AMERICAN UNIVERSITY OF BEIRUT
FACULTY OF ARTS & SCIENCES
SCIENCE & MATHEMATICS EDUCATION CENTER
DEPARTMENT OF EDUCATION

THE **TWENTY SIXTH** ANNUAL
SCIENCE AND MATHEMATICS EDUCATORS ONLINE CONFERENCE
(SMEC 26)

AI IN SCHOOL MATHEMATICS AND SCIENCE:

EXPLORING OPPORTUNITIES, CHALLENGES, AND ETHICAL CONSIDERATIONS

CONFERENCE PROGRAM

CONFERENCE CHAIR

RABIH EL MOUHAYAR

PROGRAM COMMITTEE

TAMER AMIN
SAOUMA BOUJAOUDE
RABIH EL-MOUHAYAR
ENJA OSMAN
ROLA KHISHFE

APRIL 12, 2025 | ONLINE

PROGRAM AT A GLANCE

SATURDAY APRIL 12, 2025

9:00 - 9:15 AM	**OPENING CEREMONY**
9:30 - 10:30 AM	**PLENARY SESSION 1** MODERATOR: **RABIH EL MOUHAYAR** **CHATGPT AS A BOUNDARY OBJECT BETWEEN SCHOOL AND OUT-OF-SCHOOL MATHEMATICAL PRACTICES: THE CASE OF NUMERACY PRACTICES** **MURAD JURDAK** PROFESSOR EMERITUS, DEPARTMENT OF EDUCATION AMERICAN UNIVERSITY OF BEIRUT
	CONCURRENT INTERACTIVE SESSIONS (DEVELOPMENTAL WORKSHOPS, INNOVATIVE IDEAS, REPORTS OF SCHOOL RESEARCH AND DEVELOPMENT PROJECTS)

Developmental Workshops
11:00 AM - 1:00 PM

TITLE	PRESENTER(S)	AUDIENCE
Mastering AI Tools for Enhanced Teaching and Learning	Hanadi Kassem Saleh	Math and Science All levels
Navigating the Misuse of AI in Math Education: A Workshop for Empowering Responsible Usage	Tahani Yassin Omar Shaaban	Math all levels
Designing Effective Prompts for AI Optimized Science Teaching	Rana Nasser Ahmad Yamout Sally Abo Okdeh	Science All levels

	TITLE	PRESENTER(S)	AUDIENCE
Innovative Idea Sessions 11:00 AM - 12:15 PM	ملامح وأدوار المعلّم والمربي في زمن الرّقمنة	Yana Al Mawla Marwa Saleh	Science all levels
	AI-Powered Math: Differentiating for Success	Fatima Eido Ali Tohme Zaher Abou Khasbeh	Math intermediate and high school
	Ethical Considerations of AI Use in School Mathematics and Science Education	Salam Bouji	Math and Science All Levels
	RESEARCH AND PROJECT REPORT SESSIONS		
11:00 AM - 12:30 PM	**التعليم الدامج والذكاء الاصطناعي - ديسليكسيا غولد** **ZEINA JAFFAL**		
	ELEVATING CALCULUS EDUCATION THROUGH ARTIFICIAL INTELLIGENCE: EMPOWERING EVERY STUDENT **OLA NADIM HALAWI**		
	GENERATION AI IN ARMENIA: NURTURING FUTURE INNOVATORS THROUGH ADVANCED AI EDUCATION **ANUSH AYVAZYAN AND KHATCHIG HRAG DERJIAN**		
1:00 - 2:00 PM	**BREAK**		

CONCURRENT INTERACTIVE SESSIONS

DEVELOPMENTAL WORKSHOPS AND INNOVATIVE IDEA SESSIONS

	TITLE	PRESENTER(S)	AUDIENCE
Developmental Workshops 2:00 - 4:00 PM	Integrating AI in Education: Applications for Science and Math Teachers	Mouhamad Kaymeh Sarah Halabi	Math and Science intermediate and secondary
	AI in Curriculum Design in Mathematics and Science: Investigating curriculum models that blend AI technologies with content and learning	Zakiya Asfour Reem Nassar	Math and Science all levels
	التقييمات المعززة بالذكاء الاصطناعي في التعليم: تحسين نتائج الطلاب في العلوم والرياضيات	سهى علي الديراني زينب حمادي ايمن حسن شداد	Science and Math all levels
Innovative Idea Sessions 2:00 - 3:15 PM	AI as a Resource for Brainstorming Ideas for Inquiry and Problem-Solving in Science and Mathematics	Raefa Abel Al Halim Jomaa	Science and Math All levels
	التعلم النشط وتقنيات الذكاء الاصطناعي: تطبيقات مبتكرة لتدريس الكيمياء	Nida el Riyahi	Science Intermediate and Secondary
	Igniting Science Instruction with AI Tools	Loubna Saab Taghreed Rayess Lamar Sabban	Science Elementary and intermediate

4:00 - 5:00 PM

PLENARY SESSION 2

MODERATOR: **RABIH EL MOUHAYAR**

GENERATIVE AND DEGENERATIVE AI IN SCIENCE AND MATHEMATICS CLASSROOMS: PEDAGOGICAL OPPORTUNITIES AND RESEARCH DIRECTIONS

MOHAMMED ESTAITEYEH

ASSISTANT PROFESSOR, FACULTY OF EDUCATION, BROCK UNIVERSITY, CANADA

ABSTRACTS

PLENARY SESSION 1

9:30 - 10:30 AM

> CHATGPT AS A BOUNDARY OBJECT BETWEEN SCHOOL AND OUT-OF-SCHOOL MATHEMATICAL PRACTICES: THE CASE OF NUMERACY PRACTICES

MURAD JURDAK
AMERICAN UNIVERSITY OF BEIRUT

The presentation explores the theoretical basis and practical potential of ChatGPT in bridging the gap between school-based and out-of-school mathematical practices. Drawing on Cultural Historical Activity Theory and the concept of boundary object, it highlights how ChatGPT can serve as a boundary object to connect these two domains. An analysis of ChatGPT-generated lesson plans, designed to align with out-of-school practices, revealed its strongest impact in the social and institutional relations component of the numeracy practices framework (Street et al., 2005), and its weakest in the values and beliefs component.

DEVELOPMENTAL WORKSHOPS

11:00 AM - 1:00 PM

> MASTERING AI TOOLS FOR ENHANCED TEACHING AND LEARNING

HANADI KASSEM SALEH
OATH OF DISTINCTION, USA

This session is designed to transform teaching and learning through the power of AI. It delves into the world of generative AI tools and prompt engineering, with a special focus on content creation. Participants will discover how to enhance productivity and craft effective prompts to unlock the full potential of AI in educational settings. Key objectives include exploring generative AI tools to gain hands-on experience and understand their applications in education, mastering the essential principles of prompt engineering to create impactful and efficient prompts, and utilizing AI tools to effortlessly develop lesson plans, assessments, and other educational materials. Practical strategies for incorporating AI into daily teaching practices and administrative tasks will be offered, ultimately streamlining workflows and boosting efficiency. This is an opportunity to stay ahead in the evolving landscape of education with cutting-edge AI technology.

> NAVIGATING THE MISUSE OF AI IN MATH EDUCATION: A WORKSHOP FOR EMPOWERING RESPONSIBLE USAGE

TAHANI YASSIN, OMAR SHAABAN
LEBANESE INTERNATIONAL SCHOOL, LEBANON

Artificial intelligence (AI) is transforming math education by providing tools that enhance problem-solving and personalized learning. However, students often misuse these tools, such as ChatGPT and Photomath, to bypass understanding mathematical concepts. This workshop addresses this critical issue by equipping educators with strategies to guide students toward ethical and effective AI usage. Participants will explore the development of AI-augmented assignments, effective prompt design, and methods for evaluating AI-generated outputs. The session will also emphasize creating ethical guidelines to foster accountability and deeper understanding in students. Through live demonstrations, interactive activities, and case studies, educators will learn practical ways to balance AI's benefits with the need for critical thinking and conceptual learning. By the end of the workshop, participants will have actionable strategies to integrate AI responsibly into their teaching, ensuring that students harness AI as a tool for exploration rather than a shortcut for completion. This session empowers educators to prepare students for a technology-driven future while safeguarding the integrity of their mathematical education.

> DESIGNING EFFECTIVE PROMPTS FOR AI-OPTIMIZED SCIENCE TEACHING

RANA NASSER, SALLY ABOU OKDEH, AHMAD YAMOUT,
BEIRUT ANNUNCIATION ORTHODOX COLLEGE, LEBANON

The workshop “Designing Effective Prompts for AI-Optimized Science Teaching” empowers educators to tackle artificial intelligence's (AI) transformative potential in their classrooms. With the emergence of AI systems that can help with content delivery, lesson planning, and personalized learning, the effectiveness of cues given to these tools is valuable for boosting student engagement, critical thinking, and inquiry-based learning. Implementing AI in learning is essential for preparing students with 21st-century skills. AI is increasingly integrated into daily life, with applications in research, industry, and communication. For educators, understanding AI’s role ensures they remain at the forefront of innovative teaching practices. This workshop equips educators with skills and strategies to create prompts that efficiently direct AI in providing individualized science instruction, aligning with grade-specific standards and curriculum objectives. Additionally, teachers will learn to assess and modify AI-generated outputs, ensuring accessibility and inclusion for all students. AI is a powerful tool that supports teachers but does not replace them; the educator’s primary role—to foster ethical judgment, creativity, and human connection—remains crucial. While AI streamlines tasks and enhances learning, teachers guide critical thinking and emotional growth. Through interactive dialogues, authentic classroom scenarios, and collaborative activities, educators will gain hands-on experience in developing effective prompts. The workshop also addresses issues such as bias and accuracy, providing solutions for successful AI integration. By the end, teachers will confidently incorporate AI into their instruction, enhancing learning while maintaining their irreplaceable role.

INNOVATIVE IDEA SESSIONS

11:00 AM - 12:15 PM

< ملامح وأدوار المعلّم والمربي في زمن الرّقمنة

يانا المولى، مروى صالح
مؤسسة الهادي للإعاقة السمعية والبصرية وإضطرابات اللغة والتواصل

الإضاءة على قدرات التّلامذة في الحلقة الثّالثة والثّانوي، معرفتهم وانخراطهم المتسارع في العالم الرّقمي ممّا يحتّم تحوّل جديد في دور وملامح المعلّم والمربي. إثارة الوعي عند معلّمي ومربّي المبرات في الحلقة الثّالثة والثّانوي، حول فهم ماهية التّحول الرّقمي وأثره على التّعليم بهدف تحفيز دافعيتهم لمواكبة عصر الذّكاء الإصطناعي.

> AI-POWERED MATH: DIFFERENTIATING FOR SUCCESS

FATIMA EIDO, ALI TOHME, ZAHER ABOU KHASHBEH
SAINT MARY’S ORTHODOX COLLEGE, LEBANON

This professional development training session focuses on equipping Intermediate and Secondary Math teachers with the knowledge and skills to effectively differentiate instruction in their Mathematics classrooms. Participants will explore the principles of differentiated instruction, including assessing learners’ needs, differentiating content, process, and product, and utilizing technology to support diverse learners. Through interactive lectures, group activities, and hands-on workshops, teachers will develop and implement differentiated lesson plans tailored to the unique needs of the learners. This training aims to enhance teacher effectiveness, increase learners’ engagement and motivation, and ultimately improve learners’ achievement in Mathematics.

> ETHICAL CONSIDERATIONS OF AI USE IN SCHOOL MATHEMATICS AND SCIENCE EDUCATION

SALAM BOUJI
MAKASSED ISLAMIC HIGH SCHOOL – SAIDA, LEBANON

As artificial intelligence (AI) becomes more integrated into educational practices, schools are faced with new challenges, particularly in subjects like mathematics and science. This workshop will focus on the ethical considerations of using AI in these fields, examining both the opportunities and potential risks that come with incorporating AI tools into the classroom. It is important to understand how AI can enhance learning experiences, but equally crucial to address the concerns around privacy, fairness, and the impact of AI on students' educational journeys. Throughout the session, participants will explore the challenges schools encounter, such as providing adequate teacher training, ensuring equity in access to AI resources, and navigating the complexities of data privacy and security. The discussion will also cover the possible consequences of not using AI responsibly, including bias in algorithms and the digital divide between schools with different levels of resources. The workshop will provide practical solutions for overcoming these challenges, offering strategies for schools to implement AI in a way that is both ethical and effective. Educators will gain valuable insights into how to approach AI integration thoughtfully, balancing innovation with responsibility. By the end of the session, participants will be equipped with the knowledge to make informed decisions about AI use in their schools and create a fairer, more inclusive learning environment for all students.

RESEARCH SESSIONS

11:00 AM - 12:30 PM

> التعليم الدامج والذكاء الاصطناعي - ديسليكسيا غولد

زينة محمد علي جفال
جمعية المبرات الخيرية -ثانوية الكوثر ,لبنان

يتناول البحث تأثير استخدام الذكاء الاصطناعي على التعليم الدامج، مع التركيز على استخدام أدوات الذكاء الاصطناعي لتحسين تجربة التعليم الدامج. يبدأ العرض بمقدمة قصيرة تعرّف الذكاء الاصطناعي كنظام قادر على أداء مهام معقدة تشبه التفكير البشري حيث يتميز الذكاء الاصطناعي بقدرته على التعلّم من البيانات وتحليل الأنماط، ما يساهم في تحسين التدريس وتوفير بيئات تعليمية دامجة. سيتم استعراض أدوات الذكاء الاصطناعي التي تدعم نذكر منها الات التسجيل (hardware) التعليم الدامج، والتي تندرج ضمن فئة التكنولوجيا المساعدة وهي تقسم الى مجموعتين أساسيتين هما: الأجهزة التي نذكر منها: أدوات الكتابة، مدققات القواعد، وأنظمة تحويل النصوص إلى كلام والعكس. اما ما سيسلط البحث الضوء عليه(software) والبرمجيات المصمم لدعم الطلاب ذوي الاحتياجات الخاصة الذين يعانون من عسر "Dyslexia Gold"، فهو تجربة ثانوية الكوثر للعام الدراسي ٢٠٢٤-٢٠٢٥ مع برنامج القراءة. يقدم البرنامج اختبارات تقييم تلقائية تشمل القراءة، التهجئة، وسرعة القراءة، ويعتمد على جلسات أسبوعية لتحسين أداء التلاميذ حيث تقوم كل جلسة، بمساعدة الذكاء الاصطناعي، بتتبع تقدم التلميذ وتوثيقه والانتقال به من مرحلة إلى أخرى في كل مجال بحسب تطوره فيه. كما سيقدم هذا البحث نتائج تجريبية لاستخدام الذكاء الاصطناعي في الصفوف الدامجة وسنُناقش هذه النتائج خلال المؤتمر، مع استعراض تأثير البرنامج على تحسين مهارات الطلاب وزيادة الثقة والمشاركة. من المتوقع أن يوفر البحث رؤى قيّمة حول دور الذكاء الاصطناعي في تحقيق تعليم دامج أكثر.

> ELEVATING CALCULUS EDUCATION THROUGH ARTIFICIAL INTELLIGENCE: EMPOWERING EVERY STUDENT

OLA NADIM HALAWI
AHLIAH SCHOOL, LEBANON

This study examines the integration of artificial intelligence (AI) into calculus education, emphasizing its transformative impact on classroom dynamics, pedagogy, and student learning outcomes. Traditional challenges in teaching calculus—such as abstract concepts and limited personalized support—are addressed through innovative AI tools that offer adaptive learning experiences, real-time feedback, and interactive visualizations.
Specific AI tools, including MathGPT, Microsoft Math Solver, Gemini, Symbolab, Photomath, and Wolfram Alpha, are explored for their role in deepening students' understanding of key concepts like derivatives and rates of change. These tools act as virtual tutors, enabling continuous interaction and facilitating problem-solving exercises with precision and conceptual clarity through well-designed prompts.
Drawing from classroom case studies, this study highlights the opportunities AI presents—such as enhanced engagement and improved conceptual understanding—while also addressing challenges like accessibility barriers and potential over-reliance on technology. Practical strategies are proposed to mitigate these obstacles, emphasizing a balanced approach that integrates AI with traditional teaching methods.
Additionally, this study introduces a novel framework for refining AI prompts and interactions, underscoring the importance of iterative improvement in enhancing the quality of AI feedback. This approach fosters stronger problem-solving skills and ensures a comprehensive understanding of mathematical concepts. The findings illustrate AI's potential to revolutionize calculus instruction, providing educators with a roadmap for enriching their teaching practices in an era of evolving technological advancements.

> GENERATION AI IN ARMENIA: NURTURING FUTURE INNOVATORS THROUGH ADVANCED AI EDUCATION

ANUSH AYVAZYAN, KHATCHIG-HRAG DERJIAN
FOUNDATION FOR ARMENIAN SCIENCE AND TECHNOLOGY, ARMENIA

The Generation AI High School Project represents the foundational stage of a national pipeline initiative aimed at nurturing future AI innovators and leaders. Developed by the Foundation for Armenian Science and Technology (FAST) in collaboration with the Ministry of Education, Science, Culture, and Sports of Armenia, the program is fully integrated into the public education system, providing free and equitable access to advanced math and AI education. During its pilot phase, the program has directly engaged 540 students, 61 teachers, and specialists across 15 schools in 7 regions of Armenia.
Grounded in active learning, project-based learning (PBL), and competency-based education theories, the program delivers a three-year curriculum encompassing Advanced Algebra, Python programming, and advanced AI topics like Machine Learning (ML) and Deep Learning (DL). This rigorous curriculum combines 760 hours of formal academic learning with 500 hours of additional project-based activities, fostering both academic excellence and practical application.
The first-year evaluation demonstrates significant outcomes: 51% of students improved knowledge levels, with Generation AI students outperforming peers in advanced math exams and sustaining high levels of interest in mathematics. The program fosters a positive learning environment, enhances teacher-student dynamics, and aligns closely with students' career aspirations.
Supported by government collaboration and a Public-Private Partnership (PPP) model, the program introduces systemic innovations, including hybrid teaching methodologies, long-term teacher capacity building and support, driving school reform, and setting a replicable standard for STEM and AI education worldwide.

DEVELOPMENTAL WORKSHOPS

2:00 - 4:00 PM

> INTEGRATING AI IN EDUCATION: APPLICATIONS FOR SCIENCE AND MATH TEACHERS

MOUHAMMAD KAYMEH, SARAH HALABI
LEBANESE INTERNATIONAL SCHOOL LEBANON - BEIRUT

The workshop aims to equip educators with essential strategies for integrating Artificial Intelligence (AI) into their teaching practices. Key components include: • Adaptive Learning: Participants will explore AI tools that personalize learning by adjusting content based on individual student performance, creating personalized learning experiences for different needs. This approach utilizes real-time data to enhance engagement and effectiveness in learning environments. • Automated Assessment: The workshop will cover the implementation of AI-driven grading systems that streamline assessment processes. These systems not only provide timely feedback to students but also ease the administrative workload for teachers, allowing them to focus more on instruction and student interaction. By addressing these strategies, the workshop seeks to empower educators to enhance their teaching methodologies and improve student learning outcomes through the effective use of AI.

> AI IN CURRICULUM DESIGN IN MATHEMATICS AND SCIENCE: INVESTIGATING CURRICULUM MODELS THAT BLEND AI TECHNOLOGIES WITH CONTENT AND LEARNING

ZAKIYA ASFOUR, REEM NASSAR
SCIENCE DEPARTMENT, MAKASSED ISLAMIC HIGH SCHOOL – SAIDA, LEBANON

Artificial Intelligence (AI) is increasingly recognized as a transformative tool in education, particularly in mathematics and science. One of the most important aims of integrating AI technologies is to enhance student engagement and understanding by providing adaptive, personalized learning experiences. AI-based tools not only analyze complex data but also support learners in problem-solving, critical thinking, and conceptual understanding. The main purpose of this presentation is to explore how AI technologies can enhance traditional teaching methods to create a more personalized, interactive, and effective learning experience. By combining AI tools with curriculum content, educators can address diverse student needs and optimize learning outcomes. Besides, some prepared activities will include practical demonstrations using AI tools such as ChatGPT and Eduaide. These tools showcase how educators can create personalized learning paths, generate teaching materials, and provide instant feedback to students. Examples will highlight Personalized Learning Paths, where AI analyzes students' strengths and weaknesses to adjust topics, and Adaptive Learning Tools, which offer real-time feedback and explanations. Additionally, AI-Assisted Assessment enables automated grading and pattern recognition to help educators identify struggling students and tailor their methods. Finally, Interactive Content powered by AI facilitates simulations and experiments, making complex scientific concepts easier to grasp. Solutions and ideas will be distributed to participants to work on, solve, and refine during the workshop, with an opportunity to share their work and insights in a concluding session.

> استغلال قوة الذكاء الاصطناعي في التعليم : دور الذكاء الاصطناعي في محكات العملية التعليمية و التعلمية

سهى علي الديراني – أيمن شداد
ثانوية الإمام الجواد

في عصر التكنولوجيا المتسارع، تقدم هذه الورشة رؤية مبتكرة حول كيفية استخدام أدوات الذكاء الاصطناعي في التقييمات التعليمية، لتحدث ثورة في تحسين نتائج الطالب في مجالات العلوم والرياضيات. سوف تستكشفون استراتيجيات ديناميكية تشمل تقديم تغذية راجعة تعزيزية تصحيحية فورية ودقيقة، تصحيح الأعمال تلقائيًا بكفاءة عالية، وتحليل البيانات بذكاء لتحديد الفجوات التعليمية. تتضمن الورشة أنشطة تفاعلية تُظهر كيفية تحميل إجابات الطالب لتحليلها بشكل فوري، مع تقديم تغذية راجعة تنير مسار التعلم وتصحح المفاهيم الخاطئة في لحظتها. سنستخدم أدوات تصحيح تلقائي تلتقط الأخطاء وتصححها بدقة، مما يمنح المعلمين الوقت للتركيز على ما هو أكثر أهمية - تطوير مهارات ومعارف الطالب. بالإضافة إلى ذلك، سنستخدم أدوات تحليل البيانات الاستخلاص رؤى عميقة حول أداء الطالب، مما يساعد في تصميم خطط تعليمية مخصصة تسد الفجوات وتحقق التفوق الأكاديمي. هذه الورشة ليست مجرد جلسة تعليمية، بل هي تجربة تحويلية تدعمها أبحاث ودراسات حديثة تؤكد فعالية الذكاء الاصطناعي في التعليمو التعلم. تشمل المراجع كتاب "تعليم المستقبل: دور الذكاء الاصطناعي في التعليم" للدكتور أحمد يوسف، ومقال "تحسين التقييمات التعليمية باستخدام الذكاء الاصطناعي" من مجلة التعليم الذكي لعام ٢٠٢٣. نطمح من خلال هذه الورشة إلى تزويد المعلمين بأدوات ونصائح عملية يمكن تطبيقها فورًا في الفصول الدراسية، مما يخلق تجربة تعليمية فعّالة وممتعة ترتقي بمستوى الطالب وتحقق طموحاتهم الأكاديمية. "الذكاء الاصطناعي هو الأداة الأكثر تأثيرًا التي اخترعها البشر على الإطلاق. يمكنه المساعدة في حل العديد من المشكلات التي يواجها العالم اليوم" - جيفري هينتون، أحد رواد مجال الذكاء الاصطناعي.

INNOVATIVE IDEA SESSIONS

2:00 - 3:15 PM

> AI AS A RESOURCE FOR BRAINSTORMING IDEAS FOR INQUIRY AND PROBLEM-SOLVING IN SCIENCE AND MATHEMATICS

RAEFA JOMAA
MAKASSED ISLAMIC HIGH SCHOOL – SAIDA, LEBANON

Artificial Intelligence (AI) is revolutionizing inquiry-based learning and problem-solving in science and mathematics. This workshop explores how AI tools, such as ChatGPT, can enhance the brainstorming process by generating diverse perspectives and innovative ideas, fostering critical and creative thinking among students. While AI can provide initial suggestions and solutions, the focus remains on empowering students to analyze, refine, and independently solve problems. Participants will engage in interactive activities showcasing how AI supports creative thinking and inquiry. These activities will involve generating ideas with AI, exploring various approaches to scientific and mathematical challenges, and reflecting on potential outcomes. By experiencing the capabilities of AI firsthand, participants will gain insight into how these tools can be integrated into their classrooms to enhance students' problem-solving skills. Moreover, the workshop emphasizes the importance of balancing AI's support with the development of students' independent analytical abilities. Through collaborative discussions, participants will share their experiences and strategies for using AI to enrich the learning process, considering its potential to inspire curiosity and innovation in the classroom. This workshop demonstrates that while AI is a powerful tool for brainstorming and problem-solving, its greatest value lies in complementing and enhancing students' critical thinking and creativity. Attendees will leave with practical ideas for leveraging AI to create engaging, inquiry-based learning environments in science and mathematics.

> التعلم النشط وتقنيات الذكاء االصطناعي: تطبيقات مبتكرة لتدريس الكيمياء

نداء الرياحي
مدارس العصرية الأردن

تستعرض الجلسة كيفية دمج الذكاء الاصطناعي مع التعلم النشط في مناهج العلوم عامةً، وفي الكيمياء خاصةً، لتحسين طرائق التدريس. لذا، تهدف الجلسة إلى تعزيز فهم المفاهيم الكيميائية باستخدام أدوات محاكاة تفاعلية، وتطوير مهارات التفكير التحليلي وحل المشكلات. تتضمن الجلسة أنشطة تفاعلية ومناقشات جماعية، بالإضافة إلى دليل عملي لتطبيق الاستراتيجيات في الصفوف الدراسية. كما تقدم الجلسة نموذجًا عمليًا من خلال الدمج بين التعلم النشط والذكاء الاصطناعي، مما يمكّن المعلمين من استخدام تقنيات الذكاء الاصطناعي بشكل مبتكر لتحفيز الطلبة وتعزيز استعدادهم لمستقبل مليء بالتحديات.

> IGNITING SCIENCE INSTRUCTION WITH AI TOOLS

LOUBNA SAAB, TAGHREED RAYESS, LAMAR SABBAN
SAINT MARY'S ORTHODOX COLLEGE, LEBANON

This professional development session focuses on enhancing Science instruction through the integration of differentiated instruction and AI tools. Participants will explore the principles and practices of differentiated instruction, including strategies for assessing learners' needs and creating personalized learning experiences. The session will discuss the effective use of AI tools such as AI-powered learning platforms, educational chatbots, and intelligent tutoring systems to differentiate content, process, and product in Science classrooms. Through hands-on activities, case studies, and collaborative discussions, participants will develop practical strategies for implementing differentiated instruction with AI in their own teaching contexts. This session aims to equip Science educators with the knowledge and skills necessary to create more engaging, equitable, and effective learning experiences for all learners.

PLENARY SESSION 2

4:00 - 5:00 PM

> GENERATIVE AND DEGENERATIVE AI IN SCIENCE AND MATHEMATICS CLASSROOMS: PEDAGOGICAL OPPORTUNITIES AND RESEARCH DIRECTIONS

MOHAMMED ESTAITEYEH
FACULTY OF EDUCATION, BROCK UNIVERSITY, CANADA

This plenary session explores the dual nature of AI in science and mathematics classrooms, highlighting its generative benefits and degenerative risks. It examines the pedagogical opportunities afforded by AI-powered tools, such as intelligent tutoring systems and adaptive assessment platforms, particularly in supporting differentiated instruction and personalized learning. At the same time, it critically addresses challenges associated with their adoption, including ethical concerns and the unexplored, long-term implications for teachers and students. This presentation will engage both educators and researchers, offering practical strategies for classroom implementation alongside insights into future research directions.