THE ATHENS INSTITUTE FOR EDUCATION AND RESEARCH

Abstract Book

3rd Annual International Conference on **Engineering Education**

4-7 June 2018, Athens, Greece

Edited by
Gregory T. Papanikos

2018

Abstracts

3rd Annual International Conference on Engineering Education

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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 *3rd Annual International Conference on Engineering Education (4-7 June 2018)*, organized by the Athens Institute for Education and Research (ATINER).

In total 22 papers were submitted by 26 presenters, coming from 15 different countries (China, Colombia, France, Germany, India, Iran, Italy, Morocco, the Netherlands, Pakistan, Spain, Turkey, Uganda, UK and USA). The conference was organized into 9 sessions that included a variety of topic areas such as learning strategies, scientific teaching methods and more. 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 seven research divisions and 37 research units. Each research 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

3rd Annual International Conference on Engineering Education, 4-7 June 2018, Athens, Greece Organizing and Academic Committee

ATINER's conferences are small events which serve the mission of the association under the guidance of its Academic Committee which sets the policies. In addition, each conference has its own academic committee. Members of the committee include all those who have evaluated the abstract-paper submissions and have chaired the sessions of the conference. The members of the **academic committee** of the 3rd Annual International Conference on Engineering Education were the following:

1. Gregory T. Papanikos, President, ATINER.
2. Nicholas Pappas, Vice President of Academic Membership, ATINER & Professor of History, Sam Houston University, USA.
3. Nicholas N. Patricios, Vice President of Strategic Planning & Analysis, ATINER and Professor & Dean Emeritus, School of Architecture, University of Miami, USA.
4. Virginia Sisiopiku, Head, Transportation Engineering Unit, ATINER, & Associate Professor, The University of Alabama at Birmingham, USA.
5. Sanjay Sisodiya, Associate Professor, University of Idaho, USA.
6. Mike Mavromihales, Senior Lecturer and Course Leader, University of Huddersfield, UK.
7. Eddie Smigiel, Associate Professor, INSA Strasbourg, France.
8. Javier Cubas, Assistant Professor, Polytechnic University of Madrid, Spain.
9. Elif Bengu, Academic Member, ATINER & Coordinator for Center for the Enhancement of Learning and Teaching, Abdullah Gül University, Turkey.
10. Zareena Gani, Assistant Professor, Mechanical Engineering Division, ETS, UAE.
11. Ratan Kar, Scientist, Birbal Sahni Institute of Palaeosciences, India.
12. Patrizia Falzone, Professor, University of Genoa, Italy.
13. Alice Merab Kagoda, Academic Member, ATINER & Lecturer, Makerere University, Uganda.

The **organizing committee** of the conference included the following:

1. Fani Balaska, Research Assistant, ATINER.
2. Olga Gkounta, Researcher, ATINER.
3. Hannah Howard, Research Assistant, ATINER.
4. Eirini Lentzou, Administrative Assistant, ATINER.
5. Konstantinos Manolidis, Administrator, ATINER.
6. Vassilis Skianis, Research Associate, ATINER.
7. Kostas Spyropoulos, Administrator, ATINER.

FINAL CONFERENCE PROGRAM
3rd Annual International Conference on Engineering Education,
4-7 June 2018, Athens, Greece
PROGRAM
Conference Venue: Titania Hotel, 52 Panepistimiou Street, 10678 Athens, Greece

Monday 4 June 2018

08:00-08:45 Registration and Refreshments

08:45-09:30 (Room A - Mezzanine Floor): Welcome and Opening Address

Gregory T. Papanikos, President, ATINER.
Nicholas Pappas, Vice President of Academic Membership, ATINER & Professor of History, Sam Houston University, USA.

09:30-11:00 Session I (Room E - 10th Floor): Geological Issues

Chair: Sanjay Sisodiya, Associate Professor, University of Idaho, USA.

1. Khuraijam Mohon Singh, Associate Professor, Imphal College, Imphal, India. Significance of Mineral Chemistry of Kyrdem Granitoids and Associated Enclaves, Meghalaya Plateau, Northeast India.
2. Carolin Neugebauer, Master of Geosciences, Germany. Sedimentation Processes during the Last Glacial Period Deduced from Grain Size Analyses on Gravity Core MSM 33/54-3 from the Anatolian Continental Margin.

11:00-12:30 Session II (Room E - 10th Floor): Geographic Information Systems

Chair: Alice Merab Kagoda, Lecturer, Makerere University, Uganda.

1. Sungsoon Hwang, Associate Professor, DePaul University, USA, Amanda Lin, Assistant Professor, Rosalind Franklin University of Medicine and Science, USA, Ryan Crews, Assistant Professor, Rosalind Franklin University of Medicine and Science, USA, Kristin Schneider, Associate Professor, Rosalind Franklin University of Medicine and Science, USA, Noah Rosenblatt, Assistant Professor, Rosalind Franklin University of Medicine and Science, USA, Sai Yalla, Assistant Professor, Rosalind Franklin University of Medicine and Science, USA & Elizabeth Moxley, Assistant Professor, DePaul University, USA. Assessing Community Participation among People with Limited Mobility using GPS and Accelerometer.
2. Isabelle Seguy, Researcher, INED - Institut National d'Etudes Démographiques, France. A Geographic Information System for the Study of Past Epidemics: The 1705 Epidemic in Martigues (Bouches-du-Rhône, France).
3. Elham Karimi, Noise Expert, Air Quality Control Company, Iran, Peyman Hamian, GIS and Geomarketing Advisory Services, Iran, Maryam Naderi, Head of Air and Noise, Air Quality Control Company, Iran & Vahid Hosseini, Associate Professor, Sharif University of Technology, Iran. Detection of Noise Sensitive Areas at Risk of Exceeded Sound Levels in Tehran Metropolitan City (A GIS-based Approach).

12:30-14:00 Session III (Room E - 10th Floor): Learning Strategies I

Chair: Eddie Smigiel, Associate Professor, INSA Strasbourg, France.

1. Patrick Balve, Professor, Heilbronn University of Applied Sciences, Germany & Lena Ebert, Research Assistant, Heilbronn University of Applied Sciences, Germany. Competence Development in Engineering Education – Smoothening the Transition into Corporate Practice through Problem-based Learning.
2. Sanjay Sisodiya, Associate Professor, University of Idaho, USA, Kathy O'Malley, Professor, University of Idaho, USA & Steven Shook, Professor, University of Idaho, USA. Pricing of New Products: Going Beyond Cost-Based and Competition-Based Pricing to Consider Value in Engineering Capstone Courses.
3. Javier Cubas, Assistant Professor, Polytechnic University of Madrid, Spain, Elena Roibas-Millan, Professor, Polytechnic University of Madrid, Spain, Santiago Pindado, Professor, Polytechnic University of Madrid, Spain, Félix Sorribes-Palmer, Professor, Polytechnic University of Madrid, Spain, Gustavo Alonso, Professor, Polytechnic University of Madrid, Spain, Ángel Sanz-Andrés, Professor, Polytechnic University of Madrid, Spain & Javier Pérez-Álvarez, Professor, Polytechnic University of Madrid, Spain. Concurrent Engineering Approach for Space Mission Design within the Master in Space Systems (MUSE) at *Universidad Politécnica de Madrid* (UPM).

14:00-15:00 Lunch

15:00-16:30 Session IV (Room D - 10th Floor): Science Teaching & Educational Issues

Chair: Mike Mavromihales, Senior Lecturer and Course Leader, University of Huddersfield, UK.

1. Eddie Smigiel, Associate Professor, INSA Strasbourg, France & Sandrine Simon, Professor, Université Euro-Méditerranéenne de Fès, Morocco. An Exploration of the Confusion between Concept and Formalization amongst the Community of Teachers in Physics.
2. Alice Merab Kagoda, Lecturer, Makerere University, Uganda. Teachers' Experiences and Practices of Teaching Practical Geography in Secondary Schools of Uganda.
3. Elif Bengu, Coordinator for Center for the Enhancement of Learning and Teaching, Abdullah Gül University, Turkey & Faruk Kececi, Head of Mechanical Engineering Department, Abdullah Gül University, Turkey. Maker Spaces and Their Effect on Engineering Education.
4. Laura Santos-Maldonado, Instructor, Universidad de los Andes, Colombia & Diana Carolina Lenis, Senior Pedagogical Adviser, Universidad de los Andes, Colombia. Flipped-Learning and Case Strategy for Developing Interpretative Skills in the Context of an Environmental Thermochemistry Course.

17:30-19:30 Session V ATINER's 2018 Series of Academic Dialogues: A Symposium Discussion on Recent International Research in Urban Studies and Planning

Venue: Harokopio University (New Building-Ceremony Hall), Eleftheriou Venizelou 70, Kallithea.

Chair: Virginia Sisiopiku, Head, Transportation Engineering Unit, ATINER, & Associate Professor, The University of Alabama at Birmingham, USA.

1. Ali Cheshmehzangi, Head of Department of Architecture and Built Environment, Director of CSET (Center for Sustainable Energy Technologies), Director of UIL (Urban Innovation Lab), & Associate Professor of Architecture and Urban Design, Department of Architecture and Built Environment, The University of Nottingham Ningbo China, China. Smart Cities vs. Urbanism.
2. Carolyn Aguilar-Dubose, Professor, University Iberoamericana, Mexico. From Universe to Pluriverse in Sustainability.
3. Antonio Zumelzu, Associate Professor, Austral University of Chile, Chile. Sustainability in the Global South: The Role of Urban Morphology.
4. Giulia Pellegri, Associate Professor, Architecture-Polytechnic School, University of Genoa, Italy. De-Sign Research: Interactions and Results in the International Contributions of the 2018 Design Day in Genoa. Department of Architecture and Design University of Genoa.
5. Ratna Ghosh, Assistant Professor, Amity University Noida, India. City of Chandigarh.
6. Raed Al Tal, Assistant Professor, German Jordanian University, Jordan. Cities of Continuous Urban Instability - Amman as a Case Study.

21:00-23:00 Greek Night and Dinner

Tuesday 5 June 2018

07:45-11:00 Session VI: An Educational Urban Walk in Modern and Ancient Athens

Chair: Gregory A. Katsas, Vice President of Academic Affairs, ATINER & Associate Professor, The American College of Greece-Deree College, Greece.

Group Discussion on Ancient and Modern Athens.
Visit to the Most Important Historical and Cultural Monuments of the City (be prepared to walk and talk as in the ancient peripatetic school of Aristotle)

11:15-13:00 Session VII (Room D - 10th Floor): Learning Strategies II

Chair: Javier Cubas, Assistant Professor, Polytechnic University of Madrid, Spain.

1. Mike Mavromihales, Senior Lecturer and Course Leader, University of Huddersfield, UK & Violeta Holmes, Subject Area Leader, University of Huddersfield, UK. A Multi-Pronged Approach to Blended Learning; Focussing on Fundamentals of Mechanical Engineering Undergraduate Education.
2. Rosalie Van Baest, Lecturer, Fontys Hogescholen Eindhoven, The Netherlands. Stimulating Conscious Development (BOS Model). Mechanism for Movement in Engineering Education.
3. Manuel Niever, Doctoral Researcher, Institute of Product Engineering (IPEK) at Karlsruhe Institute of Technology (KIT), Germany, Thilo Richter,

Scientific Assistant, Institute of Product Engineering (IPEK) at Karlsruhe Institute of Technology (KIT), Germany, Katharina Duehr, Scientific Assistant, Institute of Product Engineering (IPEK) at Karlsruhe Institute of Technology (KIT), Germany, Miriam Wilmsen, Doctoral Researcher, Karlsruhe Institute of Technology (KIT), Germany, Laura Lanz, Student, University of Applied Sciences Karlsruhe (HsKA), Germany, Benjamin Walter, Scientific Assistant, Institute of Product Engineering (IPEK) at Karlsruhe Institute of Technology (KIT), Germany, Albert Albers, Head of Institute of Product Engineering, Karlsruhe Institute of Technology (KIT), Germany & Carsten Hahn, Professor, University of Applied Sciences Karlsruhe (HsKA), Germany. KaLeP: A Holistic Case-Based Action Learning Environment to Educate Successful Future Engineers.

13:00-14:00 Lunch

14:00-15:30 Session VIII (Room E - 10th Floor): Geophysical Engineering

Chair: Ratan Kar, Scientist, Birbal Sahni Institute of Palaeosciences, India.

1. Oya Pamukcu, Professor, Dokuz Eylül University, Turkey & Ayca Cirmik, Research Assistant, Dokuz Eylül University, Turkey. Monitoring of the Geothermal Fields.
2. Kamran Mirza, Assistant Professor, University of the Punjab, Pakistan & Danish Khan, University of the Punjab, Pakistan. Integrated Microfacies Analysis of Lower Paleogene Carbonate Rocks of Kasanwala Area, Western Salt Range, North Western Himalayas, Pakistan.
3. Long Wang, PhD Student, China University of Geosciences, China. Reservoir Characterization and Stacking Patterns of Carbonate Grain Bank: A Case Study of Grain Bank of Cambrian Longwangmiao Formation in the Sichuan Basin, China.
4. Ayca Cirmik, Research Assistant, Dokuz Eylül University, Turkey & Oya Pamukcu, Professor, Dokuz Eylül University, Turkey. The Deformation Field of the 27th May 2017 Gölmarmara Earthquake.

15:30-17:00 Session IX (Room C - 10th Floor): Drawing & Representation: Environment-Landscape-City

Chair: Patrizia Falzone, Professor, University of Genoa, Italy.

1. Michela Scaglione, Adjust Professor, Università degli Studi di Genova, Italy. Basic Methodology for the Knowledge of a Territory through the GIS: Analysis, Surveys and Representations.
2. Ruggero Torti, Research Grant Holder, Università degli Studi di Genova, Italy. *Signum* and Visual Identity.
3. Francesca Salvetti, Professor, University of Genoa, Italy. Quality Standards for the Restoration of Color Values in Urban Areas: Color Projects.

20:00- 21:30 Dinner

Wednesday 6 June 2018
Mycenae and Island of Poros Visit
Educational Island Tour

Thursday 7 June 2018
Delphi Visit

Friday 8 June 2018
Ancient Corinth and Cape Sounion

Patrick Balve
Professor, Heilbronn University of Applied Sciences, Germany
&
Lena Ebert
Research Assistant, Heilbronn University of Applied Sciences, Germany

Competence Development in Engineering Education – Smoothening the Transition into Corporate Practice through Learning Projects

The problem-based and project-oriented teaching and learning format "Lernfabrik" (Learning Factory) of the Bachelor's engineering programme "Manufacturing and Operations Management" at Heilbronn University of Applied Sciences is currently being evaluated as part of a funded research project. The Learning Factory is positioned in the 6th semester and has been held twice a year since 2011. Within a project timeframe of 15 weeks, the students have to develop a functioning, ready-to-ship and fully documented product, which is actually manufactured in small series. Similar to industry, the students work in small self-organised teams, each performing a different function in the value-added chain within a realistic production environment.

The primary goal of the Learning Factory is to promote the development of the students' social, methodological and self-competences in addition to the deepening of engineering knowledge, and to prepare them for the upcoming start of their professional career.

Our research aims at answering the following question:

1) Are the competences of the students within the Learning Factory developed in the desired way?
2) Are students in the Learning Factory better prepared for their career start than students in two other, yet comparable, courses of study?
3) What is the competence profile of Bachelor graduates in engineering required by industry?

This study follows an empirical approach with the overarching aim to find out whether the students have experienced a gain in competence by participating in the Learning Factory. Therefore, graduates of the degree programme "Manufacturing and Operations Management" and of two other study programmes of the Faculty of Industrial and Process Engineering were included in a survey. First result show clearly that the experiences in the Learning Factory are supportive for the upcoming start of the students' professional career. On top of this, there is clear evidence that all three study courses strengthen the methodological and also the self- and social competences. Finally, the industry's demands for specific social skills, but

above all, methodological and personal competences of our Bachelor graduates could be identified.

Elif Bengu
Coordinator for Center for the Enhancement of Learning and Teaching, Abdullah Gül University, Turkey
&
Faruk Kececi
Head of Mechanical Engineering Department, Abdullah Gül University, Turkey

Maker Spaces and Their Effect on Engineering Education

According to the research "the engineer of the future needs to be able to harness creativity and innovation in order to stay competitive and relevant in an economy with ever growing needs." Accordingly, engineering faculties are expected to cultivate curiosity and foster creativity in students. "Maker space" is a new concept in education pioneered in 2001 at MIT. According to the literature review, these spaces are seen as venues where students and/or professionals gather at a specifically designed please to think, explore, discover and create by using a variety of tools and materials that are provided.

In this research, the definition of Roslunds' will be used. Because in this definition she used important elements of maker spaces; place, people and make things. She defines maker space' as a place where people get together to make things. Maker spaces might focus on designing, prototyping, 3D printing, manufacturing and programing, or some combination of these activities.

These spaces provide an opportunity for students to engage in an experiential learning and develop a large range of skills that undergraduate curriculum is unable to provide, as well as soft skills, such as planning, teamwork, budgeting and communication. There are still limited studies about the full effect and impact of these spaces in teaching and learning, from the pedagogical perspective. The research presented in this session takes place in a public university in Turkey, namely Abdullah Gul University. The maker space at this university can be considered to be the first one in its scale in the country. The presentation will discuss the effect and impact of the maker space on teaching and learning. In addition, we will present the advantages and the disadvantages of having one in regard to the sustainability and management of the space.

Ayca Cirmik
Research Assistant, Dokuz Eylül University, Turkey
&
Oya Pamukcu
Professor, Dokuz Eylül University, Turkey

The Deformation Field of the 27 May 2017 Gölmarmara Earthquake

Gediz (Alaşehir) graben, which locates in Western Anatolia region, is divided into three collapses such as Gölmarmara, Manisa and Kemalpaşa basins towards west. Gediz graben exists on Menderes massive, besides, the high and medium grades metamorphic rocks cover the basement of this area. In this area, the earthquakes occurred since ancient periods. Recently on 27th May 2017, a moderate earthquake occurred in Deynekler-Gölmarmara (Manisa City) with magnitude (Mw) 5.2 and the effects of this earthquake were felt for approximately 15 days on a great region which includes high populated cities such as Manisa, Izmir, Aydin, Uşak and Balikesir. According to Kandilli Observatory and Earthquake Research Institute (KOERI), the focal depth of the earthquake was shallow and approximately 13 km and occurred in normal fault with vertical strike.

In this study, the pre-seismic, co-seismic and post-seismic deformation analysis is realized with help of the GNSS time-series of the continuous stations locate in effected region by this earthquake. In this scope, the regional evaluations are executed due to the deformation type of the GNSS stations. As the general result, the vertical components of the time series were more affected related with the consistent of the fault sense of the earthquake occurred. Additionally, the existence of a lake which appeared with the regional tectonic collapse is the sign of the vertical movements in the area. Therefore, it can be said that the regional effect type of the earthquake is the vertical directional.

Javier Cubas
Assistant Professor, Polytechnic University of Madrid, Spain
Elena Roibas-Millan
Professor, Polytechnic University of Madrid, Spain
Santiago Pindado
Professor, Polytechnic University of Madrid, Spain
Félix Sorribes-Palmer
Professor, Polytechnic University of Madrid, Spain
Gustavo Alonso
Professor, Polytechnic University of Madrid, Spain
Ángel Sanz-Andrés
Professor, Polytechnic University of Madrid, Spain
&
Javier Pérez-Álvarez
Professor, Polytechnic University of Madrid, Spain

Concurrent Engineering Approach for Space Mission Design within the Master in Space Systems (MUSE) at *Universidad Politécnica de Madrid* (UPM)

In September 2017, second year students of the Master's Degree in Space Systems (MUSE) had the opportunity to participate in the 1stESA Academy Concurrent Engineering Challenge, organized byESA Academy's Training and Learning Centre, together with Politecnico Di Torino (Italy), University of Strathclyde (United Kingdom) and ESA Academy (Belgium) students. The four days challenge was focused on the Phase-0 design of a space mission, fully developed based on a Concurrent Engineering approach. The UPM team design was conducted within the Concurrent Design Facility (CDF) of the Instituto de Microgravedad 'Ignacio Da Riva'(IDR/UPM), located in Madrid, by the supervision of two UPM Professors acting as System Engineers of the sessions.

The experience belongs to the Study Case II of the Master's Degree in Space Systems (MUSE). MUSE is promoted, implemented and fully organized by the Instituto de Microgravedad 'Ignacio Da Riva'(IDR/UPM) and it is based on Project-Based Learning, taking advantage of the wide expertise of IDR/UPM on space research and technology. The educational program is focused on practical work within real space projects of IDR/UPM and by collaboration with several space scientific institutions. The aim of this work is to present the academic possibilities of the IDR/UPM CDF. Besides, the ESA Challenge structure and the mission developed by MUSE students is also described, as well as the future challenges proposed to integrate the Concurrent Engineering approach in the MUSE educational program.

Sungsoon Hwang
Associate Professor, DePaul University, USA
Amanda Lin
Assistant Professor, Rosalind Franklin University of Medicine and Science, USA
Ryan Crews
Assistant Professor, Rosalind Franklin University of Medicine and Science, USA
Kristin Schneider
Associate Professor, Rosalind Franklin University of Medicine and Science, USA
Noah Rosenblatt
Assistant Professor, Rosalind Franklin University of Medicine and Science, USA
Sai Yalla
Assistant Professor, Rosalind Franklin University of Medicine and Science, USA
&
Elizabeth Moxley
Assistant Professor, DePaul University, USA

Assessing Community Participation among People with Limited Mobility using GPS and Accelerometer

Contexts: Improving community participation outcomes among people with limited mobility is an important public health goal. Community participation can be defined as active involvement in activities that occur outside the home or are part of a nondomestic role. Conventional measures of community participation is self-reported, and thus lack objectivity and specificity particularly in spatial and temporal domain. Recent advances in wearable sensors for Quantified Self in public health present opportunities for improving the outcome measures.

Aim: The aim of this talk is to discuss how GPS and accelerometer were used to assess out-of-home mobility as an indicator of community participation. Data were collected as part of assessing efficacy of programs that were developed to improve health among diabetic persons with risk for foot ulcer, people with traumatic brain injury and users of lower limb prostheses.

Methods: The methodology was developed to mitigate the sensitivity of analysis results to uncertainty of GPS trajectory data (such as signal loss and signal errors). Time gaps in GPS data were filled using a gap imputation algorithm, and then GPS trajectory is segmented into a sequence of stop and move episodes before location data is seamlessly synchronized with

accelerometer data (e.g., step counts and duration of postural event such as walking and standing).

Results: After physical activity interventions for 10 diabetic patients, the daily average number of steps out of home increased from 1488 to 1771, and the number of places visited out of home increased from 2.44 to 2.73. After interventions on balance confidence for a user of lower limb prostheses, the number of trips increased from 4.5 to 5.1, and the average number of steps per trip increased from 248 to 362.

Conclusions: The integrated measurement of GPS, accelerometer and GIS can help improve outcome measures (such as community participation) by making them context-specific, and assess spatiotemporal configuration of environmental exposures. Uncertainty handling of GPS trajectory data and episode-level analysis enable exhaustive and correctly weighted exposure assessment. As a future research, a travel diary needs to be incorporated to fully characterize environmental exposures and community participation.

Alice Merab Kagoda
Lecturer, Makerere University, Uganda

Teachers' Experiences and Practices of Teaching Practical Geography in Secondary Schools of Uganda

Geography is a practical subject and its approach in teaching it is practical in nature –focusing on concepts that are relevant to everyday life. The main purpose of this study was to guide teacher trainees; identity practical activities in geography classes in secondary schools. The teaching methods used, the challenges and problems faced by geography teachers. Third year geography teacher trainee and secondary school teachers participated in the study. Results reveal that activities like map work, photograph interpretation and field works are the main activities. Teachers use the following methods; lecture, fieldwork and to a less extent group work as main methods of study. The main challenges faced by teachers include; lack of instructional materials, lack of sufficient time on timetable, lack of geographical knowledge and skills by some teachers and lack of support by school administrators. The researcher recommends special workshops for teachers, governments, school administration and parents to buy geography equipment essentials for teaching practical geography.

Elham Karimi
Noise Expert, Air Quality Control Company, Iran
Peyman Hamian
GIS and Geomarketing Advisory Services, Iran
Maryam Naderi
Head of Air and Noise, Air Quality Control Company, Iran
&
Vahid Hosseini
Associate Professor, Sharif University of Technology, Iran

Detection of Noise Sensitive Areas at Risk of Exceeded Sound Levels in Tehran Metropolitan City (A GIS-based Approach)

The problem of noise pollution in Tehran city is the most serious issue that citizens face publicly. Nowadays, noise pollution is given less priority because the health risks arising from this pollution usually does not occur immediately after the exposure. Traffic of roads and highways is one of the most important noise generating factors in Tehran, which its mitigation is considered to be a priority of today's modern life.

Although the use of noise abatement strategies, such as the installation of noise barriers, the use of double glazed windows in buildings, and porous asphalt, are all suitable and efficient noise mitigation solutions, it should not be forgotten that prevention is better than treatment. Compliance with noise buffer zones of highways and the prohibition of constructing building residential homes and noise sensitive centers, such as hospitals and schools within these zones, can play a very important role in reducing the receiving noise. Meanwhile, the use of GIS as a database, as well as a tool for modeling and analyzing spatial data, can help urban managers and decision makers make better and more accurate decisions.

In this research, using CadnaA modeling software, the sound level map of Tehran City was prepared based on the map layers of roads (traffic volume and the speed of vehicles) and buildings (height), which had already been developed in GIS software. Then, according to the standard limits for the sound level of residential and noise sensitive areas set by Iran's Department of Environment, the noise buffer zone of the highways was determined. There are a total of 5352 schools and 157 hospitals in Tehran City. Finally, using the GIS software, the percentage of resident population, as well as the schools and hospitals located in this acoustical zone, was prioritized in order to use for developing noise abatement and mitigation strategies. Based on the noise level map derived from the modeling, the noise buffer area of highways was extracted as a map layer using data Spatial Analyst tool in GIS. Accordingly, the areas with a sound level of less than 55 dBA were considered as “No-Risk” zones. The intermediate sound level was regarded to be in the range of 55-65 dBA, within which approximately 21% of

the city population resides. There are also 1420 educational centers and 32 hospitals in this zone. The high-risk area, with a sound level of above 65 dBA, includes about 22.5% of the city population, 34 hospitals, and 1217 educational centers. It is highly recommended to use abatement and mitigation strategies in the high-risk zone. In addition, in the construction of new highways, care must be taken not to have noise sensitive centers adjacent to these zones.

Mike Mavromihales
Senior Lecturer and Course Leader, University of Huddersfield, UK
&
Violeta Holmes
Subject Area Leader, University of Huddersfield, UK

A MultiPronged Approach to Blended Learning; Focusing on Fundamentals of Mechanical Engineering Undergraduate Education

This paper reviews and evaluates a selection of approaches in teaching and learning on undergraduate mechanical engineering courses. The cases discussed and evaluated include activity based learning (ABL) and Games Based Learning (GBL) intended to reinforce and apply prior underlying theoretical fundamentals. Games based learning is targeting students' ability to engage on hands-on practical collaborative learning which brings about its own benefits in teaching and learning.

Activity Based Learning compliments and incorporates previous approaches of gamification activity.

Although widely used in a selection of subject areas, there appears to be limited application of GBL in Engineering and Technology (E&T). Its effectiveness as a learning or training tool, especially in Mechanical Engineering subject area, has been unclear. The paper presents novel approaches in delivery of engineering education. Games-based Learning has a potential to enhance student experience and learning process. In order to evaluate the outcomes of both ABL and GBL approaches and observe their effects on students' performance, simple in-class games have been designed and implemented as part of delivery and participation. We report on the level of student engagement and the extent to which learning outcomes were met through the introduction of such activities.

We also consider the use of Electronic Voting System as part of a blended learning environment for reflective learning and explorative thinking. It demonstrates how such voting systems can enhance the student learning experience by integration within a flipped classroom approach and reflective learning.

Initially, a flipped classroom approach is used to encourage students to view relevant subject AV prior to classroom delivery and discussion.

A rich data set was acquired over three years of targeted and focussed delivery and used to quantify the effectiveness of the approaches taken.

Each of these approaches has brought their own benefits to teaching and learning fundamentals however there is evidence that combined, produce a powerful set of tools for mechanical engineering education. However there is evidence that a combination of these methods generates a powerful set of tools for mechanical engineering education.

Varied instruments of delivery and assessment along with novel methods to encourage student engagement and participation led to improved student performance and acquisition of knowledge and skills.

Kamran Mirza
Assistant Professor, University of the Punjab, Pakistan
&
Danish Khan
University of the Punjab, Pakistan

Integrated Microfacies Analysis of Lower Paleogene Carbonate Rocks of Kasanwala Area, Western Salt Range, North Western Himalayas, Pakistan

The lower Paleogene carbonate rocks of the western Salt Range are comprised of Lockhart Limestone, Nammal Formation and Sakesar Limestone in the order of succession, whereas the upper Paleocene Patala Formation is absent in the area. The microfacies content of these rocks were analyzed from the Kasanwala section in the Western Salt Range. The Lockhart Limestone of Paleocene age is composed of nodular limestone with some intercalated shale and is dominated by larger benthonic foraminifera including; *Miscellania miscella, Lockhartia haimei, L. conica, L. conditi, L. tipperi, Ranikothalia sindensis, R. sahni, Discocyclina ranikotensis, and Operculina salsa*. The measured thickness of Lockhart Limestone in the study area was 37m. Four microfacies of Lockhart Limestone have been observed after detailed thin section analysis namely; Bioclastic Mudstone, Lockhartia Wackestone, Miscellanea Packstone and Lockhartia Packstone microfacies. The Nammal Formation of lower Eocene age consists of alternating beds of medium to dark grey limestone with clay & shale and is highly fossiliferous in some parts. In this section, Nammal Formation was 56m thick. It is comprised of the larger benthic foraminifera including; *Discocyclina dispansa, D. ranikotensis, Assilina laminosa, Operculina sp. and Nummilites sp.* Five microfacies of Nammal Formation have been identified after light microscopic analysis namely; Bioclastic Mudstone, Nummulitic Wackestone, Bioclastic Wackestone, Peloidal Wackestone and Nummulitic Packstone microfacies. The Sakesar Limestone is composed of cream to light grey nodular massive limestone with chert nodules in the upper part and is widely distributed in the project area. The observed thickness was 36m. In Sakesar Limestone, the larger benthonic foraminifers were *Operculina sp., Assilina sp., Nummulites sp., Ranikothalia sp., and Discocyclina sp.* Three microfacies of Sakesar Limestone have been proposed after comprehensive microscopic analysis namely; Algal Mudstone, Bioclastic Mudstone and Assilina Wackestone microfacies.

On the basis of observed fauna, its bathymetry and the microfacies framework, it can safely be concluded that these lower Paleogene rocks were deposited in shallow marine, open shelf environment with free circulation of water.

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Significance of Mineral Chemistry of Kyrdem Granitoids and Associated Enclaves, Meghalaya Plateau, Northeast India

Cambro-Ordovician felsic magmatism in and around Kyrdem locality of East Khasi Hills commonly referred to as Kyrdem granitoids (512.5 ± 8.7 Ma) is an integral part of extensive felsic magmatism in Meghalaya plateau, northeast India. Kyrdem granitoids (KG) lies approximately between longitude 92°E and 92°10'E and latitude 25°38'N and 25°50'N which covers nearly 210 sq km area forming an oval-shaped felsic pluton. The KG intrudes the Proterozoic metasediments of the Shillong Group and located at the proximity of Tyrsad-Barapani lineament. The KG is characterized by development of variable attitude of primary foliations mostly marked along the margin of the pluton and is located at the proximity of Tyrsad-Barapani lineament. The KG contains xenoliths of country rock (amphibolite, phyllite, schist etc.) which are mostly confined to the margin of the pluton. Microgranular enclaves (ME) are found hosted in the porphyritic variety of KG. Petrographically Kyrdem granitoids are characterized by medium- to coarse-grained, equigranular to porphyritic texture containing varying proportions of K-feldspar megacrysts and mafic phases, though occasional cumulus phases (kf-pl-bt) with intercumulus quartz forming cumulate-like texture can also be recognized. The feldspar megacrysts in KG represent the phenocryst not the porphyroblast but in ME they appear as xenocrysts because of partly dissolved (corroded) crystal boundaries.

The presence of mafic-felsic xenocrysts in ME implies that coeval mafic and felsic magmas were having some initial crystallinities and therefore mechanical mixing of these grains also occured forming the hybrid (ME) zone. Biotites from ME and KG can equally be classified as Mg-biotites mostly stabilized at and around FMQ buffer. Biotites from ME are slightly Mg-enriched compared to that of KG, which supports the involvement of mafic magma in the origin of ME. Combined edenite, pargasite, hornblende and hastingsite substitutions with titanium analogous relations operated during mafic-felsic magma mixing event. This is further supported by the observed equivocal Mg⇌Fe substitution during biotite evolution in ME and KG similar to calc-alkaline oxidizing mafic-felsic mixing system ($fO_2=10^{-13.5}$ to $10^{-12.5}$ bar, T=920°-870° C) as estimated using experimental biotite equilibria. Compositions of amphibole ($Mg/Mg+Fe^t$ =0.42-0.68) and biotite ($Mg/Mg+Fe^t$ =0.47-0.56) of KG, which strongly oppose restite or cognate origins of ME rather attributed to moderate degree of mineral equilibrium attained during magma mixing and mingling processes. Al-in-hornblende geobarometer suggests that the KG pluton was emplaced at shallow depth of about 3.21±0.5 kbars, but some ME probably frozen (or solidified) at 4.80±0.5

kbars deeper than the respective KG (4.12±0.5 kbars). The observed variations in pressure estimate (1.48, 2.36, 4.12, 4.88 ±0.5 kbars) across the KG pluton suggest the exposure of different parts of KG pluton at present erosional levels. Coexisting plagioclase-hornblende geothermometer yields equilibration temperature in ME (794°-803°±75° C) and KG (792°-847°±75° C) which appear to represent thermal equilibration temperatures of mafic-felsic mixing system slightly above the solidus (790° C) of hybrid magma.

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Sedimentation Processes during the Last Glacial Period Deduced from Grain Size Analyses on Gravity Core MSM 33/54-3 from the Anatolian Continental Margin

Abrupt climate fluctuations within the last glacial period are recorded in several palaeoclimate archives such as Greenland ice cores and northern hemisphere sediments, both marine and terrestrial. Characterised by an abrupt warming within a few decades and followed by gradual cooling, these events – known as Dansgaard-Oeschger events (DO) - are directly related to changes in the sedimentary mechanisms for several marginal basins. Black Sea sedimentary mechanisms were mainly influenced by continental ice sheet dynamics of the northern hemisphere. Variabilities of more intense (stadial) and less intense (interstadial) glacial conditions caused by variations in North Atlantic oceanic meridional heat transport, correlate with regional climate changes [Henry et al. 2016] and thus, leading to changes of the grain size character of a sediment. South eastern Black Sea sediments represent well archived paleoenvironmental records of the last glacial course. As a marginal basin with its only connection to the world ocean circulation system via the Bosporus, the Black Sea experienced several periods as an isolated glacial lake, caused by sea level fall during cold DO events. To reveal the dominant modes of temperature variability between 60-30 thousand years, a sedimentary sequence of a gravity core of the south eastern Archangelsky Ridge (41°58.985' N, 36°43.845' E) is analysed with respect to several climate indicators. Laser diffractometry and statistical calculation programmes such as GRADISTAT obtained sedimentary parameters in order to estimate the dynamic and genetic reasons for the presence of numerous grain size distributions of the sediments. The process of End-member modelling has been used to assign the grain size distributions to the sedimentary mechanisms during DO events. Additionally, XRF analysis revealed the aeolian and fluviatile indicative elements of the core sequence to clarify how the regional ecosystem, especially vegetation, responded to these climate changes. As a result, the grain size distributions correspond remarkable with climate changes and therefore, reveal high impacts of DO events on sedimentary processes in the south eastern Black Sea region. The present study contributes a piece to the puzzle of the climate development of Southeast Europe to understand past climate mechanisms as well as to predict future climate scenarios.

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KaLeP: A Holistic Case-Based Action Learning Environment to Educate Successful Future Engineers

In terms of higher engineering education, skills beside technical competencies as e.g. functioning in multi-disciplinary teams, professional and ethical responsibility or the ability to use techniques, skills and modern engineering tools are essential for engineering absolvents. To address this need, a holistic case-based action learning environment, the Karlsruhe Education Model for Product Development "KaLeP" has been created for the field of higher engineering education, pursuing the goal of educating engineers, who fulfil preferably all criteria of the competence profile of a future engineer. This holistic education environment consists of multiple elements which focus on modern education concepts:

- interactive classroom teaching
- flipped classrooms
- innovation coaching concepts
- train the trainer approaches
- different types of co-creation
- use of different media like innovation platforms

In addition to those elements, the acquisition of real world competencies requires mastering of real world problem solving and thus the involvement of students into real projects, which can be realised through Live-Labs. As key element, these Live-Labs contribute to the education of future product engineers through the participation within a real product engineering project, assigned by a company. The students accomplish a relevant product engineering task by developing a new product generation based on customer needs within an interdisciplinary team. From an educational perspective, the students become educated through the targeted use of action learning approaches and case-based learning and accomplish specific tasks and gain additional competencies during the engineering project according to their role, as e.g. team manager, design engineer, test engineer or marketing expert.

This contribution presents the results of empirical studies which were conducted within the different elements of KaLeP, as three Live-Labs, different interactive lectures and various case-based workshops. From these findings a descriptive teaching model especially for Live-Lab education is derived which is based on elements of existing frameworks as e.g. by Bloom's Taxonomy, different types of learning and the generation theory. Additionally, it is shown how a Live-Lab environment can be used to foster agile design research involving junior researchers.

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Monitoring of the Geothermal Fields

The concept of energy and the energy resources sustainability have been one of the most important subjects and problems of the world from past to present. Depletion of the energy resources rapidly, using the non-renewable resources such as petroleum, oil and nuclear energy unconsciously and the effect of the pollutions that these resources give to environment and atmosphere are directed the human beings to use renewable energy sources. The geothermal energy, which is one of the most important renewable resources, is used in lots of fields such as electric production, medicine, tourism, agriculture, industry.

The mass changes which is very significant subject for the terms of the earth sciences, can occur with the effect of water potential in geothermal fields. In particular, the reinjection in the geothermal plants can be caused the important subsurface changes in the geothermal basin. Microgravity and GNSS methods are used for monitoring these changes in the geothermal basins. The vertical mass movements can be determined with the help of time-dependent microgravity measurements. Besides, while the isostatic state of these vertical movements, also the horizontal deformation can be calculated by using GNSS measurements.

In the scope of this study, the monitoring of the geothermal basins by using microgravity and GNSS methods is examined in general and additionally, the samples realized in Izmir city and Western Turkey are presented.

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Quality Standards for the Restoration of Color Values in Urban Areas: Color Projects

Introduction: Polychromy in architecture has always been an integral part of the buildings with its ability to influence shapes, volumes and proportions; fundamental identity component of reference for cities, environments and places that over time has generated images that characterize the landscape in any part of the world on a mnemonic and perceptive level.

In the twentieth century, the role of color in construction and its study as a qualifying aspect of our environment led to the emergence of multiple fields of investigation on historical documentary, technical/objective, theoretical/sociological observations. The control of the colors on an urban scale, in particular the historical one, where the signs left by the past are present and evident, becomes an element where the architectural debate has led to the formulation of different approaches and experiments in design choices. To date, the perceptual chromatic study at urban /environmental / landscape level can be divided into three macro areas: the color of historic buildings, the color of public housing / urban buildings and the color of new buildings.

Research Methodology: The theme color of historic buildings has been investigated since the second half of the twentieth century through the Color Plans, Color Projects, redevelopment of road axes aimed at the identification and use of methods and models of study, attentive to the complex of urban furniture , also considering the aspects related to the visual perception of the chromatic values hypothesized for the single building and its context, for the purpose of quality and congruence of the interventions. Here we will analyze the origins, the development of plans and color projects in urban areas and in particular the practices currently in use, analyzing in particular the differences and peculiarities of some case studies.

Expected Outcomes: In Italy, the birth of the Color Projects, was intended to standardize and standardize interventions on historic buildings and to intervene on the colors of the historical centers as a whole. To date, issues related to the color component in the urban landscape, continue to refer to territorial-landscape areas at the municipal level, implemented through the Plans and the Color Projects and adopted at the administrative level as an instrument for urban planning. What are the most widespread theoretical/practical attitudes in color design? What aspects are still to be explored and the new perspectives for specific national regulations in this regard?

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Flipped-Learning and Case Strategy for Developing Interpretative Skills in the Context of an Environmental Thermochemistry Course

At Universidad de Los Andes, the *Environmental Thermochemistry* Course is part of the Environmental Engineering Curriculum. The objective of this course is that the student gets to understand the basic concepts behind thermodynamics and the principles of the mass and energy balances. The course has been developed in a traditional manner (lecture and workshop sessions). However, the course methodology had to be reviewed due to the high percentage of students failing and the course performance evaluations exhibit deficient results. Therefore, we propose to implement a new methodology based on flipped-learning, using case strategy.

During the second semester of 2017 the teaching needs of the course were identified, and the design of the pedagogical strategies began. The first teaching need identified, and the most important one, was that the students develop the interpretative ability to propose mass balances and to draw a scheme that represents the processes that include its variables. In addition to developing this interpretive ability, our intention is that the students apply this in a real context. To fulfil this specific need, a case-based strategy was designed. This strategy requires that the students comply with the following steps:

1) Recognize issues related to social and environmental topics in their country;
2) Identify the role of an environmental engineer in a real context;
3) Identify the type of process and variables related to thermochemistry;
4) Interpret the information presented in the case to propose the mass balance and the scheme that represents the process; and
5) Solve mass balance.

With the pilot implementation of this case strategy, within the framework of the flipped-learning, students are expected to associate the concepts of mass balance with real-world applications in environmental engineering, as well as putting into practice the collaborative learning and strengthen communication skills. The pilot implementation of this course ends in March 2018; at a later stage, instruments will be applied to measure the perception of the students.

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Basic Methodology for the Knowledge of a Territory through the GIS: Analysis, Surveys and Representations

The research, developed in the PhD School of Architecture at the Polytechnic School in Genoa with relator Prof. Arch Patrizia Falzone, has developed a "method of investigation" aimed at knowledge of a Ligurian system coast and its hinterland, and identified the best data management, through the use of an information system able to relate the information gained.

The research identified a processing system and data management, aimed at the diagnosis, and therefore also to the project: a system implemented for the purpose of monitoring, both on the ground that built on.

The data are derived from the analysis of this knowledge punctual - land and built - including the historical, socio-economic and environmental data more significant: from the territorial scale to the building scale.

The study and analysis carried out are aimed at identifying the identity and vocation of a territory, through a project of knowledge of the natural and the anthropic background: a milestone to assess what future scenarios might be most appropriate.

The hypothesis underlying the research argues that an integrated study carried out by the Information Technology and Geomatics can form the cognitive structure complete, adequate for any kind of intervention: rehabilitation, monitoring and development of the area.

The issues investigated during the research were:

- What, how much and how to collect the data necessary to actually describe a critical and complex territory?
- What is essential to document and represent?
- What type of representation is used?
- How is the acquired system-data configured?
- What communication techniques and narrative models can be used to facilitate the accessibility of results?

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A Geographic Information System for the Study of Past Epidemics: The 1705 Epidemic in Martigues (Bouches-du-Rhône, France)

Research for some years on the city of Martigues (Bouches-du-Rhône, in the South of France) has enabled us to constitute an important onomastic database -based on the Census of 1702, parish registers, nominative lists of epidemic victims, tax registers-, and to combine it with the cadastre of the city, entirely reconstituted from fiscal data (land registers) of the same period, describing the four confronts of properties. Converting this textual information in cartographic one enable us to create an Historical Geographic Information System (H-GIS) for the city *intra-muros*. The analysis of all these historical documents gives us socio-demographical, fiscal and epidemiological information, for both individual and household levels.

At the beginning of the 18th century, this medium-sized community of about 6,000 people, comprising three parishes within the city walls and large surrounding areas of land, was hit by several severe epidemics whose causes are still not clearly understood.

To draw up epidemic profiles that might enable us to identify the pathogenic agents concerned, we use the H-GIS of Martigues to locate each epidemic victim and to follow the spread of the epidemic, day by day, week by week. The cross-linking of epidemiological and demographical data in a simultaneously spatial and temporal approach allows us to propose a new diagnosis for the epidemic which reached Martigues in the autumn of 1705.

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Pricing of New Products: Going Beyond Cost-Based and Competition-Based Pricing to Consider Value in Engineering Capstone Courses

Many undergraduate engineering programs provide their students with an opportunity to apply their design skills in a final capstone senior design project. As part of the process of engineering design, programs are increasingly incorporating business topics in their courses. Business topics range from the concepts of business startup to business growth. Students often work on teams to complete their projects, and this allows them to build their teamwork skills. To further mimic some of the business domain aspects engineering student teams might face in the professional work environment, is the application of financial and marketing analysis to the viability of projects. In these analyses, student teams estimate market demand and the resulting implications on the financial analysis of the firm.

A critical shortcoming of price determination in many of these contexts is in the techniques commonly taught to students. The most frequently used pricing tactics of cost-plus (along with markup) and competition-based pricing have weaknesses that may lead to suboptimal profitability (Nagle and Muller 2018).

When using cost-plus and markup pricing, demand is predicted prior to setting to the customer. In these two approaches, a dollar markup or percentage markup is applied to the unit cost of a product. The key issue in practice, is that price (paid by the customer) influences demand, and demand influences the quantity that is produced (thus possibly adjusting unit cost). Since most unit cost functions are dependent upon achieving certain levels of demand (e.g., economies of scale), it is difficult to "guess" on a demand function, then establish unit costs per unit, and then set price. In many markets even a slight fluctuation on price, can yield rather large changes in the demand function. A second issue comes with the determination of a dollar increase or percentage markup, inherently assumptions have to be made in what is an appropriate level for this type of increase. If too little of an increase is applied, then there might not be enough per unit profit to write down the total fixed cost structure. If too much is applied, it could be possible to believe a return to profitability may occur sooner, but more likely to scare demand away.

Competition-based pricing has its appeal from the pure simplicity of studying competitor offerings, and pricing accordingly. While this strategy is attractive in practice, it suffers from a critical issue that is problematic to a senior design course. First many senior design projects are proposing projects that are in themselves unique, and may provide products that are substantively different from existing products or have meaningful improvements over current product offerings. Using a similar pricing approach that competitors use may neglect the competitive advantage a product offers. A second issues lies in the challenges a new offering in the marketplace might have in capturing sales from competitors. On one hand, a team may disregard competitive differences in their offerings and not capture a valuable price offering. Second, could be an overestimation of the ability to capture sales as a new entrant to a market.

Value based pricing policies consider how customers perceive the benefits associated with acquiring a product. Since there may be meaningful differences as to how various customer groups perceive value in a product (Nagle and Muller 2018), we argue that there should be greater understanding of the perception of value in price determination. For example, when evaluating a new product offering relative to others, business-to-business customers may consider to what extent the new product influences revenue and costs separately, both in turn could have a resulting effect on the willingness to pay. A more precise application, would be to consider value-in-use pricing (Anderson, Narus, and van Rossum 2006) to consider the savings benefits of a new product offering to a customer.

In application, we present a pair of pricing exercises that can be done in parallel with the marketing and financial analysis for a design project. The first allows students to perform an analysis using the traditional approaches for pricing (cost-based and competition-based pricing). The second allows for applying value-based pricing principles, and includes an activity for value-in-use pricing. The learning outcomes for each set of strategies are presented, along with discussion on when such pricing strategies might or might not be appropriate to use.

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An Exploration of the Confusion between Concept and Formalization amongst the Community of Teachers in Physics

This study focuses on the links between concepts in physics and the mathematical formalisms that translate them. A physics concept ought to be explored from an epistemological disciplinary perspective, one that shouldn't be confused with the formalization process that aims at translating it. The notion of divergence of a vector field can be used to highlight the confusions that might exist between concept and formalization. Using an internet survey, an important proportion of French professors of higher education were asked to give the definition of the divergence of a vector field. 80% of the answers defined that term as the sum of the partial derivatives of the components of the field in relation to the corresponding coordinates. The paper shows how Maxwell and Heaviside have clarified this concept and how they have shown that an intrinsic definition based on vector analysis leads to the correct articulation between former concepts and new ones. By defining divergence as the limit of the electric flux per unit volume through a closed surface when the volume tends towards zero, the introduced concept takes root in previous knowledge whose limits were highlighted; it helps in pursuing the initial reflection and hence in making more sense. The poll showed surprisingly that this definition rarely appears. One might wonder about the introspection of teachers concerning the meaning of the elements they teach in physics. This article shows that much work on Science teaching combined with History of Science remains necessary despite the great amount of results that the discipline has already achieved.

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Signum and Visual Identity

The contribution focuses on the analysis of the role of the sign as the foundation of the visual identity of artistic-cultural artefacts, also intended as a connotation of their place of belonging. Today the cities, the territories and consequently the architectures and the works of art contained in them must emerge from the visual anonymity to stand out, even for the purposes of socio-economic development. The attention is then placed on a possible process of conception of a visual identity system that starts from the territory, from the city and its characterizing artifacts and is capable of transmitting identity and attractiveness to the users, be they residents, tourists, operators. The intent is to demonstrate the effectiveness of communication design in the definition of a sign or a system of signs that represent and make impressed in the memory the characters considered essential of a place and of what qualifies it, passing through the analysis of some case studies. We then arrive at a first conclusion that shows how the systems of Visual Identity defined for a given territorial and/or urban reality, also through significant artifacts, on the one hand they must be recognized as belonging to the population of the place itself, which must identify and reflect in them and, on the other hand, must also succeed in giving new impulses and possible future developments.. Ultimately, the definition of a sign - o of a system of signs - identifying a place can assume a relevant importance also in the conversion of territorial and urban areas.

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Stimulating Conscious Development (BOS Model): A Mechanism for Movement in Engineering Education

The context of the research is a practical didactic-pedagogical project in Higher Engineering education. The research is in line with a vision in our society that regards learning as a lifelong process that is not limited to education; it is an ongoing process in which a person is able to direct his own learning. Reflection and awareness are basic conditions in this process. The emphasis is on an intra-personal approach.

Coming to conscious personal development is not a self-evident process. The following key question has therefore been formulated: are there opportunities to stimulate engineering students to consciously develop their personal qualities?

We look for possibilities to stimulate the personal development of engineering students through a problem analysis in which we seek to identify the "knowing how" and develop sensitivity for the perspective of students.

The research process is an exploratory and participatory action-oriented research process. The nature of exploratory research is that no strictly predetermined route can be followed by the researcher. The research is directed towards change. A positive and appreciative dialogue is the starting point to stimulate opening up for conscious reflection. Self-reporting provides an insight into the subjective experience of engineering students.

The practical part of the research consists of two parts: a field experiment (preliminary research) and a case study. Part 1 is aimed at stimulating the opening and movement of the conscious personal development of engineering students. Part 2 includes three interviews with ten Engineering students spread over a longer educational period. During the field experiment the Research Terms, which consists of Keywords and Core Values, were put down.

This resulted in the formulation of the S.C.D. model: Stimulate Conscious Development ("B.O.S. model: Bewust Ontwikkelen Stimuleren" in Dutch). Handling the method of approach of the S.C.D. (B.O.S) model offers an opportunity to stimulate Engineering students to open up for their personal development.

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Reservoir Characterization and Stacking Patterns of Carbonate Grain Bank: A Case Study of Grain Bank of Cambrian Longwangmiao Formation in the Sichuan Basin, China

Based on the concept of the stacking pattern of sedimentary cycles to determine and classify sequences, the sequence stratigraphic framework of grain bank of Cambrian Longwangmiao Formation is established systematically in the Sichuan Basin using core and image logging. The results of the study are:

(1) the grain bank is composed of two types of meter-scale cycles, i.e. tidal flat and subtidal, and the stacking patterns of these cycles constitute third-order sequence;
(2) the grain bank shows significantly different stacking patterns at different depositional phases, including the isolated, superimposed and migrated patterns, which formed at the stage of transgression, normal regression and forced regression, respectively, and
(3) the stacking patterns of grain bank have a direct impact on the performance of the reservoir. The migrated pattern grain bank, with medium thickness and high porosity, can be regarded as high quality reservoir. Although, the superimposed pattern grain bank has the largest thickness, it performs as moderate to poor reservoir due to lower primary porosity, however, the strata after undergoing karstification during Caledonian movement can now be considered as a good reservoir, because the dissolution greatly enhanced the porosity. The isolated pattern grain bank cannot be regarded as reservoir because of poor physical properties and thin bedding.

Specifically speaking, the sediments of grain bank provided rock material and high original porosity for Longwangmiao Formation reservoirs. With frequent sea level fluctuations, the grain banks were prone to exposed or near surface levels, where pore fluids evolved rapidly due to easy access to significant, localized reservoirs of CO_2 that drove diagenetic processes (such as marine cementation, meteoric dissolution as well as penecontemporaneous dolomitization) relatively rapid pace. These diagenetic processes generally depend on the early originally deposited sediments and their stacking pattern. After burial, however, the carbonate sequences have undergone a series of diagenesis due to extensive rock-water interaction under elevated temperatures and pressures over tens to hundreds of millions of years, which might have changed the original pattern of pores and

modified the local porosity a great deal, but didn't likely to form large-scale reservoirs. However, the short-tern uplift and karstification due to Caledonian movement in this long geologic span maybe not decisive, but it greatly influence the reservoir quality. This research provides important clues in exploration and evaluation of the grain bank reservoirs, which is of equal significance to the researchers as well as oil and gas industry.