



Beirut Office

## THE TWELFTH ANNUAL SCIENCE AND MATH EDUCATORS CONFERENCE (SMEC 12)

### Conference Program

Science and Mathematics Education Center (SMEC)  
Department of Education  
Faculty of Arts and Sciences  
American University of Beirut  
Beirut, Lebanon  
April 10 and 11, 2010

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Dr. Murad Jurdak

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## ACKNOWLEDGEMENTS

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*UNESCO Regional Bureau for Education in the Arab States –Beirut*

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**We do apologize for any significant omissions**

## **SMEC 12 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

**LIMITED ENROLLMENT WORKSHOP:** There are two Developmental Workshop with limited enrollment, “The use of data logging in science investigations,” and “Lesson study: Classroom application and discussion” so you need to register for it at the registration table inside West Hall, 8:00 – 8:45 am, Saturday, April 10<sup>th</sup>. You have to register for this workshop in order to attend. This workshop is labeled “Limited Enrollment” in program. No other sessions require special registration.

**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 a Red Cross Worker will be available to administer care.

**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 teacher 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 Sunday April 11, 2010 or anytime during the week following the conference from 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**

Saturday April 10, 2010: Registration begins at 8:00 am

## **PUBLISHERS' EXHIBIT**

Saturday April 10, 2010: 10:00 am – 5:30 pm

SMEC 12 has the pleasure to welcome the following publishing and distribution companies and their representatives and others.

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**SMEC 12 CONFERENCE SCHEDULE  
SATURDAY April 10, 2010**

**The Publishers' Exhibit will be open from 10:00 am to 5:30 pm in  
West Hall Common Room**

8:00 – 8:45 am	<b>Conference Registration, West Hall Entrance</b>			
8:45 – 9:00 am	<b>OPENING CEREMONY, Assembly Hall</b>			
9:15 - 10:30 am	<b>PLENARY SESSIONS</b>			
	<b>SCIENCE</b>	<b>MATH</b>		
	<p><b>LESSON STUDY IN JAPAN: CONCEPT, DEVELOPMENT, AND EFFECTIVENESS</b></p> <p>Kinya Shimizu, Graduate School of International Development and Cooperation, Hiroshima University, Japan</p> <p align="center"><b>Assembly Hall</b></p>	<p><b>LESSON STUDY IN MATHEMATICS: ITS POTENTIAL FOR EDUCATIONAL IMPROVEMENT IN MATHEMATICS AND FOR FOSTERING DEEP PROFESSIONAL LEARNING BY TEACHERS</b></p> <p>Max Stephens, Graduate School of Education, the University of Melbourne, Australia</p> <p align="center"><b>Bathish Auditorium, West Hall</b></p>		
10:30 am–11:00am	<b>Coffee Break, West Hall, 2<sup>nd</sup> Floor Terrace</b>			
	<b>RESEARCH SESSION I</b>			
11:15 am–1:45 pm	<b>Title</b>		<b>Presenter</b>	
	The Double-Edged Sword: Highlighting the Misuse of Technological Tools		Haithan Solh	
	Impact of a Science Teaching Methods Course on Pre-service Elementary Teachers' Science Anxiety		Rana Tamim	
<b>West Hall Auditorium A</b>	The Reproduction of Geometrical Plain Figures: a Complex Task		Naim El Rouadi	
	<b>CONCURRENT INTERACTIVE SESSIONS</b>			
	<b>Title</b>	<b>Presenter(s)</b>	<b>Audience</b>	<b>Room</b>
	إستخدام الروبوت في تعليم بعض مفاهيم الفيزياء	Khaled Mrashdeh Usama Abo Al-Shawarib	Physics & Technology  Intermediate & Secondary	Fisk 102
	Teaching Chemistry for Conceptual Understanding	Nizar El-Mehtar	Chemistry  Intermediate & Secondary	Nicely 103

<b>11:15 am–1:15 pm</b>  <b>Developmental Workshops</b>  <b>Session 1</b>	Designing Student-Centered, Problem-Based, Collaborative Science Projects	Wissam Kabbani	Science All levels	Nicely 105
	Enseignement Vivant, Motivant; <i>Attention au Bourrage de Crâne!</i>	Andréé Chaoui	Science Elementary & Intermediate	Nicely 107
	التعليم والتعلم من أجل مستقبل مستدام (TLSF): رزمة وسائط متعددة لتدريب المعلمين	Suleiman Suleiman Ghada Gholam	Science, Math & Technology Secondary	Nicely 207
<b>11:15 am–12:30 pm</b>  <b>Innovative Idea Session I</b>	1,2,3-Rotate: Biology Learning Centers	Amina Harbali	Biology Intermediate & Secondary	Fisk 208
	Conceptual and Integrated Math Instruction	Rola Hallak Israa Fawaz	Math Elementary	Nicely 323
	Habits of Mind for School Mathematics	Sumaila Sabbagh	Math All levels	Nicely 325
	An E-Book <i>WILEYPLUS</i> Successful Teaching Experience in Introductory Large Physics Classes	Samih Isber	Physics & Technology Secondary & Post-Secondary	Fisk 204
	Motivating Students Through the Infusion of Technology	Simon Barakat	Science & Technology Intermediate & Secondary	Fisk 104
<b>1:00 pm – 2:00 pm</b>	<b>Lunch</b>			
<b>RESEARCH SESSION II</b>				
<b>2:00 pm–3:30 pm</b>  <b>West Hall Auditorium A</b>	<b>Title</b>	<b>Presenter</b>		
	Evaluating the Use of Assisted Software to Induce Conceptual Change As an Alternative Approach in the Teaching of Science Using Action Research	Randa Abu- Salman Rana Haidar Edward Khairallah		
	Metaphorical Understanding of Concepts in Thermodynamics and Implications for Instruction	Tamer Amin		
	Managing Classroom Behavior: Teachers' Conception & Strategies	Aline Alam		
<b>Concurrent Interactive Sessions</b>				
<b>2:00 pm – 4:00 pm</b>  <b>Developmental Workshops</b>  <b>Session II</b>	Lesson study: Classroom application and discussion	Kinya Shimizu	Science All levels	West Hall Auditorium B  <b>Limited enrollment</b>
	Writing in Mathematics: A Hidden Element of Learning	Hala Tayyarah	Math Intermediate	Nicely 412
	Classroom Capsules for	Bilal Basha	Math	Nicely 414

	Meaningful Learning of Mathematics	Manal Malaeb	Intermediate & Secondary	
	Learn...To Teach How to Learn	Nibal Hamdan	General All levels	Nicely 101
<b>2:00 pm–3:15 pm</b>  <b>Innovative Idea</b>  <b>Session II</b>	التدريس بالأسلوب التكاملي (المرحلة الأساسية) حياتنا والماء	Sana Al-Banna Mais Kamarakji	Science Elementary	Nicely 105
	أفكار بديلة عن الأدوات التقليدية لتقويم الطلبة في العلوم	Abdallah Ambusaidi	Science All levels	Nicely 107
	Molecular Switches	Zarifeh Jarjour	Biology/ Biochemistry Secondary	Fisk 208
	Using Beans to Illustrate the Way Gametes Combine Randomly During Sexual Fertilization	Michel Khuri	Biology Intermediate (Grade 9)	Fisk 104
	Exploring Data Applications in the Preschool Classroom	Mira Kaddoura Kat Abkemeier	Math Elementary	Nicely108
	Teaching Science Through Observation	Roula Jawad	Science Preschool & Grade 1	Fisk 102
<b>4:00 pm – 4:30 pm</b>	<b>Coffee Break</b>			
<b>RESEARCH SESSION III</b>				
<b>4:30 – 6:00 pm</b>  <b>West Hall</b> <b>Auditorium B</b>	فاعلية الإستقصاء التأملي الصريح والمنحى التاريخي في تعديل المفاهيم البديلة في الفيزياء والتصورات حول طبيعة العلم لدى طلاب المرحلة الأساسية العليا في فلسطين بحسب مستوى تحصيلهم العلمي	Walid Al-Arda Sumayah Al- Muhtasib		
	اتجاهات طلاب المرحلة الإعدادية نحو مادة العلوم	Tarek Abd El-Raouf Amer & Rabih Abd El-Raouf Amer		
	مركز التميز البحثي في تطوير تعليم العلوم والرياضيات (أفكر): الرؤية والأمل	Fahad Bin Suleiman Al-Shaya		

<b>CONCURRENT INTERACTIVE SESSION</b>				
	<b>Title</b>	<b>Presenter(s)</b>	<b>Audience</b>	<b>Room</b>
<b>4:30 pm – 5:45 pm</b>  <b>Innovative Ideas</b>  <b>Session III</b>	In Touch and Online with Technology: Tools for 21 <sup>st</sup> Century Teachers	Dan Tanner	Science, Math & Technology All levels	West Hall Auditorium A
	Using Video Analysis for Science Education	Gerard Ezcurra	Science & Math All levels	Nicely 412 <b>You need to bring your laptops</b>
	Ensuring instruction changes – evidence based teaching – looking closely at three models: Lesson study, Coaching and Instructional rounds	Max Stephens	Math All levels	Fisk 104

<b>4:30 pm – 6:30 pm</b>  <b>Developmental workshops</b>  <b>Session III</b>	Documenting Children's Theories: Evidence of Deep Understanding	Jennifer Le Varge Rasha Fakhreddine	Science  Early Childhood/ Lower Elementary	Nicely 101
	The 21 <sup>st</sup> Century Educator	Bassem Kandil	Science, Math & Technology  All Levels	Nicely 207
	STSE As an Effective Strategy That Increases Students Motivation and Learning in Science Classrooms	Rana Iskandarani Amal Zaatari	Science & Technology  Elementary	Fisk 102
	The use of Data Logging in Science Investigations	Suheir Suleiman Viviane Houry Saab	Science  Secondary	Fisk 208  <b>Limited enrollment</b>
	Changing Roles in the Classroom, and Going Beyond the Lesson Content in Order to Achieve Better Learning	Ramzi Ataya	Science & Math  Elementary & Intermediate	Nicely 414
	Teaching Mathematics to Students with Learning Difficulties.	Aline Bazerli and Elize Abdallah	Math  Secondary	Nicely 103
	Using Language Switching to Support Foreign Language Learners in Science Classrooms	Tamer Amin	Science  All Levels	Nicely 105
	Can Earthquakes be Useful?	Mounib El-Eid	Science (Physics)  Post-Secondary	Nicely 107

**SMEC 12 CONFERENCE SCHEDULE  
SUNDAY APRIL 11, 2010**

<b>RESEARCH SESSION IV</b>				
<b>9:00 am–10:30 am</b>  <b>West Hall Auditorium B</b>	أثر استخدام أسلوب التعلم التعاوني علي تحصيل طلاب الصف الثالث الإعدادي بالمعاهد الأزهرية في مادة العلوم واتجاهاتهم نحوها		Rabih Abd El-Raouf Amer & Tarek Abd El-Raouf Amer	
	أثر استخدام نموذجي: التعلم البنائي وتنبيأ-لاحظفسر في تكوين البنية المفاهيمية في الكيمياء لدى طلبة المرحلة الثانوية في دولة الإمارات العربية المتحدة		Raed Abdallah Sumayah Al-Muhtasib	
	Do We Need Agricultural Literacy for Elementary Science Teachers? Why and How?		Mohamed Hendy	
<b>CONCURRENT INTERACTIVE SESSION</b>				
<b>9:00 am–11:00 am</b>  <b>Developmental Workshops Session IV</b>	<b>Title</b>	<b>Presenter(s)</b>	<b>Audience</b>	<b>Room</b>
	The Brevet Sciences and Mathematics Monitoring Project: The Early Days	Barend Vlaardingbroek, Rabih El-Mouhayar, Saadeddine Shehab, Nadya Rizk & Jana Bayoud	Science & Math	West Hall Auditorium A
	Jouons Avec Les Maths	Samia Hénainé	Math Elementary	Nicely 101
	Teaching Mathematics and Science in Preschool: An Integrative Approach	Joelle Badran Magida Salam	Science & Math Preschool	Nicely 105
	A Holistic Context of Teaching Science: An Integrated Approach	Rola Sarouja Salwa Rifai	Science Elementary	Nicely 107
	Solving Math Problems with Fun	Samar Sultan	Math Elementary	Nicely 108
	Why Inquiry in Math and Science?!	Bilal Jradi Zakaria Hmadi	Math & Science Intermediate & Secondary	Nicely 323
	Use of media in science education : guided analysis of a scientific DVD	Andrée Thoumy	Math & Science All levels	Fisk 104
	<b>11:00 – 11:15</b>	<b>Break</b>		
<b>GENERAL LECTURE</b>				
<b>SCIENCE</b>				

11:15 am–12:30 pm	<p align="center"><b>THE LEVANT BETWEEN GENES AND HISTORY</b></p> <p align="center">Dr. Pierre Zalloua Lebanese American University Lebanon</p> <p align="center"><b>Bathish Auditorium</b></p>			
<b>CONCURRENT INTERACTIVE SESSION</b>				
	<b>Title</b>	<b>Presenter(s)</b>	<b>Audience</b>	<b>Room</b>
11:15 am–12:30 pm <b>Innovative ideas</b> <b>Session IV</b>	استخدام الفيچول بيبسك Visual basic PowerPoint والبوربوينت بطريقة مبتكرة في التدريس	Wael Hassan Ziad Al-Tawil	Math & Technology  All Levels	Fisk 102
	استخدام الوحدات النمطية لتعلم بعض المفاهيم والمهارات المرتبطة بالثقافة العلمية للمرحلتين الابتدائية والمتوسطة	Ahmad Al-Rowainy	Science & Math  Intermediate & Secondary	Nicely 323
	Science and Values: “A Story of Challenge”	Diana Sarieddine Randa Abu-Salman	Science  All levels	Nicely 325
	Global Warming and Methods to Reduce It.	Elie Saad	Science  Intermediate & Secondary	Fisk 208
	Once Upon A Time...	Dana El-Dimassi Oueini Nadia Sadik	Science, Math & Language Arts  Elementary	Nicely 327
	Hey, My 8-Year-Old Can Do That!	Rima Halabi Thomas Pederson	Math  Elementary & Intermediate	Fisk 104
	Transdisciplinary Education: Making it Authentic, Easy and Possible	Calin Duke Nisreen Ibrahim	Science & Math  Elementary	Nicely 412
	Using other Subject Matters to Deepen Understanding of Math and Science Concepts	Nour Ghusayni Ola Itani	Science & Math  Elementary	Nicely 414
	Discipline Problems: You Can Handle Them All	Lamis Adada Nisrine Awarke	General  All levels	Nicely 101

# **Abstracts**

# Research

<b>THE DOUBLE-EDGED SWORD: HIGHLIGHTING THE MISUSE OF TECHNOLOGICAL TOOLS</b>
<i>Haitham Solh, Division of Arts and Sciences, American University in Dubai, Dubai-U.A.E</i>
<p>The incorporation of information and communication technologies into mathematics classrooms is one of the most important themes in contemporary mathematics education. However, the power that technology has lies in its “appropriate” use; that is, using its tools to target building student skills or enhancing their conceptual knowledge. Unfortunately, some teachers often get hung up on using technology, thinking that the solution to all instructional problems lies within the use of some technological tool. The session will highlight the possible foci of using a technological tool, and how a lack of clarity in the objectives can be detrimental to the learning process. Using the results of a study conducted on a computer-based mathematics curriculum, the presenter will conclude that the disadvantage of using a seemingly powerful and effective technological tool lies in the inability of the tool to enhance and promote students’ conceptual knowledge. The session will begin with an interactive discussion about the characteristics of good teaching, and how technology can contribute positively to achieving this goal. Participants will engage with the presenter in uncovering the benefits and/or disadvantages of the technology tool presented. The session concludes with a proposed recipe for the appropriate use of technology: “Fitting technology to the curriculum and not the curriculum to technology”.</p>
<b>IMPACT OF A SCIENCE TEACHING METHODS COURSE ON PRE-SERVICE ELEMENTARY TEACHERS’ SCIENCE ANXIETY</b>
<i>Rana Tamim, Hamdan Bin Mohammed e-University, Dubai-UAE Kamran Shaikh, Concordial University, Montreal-Canada</i>
<p>Science is a subject matter that usually raises anxiety levels with many pre-service teachers. Many argue that such attitudes influence the decision to teach science and how to teach it. This has further impact on students’ attitudes towards science as a whole. As such, teachers’ anxieties towards science teaching should be addressed as early as possible during their professional training. It is reflected by research findings that science teaching methods courses may be helpful in developing more positive attitudes towards science. The objective of the current research is to formally investigate the impact of a science teaching methods course that was designed with a constructivist approach on pre-service elementary teachers' attitudes toward teaching science. Participants were 27 pre-service teachers in the Early Childhood and Elementary Education Program at a Canadian University. Through hands-on and minds-on activities, a variety of science teaching methods were modeled and presented to the pre-service teachers. Data collection included a science teaching anxiety questionnaire at the beginning and end of the course, in addition to interviews with willing participants. Findings indicated that the participants appreciated the instructional approach and had more positive attitudes towards science teaching by the end of the course. The presentation concludes with implications for instructional design of pre-service and in-service teacher training.</p>
<b>THE REPRODUCTION OF GEOMETRIC PLANE FIGURES IS A COMPLEX TASK</b>

<p><b>Naim El-Rouadi, University of Balamand, Beirut-Lebanon</b></p>
<p>The difficulties that 1st secondary students are facing, led them not to acquire competencies to reproduce geometric figures. The research geometric problem was based on calculating the radius of the circle and reproducing the figure. Procedures taken were as follow :we applied the test in 1st secondary classes in three schools One student was chosen among the ones who solved the problem correctly from each school to reproduce the figure. The main issue of this problem is to calculate using an irrational number that represents the radius of the circle.</p>
<p align="center"><b>EVALUATING THE USE OF ASSISTED SOFTWARE TO INDUCE CONCEPTUAL CHANGE AS AN ALTERNATIVE APPROACH IN THE TEACHING OF SCIENCE USING ACTION RESEARCH</b></p>
<p><i>Randa Abu Salman, Rana Haidar and Edward Khairallah, Beirut Orthodox Schools, Beirut-Lebanon</i></p>
<p>Students come to science classes with alternative conceptions about many scientific principles and mechanisms. Research has recommended conceptual change - based learning environments using simulations for better understanding of these concepts. We have been using assisted soft-ware simulations to induce conceptual change in both physics and chemistry classes in all intermediate levels in our schools as an alternative approach in the teaching of science concepts. To evaluate the use of simulations we conducted an action research at our school which will be presented in this session. The participants will be introduced to the steps involved in performing action research; its results and actions intended to be taken as an evidence-based process. The participants will be able to infer that by doing our own action research we could gain a better perspective into our own teaching and the students’ learning and that the changes that we would make in our teaching would come out of our own work.</p>
<p align="center"><b>METAPHORICAL UNDERSTANDING OF CONCEPTS IN THERMODYNAMICS AND IMPLICATIONS FOR INSTRUCTION</b></p>
<p><i>Tamer G. Amin, Lebanese American University, Beirut-Lebanon</i></p>
<p>Increasingly, research addressing the process of conceptual change that occurs during science learning has adopted the “knowledge-in-pieces” or “resource” perspective where understanding scientific concepts is modeled in terms of multiple intuitive knowledge resources. With scientific concepts modeled in this way, the knowledge of the learner is seen as continuous with the expert at the level of the intuitive knowledge resources available and the process of learning is seen as the reorganization of these resources. An independent line of research in the field of cognitive linguistics has discovered that scrutiny of everyday and technical language reveals systematic patterns of metaphorical language use. This research has claimed that these patterns reflect underlying mappings between conceptual domains, indicating that much of our understanding of abstract concepts is in fact metaphorical. This framework of “conceptual metaphor” can be seen as an analytical tool for analyzing scientific language to reveal the conceptual metaphors that structure concepts in some domain. This paper first summarizes the findings of two studies of the language of thermodynamics conducted by the author and collaborators which sought to determine conceptual metaphors used to structure understanding of the scientific concepts of energy and entropy and the second law of thermodynamics. Next, the paper discusses the implications of these findings for instruction that aims to achieve conceptual change. Two types of implications will be drawn and discussed: the</p>

importance of incorporating metalinguistic reflection on metaphorical language during instruction; and the design of analogical visual representations that can support the process of conceptual change.

### MANAGING CLASSROOM BEHAVIOUR: TEACHERS' CONCEPTION & STRATEGIES

**Aline Alam, Brummana High School, Brummana-Lebanon**

This session presents the findings of a questionnaire given to American and Middle Eastern participants in the TEI intercultural and interdisciplinary workshop which I attended in July 2009. While teachers from a variety of backgrounds and nationalities completed the survey, the survey results indicated surprising commonalities among the issues faced by classroom teachers in the classroom management problems they face and also in the ways they respond to them. The survey results also implicitly pointed to a host of sociological factors that may be affecting teachers' reactions to certain types of classroom management problems. The session will conclude with a discussion of these sociological factors that include, but are not restricted to teachers' cultural and social backgrounds that influence their response to classroom management problems, as well as teachers' attitudes regarding power and the distribution of power. We wrap up with some recommendation for improved classroom management.

فاعلية الاستقصاء التأملي الصريح والمنحى التاريخي في تعديل المفاهيم البديلة في الفيزياء والتصورات حول طبيعة العلم لدى طلاب المرحلة الأساسية العليا في فلسطين.

وليد إبراهيم العارضة، مدرسة الوكالة، نابلس- فلسطين

سمية المحتسب، جامعة عمان العربية للدراسات العليا، عمان- الأردن

بالنظر إلى أن تطوير كل من المفاهيم العلمية بوصفها اللبنة الأساسية في بناء العلوم وفي البنية المعرفية للمتعلم والفهم المناسب لطبيعة العلم بوصفه المنظور الذي ينظر المتعلم، من خلاله، إلى خصائص المعرفة العلمية وتطورها وكيفية الحصول عليها، يعد من الأهداف الرئيسية من تعليم العلوم الرامي لإعداد الفرد المنتور علمياً وتكنولوجياً، يصبح امتلاك الطلبة لمفاهيم بديلة في العلوم ولتصورات غير ملائمة حول طبيعة العلم من المعينات الرئيسية لتحقيق هذا الهدف. لذا، كان لا بد من توظيف استراتيجيات لتدريس العلوم تتلاءم مع أهداف التربية العلمية الحديثة. وقد هدفت الدراسة إلى تقصي فاعلية كل من إستراتيجية الاستقصاء التأملي الصريح والمنحى التاريخي في تعديل المفاهيم البديلة في الفيزياء والتصورات غير الملائمة لطبيعة العلم مقارنة بالطريقة الاعتيادية ( من طلاب الصف التاسع 103 وذلك من خلال الكشف عنهما قبل البدء بالتدريس لدى عينة قصدية تكونت من ) في مدرسة ذكور بلاطة الأساسية الأولى التابعة لوكالة الغوث، موزعين على ثلاث شعب اثنتان منهما تجريبيتين والثالثة ضابطة. وقد تبين أنهم يمتلكون مفاهيم بديلة في جميع مفاهيم الكهرباء المتحركة التي تناولتها أسئلة الاختبار وأن التصورات الساذجة حول طبيعة العلم كانت سائدة مقارنة بكل من التصورات الانتقالية والملائمة. وبعد الانتهاء من التدريس، وجد أن أثر إستراتيجية الاستقصاء التأملي الصريح قد تفوق على أثر كل من المنحى التاريخي والطريقة الاعتيادية ذوي الأثر المتساوي في تعديل المفاهيم البديلة. كما تبين تساوي أثر كل من إستراتيجية الاستقصاء التأملي الصريح والمنحى التاريخي وتفوقهما على الطريقة الاعتيادية في تعديل التصورات حول طبيعة العلم. وبناءً على ذلك، يُوصى باستخدام هاتين الاستراتيجيتين لتحسين تعليم العلوم في جانبي تطوير فهم المفاهيم العلمية وطبيعة العلم لدى الطلبة.

اتجاهات طلاب المرحلة الإعدادية نحو مادة العلوم

طارق عبدالرؤف محمد عامر و ربيع عبدالرؤف عامر

يتميز العصر الحالي بالتطورات السريعة والمتلاحقة في جميع مجالات الحياة فقد حقق فيه الإنسان أعظم انتصاراته العلمية والتكنولوجية ، وفيه خلق في الفضاء محاولاً استكشاف معالم الكون ، وفيه أيضاً تستوفي الثورة العلمية والتكنولوجية حلقات تطورها بدخول بني البشر عصر المعلومات في ظل تطور الاتصالات غير المسبوقة . وهدفت الدراسة الحالية إلى التعرف على اتجاهات طلبة المرحلة الإعدادية نحو مادة العلوم والتعرف على علاقة المادة نفسها واتجاهات الطلاب نحو مادة العلوم ، واعتمد الباحثان على المنهج الوصفي باعتباره المنهج الملائم

<p>لهذه الدراسة لوصف الاتجاهات ومكوناتها ومراحلها، وقاما الباحثان بتطبيق الدراسة علي عينة تكونت من 300 طالب من طلاب وطالبات الصف الثاني والثالث بالمرحلة الإعدادية .  وأُسفرت نتائج الدراسة عن أهم اتجاهات الطلاب في المرحلة الإعدادية نحو مادة العلوم تتمثل في الآتي :-  أولا : اتجاهات الطلاب نحو الثقافة والمعرفة النظرية في مادة العلوم.  ثانيا : اتجاهات الطلاب نحو مادة العلوم كمبحث دراسي .  ثالثا : اتجاهات الطلاب نحو المهن والتخصصات المرتبطة بمادة .  رابعا : اتجاهات الطلاب نحو المعمل المخبري .  خامسا : اتجاهات الطلاب نحو أهمية العلوم وارتباطه بحياة الإنسان .</p>
<p>تقرير عن مشروع تنموي وطني وإقليمي  مركز التميز البحثي في تطوير تعليم العلوم والرياضيات (أفكر): الرؤية والآمال</p>
<p>فهد بن سليمان الشايع مدير المركز أستاذ التربية العلمية المشارك، جامعة الملك سعود – الرياض، المملكة العربية السعودية</p>
<p>صدرت موافقة وزارة التعليم العالي في المملكة العربية السعودية على تمويل "مركز التميز البحثي في تطوير تعليم العلوم والرياضيات" في جامعة الملك سعود بميزانية مقدارها 25 مليون ريال سعودي (ستة ملايين وستمائة وست وستون الف دولار) لمدة خمس سنوات، وذلك ضمن المرحلة الثانية من مشروع مراكز التميز البحثي، وقام معالي وزير التعليم العالي بتوقيع عقد تمويل المركز مع معالي مدير الجامعة في 2008/7/13م. علما أن المركز بدأ مرحلته التأسيسية بموافقة معالي مدير الجامعة على تأسيس "مركز تطوير تعليم العلوم والرياضيات" في 2007/9/13م. وتتمثل رؤية المركز بأن "يكون بيت الخبرة الأول في الوطن العربي ومركزاً عالمياً ريادياً في تطوير تعليم العلوم والرياضيات وأبحاثها وفق أفضل المعايير والتوجهات العالمية". وتتركز رسالته على تقديم الدعم العلمي التربوي للمؤسسات التعليمية والمهتمين بما يسهم في تطوير تعليم العلوم والرياضيات على المستوى المحلي والعربي والعالمي (بحث ، تدريب ، فعاليات، شراكة)، وإبراز دورها في التنمية الحضارية والاجتماعية، وذلك من خلال تفعيل أدوار الشركاء (الطلاب، المعلمين وأعضاء هيئة التدريس، المناهج والبرامج التربوية، أولياء المور والإراد المجتمع، الشراكة المؤسسية والعالمية). وحدد المركز ثمانية أهداف رئيسة يسعى لتحقيقها تتركز على البحث العلمي المميز وتنفيذ البرامج التطويرية التي تصب في تطوير تعليم العلوم والرياضيات. ويقدم هذا التقرير رؤية ورسالة وأهداف وشركات المركز المحلية والإقليمية والعالمية، كما يقدم تصورا عن مجموعاته البحثية القائمة والمستقبلية. ويتناول هذا التقرير أنشطة وفعاليات المركز المختلفة التي تم تنفيذها خلال مرحلة تأسيسه والمرحلة الماضية. كما يعرض التقرير أبرز تطلعات المركز وتحدياته المستقبلية.</p>
<p>أثر استخدام أسلوب التعلم التعاوني علي تحصيل طلاب الصف الثالث الإعدادي بالمعاهد الأزهرية في مادة العلوم واتجاهاتهم نحوها</p>
<p>ربيع عبدالرؤف عامر وطارق عبدالرؤف محمد عامر</p>
<p>يشهد العالم كله اهتماما كبيرا بالتعليم وبنيته ومناهجه ، خصوصا وأن التعليم بحاجة إلي التطوير والتنوع لمواجهة تحديات القرن الحادي والعشرين ،حيث يسعى العاملون في ميدان المناهج وطرق التدريس إلي التوصل إلي استراتيجيات وأساليب حديثة تساعد المعلم علي إدارة الموقف التعليمية بنجاح.  حيث هدفت الدراسة إلى التعرف علي أثر استخدام التعلم التعاوني علي التحصيل الدراسي في مادة العلوم لدى طلاب المرحلة الإعدادية الأزهرية واتجاهاتهم نحو مادة العلوم .  وتكونت عينة الدراسة من 135 تلميذا بالصف الثالث بالمرحلة الإعدادية وقسمت عينة الدراسة إلي مجموعتين المجموعة الأولى ومجموعة تجريبية وتتكون من 67 تلميذا تم تدريسهم باستخدام أسلوب التعلم التعاوني وتكونت المجموعة الثانية وهي المجموعة الضابطة وتتكون من 68 تلميذا تم تدريسهم باستخدام الأسلوب التدريسي العادي ( الطريقة التقليدية )، واتبعا الباحثان المنهج التجريبي ( اختبار قبلي ، اختبار بعدي ) ومجموعة تجريبية - مجموعة ضابطة ( وتم توصيف خطوات سير الدراسة الفعلية ، باستخدام استراتيجية التعلم التعاوني داخل الفصل الدراسي علي العينة العمدية للدراسة وتوصلت الدراسة الي عدة نتائج وتوصيات تهدف الي تطبيق استراتيجية التعلم التعاوني داخل الفصل الدراسي.</p>
<p>أثر استخدام نموذجي: التعلم البنائي وتنبأ-لاحظ فسر في تكوين البنية المفاهيمية في الكيمياء لدى طلبة المرحلة</p>

<b>الثانوية في دولة الإمارات العربية المتحدة</b>
راند عبدالله مشرف أكاديمي/ مدرسة دبي للتربية الحديثة و سمية المحتسب، جامعة عمان العربية للدراسات العليا
<p>إن الهدف الأساسي لهذه الجلسة يتمركز حول زيادة وعي المشاركين وفهمهم في تنفيذ خطوات نموذج التعلم البنائي وكذلك خطوات نموذج تنبأ-لاحظفسر بحيث تساعد على تحسين ممارساتهم في تنفيذ أنشطة العلوم المختلفة. في الجزء الأول من الجلسة سيتم الطلب من المشاركين في وضع تنبؤاتهم حول توصيل بعض المحاليل للتيار الكهربائي (على سبيل المثال محلول السكر، ملح الطعام) ومن ثم تبرير تنبؤاتهم، وبعدها سيتم تنفيذ نشاط عملي قصير لفحص تلك التنبؤات ليصار بعد ذلك إلى تفسير النتائج. وكذلك سيتم تنفيذ نفس الهدف التعليمي ولكن من خلال نموذج التعلم البنائي (CLM) ما بين دعوة المشاركين من خلال طرح سؤال يهدف إلى استثارة تفكيرهم ومن ثم الاستكشاف وإجراء النشاط، ومن ثم تقديم التفسيرات وأخيرا التوسع في المعرفة من خلال طرح تساؤلات وتنفيذ أنشطة تتعلق بمحاليل أخرى. وفي القسم الثاني من الجلسة سيتم الحديث عن نتائج بحث تجريبي كان هدفه التعرف على أثر نمودجي التعلم البنائي وتنبأ-لاحظفسر في تكوين البنية المفاهيمية وتنمية مهارات عمليات العلم في لدى طلبة المرحلة الثانوية في دولة الإمارات العربية المتحدة، حيث أشارت نتائج الدراسة إلى فاعلية هذين النموذجين في تنظيم المعرفة لدى الطلبة لأنها تساعدهم على ربط المفاهيم ببعضها البعض وبالتالي إيجاد علاقات بين هذه المفاهيم مما سيؤدي إلى فهم أكثر للموضوعات التي تدرس للطلبة. ومن ناحية أخرى أثبتت الدراسة أن هذان النموذجان يساعدان على تطوير مهارات عمليات العلم لدى المتعلمين.</p>
<b>DO WE NEED AGRICULTURAL LITERACY FOR ELEMENTARY SCIENCE TEACHERS? WHY AND HOW?</b>
<i>Mohammed H. Hendy, College of Education, Beni Suef University, Egypt</i>
<p>We need agricultural literacy for elementary science teachers because elementary school science has several agricultural activities which need agricultural scientific literate teachers to conduct them successfully. This can be done by introducing integrated agricultural and scientific topics to pre-service elementary science teachers. Regarding this, the main purpose of this study was to determine the effect of teaching an agricultural and science integrated unit on Abu Dhabi's University pre-service science female teachers' agricultural literacy and attitudes towards integration. Two hypotheses were set to guide this study: a) there is a statistical significant difference between the mean scores of pre-test and post-test regarding agricultural literacy test, and b) there is a statistical significant difference between the mean scores of pre-test and post-test regarding attitude scale towards integration. The study adopted the one group pre test - post test research design to examine the study hypotheses. The sample group of this study was all Abu Dhabi University female pre-service elementary teachers (n= 34). The results revealed that the integrated unit had an impact on pre-service teachers' agricultural literacy level and attitudes towards integration generally and integrating agricultural concepts into the elementary science specifically. Based on these results, the study proposed further studies to measure the changes in pre-service teachers' attitudes to predict their behaviors towards integrating agricultural concepts and activities into their future instruction, and to identify barriers to integrating agricultural activities into the elementary curriculum, and then presenting suggestions that can control those barriers.</p>

## Developmental Workshops

استخدام الروبوت في تعليم بعض مفاهيم الفيزياء

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يعتبر برنامج الروبوت من البرامج الحديثة المرتبطة بالتكنولوجيا والتي دخلت إلى المدارس السعودية الخاصة منذ العام 2006م في بداية الأمر، ثم المدارس الحكومية في الفترة الأخيرة. وكان الهدف من البرنامج في بدايته تعليم الطلاب على أساسيات بناء وتشغيل الروبوت من أجل الاشتراك في المسابقات المحلية والدولية الخاصة بعلوم الروبوت. ومع تقدم خبرة الطلاب المنخرطين في هذا البرنامج، بدأت تظهر حالات استخدام لهذا البرنامج لغير أغراض المسابقات. والتحديد استخدام أدوات الروبوت لصناعة وبناء المشاريع العلمية المختلفة وذلك لسهولة الفك والتركيب والتعديل. حتى أن الكثير من هذه المشاريع المبنية على أساس أدوات الروبوت، فازت في المنافسات المحلية والدولية على حد سواء. ومعلمين لمادة الفيزياء في مدارس الظهران الأهلية، وجدنا من خلال أسئلة الطلاب وحاجاتهم لمعلمهم، أن هذه فرصة ذهبية تتمثل في تعليم الطلاب لمواد الفيزياء والرياضيات من خلال برنامج الروبوت وأدواته. أي يصبح هذا البرنامج لا يقتصر على المسابقات والمشاريع فقط، بل يدخل في صميم عملية التعليم اليومية لمواد الفيزياء والرياضيات. الهدف العام: إكساب المتدربين القدرة على توظيف واستخدام الروبوت في تعليم بعض مبادئ الفيزياء (الميكانيكا) وتدريبهم على علوم الروبوت وكيفية الاستفادة منها في العملية التعليمية، بالإضافة إلى تنمية مهاراتهم باستخدام اساليب التعلم التعاوني والتعلم المبني على المشروع وتنمية مهارات التفكير الإبداعي والعمل اليدوي. يتوقع ان يكون المشاركون قادرين على : تصميم نماذج مختلفة من الروبوت تخدم تعلمهم للطلاب للمواد العلمية (الفيزياء بشكل خاص) مثل ( روبوت السيارة، روبوت الذراع الآلي، الرافعة، المسننات....)، استخدام ( تنفيذ مشاريع عملية (روبوت ينقل الأشياء ، روبوت يسير LEGO MINDSTORMS NXT لغة البرمجة ) باتجاهات مختلفة)، إعداد خطط ومناهج تدريبية لمادة الروبوت .

#### TEACHING CHEMISTRY FOR CONCEPTUAL UNDERSTANDING

*Nizar El-Mehtar, International College, Beirut-Lebanon*

Conceptual understanding of a subject matter introduces an appreciable challenge for most students as they have to think at a deeper level, overcome their misconceptions, make meaningful associations, and construct further knowledge. The aim of this workshop is to provide learning experiences that help students to: (a) assimilate and transfer knowledge, (b) develop a better understanding of the microscopic, macroscopic, and symbolic realms of chemistry (c) reorganize fragmented information into more complex systems, and (d) appropriate intellectual tools to enhance metacognitive learning.

#### DESIGNING STUDENT-CENTERED, PROBLEM-BASED, COLLABORATIVE SCIENCE PROJECTS

*Wissam Kabbani, Chemistry Department, Secondary School, International College, Beirut-Lebanon*

This workshop suggests a teaching strategy for active collaborative learning where students are given an opportunity to construct their knowledge by ‘playing hard, safe and fair’. Participants will acquire the essentials of designing “educational challenges” and explore the efficiency of chunking, brainstorming/filtering, reflecting, and debriefing as tools for independent learning. The workshop will also suggest appropriate assessment methods for the ‘educational challenges’.

#### ENSEIGNEMENT SCIENTIFIQUE MOTIVANT ET VIVANT. ATTENTION AU COURS MAGISTRAL

*Andrée Chaoui, University of Balamand and Saint- Joseph, Lebanon*

L’enseignement scientifique au Liban, à partir de EB1 jusqu’à EB9, doit être vivant, motivant et stimulant l’attention de l’élève, l’invitant ainsi au cours présenté. Cet enseignement peut intégrer une **interdisciplinarité** : la langue, les arts plastiques, les

maths, l'histoire, la géographie ...

En effet la Science peut être proche des disciplines citées ci – dessus en décrivant un objet, un repas, un aliment, un moteur ou autre domaine scientifique. Elle intéresse l'élève et lui facilite l'apprentissage. En effet, l'élève restituera au cours de l'apprentissage scientifique ce qu'il a appris au niveau des autres disciplines. Par ailleurs, l'enseignement scientifique doit être enrichissant. Au lieu de faire un bourrage de crâne on doit inclure l'apprentissage de la recherche à partir de EB1 jusqu'à EB9.

D'autre part, l'élève ne doit pas mémoriser sa leçon sans comprendre et suivre une méthode expérimentale. Il doit observer, se documenter, expérimenter et faire des recherches pour les présenter devant les autres car il faut s'éloigner du cours magistral!

التعليم والتعلم من أجل مستقبل مستدام (TLSF): رزمة وسائط متعددة لتدريب المعلمين

ورشة عمل مقترحة في إطار المؤتمر الإقليمي

سليمان عواد سليمان، مكتب اليونسكو الإقليمي للتربية في الدول العربية- بيروت  
غادة غلام، مكتب اليونسكو، القاهرة

أعدت النسخة العربية من رزمة مصادر التعليم والتعلم من أجل مستقبل مستدام: رزمة وسائط متعددة لتدريب المعلمين (UNESCO-Beirut, Teaching and Learning for a Sustainable Future- (TLSF, 2009)، في إطار الجهود الدولية والأقليمية لتعزيز برامج التعليم والتعلم في مجال التربية من أجل التنمية المستدامة، وبشكل خاص توفير مواد تعليمية وتدريبية للمعلمين والطلبة وبعده لغات (العربية، الإنجليزية، الفرنسية) بهدف تحقيق أهداف عقد الأمم المتحدة للتربية من أجل التنمية المستدامة (2005-2014).

وتتكون الرزمة من الأقسام التالية:

- المقدمة وإستخدام الرزمة للمناهج (5 وحدات تعليمية/ تدريبية)؛
- التنمية المستدامة عبر المناهج (4 وحدات تعليمية/ تدريبية)؛
- الموضوعات المتداخلة في المنهاج (8 وحدات تعليمية/ تدريبية)؛
- استراتيجيات التعليم والتعلم (8 وحدات تعليمية/ تدريبية).

وتهدف ورشة العمل إلى إبراز أهمية التعليم والتعلم الناشط، وأكساب المعلمين مهارات التعامل مع هذه الموضوعات وفق الاستراتيجيات المحددة لتحقيق أهداف العقد في دول مناطق العالم (7 إستراتيجيات).

وستركز ورشة العمل على تبادل الخبرات في موضوعات تدريس وتعلم الوحدات التعليمية/التدريبية وكيفية إشراك الطلبة والمتعلمين في النشاطات والمشاريع التعليمية. ويأمل مكتب اليونسكو الإقليمي- بيروت في مشاركة معلمين من لبنان والدول العربية في هذه الورشة، وبشكل خاص معلمي العلوم، الرياضيات، والتكنولوجيا. وسيتم التطرق إلى كيفية تطوير مشروعات تعليمية في المدارس والمؤسسات التعليمية لخدمة المجتمع وكذلك تحقيق الأهداف الإنمائية للألفية (MDGs).

#### LESSON STUDY IN JAPAN: CONCEPT, DEVELOPMENT, AND EFFECTIVENESS

*Kinya Shimizu, Associate Professor, Graduate School of International Development and Cooperation, Hiroshima University Japan*

Lesson study is a form of professional development of teachers that allows the cooperation of classroom teachers. A small group of teachers work cooperatively in preparing the lesson plan, demonstrate the planned lesson in front of observers, and criticize each other based on evidence from student reactions. The practice was founded more than 100 years ago by Japanese elementary school teachers who were searching for the best way to improve teaching. The benefits of the practice are not only the development of the teaching skills of the demonstrating teacher, but also the observation skills of teachers who observe the lesson. In addition, since teachers work together in developing the lesson plan and receiving feedback, teachers in the group develop the sense of sharing the goals, teaching methods, and developmental view of children.

<b>WRITING IN MATHEMATICS: A HIDDEN ELEMENT OF LEARNING</b>
<i>Hala Tayyarah , Beirut Orthodox Schools, Beirut-Lebanon</i>
Solving word problems in Mathematics has continuously caused difficulties for learners throughout all levels. This is mainly due to the students' inability to express their mathematical thoughts in writing. The purpose of this session is to emphasize the importance of writing in math and to exchange ideas in which writing can be used in math classrooms.
<b>CLASSROOM CAPSULES FOR MEANINGFUL LEARNING OF MATHEMATICS</b>
<i>Bilal Basha and Manal Malaeb, Beirut Orthodox Schools, Beirut-Lebanon</i>
This session aims at introducing an approach to effective teaching and meaningful learning of math in light of the current Lebanese curriculum. In an attempt to achieve meaningful learning, various classroom practices will be highlighted besides a variety of innovative and interactive activities. These activities include new and original ideas that are of wide interest and importance in the current mathematics literature.
<b>LEARN...TO TEACH HOW TO LEARN</b>
<i>Nibal Hamdan Barq, Academic Director, Greenfield College</i>
This development workshop serves as an essential guide for teachers who try to understand why some of their students fail and provides them with valuable advice on how to improve their teaching methods as well as their students' performance and enjoyment in any subject matter. It is based on the premise that academic success is a question of good study habits, strategies and skills that any student can develop if properly guided by teachers. Session participants will be involved in a range of activities on different teaching styles (visual, auditory and kinesthetic) and ways to help students focus in class and assess their level of attention (eye contact, posture, and other signs of attentive body language). It also shows how the physical state, environment and emotional well-being of the student affect his/her academic achievement and how interactive feedback helps the learning process. By role playing, participants shall learn how to teach the different study skills that enable the student to process the information given by the teacher (managing materials and time, best study practices, writing notes, preparing for exams and using all parts of the brain to help store, retrieve and recall information). In summary, this workshop aims to help teachers realize that no one is perfect and that they have to examine their teaching method and evaluate its effectiveness in inspiring their students and preparing them to become independent and life-long learners.
<b>ENSURING INSTRUCTION CHANGES – EVIDENCE BASED TEACHING – LOOKING CLOSELY AT THREE MODELS: LESSON STUDY, COACHING AND INSTRUCTIONAL ROUNDS</b>
<i>Max Stephens, The University of Melbourne, Australia</i>
This workshop will look at three current models of instructional improvement. All three models share important elements in common. Each assumes that the process of teacher change (and improvement of learning) is a sustained and purposeful activity undertaken across a whole school. Each assumes that a clear focus has been identified – sometimes

called a “Problem of practice” – by teachers and school administrators. Each model adopts an agreed framework and processes for working together to solve a “Problem of practice”, not simply *talking* about it. In many cases, this will involve teachers visiting and observing each other’s classrooms, and usually involves “outside” experts or advisers working with teachers. What might these models mean for mathematics classrooms, for practicing teachers and for possible leaders and facilitators? How do these models help teachers and schools to improve students’ learning?

**DOCUMENTING CHILDREN’S THEORIES: EVIDENCE OF DEEP UNDERSTANDING**

*Jennifer Le Varge and Rasha Fakhreddine, Wellspring Learning Community, Beirut-Lebanon*

Children are constantly trying to figure out how the world around them works. In fact, when adults observe them closely, they can see that behind children’s actions is the pursuit of their own theories about how the world works. Children’s ongoing quest for knowledge and their deep understanding, however, must be documented in order for educators to fully recognize the scope of their theories. Documenting children’s theories is an important tool for showing evidence of deep understanding, and for classroom evaluation and assessment. The question thus arises: How can we document children’s theories? General guidelines and suggestions for using documentation to uncover theories and strategies for digging deeper with children through scientific activities, experiments and discussions will be shared with the participants. In addition, participants will take on the role of the learner and will review and discuss examples of documentation and theories from a real preschool classroom. Participants will also have the opportunity to brainstorm ideas on how they can use documentation and deep understanding strategies in their own classrooms.

**THE 21<sup>ST</sup> CENTURY EDUCATOR**

*Bassem Kandil, Hariri 3 school, Beirut-Lebanon*

The rapid pace of globalization, the shift from an industrial to an innovation economy and the explosion of networked communications, have all created the need to work and interact in new ways and to gain fluency in new tools and paradigms. 21<sup>st</sup> century skills such as *information, media, technology, and thinking skills* are indispensable skills nowadays. Educators need to expand their skill set and receive training and support to infuse those new skills into classrooms. Real world examples of effective 21<sup>st</sup> century skills instruction will be demonstrated using *Web Quests and e-portfolios*. Participants will have the opportunity to develop and share their own ideas for how ICT can be used to facilitate the integration of 21<sup>st</sup> century skills into classroom instruction.

**SCIENCE-TECHNOLOGY-SOCIETY-ENVIRONMENT (STSE) AS AN EFFECTIVE STRATEGY THAT INCREASES STUDENTS’ MOTIVATION AND LEARNING IN SCIENCE CLASSROOMS**

*Rana Iskandarani and Amal Zaatari, Hariri High School II, Beirut-Lebanon*

Activities that challenge students to design, construct, and evaluate solutions to environmental problems are at the core of science teaching. During these activities, students actively apply principles of science, technology, society and environment (STSE) as they go about the process of developing solutions to these problems. The technology education laboratory offers a wide range of tools and materials that can be used to solve current environmental problems. This provides a learning experience that motivates

students and increases their awareness about these environmental problems. In this workshop, participants will be involved in a series of activities will help their students to enhance their reading abilities, manual skills and their ability to solve problems and taking decisions when addressing science-related everyday issues.

#### THE USE OF DATA LOGGING IN SCIENCE INVESTIGATIONS

*Viviane Khoury Saab, Physics teacher, American Community School, Beirut, Lebanon*  
*Suheir Suleiman, Biology teacher, American Community School, Beirut, Lebanon*

Data logging is the process of using a computer to collect data through an interface and sensors. The data collected could be displayed in a table as well as on a graph and statistically analyzed. The collection of the data can be controlled by the experimenter. Data logging is commonly used in scientific experiments and in monitoring systems where there is the need to collect information faster than classical equipment can and where accuracy is essential. Examples of the types of information a data logging system can collect include analyzing motion, temperatures, sound frequencies, pressure, CO<sub>2</sub> concentration and O<sub>2</sub> concentration. During the session, the use of some sensors and probes in physics and biology will be demonstrated. The participants will get involved in performing experiments using the Vernier Software.

#### CHANGING THE ROLES IN THE CLASSROOM AND GOING BEYOND THE LESSON CONTENT IN ORDER TO ACHIEVE BETTER LEARNING

*Ramzi Ataya, Houghton Mifflin Harcourt Publishers, Beirut-Lebanon*

This workshop aims at helping teachers re-examine priorities, goals and procedures by helping them to teach science and math in a way that makes the teacher a guide and allows students to be researchers and thinkers. In this context, the school and home environments become laboratories for exploring, testing and applying concepts to real life situations thus providing better opportunities for students to be in the driver's seat and to reach new heights in knowledge and skill acquisition.

#### Teaching Mathematics to Students with Learning Difficulties.

*Aline Bazerli, Sagesse High School*

The primary purpose of the session is to increase the participants' awareness and understanding of how to approach mathematics concepts to students with learning difficulties in the intermediate and secondary divisions. A presentation will introduce the participants to the definition and types of learning difficulties, then will explain the features of the math learning difficulty. Then the participants will take on the role of the learner by exploring how a math lesson is modified and taught, how an individualized education program (IEP) is written, and how a test is prepared for students with learning difficulties on the overhead projector. It is important for teachers to remember that modification is applied once the communication between the math regular education teacher and the special education consultant in school is done and a formal assessment is carried out to reveal the presence of the learning difficulty. Then, participants will be divided into groups of 5-7 persons each. Each group will be handed a math lesson. Participants will modify the lesson in order to fit the needs of the student, to write an IEP, to implement the proper teaching strategy, and to prepare a quiz or test to evaluate that lesson. Moreover, they will present their work on the overhead projector with discussion. Finally, the participants will evaluate the session by filling an individualized evaluation

sheet. Time will be given for teachers to share their personal experiences.
<b>USING LANGUAGE SWITCHING TO SUPPORT FOREIGN LANGUAGE LEARNERS IN SCIENCE CLASSROOMS</b>
<i>Tamer G. Amin, Lebanese American University, Beirut-Lebanon</i>
<p>Teaching science in Lebanon is conducted in a complicated linguistic environment. Many students at the elementary level and all students at upper levels are learning science in a language that is not their native language. Increasingly, recent developments in science curricula and recommendations regarding more effective teaching practices place great demands on communication and, therefore, students' linguistic abilities. Schools often have policies that prohibit the use of Arabic in the classroom when the language of instruction of a subject like science is officially a foreign language like English or French. However, research has shown that the strategic use of students' native language in such situations can be an effective teaching strategy. This developmental workshop introduces participants to a variety of strategies for effectively switching between languages during science lessons.</p>
<b>CAN EARTHQUAKES BE USEFUL?</b>
<i>Dr. Mounib Eid, American University of Beirut, Beirut-Lebanon</i>
<p>I intend to report on an experiment I have done in the junior-Senior class I taught during the fall semester of 2009/2010 at AUB. The course, "Introduction to Astrophysics included 11 students (physics, math and engineering majors). I selected an important chapter of this course dealing with properties of Earth and its atmosphere. I connected this issue to the problem of "global warming" and "ozone depletion". My aim was to find out if motivation for learning can be enhanced through increasing students' knowledge.</p> <p>One Chapter of the course I am offering during the fall semester of 2009/2010 at AUB to 11 students of mixed majors (Physics, Math and Engineering) concerns the basic properties of the Earth's interior and a detailed description of the Earth's atmosphere. Many people think that earthquakes are a "bad work of nature"; very few realize the usefulness of earthquakes as a stabilizing factor for the Earth's stability, and that they constitute a powerful tool to verify our theoretical modeling of the internal structure of the Earth. For example, how do we know whether the Earth's interior is solid or liquid? Of course, through the analysis of seismic waves.</p>
<b>THE BREVET SCIENCES AND MATHEMATICS MONITORING PROJECT: THE EARLY DAYS</b>
<i>Barend Vlaardingerbroek, Rabih El-Mouhayar, Saadeddine Shehab, Nadya Rizk and Jana Bayoud, American University of Beirut, Beirut-Lebanon</i>
<p>As well as being filtering and sorting mechanisms, curriculum-based external examinations at critical junctures of the school cycle provide a wealth of information about learning at those levels. This information can be gained access to by means of diagnostic analyses of samples of candidate examination scripts. Feedback thus obtained is of value to teachers, examinations personnel, curriculum developers and teacher in-service training providers. The Brevet Sciences and Mathematics Monitoring Project began with a pilot analysis of the 2006-7 Brevet Chemistry and Physics examinations conducted during the summer of 2008. The Project has now become a joint effort between AUB and the Lebanese Ministry of Education and Higher Education. This seminar will outline the inception of the Project</p>

and progress to date.

### **JOUONS AVEC LES MATHS**

*Samia Hénainé, Lycée Houssam Eddine Hariri, Saida-Liban*

Les élèves acquièrent mieux les concepts mathématiques par la manipulation du matériel concret. Cela les aide à construire une représentation mentale du concept. Les objets à manipuler, et surtout au cycle primaire, sont des introductions concrètes aux idées abstraites. Chaque élève devrait avoir l'occasion de participer à des expériences concrètes, en utilisant les objets appropriés, avant de commencer à travailler les exercices d'application. Concernant les ressources imprimées, y compris le manuel scolaire et le cahier d'activités, celles-ci n'offrent que des représentations symboliques et picturales des concepts mathématiques. Cette session offre aux participants des idées simples sur la façon d'utiliser un assortiment d'objets à manipuler (objets achetés, construits ou collectionnés auxquels les élèves ont accès à tout moment). Ces idées permettent d'expliquer, de motiver et même d'évaluer les apprenants. L'important c'est d'assurer la compréhension des concepts plutôt que la mémorisation machinale des règles et d'algorithmes. Les participants auront également l'occasion de partager et de développer leurs idées sur la façon d'utiliser des objets simples.

### **TEACHING OF MATHEMATICS AND SCIENCE IN PRESCHOOL: AN INTEGRATIVE APPROACH**

*Joelle Badran and Magida Sala, Beirut Orthodox Schools, Beirut-Lebanon*

This session aims at introducing a holistic and integrative approach to the teaching and assessment of math and science in preschool by training and assessing learners on complex and interactive situations that bear various problem solving strategies, in addition to a variety of moral and behavioral values. The session is highly interactive where the attendees will participate in several activities, and conclusions will be collaboratively constructed.

### **A HOLISTIC CONTEXT OF TEACHING SCIENCE: AN INTEGRATED APPROACH**

*Salwa Rifai and Rola Sarouja, Beirut Orthodox Schools, Beirut-Lebanon*

“Knowledge learnt in isolation is rapidly forgotten”

Here comes the importance of integration. Integration aims at giving the students a holistic instead of a fragmented outlook on their studies. This overcomes the separation in the students' thinking between scientific concepts and their application in real life. The holistic approach is inquiry driven, interdisciplinary, and integrated and is based on explicit assumptions of interconnectedness. Central to the aim of achieving a well-balanced personality through education, is to blend values across the curriculum, integrate disciplines and apply the process of learning inside and outside classrooms. In this session, samples of integrated activities between science and other subjects where values are transmitted will be presented. Afterwards, an application will be presented to show how to integrate a science theme with other disciplines and stressing on values.

### **SOLVING MATH PROBLEMS WITH FUN**

<i>Samar Sultan, Math teacher, Al Kawthar Secondary School, Lebanon</i>
<p>As the emphasis has shifted from teaching problem solving to teaching <i>via</i> problem solving, many writers have attempted to clarify what is meant by a problem-solving approach to teaching mathematics. The focus in this approach is on teaching mathematical topics through problem-solving contexts and inquiry-oriented environments which are characterized by the teacher helping students construct a deep understanding of mathematical ideas and processes by engaging them in doing mathematics: creating, conjecturing, exploring, testing, and verifying. But all of this can be done while doing interesting activities making learning more fun!</p>
<b>WHY INQUIRY IN MATH AND SCIENCE?!</b>
<i>Bilal Jradi and Zakaria Hmadi, Math teachers, Al Kawthar Secondary School</i>
<p>According to the National Research Council, “inquiry into authentic questions generated from student experiences is the central strategy for teaching science”. Many educators, however, misunderstand what is meant by inquiry, believing that the term applies to almost anything they do. This workshop offers a model for specialists in the field of education. It addresses the concept of inquiry learning in science and math, which is an educational approach where the student takes the role of a scientist and conducts his/her activity through the stages of scientific research such as: observation of phenomena, asking questions, formulating hypotheses, designing experiments, collecting data, offering explanations and coming up with conclusions. The workshop also presents the basic features of inquiry which allow effective participation of students, the different types of inquiry and applying some practical inquiry strategies. The workshop also helps science and math teachers to use inquiry based learning in teaching these two subject matters through lesson models and examples from the real field work.</p>
<b>THE LEVANT BETWEEN GENES AND HISTORY</b>
<i>Pierre Zalloua, Lebanese American University, Lebanon</i>
<p>The fossil and historical records fix human origins in Africa, but little is known about the great journey that took <i>Homo sapiens</i> to the far reaches of the Earth. Recently genetic evidence has shown that we are all related descended from a common African ancestor who lived only 60,000 years ago. Though thousands of years have passed, the full story remains clearly written in our genes. Our genes allow us to chart the ancient human migrations from Africa across the continents.</p> <p>Today, the virtual geographical frontiers of the Levant define a territory that accommodates for a multiplicity of ethnicities and indigenous populations with yet unconfirmed origins and an obscure history of how they reached to populate this area and achieve this diversity. Could we talk of a Levantine lineage and how far in time could we trace it back? Did it start with the Phoenicians? With the migrations from Mesopotamia? Or after the invasions from the Arabian peninsula? The Levant has always been described in literature as a corridor for migrations out of North Africa and a frequent, if not universal, passageway for migrators to and from the European continent but little is known about the temporal and spatial (inland as opposed to outland) pattern of settlement, if any, that accompanied these migrations throughout history. Subsequent invasions of the area also</p>

contributed to this diversity, the extent of which is to be assessed. Behind this anthropologic significance lies an ultimate medical opportunity to advance in human medical genetics research, touching upon population disease heritability and susceptibility. Finally stands a pure historical advantage where a genetic back-up to consolidate or refute major historical facts and events related to migrations, intermarriages, diaspora, etc. will be available.

This presentation will discuss how the Levant differentiated throughout time to define a genetic entity by itself. It will describe the phylogeography of the Levant, using the Y chromosome biallelic markers as the genetic material. It also aims at dating the major population genetic events through linear and exponential time expansion. Subsequent genetic analyses of preserved bodily remnants of historical figures could shed the light on all the possible founder effects this area of the world has known.

### **USE OF MEDIA IN SCIENCE EDUCATION: GUIDED ANALYSIS OF A SCIENTIFIC DVD**

*Andrée Thoumy, Lebanese University & DIDAKTA Conseil et production, Beirut-Lebanon*

Media and techniques of communication and information are today a part of science teaching/learning. However, no special training is actually given (neither to the teachers nor to the learners) to allow the users of such material to benefit from this activity. We hypothesize that a general statement, provided to the audience on the aims of the used tool before its projection, can guide the audience to focus their attention, and to identify the different scenes which illustrate the mentioned aims. For instance, the statement: “This movie has scientific, educational and environmental aspects” can be provided to the audience before the presentation, and the attendees will be asked to identify the images corresponding to the mentioned aspects, and to write their answers. Other aspects can be perceived by the audience and intentionally not mentioned by the author. The movie deals mainly with ethological aspects of the life of a cat’s family and includes scenes of the family life, such as the cares to the newborns, the language of communication between the members, the games between the kittens, the hierarchical fight between two adult males. It also shows the feeding and hunting behavior of this animal group. Educational aspects consist in showing some biological relationships. On music of Beethoven, the movie ends with messages of tenderness and generosity, through the adoption of a baby cat by his mother’s sister and her babies, and also by peace and hope messages. The last image glorifies Lebanon’s natural beauty.

## **Innovative Idea**

### **1,2,3-ROTATE: BIOLOGY LEARNING CENTERS**

*Amina Harbali, Hariri High School II, Beirut- Lebanon*

The successful implementation of differentiated instruction in middle and high school biology is one of the challenges that any biology teacher confronts. In this workshop, participants experience learning centers, which is one form of differentiated instruction. The concept of “blood types” (Grade 8) will be the core of what teachers will be exploring during this session. Additional examples will be provided including “Plants” (Grade 10)

and “DNA” (Grade 11). Experiential learning of participants coupled with research findings will be used to establish a common conceptual understanding of differentiated instruction that is research-based.

### **CONCEPTUAL AND INTEGRATED MATH INSTRUCTION**

*Rola Hallak and Israa Fawaz, Makassed Houssam Eddine Hariri High School, Saida-Lebanon*

Conceptual and integrated instruction are essential features of an effective math class. However, what are some of the applicable inquiry-based strategies to teach math skills and attain a conceptual understanding? If you are aiming at changing your math class into a dynamic motivating space where real life situations are available, attending this workshop could be an interesting experience of math exploration. Through a series of inquiry-based, conceptual and integrated activities, participants will be introduced to conceptual understanding in math. Moreover, participants will discuss the importance of literacy in attaining proficiency and deeper understanding of math skills.

### **HABITS OF MIND FOR SCHOOL MATHEMATICS**

*Dr. Sumaila Sabbagh, Amman-Jordan*

Technology makes information available so rapidly and conveniently. Wagner (2003) observes, "The problem today is no longer access to information. The challenge is how to filter and make sense of all the information that bombards us daily. Thinking skills are more important than ever as we try to sort out both what is true and what is important from the overwhelming amount of data available online"(p. 20). Currently, literate individuals must be selective and mindful of the information they choose to use. However, what does it mean to be a good thinker? Nowadays, being a good thinker means having thinking skills in addition to motivation, positive attitudes, values and habits of mind which play key roles in good thinking, and in large part it is these elements that determine whether people use their thinking skills when these skills are needed. This has led mathematics educators to commit to generating new learning goals for students that are less skewed in favor of learning skills and facts and more focused on student thinking (NCTM ,2005: 1). Therefore, this presentation will introduce the key components that could be used to frame the identification of goals in mathematics which focus on reasoning skills and habits of mind and will try to answer the following questions:

1. What are "Habits of Mind" in general?
2. What are "Reasoning Habits of Mind" in mathematics education?
3. What are the roles of each of the teachers and students in improving those habits?

### **AN E-BOOK WILEYPLUS SUCCESSFUL TEACHING EXPERIENCE IN LARGE INTRODUCTORY PHYSICS CLASSES**

*Samih Isber, Department of Physics, American University of Beirut, Beirut-Lebanon*

In this session, I will discuss my recent experience in active teaching/learning by using an online textbook, which is also called an E-Book. Current advances of technology and digital-media helped teaching techniques to evolve tremendously. Over the last two semesters, I used the *WILEYPLUS* online *Fundamental of Physics* textbook in teaching Physics 210 “Introductory Physics II” (270 registered students). This technique allows instructors and students to have access to vital teaching and learning materials that include the full version of the textbook in digital form, in addition to a printed copy of the textbook. Reading assignments, graded homework, announcements, online

examination, visualizing physical concepts using short movies, and self-assessment through practice problems can be easily accomplished using *WILEYPLUS*. One of the many advantages of this technique that will be fully explored during the proposed session is homework assignment. Homework for students in large introductory classes (high school level or freshman/sophomore university level courses) constitutes a serious concern for instructors. This teaching method allows instructors to assign to students a set of homework problems on each chapter. Every student will get a set of problems or multiple-choice questions that are conceptually similar but numerically different from the rest of his/her classmates. The students' number of attempts can be monitored so that initially a hint option can be enabled if the student fails to reach the right answer. The detailed solution can also be enabled within or after the deadline so that the students have some online written feedback on the homework.

### **MOTIVATING STUDENTS THROUGH THE INFUSION OF TECHNOLOGY**

*Simon Barakat, American Community School at Beirut, Beirut, Lebanon*

Technology can be an effective and powerful tool in enhancing students' learning. Students show more interest and a higher level of motivation when lessons are technology-based. Implementation of technology in classes will positively reflect on students' motivation and interest in learning the subject matter, engagement, desire to learn, long term content retention, and performance and attitude. Integrating technology in the learning environment makes learning student centered, more cooperative, gives students greater self-esteem and more self-confidence. In addition, it allows learners to control their own learning, work at their own pace, take more initiative, and learn independently. The main objective of this workshop is to show how to design a technology-based lesson using all possible resources and how to integrate it into the curriculum.

#### **التدريس بالأسلوب التكاملي ( المرحلة الأساسية ) حياتنا و الماء**

سناء البنا، المدارس العصرية، عمان- الأردن  
ميس كمر كجي، المدارس العصرية، عمان- الأردن

تشكل المناهج الدراسية وسيلة التربية في تحقيق أهدافها، مما يجعل الربط بينها يحقق خبرة ومعرفة متكاملة للمساعدة على تنمية مهارات التفكير بصورة وظيفية لدى المتعلم وعلى نمو شخصي متكامل لديه. ويقوم الأسلوب التكاملي في التدريس على تأثر المعارف حول محور معين ترتبط فيه المفاهيم ويتطلب استخدام مصادر تعلم وطرق تدريس متنوعة. كما يتميز الأسلوب التكاملي في بناء المناهج وطرق تدريسها بالمرونة في التطبيق ويؤدي إلى نواتج تعليمية متكاملة وأكثر ثباتاً ودواماً وقابلية للنقل للمواقف الحياتية. وسوف يتم إطلاع المشاركين على أسس التكامل في بناء المادة التعليمية، وعلى مخططين لمفاهيم وحدة متكاملة بعنوان "حياتنا والماء" أعدت احدهما للصف الأول الأساسي والثانية للصف الثالث الأساسي. كما سيتم عرض أمثلة توضيحية لتدريس الوحدة الذي يوظف الاستقصاء ودرس مسجل لصف حقيقي نفذ بأسلوب التكامل. وستتاح للمشاركين فرصة لتصميم وحدة دراسية قائمة على التكامل وممارسة بعض الأنشطة التعليمية ذات الصلة.

#### **أفكار بديلة عن الأدوات التقليدية لتقويم الطلبة في العلوم**

د. عبدالله بن خميس أمبوسعيد، قسم المناهج وطرق تدريس كلية التربية/ جامعة السلطان قابوس، سلطنة عمان

يعد التقويم التربوي من العناصر الخمسة الأساسية في منظومة المنهج، ويحتل موقعا متميزا فيها. ولا يمكننا أن نتصور وجود منهاج دون أن تكون عملية التقويم مصاحبة له للتعرف على مدى تحقق أهدافه. وتبقى أدوات التقويم المستخدمة الجزء الأساسي والمهم في عملية التقويم، فمتى كانت هذه الأدوات صادقة وثابتة، فإن نتائجها ستكون صادقة لمعرفة أثر البرنامج المدرسي على تعلم الطلبة والعكس صحيح. وتعد الاختبارات بأنواعها أكثر الأدوات شيوعا واستخداما في مدارسنا؛ وقد يرجع ذلك بالأساس إلى سهولة استخدامها في ضوء الكثافة الطلابية داخل المدارس، وألفة المعلمين بها، وأخيرا سرعة تصحيحها وإعلان نتائجها. ولكل نوع من أنواع الاختبارات عدد من

الإيجابيات وعليه مجموعة من المثالب أو السلبيات. وقد أشارت بعض الدراسات إلى وجود بعض المشاكل في الأسئلة التقليدية المعروفة في اختبارات الطلبة؛ لذا فمن الأهمية البحث عن طرق أخرى بالإضافة إلى الأسئلة (Structural Communication Grid) (Linked) أسئلة تفرع الصواب والخطأ (Venn Diagram) وأشكال فن (Structured Questions)، والأسئلة التركيبية (True/False) ، (Cartoons) ، والرسوم الكاريكاتورية (Structured Questions)، والأسئلة التركيبية (True/False) ، وأسئلة المكعب والمنظمات التخطيطية وغيرها، وستحاول هذه الورقة تعرف المزيد على كيفية استخدام هذه الأنواع مع إبراز إيجابيات كل منهما، مع تقديم أمثلة لها من مادة العلوم توضح كيفية استخدامها.

### MOLECULAR SWITCHES

*Zarifeh Geries Jarjour, Lebanese University, Beirut-Lebanon*

Molecular switches control many functions of our body. The molecular switch resembles an electronic switch we use to turn lights on and off. It is a much smaller device (nanoscale) in which one biochemical partner controls the activity of another. Vision is one of the processes controlled by molecular switches. When light hits your eye, it takes only a few trillionth of a second to turn the switch on. The molecules shift between two states in response to changes in light, enabling you to see.

### USING BEANS TO ILLUSTRATE THE WAY GAMETES COMBINE RANDOMLY DURING SEXUAL FERTILIZATION

*Michel Khuri, Lebanese Evangelical School for Boys and Girls & Beirut Baptist School, Beirut-Lebanon*

Genetics is an important part of the life science curriculum for the Brevet class. The average student might have a hard time understanding this subject, which is rather abstract and involves some mathematical calculations and many analysis skills. This is especially true when it comes to explaining how gametes combine randomly during sexual fertilization. In this workshop, beans and ordinary paper bags will be used to illustrate the mentioned process. These simple materials are within reach in all schools, and the teacher can even invite the students themselves to bring them from their homes. After performing the experiment at school (in the lab or even in class), students are required to write a scientific report that follows clear guidelines provided by the teacher. This is maybe one of the very rare opportunities available for practicing writing a scientific report in the whole life science curriculum for the Brevet Class.

### EXPLORING DATA APPLICATIONS IN EARLY CHILDHOOD

*Mira Kaddoura and Kat Abkemeier, Wellspring Learning Community, Beirut-Lebanon*

Math and science in the early-childhood years have typically been taught through stand-alone lessons that have little or no connection to student interest and inquiry. The idea behind this approach is that young children must be instructed about how the world works from an adult's point of view rather than being allowed to discover how the world works through their own perceptions. "Data" is a word that you start hearing when students are old enough to learn about the scientific method and conducting experiments in the science lab, but what if that didn't have to be the case? What if young children were exposed to more authentic ways to manipulate and investigate data that are imbedded in their daily routines and lessons? In the early childhood years, students are often underestimated in their ability and enthusiasm to inquire by using data. So the question arises: How can

educators integrate math and science, specifically data representation and application, within the classroom in order to provide more meaningful opportunities for student investigation and understanding? General ideas for investigating data within the classroom will be shared and discussed with participants, as well as ways to incorporate data into daily routines. Participants will have the opportunity to examine and reflect on authentic student work with data and data applications currently used in a local preschool. Participants will also engage in hands on activities exploring how data can be used in the preschool classroom.

### **TEACHING SCIENCE THROUGH OBSERVATION**

*Roula Jawad, Hariri High School II, Beirut- Lebanon*

Observation is one of the most vital scientific skills that science curricula emphasize. The latter advocate having better observers in class, with deeper understanding of science and science inquiry. Learning to make meaningful observations, which focus mainly on enhancing students' use of all their senses, is one of the valuable skills a teacher can teach. To accomplish the goal of encouraging students to practice meaningful observations can take the form of various activities practiced either inside or outside the classroom. The purpose of this workshop is to help participants enhance observation in the teaching of science for preschool and elementary level students. The implementation of different hands-on activities in this workshop adds to the significance of applying such a skill in different science classes. In addition, sample illustrations in the forms of videos and photos reveal examples of authentic activities done by students in class. These are included in the workshop to support the magnitude and value of observation in science curricula.

### **IN TOUCH AND ONLINE WITH TECHNOLOGY: TOOLS FOR 21<sup>ST</sup> CENTURY TEACHERS**

*Dan R. Tanner, Houghton Mifflin Harcourt International Publishing, Florida-USA*

Today's students are more technologically savvy in the "outside" world. They are constantly demanding the most up-to-date resources to keep them engaged in the world around them. Instruction must meet the expectations of today's students. Without doing so, students will continue to struggle. Teachers are seeking ways to build on these interests, demands and connections based upon student interaction in the world as "digital natives". Teachers currently find themselves in the role of "digital immigrants" and constantly strive to keep up with their students' technological needs. Embracing the future of instruction, teachers realize the power and depth of understanding of instruction when connected to science and mathematics. Technology can bring a strong understanding of concepts and skills into the classroom that might not otherwise be available because of time, distance and available materials. The primary purpose of this session is to deepen participants' appreciation and understanding for the role of a current instructional technology facilitator for classroom instruction.

### **USING VIDEO ANALYSIS FOR SCIENCE EDUCATION**

*Gerard Ezcurra, Vernier International, Florida-USA*

Modern educators have many tools available to them to enhance the student's understanding of scientific principles (such as websites, simulation software and data collection tools). One such tool is video analysis, which allows students to record "real world" events in their everyday life, analyze them, show the relevancy of the applicable laws of science and apply mathematical analysis to them. Participants will get a chance to

see demonstrations on how this works both as a standalone analysis of recorded videos, and in conjunction with the collection of data using sensors. In addition to demonstrations, participants who bring their own personal computers will get a chance to do their own hands-on work.
توظيف التكنولوجيا الرقمية في التدريس ( استخدام الفيچول بيسك Visual basic والبوربوينت PowerPoint بطريقة مبتكرة في التدريس)
وائل حسن، مدارس الأتجال الأهلية بجدة – السعودية
استخدام التكنولوجيا الرقمية في التدريس له أهمية كبيرة للمعلم والمتعلم فعندما يقوم المعلم بعمل البرنامج التعليمي فإنه يتعرف على المهارات اللازمة للطالب لتثبيت المعلومة في ذهنه كما أنها تساعد المتعلم على استكشاف المعلومة والوصول إلى الحل بطريقة علمية سليمة. فضلا عن معرفة المعلم باستخدام التكنولوجيا الرقمية الحديثة ومعرفته لأنها سهلة الاستخدام وتنمي مهاراته التعليمية. واستخدام مثال لبرنامج القسمة المطولة الذي قام المعلم بعمله وكيفية إدارة الحصة من خلال استخدام التكنولوجيا الرقمية.
استخدام الوحدات النمطية لتعلم بعض المفاهيم والمهارات المرتبطة بالثقافة العلمية للمرحلتين الابتدائية والمتوسطة. أحمد الرويني، قسم العلوم والرياضيات/ مدارس الظهران الأهلية، الظهران- المملكة العربية السعودية.
من الممكن أن يصمم المعلم بنفسه مجموعات من الوحدات النمطية ويستخدمها بطريقة معينة تسهل تعلم الطلاب لبعض المفاهيم والأفكار والمهارات الأساسية المتضمنة في معايير العلوم science content standards مثل مفهوم الأنماط والاتجاهات patterns and trends وأهميته لتعلم أفضل للكثير من موضوعات العلوم. يعد استبصار الأنماط والاتجاهات من المهارات المميزة للمثقفين علمياً وللعلماء، كما أن إدراك مفهومي الأنماط والاتجاهات والتمكن من هذه المهارة ييسر تعلم الطلاب لموضوعات علمية أخرى أساسية مثل الجدول الدوري، وييسر لهم التنبؤ وهو أيضاً من المهارات العلمية، كما يمكن استخدام نفس الوحدات النمطية كمدخل لتعليم الطلاب منطق وأسس الاستقصاء العلمي حيث يطرحون أسئلة ويجدون لها حلولاً من خلال دليل مستند إلى بيانات متاحة لهم بالفعل. سيقوم المشاركون باستخدام نفس المجموعة من الوحدات النمطية التي تتكون من أشكال مختلفة ذات ألوان ومقاسات مختلفة ويعلقو كل شكل منها رقم، وذلك بأكثر من طريقة يستكشفون خلالها الطرق الممكنة للاستفادة منها في صف العلوم. وسوف يطلع المشاركون على بعض الاستخدامات الأساسية ثم يشاركون في نقاش وعصف ذهني عن الطرق المختلفة للاستخدام والأغراض المختلفة التي يمكن تحقيقها باستخدام الوحدات النمطية علاوة على مقترحاتهم لتحسينها كأداة تعلم نشط.
<b>SCIENCE AND VALUES: “A STORY OF CHALLENGE”</b>
<i>Diana Sarieddine and Randa Abu Salman, Beirut Orthodox Schools, Beirut-Lebanon</i>
This session aims to introduce approaches that can be used to integrate values in the teaching of science and how these values can be taught through the process of science inquiry. This approach touches on investigating the nature of science from a cross-curricular perspective. Participants will be engaged in various integrative activities that constitute a new approach to integrating values in the process of teaching in science classrooms.
<b>GLOBAL WARMING AND WHAT SECONDARY AND INTERMEDIATE CLASSES CAN DO TO REDUCE IT</b>
<i>Elie Saad, Jesus and Mary School, Rabweh-Lebanon</i>
Global warming is considered one of the greatest environmental threats of the 21st century. The purpose of this workshop is to present the causes and effects of global warming After developing, discussing and sharing their own ideas about the topic, participants will be

introduced to methods to reduce global warming that can be shared with their students.
<b>“ONCE UPON A TIME...”</b>
<i>Dana El-Dimassi El-Oueini and Nadia Sadik, Wellspring Learning Community, Lebanon</i>
Fairytales are a rich way to introduce literature to children in a creative and imaginative way. They also allow for wonderful opportunities to integrate various subjects to enrich the learning experiences of students. The core of the session is on how math and science objectives can be integrated into fairytales in order for learners to experience how mathematical and scientific concepts are part of the characters’ adventures to rescue a princess or win a battle with a dragon. Participants will experience various hands-on activities that show how math and science can be integrated with fairytales.
<b>HEY, MY 8-YEAR-OLD CAN DO THAT!</b>
<i>Rima Halabi and Thomas Pederson, American Community School at Beirut, Beirut-Lebanon</i>
When problems and methods are presented in a developmentally appropriate manner, students can solve many high school math problems as early as grade one. This workshop will present class activities that illustrate how fundamental algebraic and statistical concepts can be developed from early elementary grades onwards. Demonstrations will show how a single mathematical problem can be successfully tackled at different developmental stages. The algebraic problems set the foundations for the concepts of variables and equations. The statistical problems set the foundations for inferential statistics. Participants in this workshop will be grouped by grade level to develop strategies for new problems.
<b>TRANSDICIPLINARY EDUCATION: MAKING IT AUTHENTIC, EASY AND POSSIBLE</b>
<i>Calin Duke and Nisreen Ibrahim, Wellspring Learning Community, Lebanon</i>
Traditional schooling that divides information into arbitrary subjects is not only artificial but also fails to train children to see the “bigger picture.” An education that values trans-disciplinary learning is not only more authentic but it also fosters children’s natural curiosity. By allowing children to ask questions and explore topics without categorizing these ideas as “math” or “science” etc., we help students see patterns and make connections. Trans-disciplinary education can sometimes seem overwhelming and indeed it does take a lot of planning. However, because it is more authentic, once a teacher starts thinking in these terms, ideas of integration start popping up everywhere. For example, an unusually warm Saturday in December at the beach might get a teacher thinking about global warming. This might lead the teacher to remember a great article about this topic. In class, students’ questions about weather patterns across the years lead to an exploration of line graphs. The teacher may also take this opportunity to introduce vocabulary related to the topic. Voilà! science, math and English all from a day at the beach. This can easily be expanded to include a writing activity as well. This session will help teachers gain an understanding of how to integrate math, science and language arts in easy and authentic ways. This session will explicitly show how the different disciplines fit together to help students have a more holistic, “real world” understanding of overarching concepts.
<b>USING OTHER SUBJECT MATTERS TO DEEPEN UNDERSTANDING OF MATH AND SCIENCE CONCEPTS</b>
<i>Ola Itani Zein and Nour Ghusayni, Wellspring Learning Community, Lebanon</i>

Have you ever tried to use a good math or science resource that is in a language other than the language of instruction? This session will focus on how trans-disciplinary subjects and different languages can provide a good opportunity to launch into and inquire about math or science lessons. The presenters will focus on how learning math and science in different contexts will deepen students' understanding of concepts, help students make connections and enrich students' vocabulary. Presenters will also focus on how students can be challenged to view language (other than their main language of instruction) as a tool for learning and communicating in math and science. The presenters will share their first hand experience of using the bilingual approach with their students and participants will have an opportunity to apply this approach in similar settings.

**DISCIPLINE PROBLEMS: YOU CAN HANDLE THEM ALL**

*Lamis Adada and Nisrine Awarke, Hariri High School II, Beirut-Lebanon*

Effective classroom management and the ability to cope with different types of students have been the concern of many teachers. In fact, all teachers want to know the secret to helping their students succeed in school and become responsible, productive, and happy members of society. In this workshop, participants will be provided with the information, language, and skills they need to guide their students towards appropriate and responsible behavior. The session will shed light on certain discipline problems such as the class clown, apple polisher, rebel, cheater and disrespectful student, in addition to providing effective techniques for better classroom discipline.