

2016

Engineering Education & Teaching Abstracts

Annual International Conference
on Engineering Education &
Teaching, 6-9 June 2016,
Athens, Greece

Edited by Gregory T. Papanikos

THE ATHENS INSTITUTE FOR EDUCATION AND RESEARCH



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Teaching Abstracts

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Preface

This abstract book includes all the abstracts of the papers presented at the Annual International Conference on Engineering Education & Teaching, 6-9 June 2016, Athens, Greece, organized by the Athens Institute for Education and Research. In total, there were 28 papers and 42 presenters, coming from 19 different countries (Brazil, Canada, China, Croatia, Czech Republic, Israel, Italy, Poland, Portugal, South Africa, South Korea, Spain, Switzerland, Taiwan, The Netherlands, Turkey, U.K, UAE and USA). The conference was organized into nine sessions that included areas such as Geotechnology, Territorial Development, Geological Processes and other related fields. As it is the publication policy of the Institute, the papers presented in this conference will be considered for publication in one of the books of ATINER.

The Institute 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 in Athens and exchange ideas on their research and consider the future developments of their fields of study. Our mission is to make ATHENS a place where academics and researchers from all over the world meet to discuss the developments of their discipline and present their work. To serve this purpose, conferences are organized along the lines of well established and well defined scientific disciplines. In addition, interdisciplinary conferences are also organized because they serve the mission statement of the Institute. Since 1995, ATINER has organized more than 150 international conferences and has published over 100 books. Academically, the Institute is organized into six research divisions and twenty-seven research units. Each research unit organizes at least one annual conference and undertakes various small and large research projects.

I would like to thank all the participants, the members of the organizing and academic committee and most importantly the administration staff of ATINER for putting this conference together.

Gregory T. Papanikos
President

FINAL CONFERENCE PROGRAM
6th Annual International Conference on Urban Studies & Planning,
6-9 June 2016, Athens, Greece

Conference Venue: [Titania Hotel](#), 52 Panepistimiou Street, 10678 Athens,
Greece

Monday 6 June 2016

(all sessions include 10 minutes break)

08:00-08:30 Registration and Refreshments

08:30-09:00 Welcome & Opening Address (ROOM C- Mezzanine Floor)

- Gregory T. Papanikos, President, ATINER.
- George Poulos, Vice-President of Research, ATINER & Emeritus Professor, University of South Africa, South Africa.

09:00-10:30 Session I (ROOM C- Mezzanine Floor): Advanced Studies & General Studies

Chair: Nicholas N. Patricios, Director, Engineering & Architecture Research Division, ATINER, and Professor & Dean Emeritus, School of Architecture, University of Miami, USA.

1. Nikos Mourtos, Professor and Director, Aerospace Engineering, San Jose State University, USA. Reflection as a Way to Develop Engineering Process Skills.
2. *Vladimir Haasz, Professor, Czech Technical University in Prague, Czech Republic. Progress in Study Programmes at CTU - Faculty of Electrical Engineering 16 Years after Bologna Declaration.
3. Anne Donnelly, Director, Center for Undergraduate Research, University of Florida, USA, Eakta Jain, Assistant Professor, University of Florida, USA, David Lopatto, Director, Center for Teaching, Learning and Assessment, Grinnell College, USA, Heather Spooner, Center for Arts in Medicine, USA, Sahadeo Ramjatan, Graduate Student, Aerospace Engineering, University of Florida, USA & Grace Chun, Undergraduate Student, University of Florida, USA. The Role of Undergraduate Research in an Undergraduate Curriculum.
4. Santiago Pindado, Professor, Universidad Politecnica de Madrid, Spain, Angel Sanz, Universidad Politecnica de Madrid, Spain, Sebastian Franchini, Universidad Politecnica de Madrid, Spain, Isabel Perez-Grande, Universidad Politecnica de Madrid, Spain, Gustavo Alonso, Universidad Politecnica de Madrid, Spain, Javier Perez, Universidad Politecnica de Madrid, Spain, Felix Sorribes, Universidad Politecnica de Madrid, Spain, Javier Cubas, Universidad Politecnica de Madrid, Spain, Andres García, Universidad Politecnica de Madrid, Spain & Elena Roibas, Universidad Politecnica de Madrid, Spain. MUSE (Master in Space System), an Advanced Master's Degree in Space Engineering.

10:30-12:00 Session II (ROOM C- Mezzanine Floor): Urban Studies & Engineering Education

Chair: *Vladimir Haasz, Professor, Czech Technical University in Prague, Czech Republic.

1. *Anne Nortcliffe, Principal Lecturer, Sheffield Hallam University, U.K., Sam Power, Student, Sheffield Hallam University, U.K. & Karen Vernon-Parry, Principal Lecturer, Sheffield Hallam University, U.K. Engineering Learning through Aerospace Engineering Laboratory.
2. *Sonia M. Gomez Puente, Education Development Policy Advisor, Eindhoven University of Technology (TU/e), The Netherlands & P.C.W. Sommen, Associate Professor, Eindhoven University of Technology (TU/e), The Netherlands. Computer-Based and Screencasts Approach in an Electrical Engineering Course: Does Blended-Learning Work to Motivate Students?
3. *Maria Spiliotopoulou, Ph.D. Candidate and Researcher, Simon Fraser University, Canada & Mark Roseland, Director and Professor, Simon Fraser University, Canada. Sustainable Community Development through the Lens of Urban Productivity.
4. Bruno Osorio, Ph.D. Research Student, University of Bath, U.K., Nick McCullen, Lecturer, University of Bath, U.K., Ian Walker, Senior Lecturer, University of Bath, U.K. & David Coley, Professor, University of Bath, U.K. Understanding the Relation between Energy Consumption and Urban Form Characteristics.

12:00-13:30 Session III (ROOM C- Mezzanine Floor): Program Components

Chair: *Alta Greeff, Head, Curro Holdings Ltd, South Africa.

1. Erkan Kacan, Head, Computer Technologies Department, Pamukkale University, Turkey. The Effect of Energy Related Educational Program on Renewable Energy Awareness Level.
2. Youjun Tao, Professor, China University of Mining and Technology, China, Guangyuan Xie, Professor, China University of Mining and Technology, China & Yaoli Peng, Associate Professor, China University of Mining and Technology, China. Implement the Project of Excellence Engineer to Improve the Students' Engineering Ability of Mineral Processing.
3. Nese Sevim, Instructor, Mehmet Akif Ersoy University, Turkey & Zahide Yildirim, Professor, Middle East Technical University, Turkey. The Experiences of Mining Engineering Students in Game Based Learning Environment.
4. Jaco de Kock, Curro Holdings Ltd, South Africa & Alta Greeff, Curro Holdings Ltd, South Africa. How to keep Science & Technology Curricula for Middle School relevant to 21st Century demand on Teaching and Learning.

13:30-14:30 Lunch

14:30-16:00 Session IV (ROOM B- Mezzanine Floor): Transit, Infrastructure and Other Issues

Chair: Youjun Tao, Professor, China University of Mining and Technology, China.

1. *Slawomir Karas, Head of Road and Bridge Chair, Lublin University of Technology, Poland & Maciej Kowal, Researcher, Road and Bridge Chair, Lublin University of Technology, Poland. Mycenaean Bridges - In Situ Inventory and Static Analysis.
2. Yali Kuang, Professor, China University of Mining and Technology, China, Guangyuan Xie, Professor, China University of Mining and Technology, China & Youjun Tao, Professor, China University of Mining and Technology, China. Synergism of the Curriculum - MPPD and the Graduation Design to Train the Ability Analyzing and Solving Complex Engineering Problems.
3. *Alexander Kolpakov, Research Associate, Center for Urban Transportation Research, University of South Florida, USA. Idle Reduction Practices of the U.S. Transit Fleet.
4. *Marjan Mahdavi, Ph.D. Student, Politecnico di Milano, Italy, Sara Perotti, Assistant Professor, Politecnico di Milano, Italy & Angela Tumino, Assistant Professor, Politecnico di Milano, Italy. Antecedents of ITS Adoption in Intermodal Freight Transport Industry.

16:00-17:30 Session V (ROOM B- Mezzanine Floor): Culture, the City and Education

Chair: *Slawomir Karas, Head of Road and Bridge Chair, Lublin University of Technology, Poland

1. Francesca Guerrucci, Architect, University G.D'Annunzio, Italy. Water as Vehicle of Cultural Spread for Mediterranean Identity.
2. Ana Estevens, Researcher, CEG-IGOT, University of Lisbon, Portugal, Leandro Gabriel, Ph.D. Student, CEG-IGOT, University of Lisbon, Portugal & Isabel André, Professor and Researcher, CEG-IGOT, University of Lisbon, Portugal. Sounds of Protest: Music in Deprived Places.
3. Ana Medina, Ph.D. Student, Universidad Politécnica de Madrid - Goldsmiths University of London, U.K. Post-Revolution Urban Landscape. Transformation of Public Spaces after 2011 Revolutions.

17:30-19:00 Session VI (ROOM B- Mezzanine Floor): History, Application and Management in Spatial Planning - Territorial Planning and Management

Chair: Paul Claval, Emeritus Professor, University of Paris-IV (Paris-Sorbonne), France.

1. *Sayed Sharaf, Researcher, Abu Dhabi Systems and Information Centre, UAE & Pere Serra, Lecturer, Universitat Autònoma de Barcelona, Spain. Charge Detection in Al-Ain Region.
2. *Ana Peric, Post-doc Fellow, Swiss Federal Institute of Technology,

Switzerland & Bernd Scholl, Professor, Swiss Federal Institute of Technology, Switzerland. Transnational Cooperation in Europe: The Example of Integrated Spatial and Transport Development along the Hamburg-Athens Corridor.

3. Paulo Irineu Barreto Fernandes, Professor, Federal Institute Triângulo Mineiro (Campus Uberlândia, MG), Brazil. Geophilosophy: Is There a Geographical Primacy of Thought?

21:00-23:00 Greek Night and Dinner (Details during registration)

Tuesday 7 June 2016

09:30-11:00 Session VII (ROOM C- Mezzanine Floor): Practice

Chair: Anne Donnelly, Director, Center for Undergraduate Research, University of Florida, USA

1. Jutnae Kim, Professor, Dongguk University, South Korea, Euy Soo Lee, Professor, Dongguk University, South Korea, Chee Sun Won, Professor, Dongguk University, South Korea, Hae-Jong Joo, Professor, Dongguk University, South Korea & Byung-hoon Jeon, Professor, Dongguk University, South Korea. Boosting Industry-University Collaboration: Lessons from a Government-Supported Program.
2. Dong Sik Jang, Professor, Korea University, South Korea, Kwang Ho Song, Professor, Korea University, South Korea, Ju Hyun Jeon, Professor, Korea University, South Korea, Bokyung Son, Staff, Korea University, South Korea & Yujin Kim, Staff, Korea University, South Korea. Activities & Program of Innovation Center for Engineering Education, Korea University.
3. Il Geon Yoo, Professor, Hongik University, South Korea. Development of Business Feasibility Analysis Methods for Engineers and Engineering Education.
4. Jiwon Hwang, Research Professor, University of Seoul, South Korea, Ohsung Song, Professor, University of Seoul, South Korea & Hakjin Kim, Researcher, University of Seoul, South Korea. Correlation Analysis of the K-CESA Key Competencies and Course Grades for Engineering Students in University of Seoul.
5. Diogo S. Dutra, MSc Student, University of Sao Paulo, Brazil, Marcos R. P. Barretto, Professor, University of Sao Paulo, Brazil & José Reinaldo Silva, Professor, University of Sao Paulo, Brazil. Entrepreneur Education for Engineers - A Case Study of Academic Working Capital Program.

11:00-14:00 Educational and Cultural Urban Walk Around Modern and Ancient Athens (Details during registration)

14:00-15:00 Lunch

15:00-16:30 Session VIII (ROOM C- Mezzanine Floor): Methods

Chair: Moshe Barak, Professor, Ben-Gurion University of the Negev, Israel.

1. Dalene Gelderblom, Curro Holdings Ltd, South Africa & Alta Greeff, Curro Holdings Ltd, South Africa. Robotics as part of a 21st Century School Curriculum.
2. Woohyun Kim, Researcher, KISTI (Korea Institute of Science and Technology Information), South Korea. A Case Study of Online Simulation Education Utilizing the EDISON Platform.

16:30-18:30 Session IX (ROOM B- Mezzanine Floor): Special Topics II

Chair: Serdjo Kos, Tenure Professor and Dean, Faculty of Maritime Studies, University of Rijeka, Croatia.

1. Moshe Barak, Professor, Ben-Gurion University of the Negev, Israel. Teaching Engineering in K-12 Education: The Role of Cognitive Knowledge and Problem-Solving Taxonomies.
2. Melita Milenkovic, Assistant - Chair of Transport Law and Economics, University of Zagreb, Croatia & Goran Vojkovic, Assistant Professor, University of Zagreb, Croatia. The Supervisory Role of the Ministry of Finance in the Process of Awarding of Concessions in the Republic of Croatia.
3. Chen-Yi Wu, Ph.D. Candidate, National Taipei University, Taiwan, Chen-Jai Lee, Professor, National Taipei University, Taiwan & Bo-xiu Jian, Associate Professor, Shih Hsin University Department of Tourism, Taiwan. Creative Tourism and Big Variation of Community.
4. Seong-Woo Woo, Director and Principal Researcher, Korea Testing Co., South Korea. Reliability Design of Residential Sized Refrigerators Subjected to Repetitive Random Vibration Loads during Rail Transport.
5. *Jesus J. Lara, Associate Professor, The Ohio State University, USA. The Urban Design Studio Pedagogic Approaches to Urban Sustainability: Problem-Based Solutions from the Classroom to the Community.

21:00-22:30 Dinner (Details during registration)

Wednesday 8 June 2016
Cruise: (Details during registration)

Thursday 9 June 2016
Delphi Visit: (Details during registration)

Moshe Barak

Professor, Ben-Gurion University of the Negev, Israel

Teaching Engineering in K-12 Education: The Role of Cognitive Knowledge and Problem-Solving Taxonomies

This paper explores the content and methods of teaching engineering in K-12 education through the lens of educational taxonomies such as Bloom's taxonomy in the cognitive domain, the types of knowledge taxonomy, and the engineering problem-solving taxonomy. The term engineering deals with using mathematics and science for the design of artefacts and systems that answer human needs and volitions. Engineering is also strongly associated with problem solving and creativity. However, teaching engineering is a relatively new area in K-12 education, and exploring this school subject from the perspective of educational taxonomies could help in clarifying the objectives, methods and difficulties in teaching this subject to children. For example, an analysis of the literature and research findings shows that fostering students' higher-order capabilities such as design and problem solving in engineering and technology cannot take place in isolation from specific knowledge. Instruction should strive to develop a certain degree of factual, procedural, conceptual and meta-cognitive knowledge by engaging learners in assignments of increasing cognitive levels, from simple to complex ones. These conclusions could contribute to the efforts of making engineering and technology a core component in the overall curriculum.

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&

Grace Chun

Undergraduate Student, University of Florida, USA

**The Role of Undergraduate Research
in an Undergraduate Curriculum**

It is clear that in addition to mastering discipline-specific content that the engineers of tomorrow also need to learn how to formulate questions, conduct experiments, analyze data, function on a research team, and communicate results. While some of these skills can be learned in a traditional classroom, many can be acquired by participating in undergraduate research. This significantly differs from traditional capstone design classes in that they are participating in fundamental research questions under the guidance of a faculty researcher. Furthermore, this type of experience helps students better understand the nature of the discipline and what contributing to engineering research is actually like. At the University of Florida, we have developed a three level pathway to help students gain these experiences. The first is an introductory level course for entry level students that increases awareness to the possibilities of undergraduate research. The second is a suite of courses that integrate faculty research into the classroom. In these courses, students are trained to collect data that moves the faculty's own research program forward. The culminated experience is a mentored, one-on-one research experience in a faculty lab. This pathway provides students at each level of their curriculum with opportunities to gain the types of desired skills that this participation insures. The Center has facilitated a campus-wide initiative that now allows each student participating in mentored research to have their research experience listed on their transcript. Undergraduate research is also a potential retention tool as it integrates

students into their chosen department early in their undergraduate training. Evaluation data on each of these levels will be presented that measure student gains at each level.

Diogo S. Dutra

MSc Student, University of Sao Paulo, Brazil

Marcos R. P. Barretto

Professor, University of Sao Paulo, Brazil

&

José Reinaldo Silva

Professor, University of Sao Paulo, Brazil

Entrepreneur Education for Engineers – A Case Study of Academic Working Capital Program

Professional alternatives for students on the last year at engineers schools can be classified on (i) following an academic career, (ii) employment in a stable corporation and (iii) entrepreneurship. Graduation projects are considered traditionally as a link between the acquired knowledge and experience through projects linked to engineer practice. However, even if exposed to a few disciplines on entrepreneurship, the majority of the students goes through the graduate project focusing in the first or second alternative. Thus the whole process is inefficient to insert entrepreneurship as an option.

Traditional graduation projects do not follow entrepreneurship methods, specially on technological-based product/services. In fact, for this kind of development is necessary a new educational approach to stimulate a practical design and business innovation thinking on students. Concerning startups the problem could be even worse if we consider that such initiatives could be a solution to the innovation process of bigger corporations. Thus, the conclusion is that it is necessary to move from the traditional methods, probably using extracurricular initiatives.

Academic Working Capital (AWC) program was conceived to offer an alternative that could improve the process of graduation project. Students are exposed to the design of a technology-based business putting together knowledge associated to new product, processes and business innovation. It is a national program in Brazil, open to students from all public and private universities.

The purpose of the program is to show a professional alternative in entrepreneurship for those who are graduating. Expert consultants and monitors follow the group in order to help them to develop products and businesses with high potential for innovation.

In this paper we discuss the strategy of working with an open list of professional alternatives and present AWC program in 2015 as a case study, based specially on the experience acquired in its first year, specially in what concerns design and business thinking education. This

approach is described on an entrepreneurship learning process applied to 12 graduation projects, from different engineering courses of 3 top Brazilian universities.

Ana Estevens

Researcher, CEG-IGOT, University of Lisbon, Portugal

Leandro Gabriel

Ph.D. Student, CEG-IGOT, University of Lisbon, Portugal

&

Isabel André,

Professor and Researcher, CEG-IGOT, University of Lisbon, Portugal

Sounds of Protest: Music in Deprived Places

In the contemporary cities, arts play an important role in deepening processes of social cohesion, including dialogue enablement and the strengthen of bridging capital among diasporas. Furthermore it has been considered especially relevant for the promotion of individual and collective self-esteem, to the (re)construction of local and social identities and to strengthening the sense of place belonging. Artistic activities can become a means to counter or reverse the reproduction of inequality and disadvantage, constituting a stimulus to increasing personal and collective confidence, collective learning and critical thinking and contributing towards the elimination of the negative connotations associated with certain communities and places. In deprived areas of the city, where poor immigrants are overrepresented, the artistic production has the potential to help build bridges and to facilitate encounters between different populations sharing the same urban space.

Certain city neighbourhoods, like Cova da Moura in Amadora municipality, experience systematic disadvantages. Despite the social and cultural inequalities that beset this social domain, arts remains one of the main pathways to promoting social and urban cohesion, particularly via the development of competences related to creativity, citizenship and interculturality. In the context of Cova da Moura, the music, especially de migrant music from Cape Vert can also be looked at from a political significance point of view, as an expression of cultural activism, contestation and resistance. Departing from this framework, we will discuss and explore how music making, performance and consumption take shape within urban dynamics influenced. For that purpose, it will explore how Cova da Moura residents use diverse musical practices to express meaningful messages to the wider society and to contest the conditions of their inclusion (or lack thereof). Some key questions should be answered such as: what are the main messages of the musical pieces? Who are the authors? What kind of musical competencies do they have? And links with other

musicians in the neighbourhood, in Portugal or abroad? What means this musical scene to the residents? Information for this purpose come from interviews and focus groups sessions.

Paulo Irineu Barreto Fernandes

Professor, Federal Institute Triângulo Mineiro (Campus Uberlândia,
MG), Brazil

Geophilosophy: Is There a Geographical Primacy of Thought?

This paper presents results of studies on the concept “Geophilosophy” introduced by Deleuze and Guattari, in the text “geophilosophy”, in the book “What is Philosophy?”. With this term, the authors highlight the immanent character of philosophy, drawing attention to the geographical elements that have influenced and influence the construction of thought, as the relationship of humans with the territory, with the ground, with the place, and with Earth. Deleuze and Guattari say that the first philosophers created their own approach to nature, treating it by concepts and not by figures, as does, for example, the myth. The concept is a “bridge” between the relative and the absolute, and the thought is not a direct link between subject and object, but is done in relation with the territory, with the place. For Deleuze and Guattari the creator of the term “geophilosophy” was Nietzsche, when he sought to enumerate some common social aspects in different countries. Thus, philosophy would be, first of all, a geophilosophy, and the thought was born in the relationship between the thinking subject and the geographic features: the place, the territory, the landscape, and Earth. However, the term “geophilosophy” took on multiple meanings, among which are: the concept of valorization of the planet Earth, as highlighted by Caterina Resta (Italy), criticism of globalization, made by Milton Santos (Brazil) and the notion of geophilosophy as an investigative method, as presented in the “geophilosophical” notes of the prologue to poem “On Nature”, by Parmenides of Eleia, drafted by Gabriele Cornelli, which this study discusses more broadly.

Dalene Gelderblom
Curro Holdings Ltd, South Africa
&
Alta Greeff
Curro Holdings Ltd, South Africa

Robotics as part of a 21st Century School Curriculum

It is generally accepted that knowledge alone is not enough to embrace the challenges posed in the 21st Century. A well-defined set of skills, known as the 21st Century Skills, should be acquired by young people to successfully face and, more importantly, solve problems in the workplace. At CURRO private schools we continually consider new educational tools to assist learners in developing these skills during the foundation and intermediate phases. The current paper hypothesises that “Educational Robotics” is an excellent tool to achieve exactly that, if implemented effectively. It is important to note that, in the current educational paradigm, Robotics is mostly taught extra-curricular to support the teaching of Physical Science and/or Information Technology to a select few. By doing this, the opportunity is neglected to fully develop the desired 21st Century skills in all learners. The major challenge therefore is to integrate Robotics in the formal school curriculum at an early stage as currently implemented by the CURRO school educational programme. This programme is based on three pillars in order to:

- introduced learners to the important skill of coding
- cultivate their cognitive awareness and
- acquire skills to solve future challenges.

In order to critically assess the impact of the educational robotics program a study will be designed to scientifically monitor the impact/outcomes in developing critical thinking in a multicultural society. A prospective longitudinal study will be designed and conducted over a period of three years at different learning centres in South Africa. Details of the study design and possible weaknesses likely to be encountered will be addressed and critically evaluated.

Sonia M. Gomez Puente

Education Development Policy Advisor, Eindhoven University of
Technology (TU/e), The Netherlands

&

P.C.W. Sommen

Associate Professor, Eindhoven University of Technology (TU/e), The
Netherlands

Computer-Based and Screencasts Approach in an Electrical Engineering Course: Does Blended-Learning Work to Motivate Students?

Preparing electrical engineering students to take more control of their studies and to become more self-regulated learners has been the drive to re-design the Signal Processing Basics course. With the increasing growth in the number of students the electrical engineering faculty staff is integrating computer-based learning tools and blended-learning approaches into the teaching practices. The educational benefits of the use of computer-based and blended methods is that teachers' working load is reduced and gain quickly an overview of students' achievements. Likewise, students get individual feedback on progress, can identify lacunas in prior knowledge, and self-study time is maximized.

The objective of this study is to revise the effects of computer-based education on first-year electrical engineering students, and to present the design of an instructional technology model suitable for engineering education. This experience is based on a computer-based and screencast approach used in this freshman Signal Processing Basics course to motivate electrical engineering students to assess own knowledge and skills. The rationale behind is that through continuous online formative feedback on content progress students can make choices on the topics they still need to work on before taking the exam. The instructional design of the Signal Processing Basics course consists of lectures and instructions supported by computer education in the form of weekly online multiple-choice or randomized practice quizzes in a moodle platform, Oncourse, and online feedback and tutorials. In addition, screencasts are provided as a short video-clip summary of a basic building block or a small set of fundamental topics after each chapter with an outline of the main concepts addressed in the weekly lectures. Despite the educational value of this blended-learning approach students' pass rates in this first experiment are slightly higher than in

previous years, although students' perceptions on the educational approach is positive.

We evaluated this classroom experiment by comparing the pass rates and the students' questionnaires. We compared the pass rate of the previous years with this last academic year. Results of this first experiment indicate a slightly increase in pass rate. Reasons for this may be encountered in students' motivation to take and practice the content voluntary through the online quizzes is low as the quizzes are not part of the final score. Despite the results, students' questionnaire on the computer-based learning tool Oncourse is very positive as students mention to gain sufficient feedback on progress that helps to understand and apply better the content learned in the lectures and instructions.

Francesca Guerrucci
Architect, University G.D'Annunzio, Italy

Water as Vehicle of Cultural Spread for Mediterranean Identity

In the Mediterranean, the barriers break down and the stories are mixed. Instead of the land where the journey, migration, the passage is prevented by continuous borders, the sea shows that the notion of identity is a concept that does not understand the boundaries, but lets the differences and allows the meeting. The Mediterranean has historical, cultural and economic identity resulted from substantial and almost continuous contamination of all the countries bordering on its shores. In this large lake, in more than three thousand years of history, knowledge and cultures, techniques and traditions, trades and political arrangements met and clashed so much that the comparative reading of the territories that surround it leads to constant references. Ports and harbors were, for centuries, the witnesses of the birth, proliferation and vitality that the people of this area have always shown. The ports have been the point of contact land-sea, as well as the common denominator between the protection of the essential differences and promotion of identity factors unifying. Currently the tracks of the land have supplanted sea routes and the ports, places of exchange and contamination of mergers, were excluded from the fundamental role they had in the past. The earth and the water are removed. There should be a stable dialogue, constructive and planning among all countries bordering the Mediterranean and promote actions that call into play land and water, ports and cities of the Mediterranean to tackle the empty silence that currently imposes. The identity is not given once and for all, but is the subject of becoming: it builds in the meeting and may be able to exceed the purely economic logic of alliances. From the sea and the sea you can build a new future.

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Progress in Study Programmes at CTU – Faculty of Electrical Engineering 16 Years after Bologna Declaration

The main changes in study programmes at CTU in Prague based on the Bologna declaration were finished more than 10 years ago. The bachelor stage and the master stage were strictly separated in study plans. The amount of theoretical courses going before technological courses rapidly decrease in the bachelor stage and it led also to changes in the master stage - additional courses of theoretical disciplines were included to compensate the low amount of theoretical courses in the bachelor stage. Last years have shown both advantages and disadvantages of it. The paper aims to show how these advantages and disadvantages are utilised or alternatively solved at CTU in Prague - Faculty of Electrical Engineering.

Three new study programmes were open based on the experience gained after implementation of the Bologna declaration. Two of them take advantage of separation of the both stages, the third one reacts to the fact that bachelor programmes have to educate students both for an exercise in practice and a following study, which is not optimal.

The new interdisciplinary master programme “Intelligent Buildings” arose in cooperation of three faculties. It makes ready professionals for design, realisation and control of smart buildings with wide knowledge, but no narrow specialists. It includes the number of courses concerning electrical, civil and mechanical engineering in the connection with smart building design.

Small efficacy of teaching in English (small number of students in separate programmes) gave birth to a new joint bachelor programme “Electrical Engineering and Computer Science”. It consists of 18 compulsory subjects and 14 partly optional subjects, from which 7 have to be selected.

While the programmes mentioned above utilise advantages of Bologna process, the third one - Open Electronic Systems - solves its drawback mentioned above. The program should be a preparation for a following doctoral study. In this case the 2 formal separate programmes (bachelor and master) constitute one 5-year long programme designated especially for talented students.

The structure and content of the new study programmes mentioned above will be described in the full paper in more details including the first experience.

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&

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Correlation Analysis of the K-CESA Key Competencies and Course Grades for Engineering Students in University of Seoul

With the emphasis on key competencies in the OECD's Defining and Selecting of Key Competencies (DeSeCo) Project, University of Seoul in Korea has exerted efforts to reflect the importance of key competencies in university curricula. At a national level, various tools are being developed to assess the key competencies of college students. The main assessment tool used in Korea is Korea Collegiate Essential Skills Assessment (K-CESA), developed by Korea Research Institute for Vocational Education and Training (KRIVET).

This study examined whether key competencies measured using K-CESA are valid as a tool for assessing educational achievements among college students, and analyzed the correlation between K-CESA scores and course grades (usually courses aimed at competency enhancement). The analysis included the Capstone Design course to determine the relationship among key competencies, grades, and Capstone Design assessment scores. The validity of K-CESA was also tested.

The purpose of this study was to examine the effectiveness of the concept of competency in engineering education based on courses offered for college students in engineering. The analysis was performed on approximately 200 engineering students in University of Seoul, so as to minimize the influence of the student variable by limiting the subjects to those of the same major, as well as to verify the effectiveness of engineering education.

If a consistent relationship is found between K-CESA scores and course grades, K-CESA can be considered an effective tool in the assessment of educational achievements. If the results do not turn out as expected, further examination will be required from various perspectives. The validity of K-CESA as an assessment tool must be tested, followed by grade distribution and assessment criteria. Lastly, the validity of Capstone Design assessment is also necessary. These steps will enable in-depth examination of any mismatch occurring

between competencies and courses offered at universities. Gender, grade, and department can be used as variables in the analysis to determine how the results are influenced by individual characteristics. If individual characteristics differ across groups, further examination will be needed to assess the effects of certain variables on changes in student competencies. This will show whether engineering education is more effective for certain groups (e.g. male/female, upper grades/lower grades, etc.), and provide recommendations to improve university curricula.

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Activities & Program of Innovation Center for Engineering Education, Korea University

The Innovation Center for Engineering Education was established in June 2007, in order to offer a differentiated education program in the College of Engineering. The Center's programs are organized in the following five categories; Global Engineering Education Program, Collaborative Education Program with Industries, Creative Engineering Education Program, Convergence Engineering Program and Outreach program.

The key programs under the Global Engineering education include the K² Global Leadership Program with Keio University Japan (an exchange program in the field of engineering) and the Pace Program (a worldwide competition for engineering students).

Collaborative Education Program with Industries, includes the following activities such as Capstone Design Competition, the Startup Internship where students are offered field experience of startup, and the Female Students' Mentoring program where female students are offered guidance and practical advice on career paths.

Creative Engineering Education Program consists of 'Creative workshop' which is a series of lectures from experts of all areas including engineering. The 'Developing Engineering Curriculum through Experimentation' offers students experience and develop a new curriculum that goes beyond the theories and textbooks. The 'Startup Competition' offers students a chance for a startup as well as an experience of diverse career paths.

Convergence Engineering Program aims to offer a variety of courses that bring engineering and humanities. There are several courses under 'Technologies and Startup', 'Joint and Collective Courses' for students from seven majors in the College of Engineering, 'Writing and

Presentation Clinic for Engineering Students', and seminars and series of special lectures by engineers, entrepreneurs and artists.

Lastly, the Outreach program includes the 'Internship' for high school students, where high school students are offered to participate in projects run by different labs of the college, 'Taste of College of Engineering Camp' for high school students and the 'Servant Leadership Program' which is a voluntary program aimed at elementary students, giving them opportunities to experience different science kits.

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The Effect of Energy Related Educational Program on Renewable Energy Awareness Level

The common problem of countries whether they have developed or developing status is energy generation and the environmental impacts of this generation in the time where fast technological advancements exist. In this context, the importance of the knowledge and social awareness about renewable energy sources for both developed and developing countries is increasing day by day. These facts made the determination of the renewable energy awareness level of the students in the field of technical education mandatory. For this purpose, an awareness survey for renewable energy sources is applied among the participants who are subdivided into different groups with respect to their gender, role in technical education system and educational-social status in Technical Education Departments of Pamukkale University. According to the statistical results, there is no significant difference found with respect to gender and One-Way ANNOVA test results showed that there is a meaningful difference between the groups for renewable energy awareness level. After determining the low awareness level of the students for renewable energy sources, it is decided to create an energy related educational program including a novel curriculum under the roof of Pamukkale University. The educational strategy of the program is designed to contribute to local industrial deficiencies by considering local alternative energy sources. The main goal of this study is to determine the comparative effect of energy related program on the students' renewable energy awareness after two full season passed over educational start-up activity. In order to reach the goal, renewable energy awareness survey is renewed and applied among the students who are related with technical education, graduates and parents of these students or graduates. Ten different technical education program and some descriptive classifications such as "age, gender, financial status, parent's educational status, number of family members" are investigated by using statistical models and SPSS 21.0 software.

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Mycenaean Bridges - In Situ Inventory and Static Analysis

The article is the result of a short vetting combined with an equally brief inventory of two bridges in the area Mycenaean Arkadiko in the Peloponnese during the time of *2nd Annual International Conference on Transportation, Athens 2015*. Bridges are considered to be the oldest existing in the world. Conducted site visit was preceded by studies of literature, the result of which showed that in the field of Mycenaean construction, building practice there is very little known. It seems that even the superficial inventory there is a significant contribution to the knowledge of the bridges. The paper presents the results of the simplest static analysis which indicated weak points of existing construction, wherein they are the result of changing static scheme starting from the cantilever one into the somewhat random, but necessary in terms of mechanical, the scheme of cantilever-arched carrying structure. It was tried to restore a Mycenaean Bridge erection technology. However, in this respect it is not possible to talk about the success of the proceedings. Hence, it is only a test. Bridges are Mycenaean cultural heritage of humanity as well as technical heritage, a symbol recently supporting the concept of sustainable construction. Paradoxically, there is no sufficient knowledge about them.

Mycenaean Bridges are understood as those bridges built during the Mycenaean culture period, which dates back to the time of middle period bronze. This is associated with Crete (Knossos), starting from 3000 BC. The end of Cretan culture, also called the Minoan, is connected with the eruption of Thira (Santorini) island, which took place in the fifteenth century BC. After that, in this region of the world, there was a predominance of Mycenae (Μυκῆναι), which ended around 1000 BC with the fall of the Mycenaean civilization.

From this period today still exist two stone bridges made of cyclopean boulders. In the neighbourhood, ca 10km, is localized the Tirins fortress which was made in the same technology as the discussed bridges. The constructional solutions there applied provide a basis for comparative research.

Construction material is natural stone marble boulders with an average size of about 1m.

The bridges were labelled as the Bridge A and the Bridge B. They are structurally different from each other.

The present technical state of the bridges is good. With careful observation one can distinguish the original elements of the structure. Especially one of them is very interesting. This is the existence of a horizontal bottom foot plate - with minimal slope - that causes thresholds at the exit of the bridges.

It is worth mentioning that despite the passage of several millennia running riverbeds has not changed.

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Boosting Industry-University Collaboration: Lessons from a Government-Supported Program

There are various government driven reform programs for university education in South Korea, especially in university-industry collaboration programs. As one of the major programs, to narrow the growing gap between the demanding qualifications from the industry and those of the actual university-graduates with

engineering degree, the Ministry of Education launched an industry-university cooperation project coined LINC (Leaders in INdustry-university Cooperation) in 2012. Including Dongguk university in Seoul, more than 50 universities in South Korea are now participating in the on-going LINC project. After four-year fulfillment of the LINC project we analyze the achievements and lessons learned from the LINC project at Dongguk University in this paper. Key achievements and lessons gained from the LINC are as follows:

(1) Invoking reforms in curriculums and education system in the view-point of the industry-university collaboration is the major intangible achievement of the project.

(2) Establishment of infrastructure is one of the key elements to promote industry-university ties.

(3) The LINC project made it possible to lower the barriers among engineering and non-engineering disciplines. We witnessed that the engineering-exclusive educational activities such as the capstone design have been successfully implemented in non-engineering areas as well.

(4) New attempts to establish industry-centric courses in undergraduate curriculum have been made

through the LINC project. As an example, our ICIP (Internship and Capstone Design Integrated Program) has been successfully accepted as

a regular engineering course at Dongguk University, which helps students to find jobs with their results of capstone design.

In conclusion, Dongguk university benefited a lot by the LINC project to establish industry-friendly education environments, which enables Dongguk University to attract various other universities - industry projects. Yet, we still need substantial efforts and strategies to solicit active participations from professors and industries as well as students in our non-traditional education track.

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A Case Study of Online Simulation Education Utilizing the EDISON Platform

We have developed a web based simulation service for education and research of computational science and engineering areas called EDISON(Education-research Integration through Simulation On the Net).

This paper introduce the EDISON Platform based on most recent R&D achievements in the 5 major fields(Computational Fluid Dynamics, Computational Chemistry, NanoPhysics, Computational Structural Dynamics, Multi Disciplinary Optimization) and investigate the online experiment procedure at EDISON portal.

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How to keep Science & Technology Curricula for Middle School relevant to 21st Century demand on Teaching and Learning

Science and Technology teachers worldwide is currently bombarded with an explosion of information with a direct impact on school classrooms. Content material and technology does not only change from week to week, but could be out of date or totally incomplete over a certain period of time. Learners, currently on school benches, face a future with jobs not yet been created and an environment where a tertiary level degree does not necessarily secure an income or employment.

How do we create a culture of learning to develop the capacity for creative problem solving and innovation in line with a future work environment? How do we also prepare learners to be lifelong learners and active and informed citizens? How do we adapt teaching methodologies to this dramatic shift in the educational environment and use current technology to contribute to active, meaningful learning?

The Senior Phase (13 to 15 year old learners), in a multi-cultural schooling system in South Africa presents a golden opportunity for adapting current strategies to such an extent that relevant and exciting teaching and learning is incorporated without deviation from the main structure of the curricula.

This paper addresses how Senior Phase Grade 7 to 9 teachers and learners in Curro Private Schools, South Africa, engage in active, meaningful learning on the following levels:

- Relevant content material that counts
- The art of teaching at specific cognitive levels with or without technology
- The use of technology in a confident way in and outside the classroom.

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The Urban Design Studio Pedagogic Approaches to Urban Sustainability: Problem-Based Solutions from the Classroom to the Community

The urban design studio and university-community engagements have multiple goals. They include increasing university responsiveness to local needs, stimulating real world change, and preparing students to effectively address complex social challenges (Bourner 2010, Forester 1999). However, such approaches are complicated by a variety of factors including stakeholder expectations, power imbalances, and conflicting goals between educators and community members (Mansuri and Rao 2004). While the benefits of service learning programs to universities are well-documented, the experiences and benefits of such higher education partnerships to community participants is not as well-known (Netshandama 2010). Successful engagements seem to require community involvement and decision-making authority at every phase, mutual accountability and trust (Winkler 2013). This paper presents a series of case studies of community engagement and neighborhood empowerment in the development of a collective sustainable urban design plan/vision for inner-city neighborhoods. These neighborhoods are located in Columbus, Ohio and they have seen tremendous decline in population and economy over the past years.

The research team was challenged to ensure that the strategic vision was representative, and included the voices and perspectives of previously marginalized residents. Accordingly, a comprehensive and multi-scale (house, block, neighborhood, city) approach to outreach and engagement was developed. Additionally, a series of educational workshops and outreach activities were conducted that involved different segments of the population and diverse community groups in the identification of development priorities, a neighborhood health assessment, and education and assistance for green home rehabilitation.

The project findings show the value of mutual learning and education between community and higher education partners. Inner-city residents have diverse interests, wants, and needs that span many generations. Some of the challenges are acute, but all are interconnected, making it difficult to prioritize. While the project activities and documents reflect a community vision, there is ongoing need for participatory approaches where knowledge and solutions are produced and shared among everyone involved to provide guidance for future development.

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Reflection as a Way to Develop Engineering Process Skills

To succeed in today's world engineering students must develop several sets of complex skills known as process skills. These include "hard skills", such as problem-solving and engineering design, as well as "soft skills", such as lifelong learning, self-assessment, change management, communication and collaboration. These skills present a great challenge for students, educators and practicing engineers alike because they are hard to define explicitly and even harder to teach and learn. One of the reasons for this is that they depend on attitudes and values as much as they depend on content knowledge.

A prerequisite to developing any of the aforementioned process skills is the ability to monitor one's learning process and reflect upon its effectiveness. This reflection could then be used to capitalize on strengths and, more importantly, to address any weaknesses in order to improve one's learning process. Experts develop this ability over the years and do it automatically. Many engineering students, on the other hand, have great difficulty reflecting effectively.

The paper presents course design elements that help facilitate student development of reflection skills. For example, in several engineering courses students reflect on their learning process and its effectiveness. After taking their first test in class, students compare their original assessment against their performance on the test; they explain any discrepancies and suggest corrective actions to improve their learning process. Students also reflect on their development of any set of specific skills, such as problem solving. For example, they work in teams to tackle challenging open-ended problems. For each problem, they reflect individually on the difficulties they encounter, any lessons learned, as well as how they can use these lessons to perform better next time. Assessment results from implementing these assignments in several engineering courses will be presented and discussed in the paper.

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Engineering Learning through Aerospace Engineering Laboratory

The proposed paper is the results of an investigation into identifying what is good engineering laboratory practice for student learning. There is extensive literature on pedagogy of science laboratories, however the definitive literature for engineering typically cites Dewey (1910) on how learners construct knowledge from laboratories. However the engineering accreditation bodies, require all engineering degrees to have a significant amount of laboratory based learning.

The role of laboratory whether simulation or real experimentation is to develop students' learning and ability to apply the theory into practice, observing and analysing the experiment, reflect upon their learning from the experiment, and finally assimilating theory to construct and draw conclusions from the experimental learning experience essentially moving the learner through four quadrants of Kolb's learning theory, Kolb (1985). Feisel and Rosa (2005) identified that instructional laboratories should be designed to develop students' engineering knowledge, understanding and application abilities; they also identified the importance of the chronological relationship between laboratory and lecture for student knowledge synthesis.. The project aims to evaluate first year aerospace students' understanding of a theoretical topic from an aerospace dynamics lecture programme and associated practical learning opportunity to place the theory into practice. The planned research methodology is that of quantitative using MCQ to measure student learning post laboratory and qualitative using a Viva voce to assess the student learning. It should be noted neither of these methods will form the summative assessment of the student knowledge for the module. However the MCQ will provide formative assessment feedback for the formal student summative assessment; the laboratory write up. The results of the research will aid inform engineering laboratory design and timetabling to assist in maximising the learning opportunity for students.

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Understanding the Relation between Energy Consumption and Urban Form Characteristics

World energy consumption is predominantly based on fossil fuels, the use of which has impacts on climate and air quality. A substantial fraction of this energy consumption comes from urban areas, mostly from the demand from buildings and transport.

The term *Urban form* refers to the socio-economic aspects and the physical characteristics of urban areas. Through influencing many features such as human behaviour and transport dynamics, these aspects and characteristics are expected to have a significant impact on energy consumption and be a key component to future urban sustainability.

The research in this paper investigates the relationship between urban form and energy consumption, in order to understand how one influences the other. The overall urban energy consumption is first obtained by combining that from both buildings and commuting transport at a unified and large geographic scale of analysis. Urban form indicators -- both landscape metrics and socio-economic measures -- are also obtained for the same land-parcels. Correlations between the two are then computed before being plotted and mapped using a Geographic Information Systems (GIS) environment.

The results demonstrate that a variety of urban form features influence transport energy consumption, such as car availability, total land area and built urban area. Additionally, outcomes also show the importance of density measures in trying to explain urban energy consumption, such as population and housing density.

It is shown that understanding the relationship between urban form and energy consumption and quantifying the effects of one on the other can provide new information to urban policy-makers and planners. Furthermore, the large scale used in this study offers a more detailed analysis of urban areas that will allow us to design strategies to cut carbon emissions and energy consumption.

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MUSE (Master in Space System), an Advanced Master's Degree in Space Engineering

In Spain, and most part of Europe, historically, space engineering education was a small part of a broader aerospace curriculum in aeronautics, dominated by fluid- and structures- focused engineering.

The Spanish universities have entailed a profound renewal within the last years as a result of the European Space for Higher Education implementation. In the case of *Universidad Politécnica de Madrid* (UPM) this change led to the possibility of setting up new official master's degrees (*Masters Universitarios*). One of these new degrees is MUSE (*Master Universitario en Sistemas Espaciales*), the Master's Degree in Space Systems of UPM, which is fully devoted to space systems engineering and technology, and fully focused on the space industry needs.

MUSE is promoted, organized, implemented and run by *Instituto Universitario de Microgravedad "Ignacio Da Riva"* (IDR/UPM) research institute. The main purpose of this master is to share with the students the wide expertise and experience in space research/technology from the IDR/UPM (and other research groups at UPM). At present, IDR/UPM collaborates with several space scientific institutions (ESA, NASA, JAXA, etc.) on different missions, such as Rosetta, Sunrise, Exo-Mars, JEM-EUSO. Besides, IDR/UPM designed

and developed a 50-kg class satellite (UPM Sat-1) which was launched in 1995, and is currently developing another two: UPM Sat-2 and Lian-Hé (in collaboration with Beihang University, China).

In this regard, MUSE is project-based learning oriented, as it is characterized by a significant amount of practical work by the students, directly linked to IDR/UPM running space projects. This master's degree is designed to reduce as much as possible the initial training required by the graduates once enrolled in a space engineering company.

The aim of this paper is to explain the origin of MUSE master's degree program, its structure, the implementation focus and problems, student characteristics, study cases carried out, and future challenges.

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&

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The Experiences of Mining Engineering Students in Game Based Learning Environment

Games are considered as an effective tool that increases the students' motivation and engagement. However, there is insufficient number of research that investigates its effectiveness in higher education level, specifically in engineering education. The purpose of this study is to investigate the mining engineering students' experience of using simulation games for education, and to explore the constructs that shape their experiences. The participants of the study were three non-gamer and three gamer third year students at mining engineering department in one of the public university in Ankara, Turkey. The data were collected through in-depth phenomenological interviews, focus group interviews and observations. The findings of the study showed that participants enjoyed their game experiences and supported their usage in educational settings. Besides, participants were affected by five constructs during the game playing, but their effects changed based on personal characteristics and interest. *Information seeking, assessment of the activities, hypothesis testing, decision making and emotional change* are the major constructs identified in this study. *In information seeking process, participants sought information about both the game guidelines and technical information the game covered. Secondly, all the participants did assessment for different reasons. In this process, personal characteristics and needs played a significant role. Regarding with hypothesis testing, it was seen that generally all the participants used trial and error method during game playing. In decision making process, participants' observations, assessments and knowledge played significant role. Additionally, curiosity and emotional change had a huge effect on the decision making process of some participants. Finally, it was found that some participants were affected by emotional change strongly whereas some participants were not. The findings of this study might help educational researchers to gain insight about what students goes through in game environment.*

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&

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Charge Detection in Al-Ain Region

Al Ain city, also known as the garden city due to its greenery, is the second largest city in the Emirate of Abu Dhabi and the fourth largest city in the United Arab Emirates. The city development shows a fast growth of its urban boundaries during the last 40 years, with a population increase from 51,000 inhabitants (in 1975) to 560,214 (in 2010). Given the geophysical characteristics of the city (sand dunes, mountains and valleys) and the magnitude of recent changes, the objective of this research is to analyze the most recent land-use dynamics, from 2005 to 2014, at a new spatial scale of study, the district. Therefore, the 62 districts that conforms Al-Ain have been included and two general master plans considered (1986-2003 and 2003-2015). In order to develop this objective, a principal component analysis was applied to synthesize the spatial dynamics using population data extracted from censuses and land-use data derived from remote sensing images and a vector base map of Al Ain 2014. The results show the spatial changes, at district scale, from the six principal components that were retained. They were labeled as foreign workers associated to commercial services, local people associated to private and public housing, industry, rural activity, housing from big companies and, finally, religious and recreational facilities. According to them, the main urban expansion has been located to the north (Hili and Al Foah districts), with the exception of the large Al Fayda urban promotion placed in the south, and to the west (Remah district) around the main road network connecting Al Ain to Abu Dhabi. Similar expansion direction has been reported in the case of industry (north and west development) but different in the agriculture extension because the main direction has been to the west and south-west (around Abu Krayyah district).

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Sustainable Community Development through the Lens of Urban Productivity

In light of recent developments such as the COP21 Paris climate agreement, UN adoption of the Sustainable Development Goals for 2030, and the Habitat III Conference, there is increasing recognition of the role of human settlements as key components of both global challenges and global solutions. Sustainable Community Development (SCD) or Urban Sustainability has matured over the last three decades not only in planning and related fields, but also in wider professional and popular discourse. Leading urban development strategies are moving toward net-zero and even net-positive approaches to local sustainability. Overall, sustainability has evolved from an effort to reduce the impact of human activity on the environment to the potential of regeneration and self-reliance based on strong sustainability principles. Similarly, urban performance assessment frameworks have evolved from those based on weak sustainability principles toward ones based on strong and regenerative sustainability models which assess performance and impact as well.

In this presentation we briefly trace the progression of SCD theory and practice, and explain why urban sustainability planning, implementation, and assessment currently face limited and inconsistent application. We introduce the conceptual framework of Community Capital as a way of understanding SCD, and then present our current research on operationalizing SCD through the concept of urban productivity and the application of productivity metrics. The concept of urban productivity is interdisciplinary and has the potential to offer a long-term and comparative perspective for SCD. Thus in our research we explore productive or regenerative urban sustainability as a theoretical and pragmatic approach to SCD planning and assessment, and aim to offer a well-grounded SCD theoretical foundation coupled with real-world applications and assessment tools. Focusing on community capital productivity and regeneration may be the key to advancing sustainable communities.

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Implement the Project of Excellence Engineer to Improve the Students' Engineering Ability of Mineral Processing

Characteristics and status of mineral processing engineering in China University of Mining and Technology was discussed. The importance of the cultivation of innovative talents in mineral processing was illustrated. China Excellent Engineers Plan was introduced and implementation plan of personnel training was proposed. Optimizing the structure of teaching staffs in mineral processing, developing excellent course construction, strengthening the feasibility of scientific achievements changing into teaching resources and propelling the construction of national engineering practice education center were the key to the success of the program.

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**Reliability Design of Residential Sized Refrigerators
Subjected to Repetitive Random Vibration Loads during
Rail Transport**

During railroad shipment of residential refrigerators, two failures due to the repetitive random vibrations were occurring. These included the fracturing tubes between the compressor and condenser and the tearing compressor rubber mounts. Sample inspections, accelerated life tests and corrective action plans were used to identify the key control parameters for the connecting tubes. The failure modes and mechanisms found experimentally were identical to those of the failed samples in the field. The missing controllable parameters of the refrigerator system in the design phase included the shape of the compressor rubber and the connecting tube design. To correct these problems, the compressor rubber mounts and connecting tubes were redesigned. The refrigerators with the targeted B1 life were expected to survive without failure during rail transport.

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&

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Creative Tourism and Big Variation of Community

This article explores creative of class how to produce community that has different way of life, cultural diversity, and tolerant attitude. Through creativity provides activity that involve in creative tourism is also not limited to a single actor, such as the tourists themselves, but involved the creative interplay of producers, consumers, policy makers and landscapes to develop embedded creativity in tourism experiences. This integration has also led some to identify a specific form of creative tourism, which involves the co-creation of participative, 'authentic' experiences that allow people to develop their creative potential and skills through contact with local people and culture. At the same time, it gives many small-scale examples to identify authenticity in the city, pointing to community intimacy, original physical structures, and community belonging. This paper discusses big variation community of process as it has to reflect the cultural and creative fields, contains an important economic factor; and contains all kinds of work, and mutual penetration of new forms of work and lifestyle in a case study of Zhengxing Street of Tainan City, Taiwan.

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Development of Business Feasibility Analysis Methods for Engineers and Engineering Education

Business feasibility analysis in the engineering education is one of the necessary subjects for the successful commitment of the engineering projects. However, due to the lack of basic knowledge of the business and economic analysis, engineers are sometimes encountered to develop some non-useful product for business and company. For this problem, this paper will develop and present the simple and necessary steps of business feasibility studies for the engineers who are not used to the business and economic analysis. So that this will lead engineers to concentrate to their own technical renovation or development without the fear of reluctant business feasibility analysis of the projects