THE ATHENS INSTITUTE FOR EDUCATION AND RESEARCH

Abstract Book
16th Annual International Conference on Information Technology & Computer Science

18-21 May 2020, Athens, Greece

Edited by
Gregory T. Papanikos

2020

Abstracts

16th Annual International Conference on Information Technology & Computer Science

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(In Alphabetical Order by Author's Family name)

Preface

This book includes the abstracts of all the papers presented at the *16th Annual International Conference on Information Technology & Computer Science (18-21 May 2020)*, organized by the Athens Institute for Education and Research (ATINER).

A full conference program can be found before the relevant abstracts. In accordance with ATINER's Publication Policy, the papers presented during this conference will be considered for inclusion in one of ATINER's many publications.

The purpose of this abstract book is to provide members of ATINER and other academics around the world with a resource through which to discover colleagues and additional research relevant to their own work. This purpose is in congruence with the overall mission of the association. ATINER was established in 1995 as an independent academic organization with the mission to become a forum where academics and researchers from all over the world could meet to exchange ideas on their research and consider the future developments of their fields of study.

It is our hope that through ATINER's conferences and publications, Athens will become a place where academics and researchers from all over the world regularly meet to discuss the developments of their discipline and present their work. Since 1995, ATINER has organized more than 400 international conferences and has published nearly 200 books. Academically, the institute is organized into 6 divisions and 37 units. Each unit organizes at least one annual conference and undertakes various small and large research projects.

For each of these events, the involvement of multiple parties is crucial. I would like to thank all the participants, the members of the organizing and academic committees, and most importantly the administration staff of ATINER for putting this conference and its subsequent publications together. Specific individuals are listed on the following page.

Gregory T. Papanikos
President

16th Annual International Conference on Information Technology & Computer Science, 18-21 May 2020, Athens, Greece

Scientific Committee

All ATINER's conferences are organized by the <u>Academic Council</u>. This conference has been organized with the assistance of the following academic members of ATINER, who contributed by chairing the conference sessions and/or by reviewing the submitted abstracts and papers:

1. Gregory T. Papanikos, President, ATINER & Honorary Professor, University of Stirling, U.K.
2. Pascal Jollivet, Head, Computer Unit, ATINER & Associate Professor, Université de Technologie de Compiègne / Sorbonne Université, France.
3. Panagiotis Petratos, Vice-President of Information Communications Technology, ATINER & Fellow, Institution of Engineering and Technology & Professor, Department of Computer Information Systems, California State University, Stanislaus, USA.
4. Zoi Apostolia Philippakos, Editor, Athens Journal of Education, ATINER & Assistant Professor, University of Tennessee, Knoxville, USA.
5. Thomas Fehlmann, Academic Member, ATINER & Senior Researcher, Euro Project Office AG, Switzerland.

FINAL CONFERENCE PROGRAM
**16th Annual International Conference on Information Technology &
Computer Science, 18-21 May 2020, Athens, Greece**

PROGRAM

09.00-10.00
Registration

10.00-10.30
Opening and Welcoming Remarks:
- Gregory T. Papanikos, President, ATINER
- Zoi Philippakos, Assistant Professor, University of Tennessee, Knoxville, USA & Co-Editor, Athens Journal of Education.

10.30-11.00
Lena Bostrom, Professor, Mid Sweden University, Sweden.
Goran Bostedt, Associate Professor, Mid Sweden University, Sweden.
Title: Upper Secondary School Teachers' and Students' Views on Students' Motivation to Study. (PowerPoint)

11:00-11:30
Niclas Lindstrom, Associate Professor, Umeå University, Sweden.
Title: On how RE Teachers Address the Sometimes-Conflicting Tasks of Conveying Basic Values and Tools for Critical Thinking. (PowerPoint)

11:30-12:00
Lars Samuelsson, Associate Professor, Umeå University, Sweden.
Title: Ethics Teaching in Education for Sustainable Development. (PowerPoint)

12:00-12:30
Dorit Barchana-Lorand, Lecturer, Kibbutzim College of Education, Technology and the Arts, Israel.
Title: Schiller's Unfulfillable Promise: Justifying Art Education on Moral Grounds. (PowerPoint)

12:30-13:10
Athanasia Chatzifotiou, Senior Lecturer, University of Sunderland, UK.
Title: Beneficial or Detrimental? The Relationship between Sustainability, Eco-Schools and Ofsted Reports in England. (PowerPoint)
Summary

13:10-13:40
Khadija AL Balushi, Teacher Educator, Ministry of Education, Oman.
Title: "…They Feel that they Have a Voice and their Voice is Heard": Efl Teachers' Views about Participatory Professional Development. (PowerPoint)

13:40-14:10
Ilaria Viola, PhD Student, University of Salerno, Italy.
Title: Why do Teachers Decide to Teach? Factors Influencing the Choice of Becoming Teacher in Italy. (PowerPoint)

14:10-14:40
Eirini Symeonidou, Master Student, King's College London, UK.
Title: The Academic Achievements and School Life Interactions of the Recently Arrived Refugee Children in the Greek Primary Schools: Teachers' Perspectives. (PowerPoint)

14:40-15:00
Julio Cesar Barros, Assistant Professor, Researcher, Universidad Nacional de Río Cuarto, Argentina.
Title: Geometric Knowledge: Learning to Think Complexly the Notion of "Riemann Curvature Tensor". (PowerPoint)

15:00-15:30
Patricio Flores-Morales, Assistant Professor, University of Concepcion, Chile.
Title: Application of the Theory of Model-Based Learning and Teaching to an Experimental Stoichiometry Class. (PowerPoint)

15:30-16:00
Leah Patricia Hollis, Associate Professor, Morgan State University, USA.
Title: Tyrants in the Cloud: Social Dominance and Cyberbullying in American Higher Education. (PowerPoint)

16:00-16:30
Chad Loes, Professor, Mount Mercy University, USA.
Title: The Impact of Collaborative Learning on Academic Motivation. (PowerPoint)

16:30-17:00
Shiri Vivek, Professor Eastern Michigan University USA.
Title: Enhancing Student Engagement for Improved Learning Outcomes. (PowerPoint)

17:00-17:30
Qi Zheng, Professor, Texas A&M University, USA.
Title: Let Master of Public Health Students Experience Statistical Reasoning. (PowerPoint)

17:30-18:15
Robert Jay Woodward, Clinical Associate Professor, Texas A&M University, USA
Title: Incorporating High-Impact Practices into Higher Education. (PowerPoint)

18:15-18:45
Junrong Lu, PhD Student, University of Nebraska-Lincoln, USA.
Title: Concept Map Versus Matrix Note Taking: Achievement, Attitude, and Note-Taking Effects. (PowerPoint)

18:45-19:15
Deirdre Wilson, Professor, Vancouver Island University, Canada.
Title: Blending the Use of Google Docs with the Face-to-Face Modality to Facilitate the Collaborative Writing Process in a Multicultural High School English Class. (PowerPoint)

19:15-19:45

Panos Petratos, Fellow, Institution of Engineering and Technology & Professor, Department of Computer Information Systems, California State University, Stanislaus, USA.
Title: Interactive Engagement Methods for Higher Education. (PowerPoint)

20:30-22:30

Greek Night
Cancelled due to the current pandemic

Tuesday 19 May 2020

07:30-10:00 Urban Walk
Cancelled due to the current pandemic

10:00-10:30

Dorothy Economou, Lecturer, The University of Sydney, Australia.
Title: Learning how to Teach Online: Challenges in Producing an Online Thesis Writing Resource. (PowerPoint)

10:30-11:00

Ayala Raviv, Lecturer, Hemdat Hadarom College of Education, Israel.
Title: Teaching Astronomy to Preschool Children. (PowerPoint)

11:00-11:30

Eman Alam, Lecturer, Al-Azhar University, Egypt.
Title: Inquiry-Based Teaching and Learning of Biotechnological Sciences. (PowerPoint)

11:30-12:00

Carsten Lecon, Professor, Aalen University, Germany.
Title: Live Motion Capture for Higher Education. (PowerPoint)

12:00-12:40

Thomas Fehlmann, Senior Researcher, Euro Project Office AG, Switzerland.
Title: Intuitionism and Computer Science – Why Computer Scientists do not Like the Axiom of Choice. (PowerPoint)

12:40-13:10

Jan Collie, Lecturer, The Open University, UK.
Title: DEEP: Extending the Digital Forensics Process Model for Criminal Investigations (PowerPoint)

13:10-13:40

Lev Maslov, Colorado Community Colleges System Online, Denver, CO, USA andAssociate Professor, LCC International University, Lithuania.
Title: Understanding Personalities of Online Students: Importance for Successful Teaching. (PowerPoint)

13:40-14:15

Kevin Norley, Lecturer, Bedford College, UK.

Title: Reduction of Socio-Economic Diversity through Standardisation of Language: Reflections and Challenges. (PowerPoint)

14:15-14:45

Elena Ilaltdinova, Rector, Minin Nizhny Novgorod State Pedagogical University, Russia.

Title: Teaching History of Education: Blended Learning at Teacher Training. (PowerPoint)

14:45-15:15

Fathi Abu-Nasser, Associate Professor, King Faisal University, Saudi Arabia.

Title: The Application Degree of Participative School Leaderships at Al-Ahsa Governorate and its Correlation with Teachers' Professional Development. (PowerPoint)

15:15-15:45

Leiv Opstad, Professor, Norwegian University of Science and Technology, Norway.

Title: Can Multiple-Choice Questions Replace Constructed Response Test as an Exam Form in Business Courses? Evidence from a Business School. (PowerPoint)

15:45-16:15

Sergio Staab, PhD Student, RheinMain University of Applied Sciences, Germany.

Title: Increased Acceptance in the Interface Development of Nursing Documentation Software. (PowerPoint)

16:15-16:45

Abraham Flanigan, Assistant Professor, Georgia Southern University, USA.

Title: Do Distracted Students Take Incomplete Notes and Learn Less? (PowerPoint)

16:45-17:15

Cynthia Dawn Martelli, Associate Professor, Florida Gulf Coast University, USA.

Title: The Impact of a University Literacy Festival on Title I School Partners. (PowerPoint)

17:15-17:45

Roberto Mejias, Associate Professor, Center for Cybersecurity Education & Research, USA.

Morgan M. Shepherd, University of Colorado-Colorado Springs, USA.

Joseph Gersch, Colorado State University-Ft. Collins, USA.

Title: Using Threat Vulnerability Asset (TVA) Methodology to Determine Cyber Security Risk Mitigation Strategies. (PowerPoint)

20:00-21:30

Dinner

Cancelled due to the current pandemic

Wednesday 20 May 2020
Educational Islands Cruise
Cancelled due to the current pandemic
Thursday 21 May 2020
Delphi Tour
Cancelled due to the current pandemic

Fathi Abu-Nasser
Associate Professor, King Faisal University, Saudi Arabia

The Application Degree of Participative School Leaderships at Al-Ahsa Governorate and its Correlation with Teachers' Professional Development

Participative leadership is one of the most important human trends of school leadership and institutions of education. The study aimed to identify the degree of application of participative leadership by school leaders at Ihsa governorate, Saudi Arabia, and its correlation to teacher's professional development in the light of some variables. The study sample comprised (241) education leaders from both sexes throughout the school year 2018 / 2019. To collect data, an important three-part instrument was developed incorporating participative leadership and its correlation to teacher's professional development. Cronbach coefficient of instrument validation was (0.97). In analyzing data, arithmetic means, standard deviations, one way Anova, and correlation coefficient were calculated. Results of the study showed that the degree of application of the total process was high. They also showed that there was a relation with statistical significance at the level (0.01) between participative leadership with its dimension and professional development. The results also showed that there were no differences with statistical significance in answers of sample members which might be attributed to study variables at the level (0.01 = α). The study recommended intensifying training courses for school leaders with regard to participative leadership, in addition to, supporting and widening teacher's participation in school leadership.

Khadija AL Balushi
Teacher Educator, Ministry of Education, Oman

"…They Feel that they Have a Voice and their Voice is Heard": Efl Teachers' Views about Participatory Professional Development

Contemporary approaches to teacher professional development have evolved along with the paradigm shifts in teacher learning. Key shifts include a move away from transmission models of teachers' learning to more constructivist views that assume teacher-learners to be self-directed in their own professional learning and growth (Al-Balushi, 2017; Beach, 2017; Hung & Yeh, 2013). Along the same lines, there is a growing awareness of the potential of teachers' collaboration to encourage their learning (Vangrieken et al., 2017; Al-Balushi, 2017; Reilly & Literat, 2012). However, evidence from research done in Oman showed that CPD is currently imposed on teachers through INSET courses and workshops as well as other forms of CPD and that in-service TESOL teachers showed an interest in having a more active role in participating in their CPD process (AL-Lamki, 2009; AL-Yafaee, 2004). This presentation will focus on the findings of a study that develops a participatory model for TESOL teachers' continuous professional development (CPD) in Oman. Data were collected using questionnaires, semi-structured interviews and focus group interviews with TESOL teachers. The findings indicated that the centralised top-down nature of the current CPD system seems to negatively affect the success of CPD in the in-service TESOL context in Oman. The evaluation of the participatory model of CPD adopted in this study showed that this model has positively impacted on participant teachers' CPD and three aspects of change were noticed: teachers' beliefs, their practices about CPD, and change in students (e.g. their reading habits). The data showed that the participatory model of CPD enabled teachers to make decisions regarding their CPD and encouraged them to play the role of critical reflective practitioners as well as preparing them as future transformative intellectuals. The study further emphasized the significance of reforming teachers' CPD in Oman to help teachers teach beyond knowledge society. This includes dedication to building character, community, humanitarianism and democracy in young people. Besides, values, social justice, and caring have to be central to teachers' CPD and to the agenda of large-scale policy making if change is to make schools better for all students and teachers. Based on the study findings, the presenter will suggest some recommendations for

educational policy makers and practitioners in Oman and internationally. Suggestions include activating teachers voice and engaging them in educational policies. The study further recommends that the role of teachers themselves in the provision of CPD is significant; the way teachers are currently marginalized and seen as grateful recipients of CPD do not provide the conditions for intelligent and responsive teaching profession. This session is intended for teachers, teacher educators, educational researchers and educational policy makers who are involved in teacher education and teacher training/teacher development programmes.

Eman Alam
Lecturer, Al-Azhar University, Egypt

Inquiry-Based Teaching and Learning of Biotechnological Sciences

Inquiry learning has been used as a teaching and learning tool for thousands of years, however, the use of inquiry within public education has a much briefer history. Ancient Greek and Roman educational philosophies focused much more on the art of agricultural and domestic skills for the middle class and oratory for the wealthy upper class. It was not until the Enlightenment, or the Age of Reason, during the late 17th and 18th century that the subject of Science was considered a respectable academic body of knowledge. Up until the 1900s the study of science within education had a primary focus on memorizing and organizing facts. John Dewey, a well-known philosopher of education at the beginning of the 20th century, was the first to criticize the fact that science education was not taught in a way to develop young scientific thinkers. Dewey proposed that science should be taught as a process and way of thinking – not as a subject with facts to be memorized. While Dewey was the first to draw attention to this issue, much of the reform within science education followed the lifelong work and efforts of Joseph Schwab. Joseph Schwab was an educator who proposed that science did not need to be a process for identifying stable truths about the world that we live in, but rather science could be a flexible and multi-directional inquiry driven process of thinking and learning. Schwab believed that science in the classroom should more closely reflect the work of practicing scientists. Schwab developed three levels of open inquiry that align with the breakdown of inquiry processes that we see today. 1. Students are provided with questions, methods and materials and are challenged to discover relationships between variables. 2. Students are provided with a question; however, the method for research is up to the students to develop.3. Phenomena are proposed but students must develop their own questions and method for research to discover relationships among variables. Today, we know that students at all levels of education can successfully experience and develop deeper level thinking skills through scientific inquiry. The graduated levels of scientific inquiry outlined by Schwab demonstrate that students need to develop thinking skills and strategies prior to being exposed to higher levels of inquiry. Effectively, these skills need to be scaffolded by the teacher or instructor until students are able to develop questions,

methods, and conclusions on their own. A catalyst for reform within North American science education was the 1957 launch of Sputnik, the Soviet Union satellite. This historical scientific breakthrough caused a great deal of concern around the science and technology education the American students were receiving. In 1958 the U.S. congress developed and passed the National Defense Education Act in order to provide math and science teachers with adequate teaching materials. America's National Science Education Standards (NSES) (1996) outlines six important aspects pivotal to inquiry learning in science education. 1. Students should be able to recognize that science is more than memorizing and knowing facts. 2. Students should have the opportunity to develop new knowledge that builds on their prior knowledge and scientific ideas. 3. Students will develop new knowledge by restructuring their previous understandings of scientific concepts and adding new information learned. 4. Learning is influenced by students' social environment whereby they have an opportunity to learn from each other. 5.Students will take control of their learning. 6. The extent to which students are able to learn with deep understanding will influence how transferable their new knowledge is to real life contexts. Biotechnology is a subfield in the area of life sciences, and is increasingly being used in the areas of agriculture, industry, and medicine. Merriam-Webster defines biotechnology as "the manipulation of living organisms for their components to produce useful usually commercial products". Other definitions are broader and include concepts such as the use of recombinant DNA techniques to modify life forms. As such, biotechnology is a perfect marriage between content and process, providing an opportunity for the interactive experience that educators and researchers support as being the heart of learning science and in alignment with inquiry pedagogy. Biotechnology education is important because today's students will be responsible for making decisions regarding the development and use of these technologies in the short future. Given this increasing importance, Hanegan and Bigler (2009) would expect to see its integration at all levels of science education. However, although a National Science Foundation funded survey of high school biology teachers found that hands-on biotechnology education is available through advanced biology courses; similar experiences were non-existent in mainstream biology coursework in the United States. Even where biotechnology education was being implemented, the focus was primarily on content (96%) rather than process (4%). Furthermore, a preliminary study in Utah, which surveyed 42 biology teachers from across the state about their biotechnology education practices, found that not a single

educator was incorporating inquiry into their lessons and one may infer other states may share in a similar diagnosis. When asked why biotechnology educators do not incorporate inquiry into their teaching practices, many respond they do not have the time to teach with inquiry, and therefore, resort to traditional lecture and verification laboratory experiments. Benefits of inquiry-based teaching and learning. Despite the challenges discussed above, inquiry-based instruction has been at the forefront of science education reform documents for the past two decades because it has numerous benefits for students including increases in both cognitive and affective outcomes. The National Science Teachers Association (NSTA) recognizes inquiry-based instruction as a form of learning that is more aligned with both how scientists conduct science and a student's natural curiosity and interest in interacting with her environment. The NSTA also supports inquiry-based instruction as a way of learning both science content and process, as it includes asking questions and using evidence to find answers through investigation and the collection of data, the formation of an explanation from that data, and the communication and defense of those findings. Although motivation is often cited as one of its challenges, inquiry-based instruction has the ability to motivate students for their own learning, regardless of whether the proper result occurs. Inquiry provides an opportunity for students to be actively engaged in the process and be driven by the desire to find an answer. Motivation increases when tasks are shown to be relevant and challenging but at the proper level of difficulty for the learner, so as to neither bore nor frustrate the student. Through successful engagement, inquiry promotes student ownership of current learning and increases interest in future inquiry. In contrast to traditional methods, inquiry provides a means for students to construct their own understanding and question knowledge. Rather than teaching students how to memorize and regurgitate facts, inquiry develops the skills needed for students to become life-long learners, promoting the learning that is demanded by 21st century skills, in a world where knowledge and information is continuously emphasized and growing at an exponential rate.

Dorit Barchana-Lorand
Lecturer, Kibbutzim College of Education, Technology and the Arts, Israel

Schiller's Unfulfillable Promise: Justifying Art Education on Moral Grounds

"Aesthetics had been part of philosophy since Plato attacked the educational value of many forms of art in the Republic" (353), claims Paul Guyer. Indeed, the birth of aesthetics as a discipline owes greatly to the consideration of art from the perspective of education. This perspective yields the fundamental question: Why do we need art? A feeble answer quickly translates into resource-deprivation, since public funds and the cultivation of the next generation are concerned. The public educational system seems to require the sanctification of reason for its curriculum. Everything taught must be accountable in terms of some clear social benefit. A prevalent justification for art education appeals to art's direct contribution for moral education, stemming from an understanding of art as inherently capable of providing the foundation for morality. In my paper I explore one of the major origins for this argument, by Friedrich Schiller. In an ambitious manifest, Schiller grounds his new theory of ethics and education in Kant's Critique of Judgment. Schiller takes what in following years becomes Kant's most notoriously a-moralistic argument, concerning the disinterestedness of the judgment of taste, as attesting to the liberating and invigorating ethical power of art. It is only through art that society can be emancipated from its two extremes: excessive rigidity and uncontrollable passion. The artist educates society, in a way that enables its reformative healing by creating harmonious balance between passion and rules. Schiller portrays art as a powerful means to social improvement. His systematic solution for the question of the need for art education still inspires many art-education enthusiasts today, and serves as authoritative point of reference for the justification of art education. However, the theory falls short of providing solid arguments for incorporating art in the educational system. Furthermore, Schiller attempts to pursue the practical implications of some general notions regarding the benefits of art. The futility of this pursuit renders the original notions dubious. Thus his theory becomes a double-edged sword in the hands of art-education enthusiasts, facilitating the case for the art-education sceptics. The examination of Schiller's text exposes some of the fundamental pitfalls often found

with the ethical justification of art education, allowing a clearer understanding of the delicacy of this task.

Julio Cesar Barros
Assistant Professor, Researcher, Universidad Nacional de Río Cuarto, Argentina

Geometric Knowledge: Learning to Think Complexly the Notion of "Riemann Curvature Tensor"

Teaching and learning in mathematics as well as research and construction of mathematical knowledge, has been the object of interest not only by educators and mathematicians but also, and especially, for philosophers. The present work is an investigation of the geometric notion of 'Riemann curvature tensor' analyzed from the theoretical-philosophical perspective of the Paradigm of Complexity, which offers us relevant epistemological principles that support our hypothesis that this notion should be conceived as a complex system and that its learning is achieved when you understand how it is generated and how it is built. This implies, in turn, that the teaching-learning processes must aim to learn to think complexly contextualizing knowledge. We will place emphasis on the transformative practical dimension of teaching that arises as a result of reflections on the teaching task itself in teacher training. We will begin with the presentation of some of the central notions of Complexity that will help us think about mathematical problems from this approach, a task that we will combine with an in-depth study of the Riemann curvature tensor; finally, we will culminate with a proposal whose objective is to adapt the ideas addressed to the field of teaching and learning geometry.

Lena Bostrom
Professor, Mid Sweden University, Sweden
&
Goran Bostedt
Associate Professor, Mid Sweden University, Sweden

Upper Secondary School Teachers' and Students' Views on Students' Motivation to Study

In order to increase the number of student who successfully complete upper secondary school, Sweden has reformed its school system. The new system has not changed the throughput, mainly due to low study motivation. The multifaceted concept of study motivation includes various definitions and understandings of the motivation to study. Internal and external motivation factors are important for our study. Motivation originates from dynamic relationships between people; it is context-bound and changeable rather than generalizable and stable. To analyze the lack of motivation to study as the cause of low throughput in the upper secondary school, the perspective must account for the entire school and for the classroom situation. Students' perceptions of their self-worth, competence, experience, and individual goals are also crucial for the motivation to study. This interacts with how students perceive their duties—if they are relevant, how much benefit they see in them, their difficulty level and working methods, feedback, group dynamics, and other factors relevant to classroom work to influence students' motivation to study. The aim of this study is to describe and analyze what determines students' study motivation. Interaction and transaction is used as theoretical tools. The study is based on a multimethod approach. The empirical data comes from 207 students' responses to a web-survey containing 20 questions about motivation and from six semi-structured group interviews with 12 students and 20 teachers. The statistical data show significant differences between students in study programs regarding positive and negative attitudes toward schoolwork, absence from school, expectations for teachers and for results, competitiveness in realizing personal ambitions, personal feedback, and attitudes toward learning. Significant differences in self-esteem and in self-confidence that affect motivation also exist among the student groups. On the other hand, the results also indicate similarities among the students. They appreciate school as an institution, they feel safe at school, and they recognize teachers' legitimacy. The interview results indicate that teachers and students both view the complex interplay between results and

motivation as important for motivation. Study results affect motivation and vice versa in both positive and negative ways. Teachers and their leadership are also greatly important for students' study motivation. Teachers focus their leadership on the importance of knowledge. Students relate to teacher leadership in relation to personal qualities, such as being understood and getting support. One difference between the two samples is that teachers emphasize "life skills" in learning, such as strategies for purposes, intermediate goals, and a sense of belonging, but students do not mention these strategies at all. A category where teacher and student perceptions coincide is the importance of well-being and safety in the learning environment and that the class, groups, and peers motivate them. This study highlight the importance to understand study motivation from different perspectives and different student groups.

Athanasia Chatzifotiou
Senior Lecturer, University of Sunderland, UK

Beneficial or Detrimental? The Relationship between Sustainability, Eco-Schools and Ofsted Reports in England

The study addressed the relationship between education for sustainability, Eco-schools and primary school Ofsted (Office for Standards in education) reports in England. The aim was to examine the presence and impact of education for sustainability in primary schools' Ofsted reports and their webpages. The primary schools selected were schools that had gained the title of Eco-Ambassador schools because they had reached the ultimate distinction in the Eco-school approach; that is they held a Green flag. The study followed an exploratory approach employing qualitative content analysis of primary schools' Ofsted reports and their web pages. Overall, the findings indicated that neither the schools nor their Ofsted reports capitalized on the work they had invested towards sustainability and the Eco-school approach; also the relationship between the primary schools' work/ethos and their Ofsted reports is not an interactive one.

Jan Collie
Lecturer, The Open University, UK

DEEP: Extending the Digital Forensics Process Model for Criminal Investigations

The importance of high quality, reliable forensic analysis – an issue that is central to the delivery of justice – has become a topic for marked debate with scientists, specialists and government bodies calling for improved standards and procedures. At the same time, Law Enforcement agencies are under pressure to cut the cost of criminal investigations. The detrimental impact that this has had on all forensic disciplines has been noted internationally, with the UK's House of Lords warning that if the trend continues, crimes could go unsolved and miscarriages of justice may increase. These findings have echoed concerns raised by practitioners and authors in all forensic disciplines with the focus falling on digital forensics in particular over the past two years. The pivotal role that digital forensics plays in investigating and solving modern crimes is widely acknowledged: Britain's Metropolitan police estimate it features in 90% of cases. Today's law enforcement officers play a key part in the recovery, handling and automated processing of digital devices, yet they are often poorly trained to do so. Regular officers are also left to interpret outputs, with the results being presented in court. This, it is argued, is a dangerous anomaly and points to a significant gap in the current, four-stage digital forensics process model (DFPM). This paper presents an extension to that model, the Digital Evidence Enhanced Process (DEEP), with the aim of fine-tuning the mechanism and ensuring that all digital evidence is scrutinised by a qualified analyst.

Cynthia Dawn Martelli
Associate Professor, Florida Gulf Coast University, USA

The Impact of a University Literacy Festival on Title I School Partners

A literacy festival is one of the most effective ways to promote reading and fosters the idea that books make a difference, especially to under-supported students. This presentation is based on a research study that focused on how a university's literacy festival supported engagement and increased reading attitudes and habits for students of Title I schools. It also explores a longitudinal study that analyzed a university's literacy festival and its impact on students, teachers, authors, preservice teachers, and librarians from Title I schools in southwest Florida. The findings of this study suggest that literacy festivals help connect children with books, which can help promote a lifelong love of reading and writing. A university literacy festival featuring a variety of diverse authors presenting hands-on workshops showcasing their literary craft enabled students from Title I schools to engage with the authors and to see themselves as writers and illustrators and encouraged them to explore a university in their own backyard. This university literacy festival made a positive impact in the area of engagement in reading and found an increase in reading from students from Title I schools that attended the event.

Dorothy Economou
Lecturer, The University of Sydney, Australia

Learning how to Teach Online:
Challenges in Producing an Online Thesis Writing Resource

One of the fastest growing areas in academic learning worldwide is the production and use of online learning resources (darlohighereducation.com, retrieved 2018). However, there has been much slower growth in understanding how to effectively meet the pedagogic and technological challenges of this new context, especially for developing writing capabilities of higher degree research (HDR) students. Nor is there yet sufficient institutional awareness of the time and training we need to develop expertise in online learning design and production to match our face-face expertise. This paper will report on the challenges faced and lessons learnt in an ongoing online project in the Learning Centre (LC) at the University of Sydney. The aim was to produce a thesis writing tool to help higher degree research students in medically related fields develop their writing capabilities. A needs analysis conducted via interviews with supervisors and HDR students at the University of Sydney Medical School was used as a basis for the design of the tool (Economou and James, 2017). The aim was to produce a self-access resource for students to develop their own writing, one which was also a reference source for supervisors and could thus facilitate conversations about writing in the supervision process. This talk will interrogate the bumpy progress of this online project, considering the challenges and lessons learned in respect to pedagogy and technology. One pedagogic challenge was how to apply our functional linguistic descriptions of academic discourse and related pedagogic principles as successfully as we have done in face-to-face resources at the Learning Centre. One technological challenge was unrealistic expectations of the time and support needed to become fluent in ever-changing technologies in order to produce resources which are pedagogically sound, effective and engaging. Hindsight and recent experience with other LC online projects (Garcia, 2017) have shown how some of the challenges faced on such a project can be best met. Most of these will be discussed here and include conducting team-based, on-the-job training on one or two trial 'lessons' to be evaluated before proceeding with remaining content. Though many steps recommended here were only able to be applied in the later phases of this project, this paper can help future online developers to apply these from the initial, and thus most critical phases of design and planning.

Thomas Fehlmann
Senior Researcher, Euro Project Office AG, Switzerland

Intuitionism and Computer Science – Why Computer Scientists do not Like the Axiom of Choice

The Axiom of Choice says that every set has a representative element. However, deterministic computers cannot produce arbitrary elements. They need some algorithm that tells them, which one to choose. But then, the element is no longer arbitrary. Even for a true random generator, you'll need Entropy. This is data gathered from outside the system, and we as Theoretical Computer Scientists do not like that. Thus, we need to understand the axiom of choice better. For this, we use Combinatory Algebra.

Abraham Flanigan
Assistant Professor, Georgia Southern University, USA

Do Distracted Students Take Incomplete Notes and Learn Less?

The popularity of laptops has spurred research into whether note-taking behaviors and learning differ based on note-taking method (i.e., laptop versus longhand method) (Luo et al., 2018; Mueller & Oppenheimer, 2014; Morehead et al., 2019). However, existing research ignores two aspects of student note taking. First, existing laptop versus longhand studies have not accounted for the presence of distractions while students take notes, despite the fact that most college students report—and have been observed—using their mobile phones and laptop computers for off-task purposes while they take notes (Flanigan & Babchuk, 2015, 2020; Flanigan & Kiewra, 2018; McCoy, 2020). Second, studies comparing laptop and longhand note-taking methods have focused on the extent to which students capture complete idea units into their notes—while ignoring the presence of partial (i.e., incomplete) idea units in student notes. The present study was the first to quantify the presence of incomplete idea units in lecture notes. The present study examined (a) the interaction between note-taking method and digital distraction for lecture learning, (b) whether storage of incomplete idea units differed across laptop and longhand note-taking methods, and (c) how storing and reviewing incomplete idea units related to posttest achievement. One hundred undergraduate students participated in a 2 (note-taking method: laptop vs. longhand) X 2 (distraction level: texting vs. no-texting) factorial study. Participants took notes while viewing a 15-minute lecture before completing a learning assessment. Participants in the two texting groups replied to text messages on their own mobile phones once every 40 seconds during the video lecture. Consistent with past research (e.g., Kuznekoff et al., 2015; Waite et al., 2018), texting emerged as consequential for student learning. Although neither note-taking method emerged as superior to the other for boosting lecture learning, texters did worse on the posttest than non-texters. Such findings suggest that researchers and instructors concerned with student learning should be more concerned by whether students are texting during class than by the note-taking method they employ. Furthermore, our findings support Morehead et al.'s (2019) contention that it is too early to declare either note-taking method superior to the other for boosting student learning. Findings also indicated that college students store many incomplete

lecture ideas in their notes. Participants were skilled at capturing main topics and storing complete examples in their notes, but recorded nearly half as many incomplete support details as complete supporting details. These findings indicate that many of the idea units that students store in their notes during lectures do not fully capture the essence of that idea unit. Future research should (a) continue to investigate the contexts in which note-taking method affects lecture learning, (b) explore strategies that help students finish the partial idea units in their notes to determine if such strategies would aid student learning, and (c) investigate the contexts in which taking partial notes either aids or hinders lecture learning.

Patricio Flores-Morales

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Application of the Theory of Model-Based Learning and Teaching to an Experimental Stoichiometry Class

Teaching and learning Chemistry has had different approaches, such as the philosophy of science, epistemology, and inquiry. A recent and different from the aforementioned approaches is the theory of model-based learning and teaching (MBTL) (Clement, 2000, 2008). Clement has examined MBTL in sciences like Physics and Clement, and Nunez-Oviedo has examined modelling processes in Biology. MBTL appear to be useful in promoting the co-construction of knowledge in which the teacher supports the student in reaching the scientific or target model. This process is the result of introducing a succession of cognitive conflicts (CCs) by using, for instance, questions such as, "Are you sure about that? ", or "Wouldn't be better this way?". The CC provokes a re-accommodation of the students' ideas in a cycling process of generation, evaluation and modification (GEM cycles) (Clement, 1989). The goal of this study is to identify and describe teacher-student GEM cycles while experimenting. The study was conducted in a General Chemistry class to which a challenge was asked. The content of the class was stoichiometry with gases. Twenty-six students were asked to determine the number of carbon dioxide molecules produced by the reaction of diluted hydrochloric acid and sodium bicarbonate. For that reaction, the students were supplied with 25 mL of HCl(ac) 1.0 mol L-1, 1 to 5 g of $NaHCO_3$(s) (they had to choose the amount), a piece of tissue, an Erlenmeyer flask, a balloon or a surgical glove, and sticky tape. Having those materials, the student had to respond to the challenge. From a variety of strategies created by the students, two examples were selected to illustrate the GEM cycles: 1) A group chose to obtain the mass of CO_2 by subtraction. They weighed all the materials and reactants before the reaction, and mount the equipment (reactants inside the flask, balloon at the top of the flask holding it by the base to avoid the gas escape) (G). After the reaction, they weighed everything again (E). They obtained a value very close to zero. The instructor, then asked the students: "What does say the Lomosonov-Lavoisier Mass Conservation Law? (CC)". They answered correctly that the mass of the reactants and products must be the same. The instructor then asked the students to compare this answer with the result that they had obtained. They realised that it was wrong. So, the teacher asked the students to devise a new strategy to solve the

challenge. 2) The new strategy consisted of collect the gas inside the balloon (G), and weigh only the closed balloon (E). They were asked: "Are you sure that all the gas is inside the balloon?" (CC). The student answered that "a gas occupies the entire container that contains it, so, part of the gas may be in the flask". Thus, a new strategy was presented by this group (M). The strategies continued until, at the end of this experimental class, all the groups were able to mount a wet gas collecting equipment and obtain the number of CO_2 molecules generated. The students' model generation confirmed successive teacher-student GEM cycles. Moreover, the students recognised they were prompted to work in the challenge joyfully since it was a new experience.

Leah Patricia Hollis

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Tyrants in the Cloud: Social Dominance and Cyberbullying in American Higher Education

Several studies have considered cyberbullying for primary and secondary students. A few studies have considered cyberbullying between college students, yet a recent search in ProQuest and EBSCOHost revealed less than five articles of adult cyberbullying in higher education. Hence, adult cyberbullying continues to be an understudied problem in higher education. The sample of higher education professionals and faculty members were collected (N = 578) in late 2017/early 2018, in which 45% of respondents reported they were targets of cyberbullying in higher education. Respondents reported cyberbullying through emails, social media and texting from colleagues in their higher education work environment. This study applied social dominance theory in an examination of whether women, people of color, and the LGBQ community reported more incidents of cyberbullying. Sidanius and Pratto (1999) wrote that despite the struggles of civil rights movements and other resistance to bolster the human condition for all members of society, that a viciousness and ugliness remains a constant underpinning in society. Whether through stereotypes, prejudice, social mores, and discrimination, such biases and the corresponding actions may be a result of psychological or cognitive motivations, or a derivative of economic conditions in which those with resources and power rule and control those without means. More recent commentary has further stated, "intergroup discrimination, oppression, and violence continue to thrive within every modern social system" (Sidanius, et al, 2016, p. 149). Further, economic structures support the division of the "haves and the have-nots," differentiating between those who have power, access, and resources and those who do not. Those who have the power, typically strive to maintain such power, even while demoralizing. Whether the structure yields groups along racial lines, religious lines, gender lines or economic lines, Allport (1958) defined in-groups and out-groups as structures in which people are divided and defined by expectations, values, and customs. From these groupings of people, the in-group maintains its influence and uses its power to dominate the out-group (Allport, 1958). Sidanius, Pratto, and Mitchell (1994) stated such structures are evident in discriminatory practices, such as the "unequal allocation of momentary reward" (p. 1). Such desires to dominate

another through economics, access, or opportunity is what Pratto et al (1994, p. 742) considered social dominance orientation, "or the extent to which one desires that one's in-group dominate and be superior to out-groups." A chi-square analysis was used to develop the results which confirmed a statistical significance, at the $P< .01$ level, that both people of color and members of the LGBQ community are more likely to be targets of cyberbullying in higher education. However, despite the literature, which reports that women are more likely to endure cyber harassment, gender in this study was not confirmed as a compelling element on who was more likely to endure cyberbullying in higher education.

Elena Ilaltdinova

Rector, Minin Nizhny Novgorod State Pedagogical University, Russia

Teaching History of Education: Blended Learning at Teacher Training

Our strongest belief is that the history of education must be the foundation of the teachers' education. By studying the ideas and experience of the great thinkers in education a pre-service teacher may form their own pedagogical outlook and, as a result, implement them in their work with the children at school. A student should be able to study, analyze and compare, and then interiorize some pedagogical ideas and thus form their own pedagogical conception. Diversity in idea interpretations given by students, experts, university professors make basis for discussion in the classroom. It creates conditions for moving beyond traditional "delivering" lectures into a real, problem-oriented dialogue between a teacher and a student within a flipped classroom framework. It is a place where it is possible to present one's point of view, which is formed as a result of independent studying of the pedagogical ideas. The interactive descriptive tool in the form of the web-service "World Education Map" provides students with an opportunity to create their own "Pedagogy" based on set dichotomy characteristics. To form a complete picture of the world pedagogy and teachers' values a traditional chronological approach to the content formation of the courses on History of Education does not suit. We apply the paradigm approach, which let us describe the world pedagogy in its integrity and variety, unity and diversity of development, interrelations and contradictions of ideas. We offer an approach to the description of separate pedagogical theories, ideas on the basis of eighteen characteristics resting upon nine key dualistic criteria: social vs. individual value orientation, result- vs. process-orientation, external vs. internal stimulus, behavior vs. mental process, given vs. constructed knowledge, student- vs. teacher-directed, focus on operated future vs. focus on traditions, applied vs. formal knowledge, material value vs. moral values. They make the ground for a paradigm classification in pedagogy. By means of web-service "World Education Map" we offer the instrument of proximal visualization of the characteristics of a pedagogical object in the form of a Polar Chart on the basis of nine axes which are crossed in their centers. The chart reflects the intrinsic characteristic of user's approach presupposing maximum or extreme manifestation of the quality and other variations down to the absence of this quality. The interactive means of the

descriptive analysis of objects of the world pedagogy, developed in the form of a Polar Chart in the context of a paradigm approach, ensures the formation of analytical skills, research competences of pre-service teachers as users of our web-service.

Carsten Lecon
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Live Motion Capture for Higher Education

Motion Capture is a method to transfer movements of human beings or other living beings to virtual characters. It finds many applications: medicine, sports science, movies, computer games (especially sport games), etc. There exist different techniques: magnetic tracking, mechanical tracking (for example using an exoskeleton), acoustic tracking… However, mostly used is the optical tracking: cameras send light beams (normally infrared light), which are reflected by so called markers, which are fixed at the body of the subject. On the basis of the light-time measurement and the position of the camera in relation to the other cameras, the exact position in the 3D room (x-, y, -z- coordinates) can be determined.

Until recently, performing a motion capture session was a complex and long-lasting task. The actual (commercial) generation of motion capture systems allows a much simpler calibration, better tracking results and an automatic labelling, and almost no elaborate post processing is necessary. In addition, now live motion capture is possible: the recorded movement can directly be transferred to 3D models (one can see the locomotion effects of the virtual figures immediately).

This is an interesting and relevant topic for students with a multimedia focus. However, mostly motion capture systems are very expensive and the application is very complex (the operation of the software requires a strong background knowledge), so that teaching and experiencing this technology in higher education often is not possible. This is particular the case for live motion capture.

We will present simple techniques to realize live motion capture, for example using the Kinect and a special (rather cheap) video camera. Doing this, we try to use scarcely markers or forego markers completely. First experiments show promising results. Therefore, we realize some easy-to-use applications. Also, we will take into account the restrictions in contrast to commercial motion capture systems. For example, medicine and sport science applications need an exact tracking. Looking at different possible applications, we consider the cost-benefit ratio. The students can experience the difference and the respective advantages and disadvantages, since there an optical motion capture system with six cameras is installed in our media lab.

In this way, the students are able to deal with live motion capture intensively, namely:

- Theoretically: The students investigate existing solutions for live motion capture and realizations done by our students, and fining out new scopes for applications of live tracking.
- Practice: Specifying and implement new systems for live motion capturing (one such student´s work is already in progress).
- Application-oriented: Using existing application or our software for live motion capturing in students' project works, mainly when programming computer games: When using live motion capturing for the animation of the avatars, the students can simulate – and observe – game situations directly.

The results could be presented at public events: for example, visitors can generate their own animation film by letting move virtual characters in a virtual environment by their movements.

Niclas Lindstrom

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On how RE Teachers Address the Sometimes-Conflicting Tasks of Conveying Basic Values and Tools for Critical Thinking

A recurring idea, among practitioners and researchers, is that "teaching is a moral endeavour" where any act can convey "moral meaning" and "influence students" (Hansen, 2001, 826; Bulloughs, 2010; Campbell, 2013). Some have even stated that "all that can be seen and heard in classrooms" can be of moral significance, including "events, actions and even aspects of the physical environment" (Jackson, Boostrom & Hansen, 1998). Yet, they seem to be divided on how teachers ought to treat ideals, norms and values in their pedagogical practices. Hence, a division is often made between character-based and reason-based approaches to moral or ethics education. The difference can, somewhat simplified, be described schematically by their respective emphasis on group or individual, emotion or reason, habituation or critical assessment of universal ethical principles (for a more elaborated account see: Kohlberg, 1966, 2; Carr, 1983, 39; Graham, Haidt & Rimm-Kaufman, 2008, 271, 275). Even if the approaches are often described as mutually exclusive alternatives teachers are, nevertheless, often expected to perform these tasks in their everyday practices (see SNAE 2011). Against this background, we have conducted qualitative research interviews, with religious education (RE) teachers, who are considered to have a particular responsibility for moral and ethics education in the Swedish school system (Almén, 2000; Hartman, 2008; Larsson, 2009; Franck & Löfstedt, 2015). Our overall aim of this paper is to investigate how they relate to the sometimes conflicting responsibilities to convey a set of basic values and contribute to the pupils' abilities to critically examine ideals, norms and values. Our analysis of the results shows that RE teachers use different strategies to describe and motivate their pedagogical choices (Yin, 1994; Bryman, 2008). We will, for instance, distinguish between a casuist-, a rights-, and an existentialist oriented approach to moral and ethics education and perform a critical discussion of the results.

Chad Loes

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The Impact of Collaborative Learning on Academic Motivation

A substantial number of studies demonstrate the effectiveness of collaborative learning in higher education settings. This instructional approach is associated with enhanced critical thinking, persistence to the second year of college, and openness to diverse others, for example. Parallel to these inquiries, researchers continue to investigate ways to enhance the academic motivation of college students. Despite these bodies of literature, however, less is known from contemporary research about the potential linkages between collaborative learning and academic motivation.

Next, several studies suggest that collaborative learning may confer unique benefits to Black students and that academic motivation levels may differ between this group and their White counterparts in higher education. However, there is a dearth of contemporary research that explores these potential differences by following students from more than one institution over time. To help address this issue, I use multi-institutional data and a longitudinal pretest-posttest design to examine the influence of collaborative learning on academic motivation over the first year of college. Although collaborative learning failed to have a significant influence on end-of-first-year academic motivation in the main effects analysis, results of the interaction effects analysis suggest that even in the presence of a wide range of potentially confounding influences, including a pretest measure of the outcome, exposure to collaborative learning is associated with gains in academic motivation at the end of the first year of college, but only for Black students.

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Concept Map Versus Matrix Note Taking: Achievement, Attitude, and Note-Taking Effects

Graphic organizers (GO) are visual representations that display text information in spatial arrangements such as outlines, hierarchies, sequences, matrices, and concept maps (Jiang & Grabe, 2007; Katayama et al., 1997; Kiewra, 2012). GOs can help students see and learn text relationships more quickly (Robinson & Skinner, 1996) and effectively (Jairam & Kiewra, 2010) than learning from text alone. Theoretically, GOs are effective because they are computationally efficient (Larkin & Simon, 1987). They extract important information from text and position it so that related ideas are close together and in spatial patterns that make relationships immediately apparent (Kauffman & Kiewra, 2010). Not all GOs are created equal, though. Some GOs are more computationally efficient than others. For example, studies have shown that matrices are superior to outlines (Kauffman & Kiewra, 2010; Kiewra et al., 1988; Kiewra et al., 1992; Robinson & Schraw, 1994), some matrices are superior to other matrices (Jairam et al., 2011), and that hierarchies are superior to outlines (Robinson & Kiewra, 1995). Two of the most widely known and investigated graphic organizers are concept map and matrix. Concept maps are top-down GOs that represent important concepts (called nodes), using boxes or circles, and relationships between these nodes, using links (Novak, 1988), like that in Figure 1. Matrices, like that in Figure 2, are two-dimensional cross-classification tables (Jairam et al., 2011) especially applicable for comparing information (Jairam et al., 2011; Kiewra, 2012). There is a lack of scientific research comparing concept map and matrix GOs. Therefore, the present randomized experimental study trained students in matrix or concept map note taking and examined achievement, attitude, and note-taking effects. College students (n=176) were trained in how to record concept map notes, matrix notes, or conventional (control group) notes. Students then read a brief text using their respective note-taking method in preparation for fact, relationship, and concept test items that were administered immediately or following a review period. It was predicted that matrix note-taking training would produce better notes, higher achievement (especially relationship learning), and more positive attitudes than would concept map note-taking training, because matrix notes are more computationally efficient than concept map notes. Preliminary results confirmed that

demographic characteristics—such as age, gender, grade-point average, experiment motivation, and text topic prior knowledge—were comparable among the three note-taking groups. Results indicated that matrix notes did not prove superior to concept map notes in terms of achievement, but results did reveal several problems with concept map note taking. First, conventional note takers achieved more on relationship items than concept map note takers, but not matrix note takers. Second, concept map note takers had more incomplete notes and lower quality notes than matrix note takers. Last, concept map note takers rated their notes lower in effectiveness, ease of construction, enjoyability, and likelihood of future use compared to matrix note takers. Based on our findings, we counsel practitioners to be cautious in their use of concept mapping, especially for comparative material. Matrix notes, because of their completeness, comparative structure, and students' positive attitudes about them, seem a better choice. For future study, we recommend that researchers continue to investigate the relative merits of concept map and matrix note taking, under varying instructional conditions.

Lev Maslov

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Understanding Personalities of Online Students: Importance for Successful Teaching

The creation of a psychological model representing student personalities in online communication serves the following purposes: understanding preparedness, boundaries of Zone of Proximal Development of a student, and understanding student's motivation to take the class. This basis gives us the opportunity to develop a style, or "language", for better and more effective communication with students in educational process.

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Using Threat Vulnerability Asset (TVA) Methodology to Determine Cyber Security Risk Mitigation Strategies

Vulnerability assessment (VA) tools are critical in identifying cyber threats to an organization and their potential system vulnerabilities. The Threat Vulnerability Asset (TVA) methodology, an open source and uncomplicated VA tool, has been increasingly used to identify and prioritize an organization's critical IT (information technology) resources, the potential cyber threats to those IT resources, the IT safeguards currently in place, and the resulting system vulnerabilities from the triangulation of these three TVA matrix components. This conference paper will present a systematic development of the components of the TVA methodology via the "TVA Grid" to identify and evaluate critical and vulnerable IT resources for any organization. Once potential cyber threats are evaluated against existing IT safeguards, thus revealing an organization's system vulnerabilities, several cyber security risk mitigation strategies will be discussed for their best applications. These cyber security risk mitigation strategies will be presented in two major categories: Proactive Strategies (Risk Avoidance Defense, Risk Transference) and Reactive Strategies (Risk Mitigation, Risk Acceptance). The implications for practitioners and researchers is that open source VA tools such as the TVA methodology will significantly assist management in the identification of the cyber threats and resulting system vulnerabilities facing their organizations.

Kevin Norley
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Reduction of Socio-Economic Diversity through Standardisation of Language: Reflections and Challenges

Our strongest belief is that the history of education must be the foundation of the teachers' education. By studying the ideas and experience of the great thinkers in education a pre-service teacher may form their own pedagogical outlook and, as a result, implement them in their work with the children at school. A student should be able to study, analyze and compare, and then interiorize some pedagogical ideas and thus form their own pedagogical conception. Diversity in idea interpretations given by students, experts, university professors make basis for discussion in the classroom. It creates conditions for moving beyond traditional "delivering" lectures into a real, problem-oriented dialogue between a teacher and a student within a flipped classroom framework. It is a place where it is possible to present one's point of view, which is formed as a result of independent studying of the pedagogical ideas. The interactive descriptive tool in the form of the web-service "World Education Map" provides students with an opportunity to create their own "Pedagogy" based on set dichotomy characteristics. To form a complete picture of the world pedagogy and teachers' values a traditional chronological approach to the content formation of the courses on History of Education does not suit. We apply the paradigm approach, which let us describe the world pedagogy in its integrity and variety, unity and diversity of development, interrelations and contradictions of ideas. We offer an approach to the description of separate pedagogical theories, ideas on the basis of eighteen characteristics resting upon nine key dualistic criteria: social vs. individual value orientation, result- vs. process-orientation, external vs. internal stimulus, behavior vs. mental process, given vs. constructed knowledge, student- vs. teacher-directed, focus on operated future vs. focus on traditions, applied vs. formal knowledge, material value vs. moral values. They make the ground for a paradigm classification in pedagogy. By means of web-service "World Education Map" we offer the instrument of proximal visualization of the characteristics of a pedagogical object in the form of a Polar Chart on the basis of nine axes which are crossed in their centers. The chart reflects the intrinsic characteristic of user's approach presupposing maximum or extreme manifestation of the quality and other variations down to the absence of this quality. The interactive means of the

descriptive analysis of objects of the world pedagogy, developed in the form of a Polar Chart in the context of a paradigm approach, ensures the formation of analytical skills, research competences of pre-service teachers as users of our web-service.

Leiv Opstad

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Can Multiple-Choice Questions Replace Constructed Response Test as an Exam Form in Business Courses? Evidence from a Business School

The discussion of whether multiple-choice questions can replace the traditional exam with essay and constructed questions in introductory courses has just started in Norway. There is not an easy answer. The findings depend on the pattern of the questions. Therefore, one must be careful in drawing conclusions. In this research, one will explore a selected business course where 30 percent of the test is comprised of multiple-choice items. There obviously are some similarities between the two test methods. Students who perform well on writing essays tend also to achieve good results when answering multiple- choice questions. The result reveals a gender gap where multiple-choice based exam seems to favour the male students. There are some challenges in how to measure the different dimensions of knowledge. Hence, it is too early to conclude that a multiple-choice score is a good predictor of the outcome of an essay exam. This paper will provide a beneficial contribution to the debate in Norway, but it needs to be followed up with more research.

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Interactive Engagement Methods for Higher Education

NOT
AVAILABLE

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Teaching Astronomy to Preschool Children

In their everyday life, children experience astronomical phenomena such as the movement of the outer space bodies and day and night exchanges. These experiences are related to abstract concepts like gravity or the essence of time. The present study examined the ability of preschool children to understand tangible and abstract concepts related to astronomical bodies and processes, following the implementation of an intervention program. It also examined if children have changed prior misconceptions related to astronomical ideas. The study combined quantitative and qualitative research methods, and was conducted in a kindergarten with 32 children aged 4-5. The kindergarten teacher delivered the intervention program through a curriculum that she had developed under professional guidance. The children answered knowledge questionnaires before and after learning. Observations and interviews were also conducted with the children, and they prepared painting and gluing works on the subject. The findings show that only some of the children had some knowledge in astronomy prior to the learning process, and few of them expressed misconceptions in relation to the studied subjects. After learning was completed, there was a significant increase in children's knowledge and ability to explain correctly concepts in astronomy. It was also found that misconceptions presented by the children were corrected and they expressed acceptable scientific conceptions. The findings show that astronomical concepts can be taught to preschool children. They have showed knowledge and understanding of the earth's name, shape, structure and dual movement, the essence of the sun and the moon, the structure and characteristics of the solar system and the movement of the main space bodies. The children were also able to describe the qualities of gravity and the reasons for day and night exchange, and they demonstrated an understanding of the relationship between distance from a heat source like the sun and the level of heat, the relationship between the level of heat and the three states of matter, and the relationship between the distance of the observer from a physical object and its apparent size. In their paintings, the children demonstrated an understanding of the circular motion of the planets around the sun and the various lunar phases. Teaching the science of astronomy at an early age is challenging since it is a science that deals with abstract ideas (such as space bodies, their movement, the idea of

"forces"). However, these ideas apply to children's daily lives (day and night phenomenon, the sun, moon and stars, the daily derivatives of gravity). It is therefore recommended that pre-school teachers should be trained and encouraged to embed astronomy and space studies as part of the kindergarten science curriculum.

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Ethics Teaching in Education for Sustainable Development

Education for sustainable development (ESD) is nowadays internationally regarded as an important aspect of the overall education of children and young people in the world (e.g., UNESCO, 2019, Education for sustainable development: Partners in action – Global action programme (GAP) key partners' report (2015-2018); https://unesdoc.unesco.org/ark:/48223/pf0000368829). Importantly, it is included among the goals of the UN 2030 Agenda for Sustainable Development (goal 4; https://sustainabledevelopment.un.org/). Besides its content – sustainable development – ESD is also characterized by its emphasis on interactive and participatory approaches to education: "Designing teaching and learning in an interactive, learner-centred way that enables exploratory, action oriented and transformative learning" (UNESCO, 2019, "What is education for sustainable development?"; https://en.unesco.org/themes/education-sustainable-development/what-is-esd). In this paper, we show how both these aspects of ESD – its content and approach to education – reveal the importance of ethics teaching in ESD as well as provide challenges with respect to such teaching. Content: The object of ESD – the idea of sustainable development – is both normative and imprecise. It is normative because it is assumed that sustainable development is something that we ought to strive for. It is imprecise because the different concepts that together constitute the idea of sustainable development (such as 'needs', 'abilities' and 'the future'; see World Commission on Environment and Development, 1987, Our Common Future, Ch. 2, §1; https://sustainabledevelopment.un.org/content/ documents/5987our-common-future.pdf) can all be given different interpretations generating conflicting sustainability goals (weak or strong) (see, e.g., A. Dobson, 1998, Justice and the environment: Conceptions of environmental sustainability and theories of distributive justice, Oxford: Oxford University Press, Ch. 2). This means that ESD is never neutral. Instead it rests on implicit or explicit ethical assumptions. Hence, a comprehensive and reflective ESD requires that one reveals and discusses such assumptions. Approach: The kinds of interactive and participatory approaches to education that are assumed in ESD are, arguably, as such suitable for the task of revealing and discussing ethical assumptions. However, this requires that an appropriate approach to ethics education is incorporated within

ESD. Two potential problems present themselves at this point: (1) the most common way of teaching ethics – a theory-based approach – seems ill suited for this task; (2) in the context of ESD we need an approach to ethics education that is available also to teachers who are not experienced within the field of ethics (since most teachers involved in ESD arguably belong to this group of teachers). The challenge, hence, is to find an approach to ethics teaching in ESD that is (1) suitable with respect to both its content and its approach to education, and (2) available also to teachers who are not experienced within the field of ethics. We suggest a certain methods-based approach to ethics education (that we have previously developed in detail) as a promising candidate for this task.

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Increased Acceptance in the Interface Development of Nursing Documentation Software

Nowadays it is important to develop effective and efficient software that is, at the same time, easy to use. Since all systems and services are ultimately aimed at human users, it is essential to deal with the interaction between humans and machines. The acceptance of a system, i.e. the question whether a system is interpreted by a user as good or bad, is a complex construct of perception and evaluation processes. The measurement of such processes, which ends in a weighting of them, is a major step from the scientific field of social and behavioral sciences towards mathematics and computer science. A disproportionately growing number of care recipients and the associated avalanche of data in all areas of modern care continuously increases the need for more efficient, higher-quality and at the same time cost-saving options for care and its connectivity of relatives, doctors, and caregivers. The subject of the work presented here is the analysis of computer-supported systems in nursing documentation which have been poorly accepted to date. Using empirical and analytic usability tests, the following acceptance criteria of caregivers were worked out with test persons (caregivers) within the framework of a specially developed information, coordination, communication, and documentation platform for caregivers: Obligation to state reasons, social context of colleagues, subjective relevance, competence and pertinence of a user, perceived and desired nature of a system, usability and user experience Usability and user experience represent the acceptance of interactions with user interfaces in terms of usability and user satisfaction. The obligation to justify the transparency of the digitalisation of work steps is a major inhibition threshold that can be perceived as an external line. The social context of the circle of colleagues – including the subjective references and motivations of colleagues – influences the entire group dynamics with regard to potential problems and requirements for the system. The subjective relevance, competence and pertinence of a caregiver are directly related to the perceived and desired nature of a system. This means that a physical event of a system, e.g. the view of an interface, is perceived subjectively by a caregiver. Based on the preceding acceptance criteria, interfaces must fulfill the following requirements to ensure user-friendly interaction by caregivers: On the one hand, the interfaces have

to be simple. In this context, simple means that a person from the target group has enough pertinence to be able to take up and carry out the process without user irritation. On the other hand, they have to be emotional. This means that a person from the addressed target group sees a basic usefulness in terms of relevance with regard to the subjective point of view. It should be noted that the knowledge contained in an information is to be classified as relevant if it objectively serves to prepare a decision or to close a knowledge gap. If these requirements are observed in the development of software, this demonstrably increases the acceptance of the nursing staff, in the HCI context between man and machine, as well as the promotion of the incorporation of information science into the medical treatment area of nursing.

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The Academic Achievements and School Life Interactions of the Recently Arrived Refugee Children in the Greek Primary Schools: Teachers' Perspectives

The ongoing conflicts in Syria have pushed millions of people to leave their homes and search for a safe land to build their lives again. This situation has been characterised as a major refugee crisis and is one of the main political and social concerns of our times. This project focused on Greece as one of the main host countries of refugees across Europe. When refugees started reaching the Greek islands, the country was under austerity measures and the economic situation was and still is struggling. Nowadays, the number of asylum seekers is growing in the country. The newly arrived refugee children in Greece and more specifically their education examined in this study. The ways the Ministry of Education is trying to include these students in Greek primary schools and the academic and social progress of the refugee children in schools cover the main part of the paper. The aim of this study was to explore refugee children's academic achievements and school lives in Greek primary schools according to teachers' perspectives in order to see how the relevant government education policies and plans are effectively being implemented in the school context as well as to suggest ways to help improving any gaps between the policies and plans and their implementation. For exploring the situation, semi-structured interviews implemented in three big cities around Greece. Teachers working with refugee students in three different infrastructures of education were interviewed and shared their experiences. The research outcomes revealed some particular gaps in the educational policy and some school sections that need to be better organized. Students' age and previous school experience was found to play an important role in their academic progress and school-life interaction. Teachers have to be better trained by the MoE in order to handle issues like students' delayed education and bad psychological conditions. The Greek language acquisition through more suitable and effective educational material is also something that needs to be further organised from the ministry. The refugee students in Greek primary schools are having academic progress primarily in the area of native language learning. However, they are not ready to follow the classes and obtain an adequate education regarding to their age. The social interactions between the refugee and the native students flourish into

the school environment without any special programme or help, as most of the participants mentioned. Refugee education describes a quite complicated topic and more specific guidelines which will respect the culture of the students and will connect them with the whole society need to be enhanced.

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Why do Teachers Decide to Teach?
Factors Influencing the Choice of Becoming Teacher in Italy

The motivation to embark on the process of becoming a teacher is an aspect that is subject to many variables. Analysing the construct of motivation actually means considering "why the teacher chooses such a profession; how much energy they invest in it and how long and what are the consequences in the school context" (Bier, 2018, p. 16). There are a number of theories in literature, based on studies carried out in an array of disciplinary domains, on the motivation to become teachers. The latest international reports highlight that teachers do not appear to be so motivated to teach and there is a decrease in motivation over time (Bier, 2018). In addition, studies conducted by Ingersoll and Strong (2011) have shown that 40/50% of teachers leave the job within the first 5 years, contributing to the increasing challenge of finding and employing new staff. However, this data does not reflect the Italian scenario since, notwithstanding the high levels of burnout, teachers remain in their profession until retirement age (Murdaca, 2014). Studies on the motivation of in-service in Italy has been examined in depth (Caprara et al., 2006; Cavaioni et al., 2014; Magnano et al., 2014; Moè, Pazzaglia and Frisio, 2010). On the other hand, to date, literature on the motivation of learning support teachers (LSTs) is still scant. In Italy, since the late 1970s, the education system envisages that all students, irrespective of their disability are taught in mainstream schools (Aiello & Pace, in press). In classes where students with a certified disability are present, an LST is assigned to assist the teacher in the day-to-day curricular and extra-curricular activities. These professionals, on having completed their training at Masters' level to become primary or secondary school teachers, are then required to pursue an intensive 8-month teacher education course to be able to work as LSTs. The present study looks into the factors influencing the motivation of in-service teachers and young graduates to choose to further their studies and specialise in becoming learning support teachers. The participants included 246 student-teachers who were following an 8-month specialisation course at the University of Salerno in the academic year 2019/20 to obtain the warrant. The underpinning theoretical framework and the methodology will be outlined with specific reference to the FIT-CHOICE scale (Factors Influencing Teaching-Choice) (Watt & Richardson, 2017) that is currently being validated.

Shiri Vivek

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Enhancing Student Engagement for Improved Learning Outcomes

A self-assessment tool that can help faculty identify (i) the level at which their present pedagogy is engaging students and; (ii) which pedagogical modifications can enhance student engagement in their classes, can immensely support faculty efforts to strengthen learning outcomes for students across class formats and disciplines. This paper will introduce an Artificial Intelligence (AI) based, empirically developed self-assessment tool that will help faculty improve their existing pedagogy to make it more engaging for students. The resulting pedagogy can help faculty get better attention from students which has proven to lead to better learning. Although seminal works of researchers such as Alexander Astin (1984) led to significant interest in the idea of "student engagement" and the literature evolved over time, these works have been precipitated by falling enrollments, increasingly strained economic conditions and changing student perspective of higher education. Resulting student engagement measures are more tuned to gauge student's involvement on campus, making only remote correlations of co-curricular engagement with their actual learning in class (e.g. the popular National Survey of Student Engagement (NSSE). While this has led to increased resources dedicated to campus engagement, the absence of an informed tool for academic engagement leaves faculty struggling to engage Gen Z in class and enhance their learning. The available measures are either focused on engagement in schools (e.g. Hughes, Luo, Kwok and Lyod 2008), or are not empirically developed and tested (Handelsman et al. 2005). Through this presentation, I will share the empirically researched elements of student engagement, and introduce the empirically developed robust, artificially intelligent online tool to help participants revise their existing syllabi to make it more engaging for their students. This is a user-friendly self-assessment tool for instructors that assesses the level of academic engagement in their existing pedagogy and provides practical recommendations for improving the pedagogy for enhanced student learning. The new online instrument is a user-friendly tool that the researchers are developing. The tool will be ready for presentation and use of faculty by the time of the conference. The tool is a great pedagogical improvement resource for higher education faculty teaching any discipline in any format.

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Blending the Use of Google Docs with the Face-to-Face Modality to Facilitate the Collaborative Writing Process in a Multicultural High School English Class

Web-based writing tools and peer collaboration are gaining recognition as promising pedagogical strategies for supporting writing skills development. Yet, there is a notable lack of research detailing the complexities inherent in integrating these practices into the broader teaching and learning process of an ongoing course. The study described in this paper sought to fill this void by exploring how an experienced high school English teacher facilitated a narrative writing unit over a 7-week period; the unit culminated with a collaborative writing project, in which the students worked in pairs (and one triad) and used Google Docs to write a story about the future. To facilitate the triangulation of the data, a variety of data sources were collected, including field notes derived from 16 class observations, ongoing reflections written by the teacher, pre- and post-project interviews with the teacher, focus group interviews with the students, and the students' shared Google Docs. A detailed analysis of the data revealed that the teacher used a variety of strategies that align with sociocultural perspectives on writing. Most notably, the teacher guided his students toward higher levels of competency with narrative writing through instructional scaffolding, and by blending the use of a mediating tool, Google Docs, with extended opportunities for students to write collaboratively while sitting face-to-face with their peers and teacher in class. Most of the existing research on collaborative writing has taken place either through the on-line mode or the face-to-face mode. As such, the blended approach was a unique characteristic of the collaborative writing project in the focal classroom. This paper describes the affordances and constraints associated with the aforementioned pedagogical strategies and offers recommendations for the use of web-based tools and collaborative writing projects within diverse learning contexts.

Robert Jay Woodward

Clinical Associate Professor, Texas A&M University, USA

Incorporating High-Impact Practices into Higher Education

In this presentation, the effectiveness of incorporating high-impact educational practices into a higher education curriculum will be revealed. Using the tenants of Kuh (2008) as a guide, this presentation will outline practical ways to structure: 1) common intellectual experiences; 2) collaborative assignments; 3) capstone projects; and 4) global learning into any domain or discipline. Techniques used for developing student collaborative teams and designing meaningful work will be shared. Exemplars of assignments, rubrics, and course artifacts will be shown to demonstrate how the infusion of creativity can reduce "paralysis by analysis" and positively influence student engagement. Contemporary assessment methods that incorporate elements of gamification to gauge student learning outcomes will be introduced. Methods of structuring assignments and project-based learning that transcend traditional testing methods will be explored. Findings supporting the effectiveness of global education will be communicated, with data from both the Global Perspectives Inventory (GPI) and Intercultural Development Inventory (IDI) instruments being used on a sample of study abroad participants (n=72) to demonstrate significant differences in cultural awareness, cross-cultural competence, and cultural literacy. Implications of results to professionals in higher education will be conveyed. Participants who will benefit from this session are faculty, administrators, and instructional designers who are interested in implementing or improving high-impact experiences in their classrooms and campuses.

Qi Zheng
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Let Master of Public Health Students Experience Statistical Reasoning

As an indispensable tool in public health practice and research, biostatistics is an integral part of any public health student's curriculum. Most master-level public health students, lacking undergraduate training in calculus-centered mathematics, are often deemed by instructors to be unprepared for conceptual knowledge, and hence their biostatistics education is dominated by procedural skills. However, a solid understanding of the core concepts of biostatistics is essential to fruitful application of sophisticated biostatistical procedures. While no biostatistics educators would contest this assertion, some would reluctantly resort to the old-fashioned recipe approach after unsuccessful attempts to find an effective way to explain an abstract concept to master-level public health students. According to a recent survey, about forty-five percent of public health-related research utilized statistical methods for categorical data analysis. In this presentation I describe a first principle-guided, computation-driven hands-on approach to teaching categorical data analysis to master-level public health students. This approach relies solely on high school algebra and modest computer programming skill. Examples of actual work by students are presented to show that making the likelihood function easily comprehensible is key to imparting successfully most of the core concepts encountered in an introductory course in categorical data analysis. Students get a feel for the likelihood function by computing and graphing the likelihood function for a small, concrete problem adapted from real-world research. Once students master the all-important concept of the likelihood function, they are eager and able to grasp other core concepts, such as the deviance and the likelihood ratio test. Data from five end-of-semester course surveys were found to support the conclusion that master-level public health students are receptive to conceptual knowledge of biostatistics. They are able to appreciate the beauty of statistical reasoning if the instructor can effectively obviate the need for involved higher mathematics.