



The Twenty First Annual Science and Mathematics Educators Conference

Department Of Education,
Faculty Of Arts And Sciences
American University Of Beirut

SMEC 21

**TEACHING AND LEARNING
SCIENCE AND MATHEMATICS IN
MULTILINGUAL CLASSROOMS
COURS MULTILINGUES**

صفوف متعددة اللغات

CONFERENCE
PROGRAM

MARCH
9th, 2019

FOR MORE INFORMATION VISIT:

<http://website.aub.edu.lb/fas/smec/Pages/SMEC-21.aspx>

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The SMEC 21 Conference Committee wishes to thank the following persons, organizations, and companies, all of whom contributed significantly to the organization of this year's conference, in no particular order:

Nadia El Cheikh, Dean, Faculty of Arts & Sciences

Saouma BouJaoude, Associate Dean, Faculty of Arts & Sciences

Tamer Amin, Chair, Department of Education

Fady Maalouf, Modern Community School

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AUB students who volunteered to serve as ushers

SMEC 21 MISSION STATEMENT

The SMEC Conference is an annual event designed to promote the continued development of a professional community of mathematics and science educators across Lebanon and throughout the region. Specifically, the conference aims to:

- Provide an intellectual and professional forum for teachers to exchange theoretical and practical ideas regarding the teaching and learning of mathematics and science at the elementary, intermediate, and secondary levels
- Provide a forum for teacher educators and researchers to share their findings with science and mathematics teachers with a special emphasis on the practical classroom implications of their findings
- Provide an opportunity for science and mathematics teachers to interact with high-caliber science and mathematics education professionals from abroad
- Contribute to the ongoing development of a professional culture of science and mathematics teaching at the school level in Lebanon and in the region
- Raise awareness of science and mathematics teachers about the array of curriculum and supplemental classroom materials available to them through publishers and local distributors

IMPORTANT INFORMATION

IMPORTANT NOTE ABOUT ATTENDING SESSIONS: Attendance in all sessions is on a **first come first served basis except for those sessions designated as “Limited Enrolment” sessions.** In the case of Limited Enrolment sessions please sign up at the registration desk during the registration period or during the first coffee break. If a session is full please go to other sessions. Also plan what sessions you want to attend beforehand with alternative sessions in case the first one you choose is full.

PUBLISHERS’ EXHIBIT: You are encouraged to visit the publishers’ exhibit located in West Hall, Common Room **at any time** during the Conference. Representatives from all the companies will be available to meet with you, answer your questions, and show materials from their respective companies.

MEDICAL EMERGENCIES: If you have a medical emergency, go immediately to the West Hall entrance and contact someone at the registration desk for assistance.

LOST & FOUND ITEMS: If you find a lost item, please give it to an usher or SMEC Committee member or bring it to the Lost & Found in the SMEC office, Fisk Hall 241. If you lose something, check in the Lost & Found to see if it has been turned in.

PARTICIPANT CERTIFICATES: Each participant will receive a certificate of participation. Certificates can be picked up at the registration table in West Hall **at the end of the Conference** on Saturday, March 9th, 2019 (**not before 4:45 pm**) or anytime during the week following the conference from the SMEC office, Fisk Hall 241. It is preferred if the designated contact person for the school picks up all the certificates for his/her school at one time.

AUB USHERS: Ushers are available to answer your questions or help you find locations of conference events. They are identifiable by their name badges and by their red vests that say “AUB Guides.”

REGISTRATION/CHECK-IN TIMES

March 9, 2019: Registration begins at 8:00 am, West Hall Entrance.

PUBLISHERS' EXHIBIT

March 9, 2019: 10:00 am – 4:00 pm, West Hall, Common Room

SMEC 21 has the pleasure to welcome the following publishing, distribution and other companies and their representatives:

Librairie Du Liban

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**SMEC 21 CONFERENCE PROGRAM AT-A-GLANCE
SATURDAY MARCH 9, 2019**

10:00 am ▶ 4:00 pm	PUBLISHERS' EXHIBIT (COMMON ROOM, WEST HALL)	
8:00 ▶ 8:45 am	CONFERENCE REGISTRATION (WEST HALL ENTRANCE)	
8:45 ▶ 9:15 am	OPENING CEREMONY (ASSEMBLY HALL)	
	PLENARY SESSIONS	
9:15 ▶ 10:30 am	SCIENCE	MATHEMATICS
	Assembly Hall	Bathish Auditorium, West Hall
	Talking Science: Teaching and Learning Science In Multilingual Classrooms in South Africa	Language Diversity in Mathematics Classrooms – Empirical Findings and Language-responsive Teaching Approaches
	<i>Audrey Msimanga, School of Education at Sol Plaatje University in Kimberley, South Africa</i>	<i>Susanne Prediger, Institute for Development and Research in Mathematics Education, Technical University of Dortmund, Germany</i>
10:30 ▶ 11:00 am	COFFEE BREAK (Common Room, West Hall)	
	Research and Project Report Sessions, Auditorium A	
11:00 am ▶ 1:00 pm	<p align="center">11:00 ▶ 11:30 am</p> <p align="center">Analyzing Plans of Localizing Professional Development of the Ministry of Education in Kuwait Based on TPACK Model <i>Fatimah Al Hashem</i></p> <p align="center">11:30 am ▶ 12:00 pm</p> <p align="center">Effect of ICT on Elementary Students' Reasoning & Communication Skills in Science at Lebanese Private Schools <i>Layal Omar Temsah</i></p> <p align="center">12:00 ▶ 12:30 pm</p> <p align="center">Influence of an Academic Intervention about Literal Symbols on Students' Performance (at Seventh and Eighth Grade Levels) <i>Manal Kiwan</i></p> <p align="center">12:30 ▶ 1:00 pm</p> <p align="center">مقارنة تعليم العلوم والرياضيات باللغة الأجنبية في الحلقة الثانية من التعليم الأساسي مع تعليمها باللغة العربية: تجربة ثانوية الكوثر فاطمة قبيسي، أماني الحاج</p>	

SMEC 21 CONFERENCE PROGRAM AT-A-GLANCE SATURDAY MARCH 9, 2019

Concurrent Interactive Sessions (Developmental Workshops and Innovative Idea Sessions)

Developmental Workshops	Title	Presenter(s)	Audience	Room
11:00 am ▶ 1:00 pm	Integrating Scratch Software in Triangles in Cycle 2 Math Classes	<i>Bassam El Hajj Ali & Iman Osta</i>	Math Upper Elementary	Fisk 208 (limited enrolment)
	Concept Items	<i>Houssam Kasti</i>	Math Secondary	Nicely 322
	Mathematics in Everyday Life	<i>Amin Dinnawi & Hasan Dinnawi</i>	Math Intermediate & Secondary	Nicely 325
	Using Seesaw For 6 th - 12 th Grade	<i>Seifedine Kadry</i>	Math & Science-Intermediate & Secondary	Fisk 204A (limited enrolment)
	A New Interactive Digital e-Learning Tool to Promote Grade 9 and Grade 12 Student Understanding of Math and Physics	<i>Ramzi Ataya & Daoud El Gharib</i>	Math & Physics (English & French) Grade 9 & Grade 12	Fisk 102 (limited enrolment)
	Middle Years Program (MYP): A Promising Inquiry Approach in Education	<i>Farah Abed Ali & Reem Halawi</i>	Science All Levels	Fisk 104
	Science Thinkers: PBL in Science Classroom	<i>Amina Maatouk</i>	Science Elementary & Intermediate	Nicely 103
	Creating a Constructive Communication in a Science Class	<i>Roweida Bawab & Sarwa Al Akkad</i>	Science Intermediate & Secondary	Nicely 108

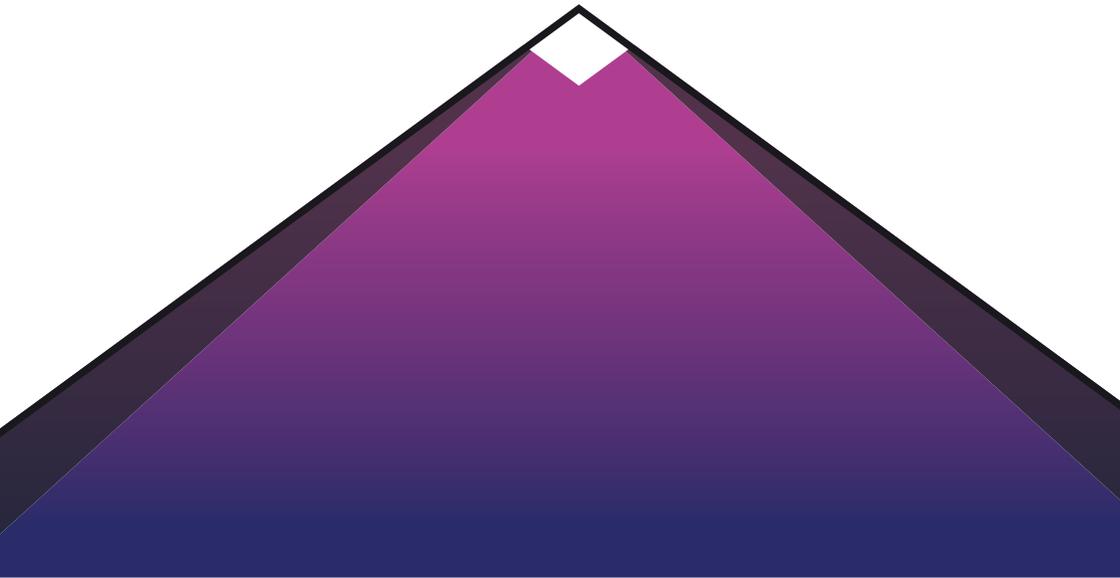
**SMEC 21 CONFERENCE PROGRAM AT-A-GLANCE
SATURDAY MARCH 9, 2019**

Innovative Idea Sessions	Title	Presenter(s)	Audience	Room
11:30 am ▶ 12:45 pm	Will It Crack? A STEM Project Based Learning Activity	<i>Rayya Younes & Maya Antoun & Sara Salloum</i>	Math & Science Upper Elementary, Intermediate & Secondary	Nicely 323
	i Student – i Teacher	<i>Mirna Faour & Ali Reda & Ahmad Hammoud</i>	Math & Science Intermediate & Secondary	Fisk (102) (limited enrolment)
	صغار القصص تعلم الرياضيات	نور المصري و فاطمة جمعة	Math Kindergarten & Lower Elementary	Nicely 107
	A Website Teacher: JITT: Just in-time-teaching	<i>Abir El Darwish</i>	Science Intermediate & Secondary	Nicely 101
1:00 ▶ 2:00 pm	LUNCH (AUB Cafeteria, Ada Dodge Hall) (With Pre-paid Vouchers Only)			
	PLENARY SESSIONS			
2:00 ▶ 3:15/3:30 pm	MATHEMATICS Auditorium A (Arabic) School Mathematics Discourse as Communication <i>Jehad Alshwaikh</i> <i>Birzeit University, Palestine</i>	SCIENCE Bathish Auditorium The Secret Life of Plants: Documentary Screening and Introduction to AUB as a Botanic Garden <i>Tamer Amin & AUBotanic,</i> <i>American University of Beirut (90 MIN.)</i>		
3:15 ▶ 3:45 pm	COFFEE BREAK (Common Room, West Hall)			

SMEC 21 CONFERENCE PROGRAM AT-A-GLANCE SATURDAY MARCH 9, 2019

Concurrent Interactive Sessions (Developmental Workshops and Innovative Idea Sessions)				
	Title	Presenter(s)	Audience	Room
Developmental Workshops 3:45 ▶ 5:45 pm	Coding with Scratch	Rana Kaoury	Math Intermediate	Fisk 208 (limited enrolment)
	هيك أجلي (رياضيات)	رندا فضل الله وإخلاق حمّود	Math Elementary	Nicely 101
	Sciences Through Minecraft and Micro:Bit	Sara Abou Afach & Tarek El Basha	Science All levels Chemistry Teachers & Coordinators	Fisk 204 A (limited enrolment)
	Action Verbs; Route to Critical Thinking!	Zeina Merhi	Science All levels	Nicely 107
	Semiotic Modalities in Teaching: Going Beyond the Norm	Hanadi Hammoud	Science Intermediate & Secondary	Nicely 103
	Entrepreneurship Education in the Classroom, A Step towards Education 2030	Jinan Karameh Shayya	Science Intermediate & Secondary	Nicely 323
		Title	Presenter(s)	Audience
Innovative Idea Sessions 3:45 ▶ 5:00 pm	Thinking of Mathematics as Communication	Samia Henaine	Math Elementary	Fisk 104
	Representations as Tools for Thinking in a Problem Solving Context	Rana Aboul Hosn	Math Elementary & Intermediate	Nicely 318
	Rendre l'enseignement interactif et attrayant	Andree Chaoui	Science Elementary & Intermediate	Nicely 108
	My Mother's Sphygmomanometer	Fouad Bakkar	Science All Levels	Nicely 325 (limited enrolment)

ABSTRACTS



PLENARY 1 - SCIENCE

(9:15 ▶ 10:30 AM)

Talking Science: Teaching and Learning Science in Multilingual Classrooms in South Africa

Audrey Msimanga, School of Education,
Sol Plaatje University in Kimberley, South Africa

Research globally shows that for many English Additional Language Learners (EALs) language remains a critical factor in performance in science subjects and subsequent uptake of STEM careers. Some researchers argue that learning science is like learning a new language, the language of science. EALs learn this (new) language of science in a second or additional language, which in most cases they are not proficient in. Thus, for EALs learning science is not just a conceptual task but a linguistic one as well. While there has been extensive research to understand the challenges of EALs learning science, there is very little practice-based evidence on teaching and learning strategies that enable EALs to navigate both the conceptual and linguistic borders during science teaching and learning. Where it exists, the findings of such research have not found their way into teacher education programmes to help prepare teachers to teach science effectively in contexts of linguistic diversity. I will draw from emerging findings from the Language in Science Project (LiSP) that has been running in one of the provinces of South Africa since 2014 to explore whether and how research can empower teacher education to prepare science teachers to be able to mobilise the linguistic resources of their teaching and learning contexts to maximise student access to and success in science subjects.

PLENARY 2 - MATHEMATICS

(9:15 ▶ 10:30 AM)

Language Diversity in Mathematics Classrooms - Empirical Findings and Language - Responsive Teaching Approaches

Susanne Prediger, Institute for Development
and Research in Mathematics Education,
Technical University of Dortmund, Germany

Achievement gaps between monolingual and multilingual students or between students of high and low socio-economic status can be explained by language gaps. That means, students with high academic language proficiency outperform their less proficient peers. Thus, for increasing equity, language diversity of math and science classrooms should be taken into account. The talk presents empirical findings for explaining the language gap and language-responsive teaching approaches which have been shown to be effective for fostering language learners' mathematics learning.

PLENARY 3 - MATHEMATICS

(2:00 ▶ 3:15 PM)

(Arabic) School Mathematics Discourse as Communication

Jehad Alshwaikh, Birzeit University, Palestine

In the last two decades, researchers have increasingly studied communication in mathematics discourse. The scholarship has focused on language but recently has expanded to include other forms of communication, including visuals (pictures, diagrams, graphs) and gestures. There is little research, however, about communication in Arabic mathematics discourse. By focusing on the Arabic language, my goal in this talk is to show that what we say, write and do in mathematics lessons matters. The talk consists of two parts. First, I will explore communication of mathematics. I will address questions such as: How is mathematics presented in Arabic mathematics discourse, for example in textbooks and teachers' words?; and What role(s) does such communication suggest for learners of mathematics? I use social semiotics as a theoretical lens to analyse mathematics as a communicative discourse in which different forms (modes) such as language and diagrams are used to represent mathematics. I share some examples and results from my research in the Palestinian context. Second, I will address multilingualism in (Arabic) mathematical discourse, in which I explore the impact of the two linguistic forms (written and spoken) on teaching and learning mathematics. Furthermore, I reflect on challenges that we face as researchers in mathematics education, such as the issue of translation from English into Arabic. I finish with a reflection on this research journey (so far) and what will come next.

PLENARY 4 - SCIENCE

(2:00 ▶ 3:30 PM)

The Secret Life of Plants: Documentary Screening and Introduction to AUB as a Botanic Garden

Tamer Amin & AUBotanic, American University of Beirut

AUB has recently been designated as a botanic garden to showcase, preserve and enhance the educational opportunities of its large collection of plant species. In this session, participants will be introduced to the AUBotanic initiative and the educational activities that are being organized that schools can take advantage of. In addition, there will be a screening of the documentary film "Solving the Secrets," Part 2 of the "Kingdom of Plants" series prepared and presented by the world-renowned naturalist Sir David Attenborough. In this documentary, with the aid of sophisticated visual effects, he describes the secrets of plant movement and scent, hidden links with the world of insects, and even a specimen that has "the power of mind control."

RESEARCH AND PROJECT REPORT SESSIONS

(11:00 AM ▶ 1:00 PM)

Analyzing Plans of Localizing Professional Development of the Ministry of Education in Kuwait Based on TPACK Model

Fatimah M. Al Hashem, GUST University, Kuwait

In current thinking the professional development of teachers is viewed as a continuum process that needs to contain content, pedagogical and technological knowledge. As The State of Kuwait Shifted the national curriculum to be based on competency based curriculum, top to down training system was designed by the supervisors and the World Bank as induction training program to support and aid teachers to adopt to the new curriculum. Descriptive analysis as well as qualitative approach were used to analyze the process of localizing training in public schools of Kuwait based on TPACK model. This research, with its analyses and recommendations, will be the first step towards the provision of a roadmap for the career-long professional development of teachers in Kuwait and a basis for the formulation of policies on which a Teacher Education Strategy and a National Teacher Framework can be built.

Effect of ICT on Elementary Students' Reasoning & Communication Skills in Science at Lebanese Private Schools

Layal Omar Temsah, Saint Joseph University, Beirut, Lebanon

With the outbreak of the new technology era and the emergence of multiple technological tools such as active boards, mobile devices and tabs for teaching science, the effectiveness and appropriateness of these tools are yet questionable. Students' performance in science, especially in the Arab world, is still unsatisfactory as shown by the TIMMS results of 2007 and 2011. In Lebanon, it was interesting to understand what was being done in schools to improve students' outcomes prior to sitting for international exams, specifically at the elementary level. The purpose of this study was to explore the perceptions of Heads of private elementary schools and science coordinators and teachers, regarding the use of technology, and the extent to which these technologies were enhancing students' reasoning and communication skills. Participants in this study were 164 grade- six students from three private schools in different regions of the Lebanese capital. They also included three Heads of Elementary schools and four science teachers of whom three were also coordinators. Semi-structured interviews and class observations were used. Findings revealed that the vision and mission of the school leadership, and the teachers' practices associated with the appropriate integration of technology were key determinants for enhancing students' reasoning and communication skills in science.

Influence of an Academic Intervention about Literal Symbols on Students' Performance (at Seventh and Eighth Grade Levels)

Manal Kiwan, Lebanese University, Lebanon

Several researches documented students' limited ability when dealing with tasks involving literal symbols (Koedinger & Nathan, 2004; Kiwan, 2015; Lochhead & José, 1999; Moses & Cobb, 2001; Usiskin, 1988). This study investigates whether an academic intervention that explicitly highlights the different uses of literal symbols found at seventh grade level helps students perform better in tasks involving literal symbols. Moreover, it checks whether the intervention influences students' adaptation of the new uses of literal symbols introduced at eighth grade level. For this purpose, a control group and an experimental group of seventh grade students were subject to the intervention that highlights the uses of literal symbols as units, labels, constants, specific unknowns, continuous unknowns, generalized numbers and abstract symbols. By the end of which, an assimilation test has been performed. Later on, by the end of grade eight, these students were subject to an accommodation test to check their adaptation of new roles of literal symbols introduced (discrete unknowns and varying quantities). This has been applied twice for the two consecutive academic years 2016-2017 and 2017-2018. Results revealed that students subject to the intervention showed a better performance in tasks involving the different uses of literal symbols encountered in the intervention and even a better adaptation of the new uses of literal symbols introduced at grade eight.

مقارنة تعليم العلوم والرياضيات باللغة الأجنبية في الحلقة الثانية من التعليم الأساسي مع تعليمه باللغة العربية: تجربة ثانوية الكوثر

فاطمة قبيسي، أماني الحاج، ثانوية الكوثر، لبنان

لا يزال تعليم الرياضيات والعلوم باللغة الأجنبية مقارنة باللغة الأم يأخذ الكثير من الجدل حول الأثر على تحصيل التلميذ من جهة وعلى ربط ما يتعلمه بواقعه وبالتالي توظيفه في حياته اليومية. تكمن أهمية هذا البحث في أنه يتضمن مقارنة تحصيل التلامذة في الرياضيات والعلوم والقدرة على الربط بالحياة اليومية لتلامذة يدرسون في نفس المدرسة، نفس المنهج، وحتى أحيانا نفس المدرس إنما ما يختلف فقط هو أن بعضهم يدرسها باللغة الأجنبية وبعضهم باللغة العربية. وعليه فإن الدراسة ستحاول الإجابة عن الأسئلة التالية: هل تعليم الرياضيات والعلوم باللغة الأجنبية أثر سلبا على تحصيل التلامذة؟ هل أثر على قدرتهم على توظيف ما تعلموه في حياتهم اليومية؟ هل تمكن التلميذ من اللغة الأجنبية أو العربية مرتبط بالتحصّل في المواد العلمية؟ هل الخلفية الثقافية والإجتماعية والإقتصادية للأهل مؤثرة في أفضلية التلعيّم باللغة الأم مقارنة باللغة الأجنبية؟ سيتم استخدام نتائج تلاميذ شعب الإنكليزي وشعب الفرنسي على مدار 3 سنوات متتالية وتحليلها ورصد نسب النجاح فيها والمعدلات الوسطية والمقارنة بينها باستخدام تمثيلات بيانية بالخطوط والمقارنة مع التحصيل باللغات الأجنبية ودراسة متغبر الخلفية الإقتصادية والثقافية للأهل. وخلال العرض التفاعلي للمشاركين سيتم شرح جميع مراحل البحث وأدواته.

DEVELOPMENTAL WORKSHOPS

(11:00 ▶ 1:00 PM)

Integrating Scratch Software in Triangles in Cycle 2 Math Classes

Bassam El Hajj Ali & Iman Osta, Lebanese American University,
Beirut, Lebanon

This workshop is intended for cycle 2 Mathematics teachers in Lebanon who seek to deepen their exploration in integrating digital technological resources in their classrooms. In this workshop, we will approach and discuss the development of problem solving in the Mathematics teaching and learning processes, through Scratch Software. The workshop is intended to introduce participants to Scratch features and tools in addition to the basic functionalities. To do this, we select situations in the context of Geometry that allow us to explore some of the potentialities of this multiplatform software. In this workshop, the participants will have the opportunity to explore some of the activities as a means to discuss the potential impacts of the underlying geometric content in the context of the students' classroom experiences. We intend to show and explore some projects developed that articulate computational thinking and Mathematical education in teaching and learning situations in the unit of types of triangles and their angles. In this workshop, participants follow hands-on activities where they acquire the basics of computer programming and develop a small-scale software application using Scratch. This workshop presents how learners assimilate and use these practices when developing their first computing application in a non-traditional learning experience.

Concept Items

Houssam Kasti, American University of Beirut, Beirut, Lebanon

The United States National Council of the Teachers of Mathematics NCTM (Collins, 2011) defines four levels of cognitive assessment questions: memorization (knowledge), procedures without connections (procedural), procedures with connections (conceptual), and doing mathematics Knowledge (Problem solving). Most international and standardized mathematics tests nowadays are stressing on the conceptual test items. The connection of the mathematical concept to behavioural sciences, science, engineering, technology, or to art is paramount in this era. In this workshop we will differentiate between the four levels mentioned above, we will solve conceptual items covering most of the Lebanese mathematics curriculum. In addition, we will present some test items from the international tests and discuss them.

Mathematics in Everyday Life

Amin Dinnawi, Beirut Annunciation College (BAC), Lebanon

Hasan Dinnawi, Eastwood International School,
Mansourieh, Lebanon

The aim of this workshop is to share and investigate several real-life applications of Mathematics. Shifting paradigms from traditional ways of teaching to interactive and collaborative inquiry-based activities is easier said than done. This workshop provides a variety of mathematical real-life problems and teaching ideas to solve them. It also models the role of the teacher as a facilitator of the knowledge in the math classroom. A lot of studies reveal that students are more motivated to solve real life problems that they relate to, and hence they would be more motivated to learn problem solving skills. This workshop will engage the participants in inquiry activities where they have to solve problems in real life contexts collaboratively just like it would happen in an actual Mathematics classroom. It also aims to portray the ways in which students construct their own knowledge, invent their own strategies and create novel solutions to problems as well as test their validity in the real life context. In closing, participants will also investigate some facts from ancient times and discussions will ensue on the importance of teaching students the epistemology of certain mathematical concepts.

Using Seesaw for 6th – 12th Grade

Seifedine Kadry, Beirut Arab University, Lebanon

Seesaw is a platform for student engagement that inspires students of all ages to do their best, and saves teachers time! On Seesaw, students use creative tools to take pictures, draw, record videos and more to capture learning in a portfolio. Teachers, find or create activities to share with students. Families only see their child's work and leave comments and encouragement. The aim of the interactive hands-on workshop is to introduce this online platform to Grade 6th to 12th teachers.

A New Interactive Digital e-Learning Tool to Promote Grade 9 & Grade 12 Student Understanding of Math & Physics

Ramzi Ataya, Daoud El Gharib, NEEDS Company, Lebanon

Brevet and Baccalaureate National Examinations are the most crucial official exams that students shall consider during their journey towards university. A new approach method based on interactive digital e-learning has been developed to enhance teaching of curricular content for classes with official exams namely Brevet and Baccalaureate. This e-learning platform called "LEARNIT" can be used within schools' classrooms by teachers and outside schools by individual students. It is the 1st Online Training Program for Brevet/Baccalaureate National Examination, an innovative digital platform designed and projected by Intellectual Authoring and Academic Team to enable learners reinforce their knowledge and skills, and achieve success in national official exams. LEARNIT is an interactive multi-platform responsive portal that allows Brevet/Baccalaureate students to access Mathematics/Physics review materials, chapter exercises and trial exam simulation with complete detailed answer sheets, in French and English. All included exercises and trial tests are based on analysis of previous official exams and come in form of interactive exercises within review lessons, and four to five end unit exercises with detailed answer sheets. After completing all mini lessons, LEARNIT provides number of complete Trial exams to be solved with complete detailed answer sheets.

LEARNIT is a powerful learning tool that has proven its worth in several schools and helped students who joined our community of e-learners achieve concrete progress and improvement of their achievements in official exams. We expect more schools to join us in partnership for improving learning environment through state-of-the-art learning tools promoting 21st century learning methodology across students in Lebanon. LEARNIT presentation and demonstration could always be held in multi-languages: Arabic, English, and French in order to convey the message properly to both the Francophone and Anglophone audience.

Middle Years Program (MYP): A Promising Inquiry Approach in Education

Farah Abed Ali & Reem Halawi, Wellspring Learning Community,
Beirut, Lebanon

Nowadays many schools around the world are implementing the IB program. Some schools are integrating the IB learner profile within their national curriculum others are implementing the full IB program aiming towards IB accreditation. The IB starts with PYP; Primary Years Programme, the MYP; Middle Years Programme and the DP; Diploma Programme. Most schools in Lebanon, start with PYP from Grade 1 to 5. In grade 6, students shift to the national or American program till grade 10. In grade 11, students can either choose DP if the school offers, national or American high school program. MYP is a less popular program for grades 6 to 10, although the MYP incorporates most teaching and learning pedagogies implemented by other programs. Assessment in MYP is what characterizes the program and gives it its uniqueness. In MYP, students are assessed not only based on content and knowledge, but also based on their practical, analytical skills and their ability to reflect and relate science to the real world. The four assessment criterion include: Criterion A: Knowing and Understanding, Criterion B: Inquiring and Designing, Criterion C: Processing and Evaluating and Criterion D: Reflecting on the Impacts of Science. Scientific inquiry is an evident example to cater for the MYP approaches. MYP is not only featured by assessments, but also by the service learning students have to practice throughout the unit. The MYP programme prepares students to be 21st century citizens by arming them with the knowledge and skills to make connections between what they learn and real life-thus the STEAM approach is evident in all aspects of the program.

Science Thinkers: PBL in Science Classroom

Amina Maatouk, Makassed Aicha Om El Mo'minin School,
Saïda, Lebanon

Twenty-first century skills necessitate the implementation of instruction that allows students to apply content, collaborate, take ownership of their learning, and use technology meaningfully. Problem-Based Learning (PBL) is one pedagogical approach that provides a structure for discovery, helps students internalize learning and leads to greater comprehension. Moreover, it encourages independent responsibility for shared learning and allows for the development of all essential skills for future practice. Participants will take the role of "elementary students" who work cooperatively to solve open ended problems, and the role of educators to plan together for a PBL topic to be used in their science classrooms in order to improve students' engagement in the learning process.

Creating a Constructive Communication in a Science Class

Roweida Bawab, Houssam Eddine Hariri High School,
Saida, Lebanon

Sarwa Alakkad Hankir, Houssam Eddine Hariri High School,
Saida, Lebanon

It is not a secret that we are social creatures; we communicate for 7 out of every 10 minutes we are awake in average, and we are expected to stay social in our classes. Communication is a cornerstone in every class we teach, and in sciences it is the major tool that keeps the class going. Teachers are constantly working with diverse groups, where the language they use in class can either be the key or the road block to students' understanding. Students come from different backgrounds and have tricky ways of expressing themselves as well as their thoughts and ideas. It's our job to look up ways to understand their languages and channel them in a way that serves us and the educational process. This workshop aims to shed the light on ways to encourage positive, constructive communication in a science classroom and consider ways to benefit from such communication.

INNOVATIVE IDEA SESSIONS

(11:30 AM ▶ 12:45 PM)

Will it Crack?

A STEM Project Based Learning Activity

Rayya Younes, Maya Antoun & Sara Salloum,
University of Balamand, Lebanon

What does a STEM project based activity really look like from beginning to end? In this workshop, participants will experience STEM project based learning through a hands on activity. Participants will also learn how to design and manage project based learning activities in their classrooms. The discussion will focus on a) the advantages and barriers to implementing similar activities in the classroom b) how to integrate language in the content areas based on the “Content Language Integrated Approach” (CLIL).

i Student – i Teacher

Mirna Faour, Ali Reda & Ahmad Hammoud Institution Educative
Amal, Lycée Hassan Kassir, Beyrouth, Liban

La classe inversée «Flipped Classrooms» est une forme d'organisation d'enseignement qui propose de fournir aux élèves des éléments de cours, le plus souvent sous forme numérique (capsules vidéos, etc.) pour qu'ils l'étudient chez eux, le temps de cours étant ensuite consacré à des exercices, travaux de groupes, aides individualisées. Un mélange fertile de la transmission directe (j'enseigne) avec une approche constructiviste ou encore socio-constructiviste de l'apprentissage (c'est aux apprenants qu'il revient d'apprendre). Une classe où les étudiants sont davantage engagés dans leurs apprentissages.

صغار القاص تعلم الرياضيات

نور المصري وفاطمة جمعة، مدارس المبرات – ثانوية الكوثر، لبنان

- التعرف على أهمية الرياضيات والغاية منها في قسم رياض الأطفال
- التعرف على أهمية الأعداد، الخطوط، الاشكال الهندسية وطرق توظيفها.
- التعرف على دور استراتيجية حل المشكلات في تنمية المهارات الفكرية والتحليل من خلال الانشطة الرياضية.

A Website Teacher: Just-In-Time Teaching (JITT).

Abir El Darwish, Amal Educational Institutions, Beirut, Lebanon

The framework for twenty first century learning is based on life and career skills, learning and innovation skills, information, media and technology skills. JITT is an active learning method using a brief web-based questions delivered to the students before a class meeting, then, the students' answers are reviewed by the teacher before the class and they are used to develop classroom activities. JITT is a pedagogical strategy that promotes active students engagements and motivates students by linking out-of-class JITT exercises linked to JITT responses and classroom activities, it creates a challenge for the students to search new information about new topics, the students answer a small set of web-based questions on upcoming course material outside the class and submit their responses online. The instructor reviews the students JITT responses and develops in class active learning exercises targeting learning gaps identified in the JITT responses. JITT provides twenty first century skills for learners by analyzing data (critical thinking), answering (problem solving), discussing the answers (cooperative learning) and reflective skills (self-directed and self-monitoring skills).

DEVELOPMENTAL WORKSHOPS

(3:45 ▶ 5:45 PM)

Coding with Scratch

Rana Kaoury, International College, Lebanon

Mitch Resnick of MIT lab said during one of his TED conferences that “young people today have lots of experience and lots of familiarity with interacting with new technologies like texting, chatting and gaming, but a lot less so of creating and expressing themselves with any of these new technologies they are interested in. It’s almost as if they can read but not write.” According to code.org “71% of all new jobs in STEM are in computing, but only 8% of STEM graduates are in Computer Science”. As educators, it is important to stay up to date on these innovations, as it is our responsibility to prepare students and help them have a better and brighter future, by introducing programming, a skill they will use in the future. This workshop introduces participants to Scratch. Scratch is a simple block-like interface or tool that is often used in teaching coding, computer science and computational thinking. From programming websites, to games and finally artificial intelligence, Scratch is a simple language that works well for introductory programming where students can drag-and-drop icons instead of typing the code. Scratch is an easy way to introduce coding in our schools because it fits all ages and it makes coding as easy as stacking building blocks. In addition, it helps students learn to think creatively and reason systematically.

هيك . أحلى (رياضيات)

رندا فضل الله واخلاص حمود، ثانوية الكوثر، بيروت، لبنان

إن تعلم الرياضيات في مرحلة مبكرة أمر هام ، والأهم منه معرفة الحاجة الملحة لتعلمها وكيفية الاستفادة منها وتطبيقها حتى تكون عوناً . ويأتي السؤال ما هي أهمية الألعاب في الرياضيات ؟ بعض الاجابات هي لتنمية مهارة التفكير لدى المتعلم ومهاراته الاساسية اضافة الى إثارة الدافعية نحوالتعلم وزيادة التفاعل الصّفي من خلال العمل التعاوني الجماعي وما يشمله من جو تنافسي برئ بينهم والاهم معالجة صعوبات التّعلم عند الطلاب. واتخاذ موقف ايجابي من هذه المادة والابتعاد عن الاسلوب التلقيني ليألف الطالب هذه المادة .وتفصيلها أكثر وارد ضمن سياق انشطة الدورة.

Sciences through Minecraft and Micro: Bit

Sara Abou Afash, Lebanese University, Lebanon

Tarek El Basha, Tablet Academy – MENA, Lebanon

Technology these days are part of our daily life, denying this fact keeps us from providing different opportunities for students. The 21st century skills; all k-12 students should acquire, is in tandem with technology. All of this could be achieved if we use technology in classroom in proper way. This session aim is at introducing different technologies (Minecraft MEE and Micro:Bit) as an aiding tools to help delivering different Sciences and Mathematics concepts that teachers can use it in their classroom. Engaging students throughout the day sometimes could be challenging, however since the main reason of using technology in education is to aid the learning teaching process, MEE and Microbit provided engaging solutions for students to see how these subjects are essential in our daily life and how subject are linked. Thus these technologies provide experimental safe environment allowing them to construct their own understanding on the project. Minecraft was initially a number one game that most of the students used to play after school time. Last year, they introduced the chemistry lab where teacher can decide whether the session is delivered as individual or a as a whole classroom involvement. While Micro:Bit is a tiny programmable computer, designed to make learning and teaching easy and fun. The application of these examples can be used in primary classes through university level as they can be used through different concepts/units.

Action Verbs; Route to Critical Thinking!

Zeina Merhi, Universal College of Alley, Lebanon

This workshop sheds the light on the most frequently used action verbs, their meaning, and interpretation according to the Lebanese Curriculum in correlation with Bloom's taxonomy. The primary purpose of this workshop is to equip science teachers of all cycles with the knowledge and skills needed to promote the students' critical thinking via well-planned strategies and well- designed problem solving exercises. Participants will take the role of a "learner" by participating in hands-on activities, practicing the action verbs, and designing exercises that target high cognitive levels. Hence, they will become aware of the importance and usefulness of action verbs which can be immediately used in their classrooms to enhance students' engagement and promote their critical thinking.

Semiotic Modalities in Teaching: Going Beyond the Norm

Hanadi Hammoud, Saint Georges Schools, Lebanon

Semiotic modalities in teaching are methods that can be used to explain certain concepts generally, and in biology classes, such methods can be utilized as an innovative way to deliver the material. This session will present examples of these teaching methodologies that can be applied in multilingual classes, including the use of gesticulation, the implementation of the language of art, the method of drawing a path and the utilization of technology in teaching biology. During this session, the presenter will share these methodologies based on experience of employing them in intermediate and secondary classes, and some hands-on activities that can be used in these classes will be simulated. This will allow the attendees to apply certain activities while explaining, and to transform their classes from a passive environment, from the perspective of students, into an active and interesting one, thus going beyond the norm.

Entrepreneurship Education in the Classroom, A Step Towards Education 2030

Jinan Karameh Shayya, Entrepreneur Academy, Lebanon

Globalization and the fast dynamic world are a challenge to be overcome by adaptation both at national and individual levels. Bringing entrepreneurship knowledge, skills, and attitudes into focus and integrating this field into education appear to be promising, since the potential lies in education 2030, education for sustainable development. Education 2030, adopted recently by the National Center for Education and Research, promotes 1) Economic growth, 2) Fair distribution of resources, 3) Full employment, 4) Favorable Balance of payment, and 5) Price stability which are the main objectives of entrepreneurship education. Entrepreneurship education can be defined as the purposeful intervention by an educator in the life of the learner to impact entrepreneurial qualities and skills to enable the learner to survive in the world of business. This developmental workshop aims to: a) introduce entrepreneurship education and its significance, and b) practice some Entrepreneurship education learning strategies that are applicable in the science classroom. This session is targeting science teachers and coordinators for middle and secondary levels. Participants will have the chance to share their experiences in this issue and reflect on their own practices and challenges that they usually face when implementing Entrepreneurship Education. Entrepreneurship Education practices would provide our students with the necessary knowledge, skills to adapt the context of the 21st century and to rise up with our nation.

INNOVATIVE IDEA SESSIONS

(3:45 ▶ 5:00 PM)

Thinking of Mathematics as Communication

Samia Henaine, Houssam Eddine Hariri High School, Lebanon

When people think of communication, they typically think about activities, such as writing, drawing, speaking, or using body language, and they often consider language teachers as the only persons responsible for children's communication development. Researches and educators have emphasized during the last two decades the importance of inquiry and mathematical problem solving, which are suffused with talk: questioning, explaining, communicating, debating, sharing and presenting strategies. Although we all convinced of the importance of these approaches, we cannot ignore the challenges that we are facing since our children do not learn Mathematics in their mother-tongue language. This session will discuss the factors that hinder students from communicating their thinking, the reasons of students' failure in solving Math problems, and the strategies, ideas, and tools that can be adapted to any math concept or grade level in order to help students be good communicators. Moreover, participants will be asked to communicate about the kinds of experiences they have had in teaching Mathematics, the solutions that they have tried, and their points of view on how best they consider Math teaching to be.

Representations as Tools for Thinking in a Problem Solving Context

Rana Aboul Hosn, Lebanese American University, Brummana High School, Lebanon

Teaching through problem solving is considered a challenge in a multilingual classroom where students use a different language than the native language spoken at home. Moreover, solving math word problems, which requires the engagement in different cognitive actions has always been difficult for students at elementary and middle school levels. Research and experience show that a successful problem-solving teaching and learning model needs to include a construction of visual schematic representations that show relationships between the different components of the problem. Representations such as tables, graphs, diagrams and pictures extensively and functionally used when teaching improve the development of students' reasoning and problem solving abilities. The purpose of this workshop is to engage elementary and intermediate math teachers in activities that show the importance of integrating "representations as tools for problem solving". Participants will have the chance to share their experiences in their classrooms regarding their students' representations. At last, participants will be able to design mini-lesson scenarios with greater emphasis on representations as tools for thinking and problem solving.

Rendre l'enseignement scientifique interactif et attrayant

Andrée Chaoui, Université de Balamand, Beirut, Liban

Les défis que rencontre l'enseignant dans le domaine de la science sont nombreux: comment stimuler le questionnement et la participation de l'élève au cours? Comment le guider vers un échange continu entre lui et le professeur pour acquérir une meilleure compétence de communication? Comment lui donner le goût de la science et rendre l'expérience un moyen de vérifier une chose palpable qui produit chez l'élève une émotion ? Nous apportons, par la suite des réponses à toutes ces questions : il faut retrouver des situations d'apprentissage qui permettent de réaliser un enseignement actif et attrayant. C'est tout petit, que l'enfant prenne le goût des expériences soit en chimie, en physique ou en biologie. Par exemple, un enfant qui a compris qu'une chose comme la cuisine est de la chimie aura moins de difficultés à aimer cette discipline à l'école. D'une manière générale l'enseignement doit être interactif et concret : Il faut apprendre à l'enfant comment il doit apprendre lui-même ses leçons. On peut présenter des sujets de discussion avec les élèves autour de la leçon et valider cette dernière avec eux ; cette méthode est basée sur une information de va-et-vient entre élèves et enseignant. Ainsi les élèves acquièrent une meilleure compétence de communication qui se répercute plus tard dans les classes supérieures et par suite dans leur travail dans le monde. Pour conclure, on peut dire que l'enseignement scientifique doit être attrayant et interactif en faisant participer les élèves pour réaliser le cours avec le professeur. Il est évident que la méthode dite active est meilleure pour l'apprentissage et la compréhension.

La séance est pour 75 minutes, on présentera un exposé expliquant les divers moyens ludiques et concrets qui peuvent rendre l'enseignement des sciences interactif. Un débat avec les enseignants consolide l'exposé. Cette séance est ouverte aux enseignants des cycles primaire et complémentaire.

My Mother's Sphygmomanometer

Fouad Bakkar, Amjad High School - National Protestant College, Lebanon

Innovations in life start by creativity and everyone can be motivated in order to innovate. The aim of this session is to share with my colleagues an observation I had witnessed during my childhood and adolescence. Measuring one's blood pressure is possible through a measuring tool "the sphygmomanometer". However, my mother who is neither a medical expert nor had a sphygmomanometer at that time, followed a different strategy with different tools and enabled her to monitor the blood pressure of neighbors and relatives who had chronic hypo or hypertension. The curiosity triggered by such an observation at that time and the passion I have as a Biology teacher to promote critical thinking and "problem-based learning" had a great impact on my teaching strategies. In this sense, the term "variable" in learning science has been concretized and students are able to live and apply the scientific method rather than being a chart for memory. Through a well- designed hand-on activity, participants in this innovative session will be able to live this observation "my mother's sphygmomanometer" in groups of two, collect data and share their findings. The innovative session will highlight the significance of such related activities in students' life and their acquisition for the 21st century competencies: creativity, scientific method, collaboration, problem solving, analysis, research skills and using data.



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