **4th Day: 31th October 2026, Saturday**	
Hours	**Event**
11:00 - 13:30	**CLOSING THE CONFERENCE**

ABSTRACTS

KEYNOTE SPEAKER



Marija Mijušković

Dr. Marija Mijušković is an assistant professor in the Department of English Language and Literature at the Faculty of Philology, University of Montenegro. She holds advanced degrees from both the University of Belgrade and the University of Montenegro. Her research focuses on effective and innovative methods for teaching English as a foreign language (EFL). As a frequent speaker and guest lecturer across Europe, Dr. Mijušković provides fresh insights into English language teaching, particularly emphasizing differentiated instruction. Her work encompasses the development of language skills and seeks to enhance classroom practices within Montenegro's education system. Through her research and publications, she inspires educators to engage every learner and make teaching both practical and impactful.

KEYNOTE SPEAKER



Belgin Elmas

Belgin Elmas completed her undergraduate and doctoral studies at Anadolu University and her master's degree at Bilkent University as a recipient of the Fulbright Program scholarship. Between 1989 and 2019, Dr. Elmas served at Anadolu University in various academic and administrative roles, including Director of the School of Foreign Languages and Vice Director of the Institute of Educational Sciences. From 2019 to 2025, she served as Chair of the Department of English Language Teaching at TED University. In her doctoral dissertation, Dr. Elmas investigated the causes of anxiety experienced by foreign language learners in speaking and writing. Her research interests include foreign language education, teacher education, psychological factors affecting language learning, and the use of technology in language education. She continues to conduct research in these areas at both national and international levels and has supervised numerous master's and doctoral theses. In addition to her academic work, Dr. Elmas shares her expertise with broader audiences through a YouTube channel where she hosts conversations with experts on education, as well as through her personal website where she publishes her writings. Dr. Elmas teaches undergraduate and graduate courses on language teaching methods, contemporary approaches in education, teacher education, and educational psychology, and continues to contribute to the professional development of future teachers.

KEYNOTE SPEAKER



Hakan Sarı

After graduating from Kırşehir High Teacher Training School and the Department of Educational Sciences at Gazi University, he successfully completed his master's degree in special education at the University of Warwick and his doctoral degree in special education at Oxford Brookes University in the UK, returning to Turkey in 2000. Since 2001, he has served as the Head of the Department and Head of the Main Science Discipline in the Special Education Department he established. Prof. Dr. Hakan SARI has authored numerous books, book chapters, research articles, and reports published both in Turkey and abroad. He has represented our country in the best possible manner as an invited keynote speaker at many international congresses. In line with this goal, he continues to contribute to education in our country by training students at the undergraduate, master's, and doctoral levels in the field of special education. Additionally, after successfully serving in various periods as Advisor to the Minister at the Ministry of National Education, Director General for Special Education and Guidance Services, Advisor to the President of YÖK (Council of Higher Education), and General Coordinator of the Disabled Student Units within YÖK, he returned to his duties at the university. He currently serves as the Head of Department and Head of the Main Science Discipline in the Special Education Department at Necmettin Erbakan University. He has successfully completed and published numerous national and international books, articles, and scientific reports. Prof. Dr. Hakan SARI is married and has two children.

KEYNOTE SPEAKER



Osman Cankoy

Osman Cankoy graduated from Middle East Technical University, Department of Mathematics in 1987. Subsequently, he completed his Master's degree in the Department of Science Education at Middle East Technical University, Faculty of Education in 1989, and earned his Ph.D. in Curriculum Development and Mathematics Instruction in 1998 from the same university. After working at the Department of Mathematics at Eastern Mediterranean University for a year in 1990, he taught Mathematics, Computer Science, and Science at Famagusta Turkish Maarif College between 1990 and 1992. From 1994 to 2022, he served at Atatürk Teacher Academy, including 5 years as the President of the Academy. Cankoy received the title of Associate Professor in 2008 and full Professor in 2014. He is currently working as a part-time faculty member at Middle East Technical University Northern Cyprus Campus. He has authored and edited various mathematics textbooks for primary and secondary school levels from 1st to 8th grade. He is married and has two children.

Reaching Different Learners: Rethinking Mentorship as Mediation in Differentiated EFL Classrooms

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Abstract

In English as a Foreign Language (EFL) classrooms, students often follow the same curriculum despite having varying levels of proficiency. It is common for a single group to exhibit differences in linguistic skills, cognitive readiness, and learning pace. In these environments, differentiation is not merely a methodological choice; it is a professional responsibility. This keynote addresses a significant challenge in teacher education: how can we prepare future teachers to respond thoughtfully and effectively to the diverse needs in EFL classrooms? Mentorship is redefined here as a structured form of pedagogical mediation that enables pre-service teachers to develop the capacity for principled differentiation. Rather than viewing differentiation as a simple mechanical adjustment of materials, mentorship can serve as a model for reflective decision-making. This involves carefully balancing linguistic input, cognitive demand, and task complexity while keeping learning objectives unchanged. Drawing upon experiences from the Montenegrin context, where guided mentoring practices aided students in creating differentiated classroom and homework tasks aligned with the Common European Framework of Reference for Languages (CEFR), this example highlights broader questions regarding teacher preparation. Such tasks target the four language skills and accommodate a range of proficiency levels within the same classroom. Preparing teachers for real EFL classrooms involves more than just methodological training. It requires structured opportunities for practice in mediation through scaffolding, dialogue, guided questioning, and informed pedagogical choices. Understanding mentorship in this way positions it not merely as supplementary support but as a strategic tool for fostering adaptive, reflective, and inclusive EFL teaching.

Keywords: mentorship, mediation, differentiation, EFL, CEFR, teacher education

Teaching Between Yin and Yang: Balance, Struggle, and Meaning in ELT

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Abstract

Language teaching is often framed around skills, outcomes, and measurable achievement. Yet classrooms are also deeply human spaces, shaped by identity, uncertainty, vulnerability, and purpose. This plenary introduces existential psychology as a powerful lens for understanding the experiences of both teachers and learners in English Language Teaching (ELT). Moving beyond the traditional focus on identifying negative emotions that affect the learning process, and the more recent emphasis on enforced positivity, the talk proposes a meaning-centered perspective in which challenges are understood as natural and potentially transformative aspects of the learning journey. Drawing on principles from existential psychology, the session explores how meaning, responsibility, choice, and growth can be integrated into language education. It introduces the PURE model as a practical framework for guiding teachers and learners to reflect on purpose, identity, and agency, and demonstrates how existential awareness can enrich classroom practice. By positioning language classrooms as spaces for human growth rather than just linguistic performance, the talk invites educators to reconsider teaching as a process of co-constructing meaning, enabling both teachers and learners to experience deeper engagement, resilience, and transformation.

New Developments and Improvements in Special Education in Turkiye: In the Light of Legal Framework

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Abstract

This presentation examines how the constitutional guarantee enshrined in Article 42 of the Constitution of the Republic of Türkiye -which stipulates that "no one shall be deprived of the right to education and training"- has been translated into a multi-layered legal framework within the field of special education and how it guides actions related to special education. This framework encompasses a range of legal regulations: starting with fundamental statutes such as the Basic Law on National Education (1973), Decree-Law No. 573 (1997), and the Law on Persons with Disabilities No. 5378 (2005), and extending to the UN Convention on the Rights of Persons with Disabilities (ratified by Turkey in 2009); the Regulation on Special Education Services (prepared and enacted in 2012—and subsequently revised in 2018 and 2022 -to facilitate the transition to 12-year compulsory education and guide all subsequent special education activities); and the ÇÖZGER assessment system (2019), which serves as a crucial component of needs-based educational identification and assessment and forms the basis for medical evaluation. The presentation also addresses developments in special education between 2012 and 2026, including: legislative changes that strengthen accountability; the work of relevant Parliamentary Research Commissions established within the Grand National Assembly of Türkiye (TBMM) to identify the challenges faced by individuals with handicaps and the gifted- two key groups within special education—and to ensure their participation in society as productive citizens through quality education free from discrimination; accessibility rights reflecting a new approach in both physical and digital environments; and improvements to Individualized Education Programs (IEPs)- designed to fully meet the educational needs of all students by incorporating evolving research trends and utilizing detailed educational identification and assessment processes conducted by professional teams. Additionally, the presentation covers new developments in support services for special education provided within the framework of IEPs. Furthermore, it advocates for the inclusion of all teachers- whether teaching a foreign language or a second language- as members of the IEP team. The conclusion highlights the necessary steps to bridge the gap between legislation and practices and explains why the agenda, for the next five years, should be a primary priority for all special education professionals and policymakers. Finally, the presentation details the necessary future trends for research on special education in Türkiye.

Keywords: Turkey, Special Education, Inclusive Education, Legal Framework, Individualized Education Program (IEP), Accessibility, Universal Design for Learning, New Research Trends

Life is Mathematics

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Abstract

Mathematics is a universal language of interpretation woven into the fabric of daily life, extending far beyond the paradigm of mere "numbers and formulas." The mechanisms of mathematical reasoning -which individuals unconsciously employ during decision-making, strategic planning, and complex problem-solving- can be examined from various perspectives. Mathematics can be viewed not merely as an academic discipline, but as a fundamental cognitive tool that fosters analytical thinking, a critical perspective, and the ability to generate creative solutions. From another angle, it addresses the deep-seated negative perceptions of the subject within society; by bridging abstract concepts with real-life scenarios, mathematics emerges as a vital educational model designed to overcome these barriers. It also serves as a practical framework underpinning processes of comparison and logical inference across a wide spectrum of activities, ranging from everyday shopping to risk management. Ultimately, mathematics is positioned as a universal language that transcends the confines of the classroom, enabling us to understand and make sense of the world. The primary objective is to transform mathematics from an abstract requirement into a tool of awareness that enhances an individual's quality of life and expands their cognitive capacity.

Graduate Chemistry Education Students' Experiences with a Locally Developed Generative AI-Supported Learning Platform: A Case Study within the TPACK, SAMR, and PLC Frameworks

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Abstract

Generative artificial intelligence (GenAI) technologies are moving beyond content delivery in education to assume transformative roles in instructional design, assessment and evaluation, and ethical decision-making. However, studies examining the pedagogical role of AI platforms tailored to the national curriculum context and the discipline-specific instructional needs of chemistry in teacher education remain limited (Holmes et al., 2019; Luckin et al., 2016; Zawacki-Richter et al., 2019). This study aims to examine graduate chemistry education students' experiences of developing instructional materials through a locally developed GenAI-based instructional design platform within the theoretical frameworks of Technological Pedagogical Content Knowledge (TPACK), the SAMR model, and Professional Learning Communities (PLC). Employing a qualitative multiple-case study design, the study involved four master's students enrolled in a graduate chemistry education programme at a public university. The research setting was structured around a locally developed educational technology platform featuring a multilingual generative AI architecture and alignment with national and international (IB and AP) curricula. Over the course of one academic semester, participants designed chemistry teaching materials using the platform's automated assessment and evaluation modules, lesson-planning and concept-mapping algorithms, and pedagogical audio narration (podcast) tools. Data were collected through the digital artefacts developed by the participants and their reflective reports and were analysed using thematic analysis. The findings indicate that GenAI integration enabled the graduate students to mobilise TPACK components specific to chemistry concepts and advance their designs towards the higher levels of the SAMR model, namely modification and redefinition. Through peer feedback, the participants established a functional professional learning community (PLC) and, by

critically engaging with issues of algorithmic bias, data security, and copyright, demonstrated that ultimate control over the design process remained with the teachers, thereby preserving teacher autonomy. The findings highlight the strategic role of AI platforms that are responsive to local contexts in fostering an ethical, high-quality, and sustainable digital transformation in chemistry teacher education.

Keywords: generative artificial intelligence, chemistry education, graduate education, TPACK, SAMR model

Exploring the Relationship Between Pre-service Science Teachers' AI Literacy, AI Self-Efficacy, and AI Readiness

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Abstract

With rapid advancements in information and communication technologies, artificial intelligence has become a prominent technology increasingly permeating many areas of life, including education. As artificial intelligence becomes increasingly integrated into science teaching, future teachers must use these technologies effectively, ethically, and pedagogically, and reflect them in classroom practice. Pre-service science teachers' knowledge and skills related to artificial intelligence, their perceived competence in using these technologies, and their readiness to implement them in instructional processes are important for effectively integrating artificial intelligence into educational environments. In recent years, while studies on pre-service science teachers' artificial intelligence literacy, self-efficacy, and readiness have increased, research addressing the relationships among these constructs remains limited. Accordingly, this study aims to examine the relationships between pre-service science teachers' artificial intelligence literacy, artificial intelligence self-efficacy, and artificial intelligence readiness. The research will be conducted with pre-service science teachers studying at the faculties of education at several universities in Turkey. Data will be collected online using a personal information form, the Artificial Intelligence Literacy Scale, the Artificial Intelligence Self-Efficacy Scale, and the Artificial Intelligence Readiness Scale. The data obtained will be analyzed using Pearson correlation analysis.

Self-Regulated Learning in Educational Research: A Bibliometric Analysis

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Abstract

Self-regulated learning (SRL) is an important learning approach that encompasses individuals' abilities to plan, monitor, and evaluate their own learning processes. In recent years, there has been a significant increase in the number of academic studies focusing on this topic in educational research. The aim of this study is to examine the development and research trends of the self-regulated learning literature through bibliometric analysis. Within this scope, a total of 2,475 articles published between 1986 and 2024 and indexed in the Web of Science Core Collection database were analyzed. The distribution of publications by year, publication language, productive countries, institutions, and journals was examined descriptively. In addition, co-authorship, co-citation, and keyword co-occurrence analyses were conducted using VOSviewer software. The findings indicate that publications in the field of self-regulated learning have increased significantly, particularly after 2010, revealing a clear growth trend in the literature. In terms of country distribution, the United States, China, and several European countries were identified as the most productive contributors. The keyword co-occurrence analysis showed that research on self-regulated learning is mainly clustered around themes such as motivation, metacognition, academic achievement, and learning strategies. In addition, concepts related to online learning, learning analytics, and technology-supported learning have become increasingly prominent in the literature. Overall, this study provides a comprehensive mapping of the intellectual and thematic structure of self-regulated learning research and offers insights into emerging research trends and future research directions.

COP31 in Türkiye: From Paris Commitments to Climate Action

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Abstract

The Paris Agreement has established a dynamic global climate governance framework based on progressively ambitious nationally determined contributions (NDCs), enhanced transparency, adaptation, climate finance, technology development and transfer, and the periodic assessment of collective progress. Within this framework, Türkiye has strengthened its national climate policy architecture through its 2053 net-zero emissions target, its Second Nationally Determined Contribution (NDC 3.0), and the adoption of its first Climate Law in 2025. Türkiye's Second NDC aims to reduce greenhouse gas emissions by 466 $MtCO_2e$ relative to the reference scenario, limiting total emissions to 643 $MtCO_2e$ by 2035. Against this background, Türkiye's hosting of the 31st Conference of the Parties to the United Nations Framework Convention on Climate Change (COP31) in Antalya in November 2026 represents an important intersection between international climate diplomacy and domestic climate policy. This study assesses Türkiye's responsibilities under the Paris Agreement and examines the extent to which COP31 can serve as a catalyst for accelerating the implementation of national climate commitments.
The study adopts a policy and document analysis approach, examining the Paris Agreement, Türkiye's Second NDC, national climate legislation and strategic documents, and the emerging COP31 agenda. The assessment focuses on mitigation and adaptation, enhanced transparency, renewable energy transition, emissions trading and carbon pricing, climate finance, circular economy, local climate action, technology transfer, and institutional capacity. The analysis suggests that hosting COP31 could provide Türkiye with opportunities to better align its international commitments with domestic implementation, mobilize climate finance and low-carbon investment, accelerate technological and institutional transformation, and strengthen multi-level climate governance. However, the long-term significance of COP31 will depend on the extent to which increased diplomatic visibility translates into measurable emission reductions, enhanced adaptation capacity, transparent monitoring, and sustained policy implementation. COP31 therefore represents not only a major international climate event for Türkiye but also a critical opportunity to accelerate the transition from Paris Agreement commitments to concrete climate action in pursuit of the 2035 NDC and 2053 net-zero targets.

Keywords: COP31, Türkiye, Paris Agreement, nationally determined contributions, climate governance, climate policy, net-zero emissions, climate action.

Creativity Skills in Science Education: A Bibliometric Analysis

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Abstract

This study aims to examine published articles on creativity skills in science education through bibliometric analysis, providing a comprehensive overview of the structure and developmental trends of scientific production in this field and offering guidance for future research. A descriptive research design was employed. The data were retrieved from the Web of Science (WoS) database and were limited to articles, reviews, and early-access publications written in English and published between 2010 and 2026. The process of constructing the dataset was reported using the PRISMA flow diagram, and the analyses were conducted using Biblioshiny, the web-based interface of the Bibliometrix package in R. A total of 256 publications on creativity in science education were included in the analysis. The publications were examined in terms of annual publication trends, annual growth rate, citation patterns, thematic structure, temporal evolution of keywords, productivity of countries and institutions, author and journal profiles, co-authorship networks, and the distinctive characteristics of the most highly cited studies. The findings revealed that research on creativity in science education had an annual growth rate of 10.23% between 2010 and 2026, with the number of publications reaching its highest level in 2025 with 38 articles. In terms of country productivity, the United States ranked first, followed by China, while Türkiye ranked third. Thematic analyses indicated that studies predominantly clustered around creativity, science education, students, schools, and STEM; however, well-developed motor themes capable of driving the field forward remained relatively limited. The temporal evolution of keywords further showed that scientific creativity, STEM education, divergent thinking, and creativity have become increasingly prominent in recent years. Overall, the findings suggest that research on creativity in science education represents a rapidly developing field that is still undergoing conceptual and thematic maturation. By mapping the existing body of scientific knowledge on creativity in science education, this study is expected to contribute to identifying current research trends and gaps in the literature and to provide a framework for guiding future research.

Keywords: science education, creativity, scientific creativity, 21st-century skills, bibliometric analysis, STEM

The Effect of Flipped Learning on 11th-Grade Students' Academic Achievement in the Topic of Gases

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Abstract

The increasing integration of digital technologies into educational processes has led to changes in students' learning styles and, consequently, to a need to reconsider and redesign instructional approaches. One of the approaches that has gained prominence in this context is flipped learning. Flipped learning is a student-centered instructional approach in which students engage with basic content before class and classroom time is devoted to practice, discussion, and problem-solving activities. Unlike traditional classroom instruction, this approach allows students to progress at their own pace while enabling teachers to provide more guidance and support during class time. Thus, it is used as an effective instructional model to promote active learning, reinforce acquired knowledge, and deepen students' understanding. This study aimed to investigate the effect of the flipped learning model on 11th-grade students' academic achievement in the topic of gases. The study employed a quasi-experimental design within the framework of quantitative research. The population of the study consisted of 11th-grade students enrolled at a public Anatolian high school affiliated with the Ministry of National Education in Sincan, Ankara, during the 2024–2025 academic year (N = 60). Two 11th-grade classes were selected using convenience sampling. One class was assigned as the control group, in which instruction was conducted using traditional teaching methods, while the other was assigned as the experimental group, in which instruction was based on the flipped learning model. For the experimental group, a flipped learning e-book was developed by the researchers using the FlipHTML5 platform to support students' pre-class preparation and increase their active participation during classroom instruction. The e-book includes explanations of the topics covered in the 11th-grade chemistry unit on gases, examples connecting the content to everyday life, descriptions of experiments, graphical interpretations, interactive content, sample questions with solutions, and virtual experiment links. The intervention was implemented in both groups for eight weeks. At the end of the implementation period, an academic achievement test on the topic of gases was administered to the experimental and control groups. The test was developed by the researchers, and the data obtained were analyzed using SPSS statistical software. The findings indicated a statistically significant difference between the academic achievement of students in the experimental group, who were instructed through the flipped learning model, and those in the control group, in favor of the experimental group.

Climate Change Literacy Scale for Pre-Service Teachers: A Validity and Reliability Study

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Burçak Ata

Abstract

The purpose of this study is to develop a valid and reliable 3-point Likert-type measurement instrument to determine the climate change literacy levels of volunteer pre-service teachers. The study group consisted of 441 pre-service teachers selected via convenience sampling from various departments within the faculty of education at a state university in Ankara. Following the content validity assessment via expert opinions, a 43-item draft form was pilot-tested, and Exploratory Factor Analysis (EFA) was subsequently conducted to evaluate its construct validity. The data suitability for factor analysis was confirmed (KMO = 0.88; Bartlett's test, $p < .05$), and 16 items with factor loadings below .40 or those exhibiting cross-loadings were sequentially eliminated, resulting in a finalized 27-item scale. The scale revealed a three-factor structure consisting of "Concept and Understanding" (7 items), "Attitude and Value Orientation" (9 items), and "Application and Action Skill" (11 items), explaining 59.86% of the total variance. Reliability analyses indicated that the Cronbach's Alpha internal consistency coefficient was .90 for the overall scale, ranging between .86 and .95 for the sub-dimensions. These empirical findings demonstrate that the Climate Change Literacy Scale is a valid, reliable, and practical measurement tool capable of stable and precise assessment of climate change literacy levels among pre-service teachers.

Keywords: Climate change literacy, Scale development, Pre-service teachers, Exploratory factor analysis, Validity and reliability.

A Comparative Examination of Augmented Reality Research in Education in Türkiye and China through Document Analysis

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Abstract

Augmented Reality (AR) technologies in education have gained a strategic position in the literature due to their potential to concretize abstract concepts and provide multisensory learning environments. According to international bibliometric data, China ranks first in the world in the field of augmented reality (AR) in education with 1,030 articles, while Türkiye ranks fourth with 281 articles. This situation makes the comparison of the two countries in terms of AR research production conditions meaningful from the perspective of the literature. Articles published between 2020 and 2026 were examined using the document analysis method. Following the application of inclusion and exclusion criteria, a total of 33 articles, including 20 from Türkiye and 13 from China, constituted the dataset. The articles were classified according to nine criteria: publication year, journal indexing status, number of authors, research method, educational level, learning environment, subject area, AR software strategy, and financial support status. The analysis revealed that science was the prominent subject area in both countries, and 81.8% of the studies were limited to school-based learning environments. Based on the findings, it is recommended that grant and laboratory programs supported by the Ministry of National Education (MEB) and TÜBİTAK be developed to transform AR research in Türkiye from the level of individual projects into a sustainable research ecosystem. It is also recommended that basic coding, no-code material development, and teacher–software developer co-design skills be integrated into teacher education programs.

The Position of Migrant Students in the Global Power Relations and Educational Regimes

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Abstract

This study offers a critical perspective on the systematic barriers faced by migrant students in their academic lives within the framework of implicit exclusion mechanisms reproduced through pedagogical practices. Homogenization practices imposed by the neoliberal education paradigm were analyzed from a comparative perspective with specific focus on Türkiye and the European Union (EU). Designed on the basis of Bourdieu's cultural capital theory and Foucault's power / knowledge spiral, this study opens to debate how education systems reproduce migrant subjects as precarious actors (precariat). Data obtained through qualitative document analysis were created using the current education strategy documents published by both Türkiye and the European Union (EU), migrant integration reports, and official curriculum directives. These documents were examined using qualitative document analysis and critical discourse analysis techniques with the purpose of decoding the power patterns hidden between the lines. The qualitative document analysis conducted within the scope of this study presents concrete data regarding the operation of the system by decoding the implicit messages between the lines of national and international education policy documents. The obtained findings provide evidence that education institutions are structured as gatekeepers that preserve existing power hierarchies and exclude migrant subjects instead of ensuring the social mobility that they promise. In conclusion, this study ask the question whether education can be transformed from being an instrument that legitimizes the status quo in the context of global power asymmetries.

Keywords: Migrant education, Cultural capital, Power relations, Education policies, Power mechanisms.

Against All Odds: Cultivating Transformative Values for 21st-Century Global Citizens

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Abstract

The demands of the 21st century require a re-envisioning of education that extends beyond content mastery to the cultivation of values essential for global citizenship. This paper presents a values-centered framework designed to prepare learners to navigate complexity, diversity, and global interdependence. Grounded in narrative inquiry and informed by lived experiences documented in *Against All Odds: I Did It!*, this theoretical study explores how resilience, cultural humility, ethical leadership, and global responsibility can be intentionally integrated into educational practice. Drawing on interdisciplinary perspectives from education, technology, and social development, this work bridges theory and practice by offering practical strategies for embedding values into curriculum design, teacher preparation, and student engagement (UNESCO, 2015; OECD, 2018). The paper further examines the role of educators and world leaders as transformative agents who shape not only academic outcomes but also the moral and social capacities of learners globally (Freire, Paulo, 1970). Findings suggest that values-based education fosters critical thinking, empathy, and ethical decision-making—competencies necessary for sustainable global development (Nussbaum, Martha C., 2010). This proposal aligns with the mission of GLOBETS 2026 by contributing innovative approaches to the implementation of research across diverse educational contexts. Implications for policy, practice, and future research are discussed.

Keywords: Global citizenship, values-based education, resilience, ethical leadership, cultural humility, sustainability, 21st-century skills

Views of Preschool Teachers on Multicultural Education Practices

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Abstract

This study aimed to examine the practical experiences of preschool teachers working in multicultural classrooms, the challenges they encounter, and their needs concerning the enhancement of multicultural education practices. Nicosia was selected as the research setting because it is a central urban area with a high concentration of children from diverse cultural and linguistic backgrounds. The study employed a qualitative case study design. The study group comprised 21 preschool teachers working in public kindergartens and preschool classes within primary schools affiliated with the Ministry of National Education of the Turkish Republic of Northern Cyprus during the 2025–2026 academic year. Participants were selected through maximum variation sampling, a purposive sampling strategy. Data were collected using a semi-structured interview form developed by the researcher and analyzed through content analysis. The findings indicated that teachers most frequently encountered language- and communication-related challenges when implementing multicultural education. Linguistic differences were found to hinder communication with children, children's participation in classroom activities, and teacher–family communication. Teachers also identified the limited availability of multicultural materials, difficulties in family participation, children's adaptation to cultural differences, and the heterogeneous composition of classrooms as significant challenges. Although teachers incorporated books, visual materials, music, art, and drama activities that introduced different cultures, practices directly supporting social equity, the prevention of discrimination, and integration remained comparatively limited. To enhance existing practices, participants recommended increasing the availability of materials representing diverse cultures and languages, providing practice-oriented in-service training, supporting family participation, and strengthening school–family collaboration. The study concluded that multicultural education in preschool settings in Nicosia should not be limited to making cultural differences visible; rather, it should be implemented through a holistic approach that integrates the recognition of cultural diversity, social equity, and integration. The

findings further suggested that teachers' positive attitudes alone may be insufficient in settings characterized by substantial cultural diversity, and that practices may remain confined to introducing cultures in the absence of language support, high-quality materials, institutional guidance, and sustainable family participation. Accordingly, it is recommended that teacher education and local education policies be developed in response to teachers' local needs and that preschool curricula be designed to respond more effectively to multicultural contexts.

Keywords: multicultural education, preschool education, teacher experiences, teacher needs, cultural diversity

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Interdisciplinary Music Integration in Primary Education: An Examination of Trends in the Literature

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Abstract

Music is not only a subject in primary education but also an integrative tool that can support learning processes across different disciplines. Therefore, it is important to examine how music is integrated with different curriculum areas and how research in this field has been distributed over time. The aim of this study is to examine empirical research on the pedagogical integration of music with other curriculum areas in primary education according to publication years and curriculum areas. The study is expected to contribute to identifying trends in the literature and curriculum areas that are relatively underrepresented. Designed as a descriptive literature review, the study involved searches in the Scopus, Web of Science Core Collection, and ERIC databases to identify relevant publications. Articles published in English between 2000 and August 2026, appearing in peer-reviewed journals, and presenting empirical research were considered for inclusion. The inclusion criteria required studies to cover the primary education level and to involve the intentional integration of music with at least one other curriculum area, skill, or learning content as part of a pedagogical practice. Following the application of the specified criteria and the removal of duplicate records, 53 publications were included in the review. The publications were coded according to publication year and the primary curriculum area with which music was integrated, and the data were analyzed using frequencies and percentages. Of the publications, 33 (62.3%) were published during the 2020–2026 period, with the highest numbers of publications recorded in 2025 (n=8), 2024 (n=7), and 2020 (n=6). In terms of curriculum areas, Language/Literacy was the most frequently addressed area of integration (n=22, 41.5%), followed by Mathematics (n=11, 20.8%). The Information/Data/Information and Communication Technologies (ICT) and Multi-/Cross-curricular categories each included five publications (9.4%). The remaining publications were distributed across Social Studies/Citizenship/Values (n=4, 7.5%), Science/Environment (n=3, 5.7%), Dance/Movement (n=2, 3.8%), and Visual Arts (n=1, 1.9%). The findings indicate that music integration in the reviewed literature is predominantly associated with language/literacy and mathematics, while other curriculum areas are represented in a more limited number of studies.

Keywords: interdisciplinary music integration, primary education, music education, curriculum integration, descriptive literature review

Examining Teachers' Perspectives on the Challenges of Foreign Language Teaching for Learners with Specific Learning Difficulties

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Abstract

The growing emphasis on inclusive education has increased the presence of learners with Specific Learning Difficulties (SpLD) in mainstream foreign language classrooms, placing new instructional demands on language teachers. Although foreign language learning may present unique linguistic, cognitive, and affective challenges for learners with SpLD, research examining teachers' experiences and perspectives in addressing these challenges remains limited, particularly in English as a Foreign Language (EFL) contexts. Understanding teachers' perspectives is essential for identifying the barriers they encounter, the instructional strategies they employ, and the support they need to provide effective and inclusive foreign language instruction. This qualitative study aims to examine teachers' perspectives on the challenges of teaching foreign languages to learners with Specific Learning Difficulties. Semi-structured interviews are conducted with 15 foreign language teachers who have experience teaching learners with SpLD. The interview data is analysed using thematic analysis with the support of MAXQDA to identify recurring themes related to instructional challenges, classroom practices, assessment, teacher preparation, instructional resources, and professional support. Through an in-depth exploration of teachers' experiences, the study seeks to provide a comprehensive understanding of the realities of foreign language teaching in inclusive classrooms. The findings are expected to contribute to the growing body of literature on inclusive foreign language education by highlighting the challenges teachers face and the strategies they develop in response to diverse learner needs. The study is also expected to offer practical implications for teacher education programmes, professional development initiatives, curriculum design, and educational policy aimed at improving foreign language instruction for learners with Specific Learning Difficulties.

Keywords: Specific Learning Difficulties, Foreign Language Teaching, Teachers' Perspectives, Qualitative Research, Inclusive Education.

An Examination of the Views and Experiences of Educational Supervisors Working in Northern Cyprus Regarding the Educational Supervision Process

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Abstract

Today, improving the quality of education systems and ensuring sustainable school development require educational supervision to be addressed not only through its control function but also through its guidance, professional development, and monitoring dimensions. This study aimed to examine the views and experiences of educational supervision personnel working in the Turkish Republic of Northern Cyprus regarding educational supervision. The study explored participants' views on the purposes of educational supervision, its contribution to school development, the problems encountered during the supervision process, the guidance activities carried out, and the improvement of the educational supervision system. The study was conducted using a phenomenological design within the qualitative research approach. The study group consisted of 21 participants selected through criterion sampling, including 16 educational supervision personnel working under the Ministry of National Education of the Turkish Republic of Northern Cyprus and five participants who had recently retired from such positions. The research data were collected through face-to-face and online interviews conducted using a semi-structured interview form, as well as through an online form, and were analysed using content analysis. The findings revealed that participants predominantly viewed educational supervision as a process that supports guidance, professional development, educational quality, and school improvement. However, the functions of ensuring compliance with legislation, maintaining standards, identifying deficiencies, and conducting evaluations also remained important. Educational supervision was found to contribute to school development through guidance provided to teachers and school administrators, constructive feedback, the identification of institutional needs, and the monitoring of improvement. The main problems encountered during the supervision process included legal and institutional deficiencies, an insufficient number of supervisors, heavy workloads, time and transportation constraints, communication difficulties, and the perception of supervision as a fault-finding process. Although guidance activities were considered effective, they were not adequately supported in terms of personnel, time, continuity, and systematic monitoring. Participants recommended strengthening the legal and institutional structure; ensuring merit, transparency, impartiality, and independence; increasing the number of supervisors and professional development opportunities; and

improving school self-evaluation and digital monitoring systems. Consequently, educational supervision should be structured as a continuous improvement process that integrates evaluation, guidance, professional support, implementation, and monitoring rather than as a periodic control activity.

Examining Pre-service Teachers' Experiences in a Life Studies Measurement and Evaluation Module through Digital Reflective Journals

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Abstract

Reflective journals are tools that enable learners to regularly express the knowledge they acquire during the learning process, the difficulties they encounter, their feelings and thoughts, and their evaluations of their own learning. The use of reflective journals in teacher education can contribute to making visible not only what pre-service teachers learn, but also how they make sense of their learning, how they relate it to their prior knowledge and experiences, and how they intend to transfer it to their future professional practices. Digital reflective journals, on the other hand, enable these reflections to be recorded simultaneously and systematically throughout the instructional process. Assessment and evaluation is one of the fundamental professional competencies that requires pre-service teachers to transform their theoretical knowledge into practice by relating it to the characteristics of the teaching field. The daily life-related, interdisciplinary, and student-centered nature of the Life Studies course also necessitates the use of different assessment and evaluation approaches in line with the objectives and learning outcomes of the course. The aim of this study is to examine the learning experiences of pre-service primary school teachers during the Assessment and Evaluation in Life Studies Teaching Module through digital reflective journals. In this context, the study addresses how pre-service teachers make sense of their learning regarding assessment and evaluation, how they relate this learning to Life Studies teaching and their future teaching practices, the difficulties they encounter during the process, and the professional awareness they develop. The study was designed as a case study within the framework of a qualitative research approach. The research was conducted at Atatürk Teacher Training Academy, where courses in the teacher education program are delivered in a modular structure. Within this structure, course content is delivered through intensive modules focusing on specific subject areas and competencies. The context of the study consists of the Assessment and Evaluation in Life Studies Teaching Module, which was conducted for a total of 10 hours over two weeks as part of the Life Studies Teaching course. A total of 70 pre-service primary school teachers who took the module participated in the study. Within the scope of the module, traditional and alternative assessment tools, performance assessment, rubrics, portfolios, self-assessment, and peer assessment were addressed in relation to the objectives, content, and learning outcomes of the Life Studies course. At the end of each lesson, pre-service teachers completed their digital reflective journals via Microsoft Teams on the same day. In the journals, the participants were asked to explain the points

that attracted their attention regarding assessment and evaluation that day, how the topic covered affected their perspectives on assessment and evaluation in Life Studies teaching, how they could use what they had learned as future primary school teachers, the points they found difficult or that prompted them to think more deeply, and their feelings and thoughts about the lesson. Only the digital reflective journals of pre-service teachers who provided voluntary consent were used as research data. Descriptive analysis is being used to analyze the data, and direct quotations are being utilized to reflect the participants' experiences in their own words. The data analysis process of the study is ongoing. Nevertheless, preliminary examinations of the digital reflective journals indicate that pre-service teachers not only explain the assessment and evaluation concepts and approaches they have learned but also question them in terms of the characteristics of Life Studies teaching and relate them to their future classroom practices. The preliminary examinations particularly highlight reflections on the selection of appropriate assessment tools, the comparison of traditional and alternative assessment and evaluation approaches, student-centered assessment, difficulties encountered during the learning process, and the transfer of what has been learned to teaching practices. The journals also appear to serve as a tool that enables pre-service teachers to question their own learning, express the points they have difficulty understanding, and make their thoughts and feelings regarding assessment and evaluation visible. The preliminary findings indicate that digital reflective journals have the potential not only to provide data for monitoring pre-service teachers' learning processes but also to support them in reflecting on their own learning and establishing connections with professional practices. Upon completion of the analysis process, the study aims to present a holistic picture of pre-service teachers' learning experiences, their understandings of assessment and evaluation, the difficulties they experience, their professional awareness, and their reflections on practice.

A Design- and Modeling-Based In-Service Training Approach: The Recombinant DNA Design Workshop

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Abstract

This study investigated the implementation of a "Recombinant DNA Design Workshop" conducted within an in-service professional development program for science and biology teachers and examined the biotechnology projects developed by participants. Using a design-based research approach, the study involved 17 teachers. During an approximately two-hour session of the four-day program, participants worked in six groups of two or three, identified a real-world problem, and designed a recombinant product intended to address it. Key components of recombinant DNA technology, including DNA, target gene, plasmid, recombinant plasmid, bacterial cell, and final product, were modeled using colored modeling clay. Data consisted of the groups' physical models and written project descriptions on worksheets. The data were analyzed descriptively across six dimensions: problem identification, product design, process modeling, scientific consistency, problem-solving approach, and scientific and societal contribution. Findings showed that participants developed original projects in health, agriculture, environmental sustainability, and functional foods, including applications related to lupus treatment, polycystic ovary syndrome, biodegradation of plastic waste, and plants resistant to environmental stressors. Participants generally transferred fundamental principles of recombinant DNA technology to different problem contexts; however, some groups showed limited or partially inaccurate understanding of relationships among the target gene, product, vector, and host cell. Overall, the workshop enabled teachers to connect biotechnology knowledge with real-life problems, model abstract molecular processes, collaborate in solution development, and design original products. These findings indicate that a short, intensive design activity can support teachers in translating conceptual knowledge into applied problem-solving and design practices within a productive learning environment.

Keywords: recombinant DNA, biotechnology education, modeling, in-service training, teacher professional development

Decision-Making and Decision-Making Processes in Educational Administration

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Abstract

Decision-making can be defined as one of the fundamental managerial processes that enables individuals, organizations, and educational institutions to achieve their goals. All managerial functions, including planning, organizing, directing, coordinating, and controlling, are directly or indirectly related to the decision-making process. Therefore, decision-making should not be regarded merely as a choice among alternatives, but rather as a multidimensional process that facilitates the achievement of organizational objectives. This study theoretically examines the concepts of decision-making, the stages of the decision-making process, decision-making in organizations, types of decisions, factors affecting decision-making, decision-making styles, decision-making models, and decision-making processes in educational administration. The study first defines the concept of decision-making and explains the main stages of decision-making as a process. Subsequently, the role of decision-making activities within the management process of organizations is evaluated. In this context, types of decisions are discussed in terms of hierarchical position, duration, degree of programmability, number of decision-makers, and level of information. In the following section, decision-making styles are examined through the approaches of Scott and Bruce, Driver, Harren, Kuzgun, and Arroba. The section on decision-making models explains the rational decision-making model, bounded rationality model, intuitive decision-making model, and garbage can model. Finally, decision-making processes in educational administration are evaluated under the subheadings of decision-making in school management, participative decision-making, leadership styles, and data-driven decision-making. Overall, the study concludes that decision-making is not merely an individual preference; rather, it is directly associated with organizational structure, environmental conditions, leadership approaches, information use, and stakeholder participation.

Keywords: Decision-making, decision-making styles, decision-making models, educational administration, school management

An Evaluation of Primary School Teachers' Knowledge and Awareness of Children's Rights

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Abstract

This study will analyse, the knowledge and awareness levels of primary school teachers working in the Nicosia region of Turkish Republic of Northern Cyprus pertaining to children's rights and the United Nations Convention on the Rights of the Child. The study also aims to identify teachers' definitions of children's rights, their views on the fundamental rights of children, their opinions regarding violations of children's rights, the measures they take to protect these rights, and their suggestions for helping children learn their rights more effectively. Children's rights refer to the legal rights recognized to ensure that children, who require care and attention, can develop in a healthy and free manner in physical, cognitive, emotional, and social domains (Taş & Fırat, 2023). Parents and teachers play a significant role in teaching children about their rights. Therefore, it is important to determine the level of knowledge and awareness that primary school teachers have regarding children's rights, in order to educate students who are aware of and mindful of their rights. A qualitative research approach was used in conducting this study. The descriptive research model was chosen from a range of research models. The research participants were 25 primary school teachers working in three primary schools in the Nicosia region during the 2025–2026 academic year. Participants were selected using criterion sampling. The criteria used were: working in the Nicosia region, being a primary school teacher, and volunteering to participate in the research. A semi-structured interview form developed by the researchers was used as the data collection tool in this study. Expert opinions were consulted from two faculty members while preparing the questions included in this form. Data were collected through face-to-face interviews. No audio recordings were made during the interviews. The researchers took notes based on the teachers' responses. The data collected was analysed using content analysis. After identifying codes, themes and frequencies, the findings were presented in tables. The research revealed that teachers have a basic level of knowledge regarding children's rights. However, it was observed that the vast majority of teachers were unaware of the date on which the Convention on the Rights of the Child was signed. Teachers define children's rights as the rights to whom children are entitled. According to the participants, children's rights ensure that children grow up in a healthy, happy and safe manner. The

teachers participating in the study classified the fundamental rights that children should possess as nutrition, shelter, education and health. This indicates that teachers view children's rights as vital necessities. An evaluation of children's rights violated in the school environment revealed that, according to teachers' views, the right to play, the right to education and peer bullying were the most significant violations. In addition, some teachers emphasised the right to equality and noted that it was occasionally violated. The vast majority of teachers who encounter such violations contact the school management and the family directly. The findings further revealed that the most common method used by teachers to protect children's rights is discussing these rights with students. According to the participants, increasing parental awareness is the most important factor in helping children learn their rights more effectively. Teachers particularly emphasized the significant role of families in this process.

Keywords: Children's rights, Convention on the Rights of the Child

The Effect of a Virtual Reality-Supported Cell Laboratory Design Workshop on Biology Preservice Teachers' Instructional Design Skills

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Abstract

Virtual reality (VR) has been increasingly considered a promising educational technology for supporting the learning of abstract and three-dimensional structures, enabling learners to interactively experience complex biological concepts, and addressing some of the limitations associated with traditional laboratory practices (Makransky & Petersen, 2021; Radianti et al., 2020). In biology education, cells and cellular structures constitute important areas in which VR applications may provide particular instructional benefits because their microscopic and three-dimensional characteristics make them difficult to observe and conceptualize directly (Merchant et al., 2014; Potkonjak et al., 2016). However, rather than experiencing VR technology merely as a learning tool, preservice teachers need opportunities to integrate VR into pedagogically meaningful learning environments and design technology-supported laboratory activities (Mishra & Koehler, 2006). The purpose of this study is to investigate the effect of a Virtual Reality-Supported Cell Laboratory Design Workshop on biology preservice teachers' instructional design skills. In the study, preservice teachers will first experience cellular structures and processes through a virtual reality environment and subsequently design laboratory activities for teaching cell-related concepts based on their VR experiences. During the workshop, participants will be expected to identify instructional objectives, develop appropriate laboratory activities, integrate VR applications into the instructional process, and revise their designs based on peer feedback. The laboratory designs developed by the preservice teachers will be evaluated according to criteria including scientific accuracy, pedagogical appropriateness, suitability for the target student level, laboratory safety, and pedagogical integration of virtual reality. The study is expected to contribute to the literature by demonstrating how VR can be used in teacher education not merely as an experiential technology but also as a pedagogical tool that supports preservice teachers in developing original laboratory and instructional designs.