



THE ATHENS INSTITUTE FOR EDUCATION AND RESEARCH

Abstract Book

4th Annual International Conference on
Transportation
4-7 June 2018, Athens, Greece

Edited by
Gregory T. Papanikos

2018

Abstracts
4th Annual International
Conference on
Transportation
4-7 June 2018
Athens, Greece

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Preface

This book includes the abstracts of all the papers presented at the 4th *Annual International Conference on Transportation (4-7 June 2018)*, organized by the Athens Institute for Education and Research (ATINER).

In total 29 papers were submitted by nearly 40 presenters, coming from 18 different countries (Brazil, China, Croatia, Czech Republic, Germany, India, Italy, Mexico, the Netherlands, the Philippines, Poland, Romania, South Korea, Spain, Thailand, Turkey, UK and USA). The conference was organized into 10 sessions that included a variety of topic areas such as transit policy, traffic law 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

4th Annual International Conference on Transportation, 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 4th Annual International Conference on Transportation 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. Peter Yannopoulos, Vice President of Global Communications, ATINER, Co-editor, Athens Journal of Business and Economics & Professor, Brock University, Canada.
6. Nagui Roupail, Professor, North Carolina State University, USA.
7. Essam Radwan, Professor and CATSS Director, University of Central Florida, USA.
8. Sherif Ishak, Professor, University of Alabama in Huntsville, USA.
9. Nikiforos Stamatiadis, Professor, University of Kentucky, USA.
10. Natasa Tomic-Petrovic, Academic Member, ATINER & Associate Professor, University of Belgrade, Serbia.
11. Mike Mavromihales, Senior Lecturer and Course Leader, University of Huddersfield, UK.
12. Eddie Smigiel, Associate Professor, INSA Strasbourg, France.
13. Javier Cubas, Assistant Professor, Polytechnic University of Madrid, Spain.
14. Sang Hyup Lee, Research Fellow, Korea Institute of Civil Engineering and Building Technology, South Korea.
15. Olga Gkounta, Researcher, ATINER.

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

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

FINAL CONFERENCE PROGRAM
4th Annual International Conference on Transportation,
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 D - 10th Floor): Transportation Modelling

Chair: Virginia Sisiopiku, Associate Professor, The University of Alabama at Birmingham, USA.

1. Nagui Rouphail, Professor, North Carolina State University, USA & Alan Karr, Director, Research Triangle International (RTI), USA. Microscale Detection and Characterization of Lane Changes using High Resolution Driving Data.
2. Shaopeng Zhong, Deputy Laboratory Director of Traffic Engineering, Dalian University of Technology, China. Optimal Road Congestion Pricing for Both Traffic Efficiency and Safety under Demand Uncertainty.
3. Sang Hyup Lee, Research Fellow, Korea Institute of Civil Engineering and Building Technology, South Korea. The Korean Traffic Count System and The Role of KICT in National Traffic Data Collection.

11:00-12:30 Session II (Room D - 10th Floor): Traffic Law & Safety

Chair: Nagui Rouphail, Professor, North Carolina State University, USA.

1. Kyungwoo Kang, Professor, Hanyang University, South Korea. Relationship between Cost Efficiency of Bus Transit System and Accidents, Using a Stochastic Cost Frontier Model.
2. Nikol Jilkova, PhD Student, Masaryk University, Czech Republic & Jan Scheuer, PhD Student, Masaryk University, Czech Republic. Current Issues of Czech Road Traffic Law in the Context of Jurisprudence and Road Safety.

12:30-14:00 Session III (Room D - 10th Floor): Transportation Operations and Management

Chair: Olga Gkounta, Researcher, ATINER.

1. Mecit Cetin, Associate Professor, Old Dominion University, USA & Lianyu Chu, CLR Analytics, USA.

12:30-14:00 Session IV (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

<p>Anonymous Truck Re-identification Algorithms for Estimating Freight Flows between Data Collection Stations.</p> <p>2. Zeynep Dundar, Research Assistant, Dokuz Eylül University, Turkey. Effects of Konak Tunnel in Izmir on Lived Space.</p> <p>3. <u>Sewodo Augustin Degbe</u>, PhD Student, Shanghai Maritime University, China & Bingliang Song, Professor, Shanghai Maritime University, China. Dry Port Development: A Pivot Strategy to Enhance Sustainable Transit Traffic via West African Corridors.</p> <p>4. Sabrina Howard, PhD Candidate, University of Southern California, USA. Window Seat: Examining Public Space, Identity, and the Politics of Everyday Life through Public Transportation.</p>	<p>Assistant, Heilbronn University of Applied Sciences, Germany. Competence Development in Engineering Education – Smoothing the Transition into Corporate Practice through Problem-based Learning.2</p> <p>2. <u>Sanjay Sisodiya</u>, 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.</p> <p>3. <u>Javier Cubas</u>, 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 <i>Universidad Politécnica de Madrid</i> (UPM).</p>
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14:00-15:00 Lunch

15:00-16:30 Session V (Room C - 10th Floor): Urban Components & Infrastructure

Chair: Peter Yannopoulos, Vice President of Global Communications, ATINER, Co-editor, Athens Journal of Business and Economics & Professor, Brock University, Canada.

1. Carolyn Aguilar-Dubose, Professor, Universidad Iberoamericana, Mexico. The Urban Park: Nature and Democracy as Component of a Planning Strategy.
2. Ratna Ghosh, Assistant Professor, Amity University, India & Uttam Kumar Roy, Assistant Professor, IIT Roorkee, India. Evolving Strategies for Housing Development at a Sub-Regional Level.
3. Dominic Hofmann, Research Assistant and PhD Student, Frankfurt University of Applied Sciences, Germany. Infrastructure – Design - Emotions.
4. Pruethipong Xinghatiraj, Civil Engineer, Ministry of Transports, Thailand. The Formulation of Peak Runoff Rate Equation for Road Networks on Frequently Flooded Areas in Central Thailand.
5. Chin-Wei Chen, Graduate Student, National Science and Technology Center for Disaster Reduction, Taiwan and The University of Manchester, UK. How to Assess Footbridges by Walkability? A Case Study in Taiwan.

17:30-19:30 Session VI 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 Pellegrini, 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 VII: 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.	
<p>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)</p>	
11:15-13:00 Session VIII (Room C - 10th Floor): Urban Structuring, Environment & Special Issues	11:15-13:00 Session IX (Room D - 10th Floor): Learning Strategies II
Chair: Kamran Mirza, Assistant Professor, University of the Punjab, Pakistan.	Chair: Javier Cubas, Assistant Professor, Polytechnic University of Madrid, Spain.
<ol style="list-style-type: none"> 1. <u>Lucia Martincigh</u>, Professor, University of Roma Tre, Italy, Anna Vincenzoni, Councilor, Town Municipality of Rome, Italy, Marina Di Guida, Postdoctoral Research Fellow, University of Roma Tre, Italy & Giovanni Perrucci, Postdoctoral Research Fellow, University of Roma Tre, Italy. Tools for a Better Liveability in Neighbourhoods: The “Environmental Island” Design Methodology and the Citizen Engagement Process. 2. <u>Lukasz Damurski</u>, Assistant Professor, Wroclaw University of Science and Technology, Poland, Jacek Pluta, Assistant Professor, University of Wroclaw, Poland, <u>Jerzy Ladysz</u>, Assistant Professor, Wroclaw University of Science and Technology, Poland, Wawrzyniec Zipser, Assistant Professor, Wroclaw University of Science and Technology, Poland & <u>Magdalena Mayer-Wydra</u>, PhD Candidate, University of Wroclaw, Poland. Potential for Conversion of Offline Services into Online ones in Urban and Suburban Neighbourhoods. Examples of Wroclaw and Siechnice in Poland. 	<ol style="list-style-type: none"> 1. <u>Mike Mavromihales</u>, 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. <u>Manuel Niever</u>, 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

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| <p>3. Andrea Ferraz Young, Researcher, CEMADEN Brazilian National Center of Monitoring and Early Warning of Natural Disasters, Ministry of Science, Technology, Innovation and Communication, Brazil. Adaptation Actions for Integrated Climate Risk Management into Urban Planning: An Integrated Approach in São Paulo Metropolitan Area (Brazil).</p> <p>4. Cristiana-Maria Pioarca-Ciocanea, Senior Researcher, University of Bucharest, Center for Environmental Research and Impact Studies, Romania. Monitoring Wildlife in Romania – Empirical Evaluation of Argos Location Errors in Romania.</p> <p>5. <u>Ratan Kar</u>, Scientist, Birbal Sahni Institute of Palaeosciences, India & Ruchika Bajpai, Research Scholar, Birbal Sahni Institute of Palaeosciences, India. Climatic and Vegetational Changes during the Last 11,500 Years from Glacial Sites in Lahaul Valley, Western Himalaya, India.</p> <p>6. Mark John Burke, Researcher, Cambridge University, UK. Home Ownership Participation – A Cross Sectional Analysis of Major Cities.</p> | <p>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.</p> |
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13:00-14:00 Lunch

14:00-15:30 Session X (Room D - 10th Floor): Policy

Chair: Sang Hyup Lee, Research Fellow, Korea Institute of Civil Engineering and Building Technology, South Korea.

1. Jonathan Maliwat, Faculty, WCC Aeronautical and Technological College - North Manila, Philippines. Past, Present and Future of ASEAN Transport Cooperation.
2. Ana Gundic, Research Assistant, University of Zadar, Croatia, Dalibor Ivanišević, M.Eng., University of Zadar, Croatia & Damir Zec, Professor, University of Zadar, Croatia. Generic Competencies for Masters and First Deck Officers.
3. Srdan Vujicic, PhD Student, University of Dubrovnik, Croatia, Nermin Hasanspahic, PhD Student, University of Dubrovnik, Croatia & Darijo Miskovic, PhD Student, University of Dubrovnik, Croatia. Importance of Leadership Qualities on Board Ships with Emphasis on Crisis Situation.

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

Carolyn Aguilar-Dubose
Professor, Universidad Iberoamericana, Mexico

The Urban Park: Nature and Democracy as Component of a Planning Strategy

The park is a space imbued with a duality which is confirmed by a long-lived and constant ingredient, when one talks of NATURE, and a much more recent, but no less powerful one, when one talks of DEMOCRACY. It brings the ideas of paradise, country in the city and landscape to the fore, as well as health, repose and community.

Parks, invaluable components of public space, can be forceful advocates for building collective memory, as well as for forming an identifiable and significant urban structure.

This research demonstrates that parks continue to represent a moral space, a space of 'goodness', through layers of commonplaces found in survey testimonials and drawings, through books about parks and about the city, as well as through newspapers, films, television series and paintings.

Not all professionals responsible for the design and care of parks understand this duality, or the wealth of diverse meaning parks convey to all types of users. Designers, Planners and Managers see the park as an 'object', a passive space whose success is centered on rearranging physical attributes. Users consider the park to be a 'subject', an active element of the city. The park can lose its power and become fragile when projects do not meet users' expectations.

Parks and park systems are a reliable planning strategy. In the present discussion on the 'spaciality' of social problems, the urban park can contribute to promote a healthy, legible, just, beautiful and livable city.

Patrick Balve

Professor, Heilbronn University of Applied Sciences, Germany

&

Lena Ebert

Research Assistant, Heilbronn University of Applied Sciences, Germany

Competence Development in Engineering Education - Smoothing the Transition into Corporate Practice through Learning Projects Learning Projects to Avoid Praxis Shocks (Reality Shock)

The project-oriented and problem-based teaching and learning format "Lernfabrik" (Learning Factory) of the engineering degree program "Manufacturing and Operations Management" at Heilbronn University of Applied Sciences is currently being evaluated as part of a funded project. This curricular problem-based and project-oriented form of practical training, which is anchored in the 6th semester of the Bachelor's programme, has been held twice a year since 2011. Within a project timeframe of only 15 weeks, the students are to develop a functioning, ready-to-ship and fully documented product which is actually manufactured in small series. To this end, the students work in small self-organized teams, each performing a different function in the value-added chain within a simulated production company.

The aim of the learning factory is to promote the development of the students' social, methodological and self-skills in addition to the deepening of engineering knowledge, and to prepare them for the upcoming career start.

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) Does taking part in the Learning Factory change the participants' idea of what competences are required for an engineer? (especially with respect to communication and cooperation skills)
- 3) Are students in the learning factory better prepared for their career start than students in comparable courses of study?
- 4) What is the competence profile of Bachelor graduates in engineering required by industry?

This study follows an empiric approach. For the evaluation of the Learning Factory, the main question is accordingly whether the students have experienced an improvement within the mentioned areas of competence by participating in this teaching project. For this reason, graduates of the degree program "Manufacturing and Operations Management" and two other study programs of the Faculty of Industrial and

Process Engineering are invited to participate in a survey. In this survey, they are asked to assess their competences at the time of graduation and to state the competences required in their current job. First results will be available in June.

Mark John Burke
Researcher, Cambridge University, UK

Home Ownership Participation - A Cross Sectional Analysis of Major Cities

This paper examines the effects of macroeconomic movements across developed and developing markets and tests the widely held assumption that increased overall economic performance leads to, or contributes to, increased home ownership participation in metropolises. Analysing twelve select countries and their capital cities through multivariate regression analysis, with varying socio-economic trajectories, it is proven that there is no observable correlation between an increase in indicators of national wealth and increased home ownership. This research posits that a more nuanced understanding of factors leading to home ownership within major economic hubs and metropolises is required, as well as proposing a number of causes of housing shortages in cities, along with avenues for future research.

Mecit Cetin

Associate Professor, Old Dominion University, USA

&

Lianyu Chu

CLR Analytics, USA

Anonymous Truck Re-identification Algorithms for Estimating Freight Flows between Data Collection Stations

Most transportation agencies rely on point detectors (e.g., inductive loops, axle detectors) located at specific locations on highways to collect data on traffic volumes, vehicle classes, and other relevant attributes of traffic. By utilizing data collected from such point detectors, researchers have developed vehicle re-identification algorithms to match measurements at two sites that belong to the same vehicle. This enables anonymously tracking the movement of individual vehicles between different data collection sites which in turn provides valuable information for the estimation of travel times, travel delays, origin-destination flows, as well as for the calibration of two weigh-in-motion (WIM) equipment if the measurement sites have WIM sensors.

In previous research, it has been demonstrated that there is enough variation within the truck population in terms of axle spacings and vehicle lengths, which enable anonymous re-identification of trucks between two measurement stations (e.g., two WIM sites). In this paper, the performance of a Bayesian model for re-identification of trucks is analyzed when data from distinct types of sensors are available. Depending on the availability of sensors and vehicle measurements at the two stations, four scenarios are considered:

- i. SG: In this scenario, only loop detector signature data are utilized as input for the truck re-identification.
- ii. VC: In this scenario, it is assumed that vehicle length as well as axle spacings measured by a vehicle classification system are available as inputs for the re-identification algorithm.
- iii. WIM: In this scenario, in addition to the VC data, axle weights are also used as the input.
- iv. ALL: In this last scenario, all available information from WIM and SG scenarios are utilized as input for the purpose of re-identification.

The re-identification models are then tested with data collected from six different WIM sites in CA. Since the re-identification models require ground-truth data for model fitting and testing, the transferability of such models to other sites is also evaluated to understand how these models would perform when ground-truth data are not available. The results show that the VC

scenario gives the lowest accuracy whereas ALL scenario the highest. Since the majority of the trucks are FHWA class 9, their axle spacings do not necessarily exhibit large enough variation for distinguishing individual trucks, hence the low accuracy of the VC scenario. ALL scenario, as expected, has the best performance since all available data are being utilized. In addition, SG scenario typically performs better than WIM scenario. This indicates that signatures contain more information than the WIM data in distinguishing individual trucks.

Chin-Wei Chen

Graduate Student, National Science and Technology Center for Disaster
Reduction, Taiwan and The University of Manchester, UK

How to Assess Footbridges by Walkability? A Case Study in Taiwan

Walking has been regarded as the most basic way to move in daily life. It increases pedestrian activities and encourages interactions with neighbours. Also, "Walkability" is widely accepted concept to evaluate pedestrian environment. However, pedestrians' environment has been ignored by urban planners in east countries, and open space is easily squeezed by motorists. On the other hand, footbridge is a crucial walking network to connect diverse destinations. Nevertheless, urban professionals usually consider footbridge construction as single development or "engineering" project in east Asia, ignoring footbridge as a part of pedestrian infrastructure in cities. As a result, the aim of this research is to identify the composition of pedestrian friendly footbridges, and establish a suitable assessment framework for footbridges by walkability. This paper would analyse several case studies, trying to give a conceptual framework of footbridges by walkability. Then, street survey might be used for understanding users' perspectives, and test the whole footbridge assessment framework. This research will show high-care for pedestrian-friendly environment and promote sustainable lifestyle in cities.

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.

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**Potential for Conversion of Offline Services into Online ones
in Urban and Suburban Neighbourhoods: Examples of
Wrocław and Siechnice in Poland**

Services originally developed as natural concentrations of human activity, reflecting the Christallerian hierarchy of central places. Today those natural mechanisms are challenged by strong competition from online facilities. More and more services are offered by the Internet and this affects the traditional 'bricks-and-mortar' urban development. In this paper we examine the potential for conversion from offline to online channels in urbanized neighbourhoods.

The research sample reflects the current trends in human settlement in Poland and includes a well-established urban neighbourhood (Pereca Square in Wrocław) and a rapidly developing suburban municipality (Rynek Square in Siechnice). A social research conducted in 2017 among users of public spaces and among service providers (276 respondents in total) enables drawing reliable hypotheses on the relationship between offline and online services in local contexts.

The results show that about 60% of customers in Wrocław and 74% in Siechnice use online shopping whereas only 25% of service providers in Wrocław and 19% in Siechnice offer their products online. There is a significant potential for conversion from offline to online channels (and for hybridization of both of them) which is relatively higher in suburban neighbourhoods but lower in urban ones.

The paper contributes to the current debate on the real-virtual dichotomy in urban development. In particular it addresses the question of the conflicting (competitive) or supporting (complementary) role of the Internet in shaping urban functions. It also gives a valuable insight into the demand / supply relationship in various (urban and suburban) settings and defines the

potential for hybridization of online and offline channels in local urban services.

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Dry Port Development: A Pivot Strategy to Enhance Sustainable Transit Traffic via West African Corridors

As the business environment becomes more competitive and global than ever before, service industries, such as ports, are placing greater emphasis on customer satisfaction through providing quality services efficiently. Togo, like many countries in Sub-Saharan Africa, is enjoying a period of rapid growth in the past decade and within this period, Togo's international trade has grown tremendously. However, like many other coastal developing nations it lacks a dry port which can enhance the efficient and effective transportation of cargoes via the country's corridor as well as relieving the pressure on the sea ports. The ability of countries to deliver goods and services on time and at the lowest possible cost is a key determinant of integration into the world economy today and landlocked developing countries in West Africa, continue to face serious constraints and challenges in the areas of trade, transit, and overall socio-economic development. Unfortunately, just as traffic continues to grow through the transport corridor by each passing year, so are the difficulties in managing the trade. Conferring to, access by hinterland nations to use the seaport(s) of a neighboring coastal country, is a legal right. Therefore, coastal nations are gratified to open their port(s) to hinterland nations.

The essence of this paper is therefore, to select an optimum location for the development of a dry port in Togo based on specific criteria relevant to the objective. The study conducted a field study in order to determine specific criteria which are considered relevant and influential to dry port location decision making. A simple forecast of container throughput for the port of Lomé was also applied using regression analysis in order to analyze the growth rate of traffic and associated capacity constraints that the port might experience in the nearest future. A Gravity location model was also employed, at the land-side in order to ascertain the transportation cost of goods from the port of Lomé to the hinterland markets with a cost minimization objective. The Gravity model was further used to determine an appropriate location for a dry port in Togo in order to benefit from economies of scale and to initiate an appropriate cargo distribution strategy.

Finally, SWOT analysis was used to analyze the endogenous and exogenous factors which are considered to be crucial to the objective of

this research and Sokodé a city in the central region of Togo was selected to be the best location for siting a dry port.

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Effects of Konak Tunnel in Izmir on Lived Space

Large-scale decisions taken for the city, due to political and economic reasons, apply pressure to the spaces of daily life and do not ignore the urban space and the right to the city. The construction of Konak Tunnel in İzmir which connects Konak, the political and trade center of İzmir city, to the other important parts of the city started in September 2011 and finished in May 2015. Konak Tunnel consists of 1,674 meters two tubes. Two-year period for construction was foreseen but the area was declared 2nd and 3rd degree archeological, urban and natural site by İzmir Number 1 Regional Conservation Council of Cultural and Natural Wealth. So the construction lasted four years. The construction of tunnel started without geological studies, ÇED reports and even bidding. Civil society organizations, chambers and municipalities opposed to the project from the beginning. Also during the construction, important historic monuments and ruins were found because the tunnel area has at least 400 years of history.

During the construction process, cracks and damages emerged on the several houses and roads in Damlacık which is the neighborhood located just above the tunnel. Expropriation decisions taken for Damlacık caused rent debate due to Körfez view, proximity to the city center and not given clear information to the public about the damage before the tunnel construction. Damlacık with the history of 400 years is one of the oldest Turkish quarters of Izmir. Although it is 100 meters far from the city center, because of the wrong city politics the area has stayed away from the city center and in time, it has become a neighborhood that has been forgotten and even forced to be forgot. Damlacık, in the middle of Izmir, is one of the rare places where the neighborhood culture and union are still alive.

Neoliberal policies which has influenced all over world since the 1980s, lead to inequalities and human rights violations in cities. Neoliberal policies dictate to the citizen economic and political decisions taken by the governments. Therefore, the right to speak on the spaces they live is taken away from the citizens, urban spaces in major cities turn into a commodity and capital that relies on power becomes the new arbiter on daily spaces of citizens.

During the process, the residents of Damlacık who were faced with the danger of losing their homes organized forums and showed their reactions to the project but many houses in Damlacık were damaged and expropriated. Residents were forced to move to other parts of the city. This case clearly shows that urban planning of the public sector is based on the accumulation of capital and it disregard the lived spaces of the city. In this study a comprehensive reading of the situations which Konak Tunnel has caused

from the beginning of the Tunnel planning will be discussed according to the terms "right to the city", "lived space" and "daily life".

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**Adaptation Actions for Integrated Climate Risk Management
into Urban Planning: An Integrated Approach in São Paulo
Metropolitan Area (Brazil)**

This work explores some questions highlighting how political actions and public decisions can improve the resilience of people and places in São Paulo Metropolitan Area (SPMA). What are the connections among city planning processes, climate change and resilience? How political decisions could connect planning and governance with special focus on adaptation and resilience? Cities face a chronic stresses and/or acute impacts, therefore special focus should be on the development of regulations and incentives to the interactions of concepts on climate change, city adaptation and resilience, through the perspective of transition for urban resilience, which enable cities change and build capacity of innovation in face of uncertainty. Changes in many extreme weather and climate events have been observed since 1933 and precipitation patterns are projected to change in the future (2030-2050), possibly resulting in floods caused storms or water scarcity caused by droughts. The urban areas in SPMA are highly complex with interdependent systems (i.e. airports, commerce and international trade, industry). A failing caused by an extreme event (e.g. storms, heavy rains) in this urban system can result in cascading impacts that can disrupt such as that occurred in 2011 (i.e. interruptions of energy, transport system, and communication). On the other hand, between 2013 and 2014, SPMA has experienced a terrible drought and scarcity of water. For this reason, almost ten years ago, precisely in 2010, it was developed a scientific project called Vulnerability of Megacities to Climate Change in São Paulo Metropolitan Area. We can say that many of the expected events actually occurred such as the floods in 2011 and the drastic drought between 2013 and 2014 as much as the return of floods in 2016, 2017 and 2018 (during summer seasons). Actually, we will take a retrospective of what has been technically analyzed in the past and the evolution of the events up to the present moment. Resilient cities will require new issue and problem framings, analytical procedures, and deliberative public processes that together can generate norms and practice for safest places. Physical changes without accompanying social, political and institutional engagement will ultimately fail to prevent disasters.

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&

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Evolving Strategies for Housing Development at a Sub-Regional Level

This study is an attempt to tackle the existing and upcoming issues related to housing at a sub-regional level, where, at the core of the study area herein termed as Greater Roorkee Area, lies the city of Roorkee, which has since long been an established educational and institutional hub of national importance. The analysis of this region reveals its increasing dynamism and shifts towards the tertiary economy from a primarily agricultural region. The core strategy to tackle the emergent issues from the study was thought to be a balance between regulating the intensity and location of development by giving due consideration to the ecological fragility apart from anticipated future growth in transportation and employment areas. Adopting this scale of study provides the researcher an opportunity to explore the issues in details and therefore the results that are produced are location specific apart from covering the regulatory framework aspect.

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Generic Competencies for Masters and First Deck Officers

A rapid growth of the maritime transport caused a rapid development of new technologies for almost all processes taking place on board modern ships. These new devices and technologies significantly influenced decision-making processes, but also reduced the number of crewmembers and increased crew's workload. Consequently, competences identified in the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (hereinafter STCW), in many cases need to be adjusted or even upgraded to upkeep with redefined working processes.

In a number of cases these new technologies require masters and deck officers to use more general capabilities and skills and to readjust the working processes to prevailing conditions. In such circumstances special attention has to be paid to more generic competences.

Consequently, in the paper generic competences needed to perform work on management level in cases characterized by limited or no previous experience are discussed. In particular, the paper deals with those generic competences that are significantly inter-related with those defined in the STCW Convention. Finally, in the paper a need to emphasize the most important generic competencies during MET process is highlighted.

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Infrastructure - Design - Emotions

Introduction: The presentation is based on an ongoing Ph.D. project. The aim of the presentation is to explain the influence of design on the modal choice. Symbolic, aesthetic and functional levels of design will be considered. These results will help manufacturers and operators of sustainable transport and direct transport infrastructure to classify the importance of the aforementioned factors. In addition, through an appealing design, an emotional bonding to a mode of transport can be established. The research is concentrating on sustainable transport modes like public transport, sharing-systems, walking and cycling.

Theoretical background: The transport sector causes 18% of all greenhouse gas emissions in Germany (umweltbundesamt.de, 2016a). The traffic sector also dominates the primary energy use with around 24% of all consumptions (umweltbundesamt.de, 2016b). The trend of the overall energy consumption over the past 20 years is steady increasing. A large proportion of emission and consumption are attributable to motorized private transport and air traffic. The primary objectives of transport planning are to avoid and relocate traffic as well as handling traffic in an environmentally friendly way (Müller, Scholich 2010). The overall goal is to convince users of environmentally-friendly transport modes.

Methods: For the interdisciplinary approach, a comprehensive mix of methods was necessary. The first method was a comprehensive literature review. Practical knowledge was gained during a local conference (with corresponding workshops), where 80 experts participated in 2015/Frankfurt. Furthermore, 27 expert interviews were conducted in early 2016. Furthermore, qualitative surveys of several case studies in Europe were done in 2016/2017. In 2017, a quantitative user survey was done with overall 400 participants. The findings of all methods result in comprehensive recommendations for traffic planners.

Results: The project is still ongoing. Early results show that the importance of design, regarding the modal choice, is a research gap. But all the interviewed experts mentioned that the potential of that approach has a fundamental importance. The conference will be used, to present first exclusive results of the project, especially scientific findings of the quantitative surveys.

Conclusion: An interdisciplinary project, carried out by engineers, influenced by architects, designers, psychologists and sociologists to promote sustainable transport modes.

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Window Seat: Examining Public Space, Identity, and the Politics of Everyday Life through Public Transportation

“Window Seat” uses public transportation as a lens through which to explore the relationship between social identity, public space, and democracy. Through ethnographic inquiry, interviews, media analysis, and critical engagement with literature in sociocultural psychology, urban studies, and gender studies, “Window Seat” moves beyond an urban planning approach to public transit to interrogate questions of individual and collective identity, civility, and violence by asking: “How does using public transit as the entry point provide unique insights into the relationship between social identity, politics, and public space”? and “How do our experiences in public space contribute to our ideas about ourselves and our relationship to the world”?

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Current Issues of Czech Road Traffic Law in the Context of Jurisprudence and Road Safety

Deaths and severe injuries caused by road accidents are far-reaching. It affects not only the life of people involved in the accident (primary victims) but also a life of other people (mainly members of a family, etc. - secondary victims) and those accidents have also a significant impact on a state budget. For all these reasons improving road safety should be one of the main topics of the state policy. There are more ways how to improve road safety of the country, but the effective legislation and enforcement are between the most important ones.

Our article will focus on the road traffic legislation of the Czech Republic from the perspective of the road safety. With the use of the relevant case-law it will demonstrate how is the road safety approached by the Czech legislator, administrative authorities and by the Czech courts – those views are equally important. Correct and effective legal regulation of sanctions for traffic offences and the possibility of individualisation by the administrative authorities and judicial control, those are all factors which influence the preventive effect (general and individual) of the punishment, and those factors can help to improve road safety.

This article will bring up selected recent legal questions of Czech road traffic law, such as: consequences of material aspect of the offence; character of demerit point system; constitutionality of the owners/drivers liability; discussion about introduction of fixed penalties, etc.

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Relationship between Cost Efficiency of Bus Transit System and Accidents, Using a Stochastic Cost Frontier Model

Over the last decades, the regional government of Kyung-gi Providence of Korea has devoted a large amount of effort and subsidy to projects aimed at increases some of public transport cost efficiency. However, the overall results indicated that most of these efforts has revealed as very ineffective and the bus related accidents were continued increased compare to sharp decrease other major cities and providences of Korea. The key objectives of this research is to find the relationship between the technical efficiencies of bus operating firms and bus related accidents using stochastic cost frontier model. To our knowledge this research is first to try to find out the efficiency of bus companies and bus accidents.

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Climatic and Vegetational Changes during the Last 11,500 Years from Glacial Sites in Lahaul Valley, Western Himalaya, India

The higher Himalaya is an exceptional repository of past climatic records, which provides a unique prospect to study the interaction of glaciations and climate during the Quaternary Period. Among the various proxies, pollen grains recovered from the terrestrial sediments offer a broad outlook of the vegetation and significantly help in understanding the long term climatic changes. Pollen-spores preserved in the sediment layers provide details about the environmental conditions at the time of their deposition. Hence their alterations, both qualitatively and quantitatively, in the sediments at different depths, are excellent indices for the analysis of temporal variations of climate. The objective of the present study is to decipher the past vegetational and climatic changes during the Holocene (~11,600 years) from selected glacial sites in the Lahaul Valley, India. The area is a cold, high-altitude desert located in the Trans-Himalayan region, characterized by alpine, steppe type of vegetation.

Palynological studies have been undertaken around Hamtah and Chattru glaciers from the surface and sub-surface sediments. The study of surface samples has brought out the pollen-vegetation relationship, which has been used as a modern analogue to deduce the past vegetational and concurrent climatic changes from the sub-surface sediments. In the outwash plains of the Hamtah and Chattru glaciers, two trial trenches having a depth of 90 cm and 130 cm respectively, were dug to rebuild the vegetational changes with reference to past climatic fluctuations. Overall, the arboreal pollen is dominating over the non-arboreal pollen in both the profiles. Various climatic phases have been inferred since the last 11,500 years BP to Recent, on the basis of the changing frequencies of arboreal and non-arboreal pollen (AP/NAP ratio).

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The Optimum Days for Collecting the Short Duration Traffic Count Data in Korea

Traffic volumes based on the vehicle classification are the important basic data which are directly used for transportation planning, transportation network planning, highway design, highway management, automated highway control and so forth. In Korea they are collected by two types of collection methods, one of which is the continuous traffic count and the other is the short duration traffic count.

The continuous traffic count is conducted by collection of traffic data for 365-day period a year using permanent traffic counters. The Ministry of Internal Affairs began the nationwide traffic count in 1955. Eleven years later, the Ministry of Construction took charge of the task. In 1985 loop detectors were used for continuous traffic count. In 1995 automatic vehicle classifiers were installed for everyday operation on national highways for the first time. Currently the continuous traffic count data are collected at about 630 spots on national highways and at about 200 spots on national expressways using automatic vehicle classifiers.

The short duration traffic count, the other type of the traffic count system, is conducted by collection of traffic data for a few days period using portable traffic data collection devices. Currently the short duration traffic count data are collected at about 785 spots on national highways. The collection occurs one time for the same spot a year. In this case the vehicle classification data are collected manually.

Unlike continuous counts, short duration counts are performed by collection of traffic data for a few days period and thus, the magnitude of deviation of collected data from AADT varies depending upon when data collections take place. Therefore, this study was done to find out the best months and days of data collection of each highway classification in order to enhance the accuracy of AADT estimation.

The study result shows that 1) for urban highways and rural highways, the weekday traffic volumes show the least deviation from AADT for months March - November, and 2) for tourist highways, the traffic volumes on Fridays and a few days before and after the vacation periods show the least deviation from AADT. Therefore, in order to enhance the accuracy of AADT estimation for the whole national highway short duration traffic count, it is recommended that first, data collection days for tourist highways should be selected to be Friday or a few days before or after the vacation period, and then, data collection days for

urban highways and rural highways should be selected to be weekdays of months except December – February.

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Past, Present and Future of ASEAN Transport Cooperation

This paper attempts to look at the history of ASEAN transformation and regional cooperation in the transport sector in particular. It also attempts to look into the future of ASEAN transport cooperation as it attempts to transform itself into a progressive evolution of the transportation systems in the region. This paper aims to address the following research questions:

1. *How did it start as a perspective on formulating transport action plan in the context of ASEAN regionalism?*
2. *How does it benefit the countries of ASEAN in terms of regional cooperation, multilateral agreements, and other protocols?*

The methodology employed in this paper borrows from Carol Weiss's Theory-based Evaluation (TBE). On that account, there is a need to review the current status and outcome with regards to past practices, current implementation, and future roadmap of ASEAN transport cooperation to move forward and to carry out its mission and service to its people today and tomorrow.

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Tools for a Better Liveability in Neighbourhoods: The “Environmental Island” Design Methodology and the Citizen Engagement Process

The constant increase of private vehicular traffic and its arrogant pervasiveness worsened the urban environment liveability in many Italian cities and destroy more and more their true essence. Only in the last thirty-year period, in Europe, there was a marked acceleration in scientific research and policymaking, for defining and experimenting traffic calming strategies and measures aimed at improving the level of safety and accessibility, creating more shared spaces and increasing quality of life, especially in neighbourhoods. Lagging behind other European countries, also Italy started to relate the slow speed principle to the liveable district notion; thanks to the New Traffic Code, the concept of «Environmental Island» was introduced: a «single urban zone delimited by the main road network, aimed at recovering urban spaces’ liveability». The «Environmental Island» can then be meant as a possibility not only for reorganizing vehicular mobility but also for upgrading residential urban areas and satisfying dwellers’ daily life needs.

The analysis of limits and possibilities of application demonstrated that the used methodology could take, both from scientific and operative viewpoint, to interesting results defining actions’ location, priority and range and providing administrations advice on the opportunity to act. It is indeed the tight interlace between design process, involving technicians, and public consultation process, involving citizens and local administrations, that can achieve success. In order to ensure the effectiveness of this work, a widespread awareness of the need of changing rooted habits, regarding urban space use, has to be developed; this becomes then the best occasion to implement a type of collective education that leads to a more responsible behaviour from the overall sustainability viewpoint.

For years, the topic here presented was researched, also featuring pilot studies in Rome, and now is going to become an applied research; thanks to the collaboration with various stakeholders, a participation process,

aimed at defining the implementation of an Environmental Island in one of the oldest and most central districts of Roma: Rione Monti, is currently underway.

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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.

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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 Wildlife in Romania - Empirical Evaluation of Argos Location Errors in Romania

Tracking animals and movement data collection is a challenging task due to the technological and data quality constraints (Turchin, 2015). Location transmitters must be resistant to shocks, appropriately sized to the animal monitored, and include a long lasting battery or alternative power source for consistent two-way communication between devices and remote satellites. A device meeting all these parameters is cumbersome and heavy, therefore difficult to use. The challenge is the device's physical size since such a device must not exceed 5% of the animal's body weight.

The global navigation satellite system such as GPS offers the possibility to collect acceptable quality data, but the devices equipped with GPS are particularly heavy and not suitable for many species. For small size species is more appropriate the use Argos systems, but the location of a Platform Transmitter using Doppler effect influence the accuracy of location (McClintock et al., 2015). Argos operator, Collecte Localisation Satellites - CLS, attribute the position of a PTT to a location class based on geometrical conditions of the satellite pass and stability of the transmitter frequency (Madry, 2015), however, little is known about the degree of the accuracy of error prediction in Romania. To overcome the lack of data about Argos telemetry accuracy in Romania, we performed a field test with 5 low power solar PTT's (GeoTrak, Inc. USA, 23 g) in 4 geographic locations in static, low speed, and high-speed condition. We compared Argos and true GPS locations, analyzed the error structures and tested the influence of filtering methods on the quality of Argos location datasets (i.e. retaining best location classes, keeping only the locations complying with the maximum speed of the studied animal, Douglas Argos filter based on spatial redundancy, movement rate and angles (Douglas et al., 2012)). We conclude that Argos locations in Romania exceed the error values assigned by CLS and the data need to be filtered and tested before movement analysis.

The study was supported by a grant of the Romanian National Authority for Scientific Research, PN-III-P2-2.1-PED-2016-0568 Argos based applications for real time wildlife monitoring in Romania (BioMoveFix).

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Micro-scale Detection and Characterization of Lane Changes using High Resolution Driving Data

Microscopic simulation models are founded on a series of tactical driver behavior based models most prominently among those are the car following, lane changing, queue discharge and gap acceptance models. With the emergence of high resolution probe vehicle data that are generated at rates at or exceeding 1 Hz, and with ongoing efforts at digitizing the road infrastructure in preparation for the operation of connected and autonomous vehicles, the time is ripe to exploit those capabilities to detect and characterize micro-scale lane changing behavior. This effort is in part motivated by the need to properly calibrate and validate current lane changing/selection algorithms in microscopic models and in another part by the emerging ability to identify lane changing “hotspots” as potential safety problem locations on the roadway network.

The research approach relies on data generated from an in-vehicle unit called “i2d” for intelligence to drive. The unit collects and archives in the cloud second by second data on vehicle position, speed, 3D accelerations among a host of other metrics extracted from the OBD-II vehicle port in near real time. Units were installed in approximately 30 vehicles driven by volunteers in a naturalistic driving setting. Archived driver behavior i2d data dates back to 2014, and includes over 50 million seconds of driving under a variety of road, environmental and traffic conditions.

The initial work consisted of developing and validating a lane detection algorithm. The algorithm, implemented in the R platform, uses as input 1 Hz individual vehicle positional data, along with lane-by-lane latitude-longitude information defining the centerline and edges for each lane. Taking advantage of several embedded R utilities, the algorithm identifies the lane position closest to the vehicle and assigns that lane until it identifies a crossing of the line divider between the current and destination lane. The start and end times of a lane changes, along with the lateral speed associated with each are also tracked. The algorithm has been validated through a series of controlled experiments where pre-specified lane changes (to the right and to the left lane) were executed and videotaped both on a series of straight and curved road sections. Out of the 26 controlled lane changes in that experiment, the algorithm had a detection rate of 93% and a false alarm rate of 8%. Moreover, the majority of the detected lane changes were properly characterized as mild, moderate or aggressive. The lack of perfect

concordance was primarily the result of noise presence in the longitude/latitude data from the vehicle GPS unit.

Subsequent to validation, the algorithm was run on the larger dataset, and the location, intensity and direction of lane changes were characterized. The presentation will cover both model development, validation and applications both for mobility and safety purposes.

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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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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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Importance of Leadership Qualities on Board Ships with Emphasis on Crisis Situation

Inadequate leadership is one of the factors that can cause maritime accidents and affect human lives and environment. Overview of maritime accidents caused by inadequate leadership and human relations among ship's team members is presented in this paper. Good human relations and satisfaction among all ship's team members is precondition for effective teamwork. Ship's masters should establish effective teamwork in order to implement adequate leadership style and increase safety on board ships. Knowledge of factors that can be crucial for implementing proper leadership style can serve as motivator for better work performance and stimulate the morale, especially in case of maritime accidents that have evacuation of the vessel as a consequence. Implementations of positive characteristics and methods that can serve as guidelines and key to successful leadership on board ships are introduced in this paper. Senior ship's officers were asked to fill a questionnaire ranking characteristics of leadership qualities. Important characteristics of leadership skills are summarized from questionnaire analysis.

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The Formulation of Peak Runoff Rate Equation for Road Networks on Frequently Flooded Areas in Central Thailand

Many disasters have occurred in Thailand, leading to loss of life and economic damages. Most disasters are from storm- and flood-related. Most flooding disasters have been blamed from the effects of deforestation due to the development of transportation network. So, when heavy rain continues, surface runoff is increased, particularly in areas where roads were developed. If the drainage system is insufficient, it will cause more flooding problems.

The design of the drainage system is based on the maximum flow rate calculated traditionally by methods that are in the form of equations or graphs. However, there are some limitations on using such methods, especially on the urban areas in central part of Thailand that are difficult to determine the exact size of the appropriate rainfall area. This leads to the insufficient design of the drainage capacity. To remedy flooding problem in frequently flooded area especially on central part of Thailand, this study will determine the maximum flow rate through the use of mathematical model on the DEM, satellite image, rainfall intensity, soil characteristics, etc. The results show that maximum flow rates from the mathematical models are closer to the actual data from satellite images than the calculation from the traditional method.

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Optimal Road Congestion Pricing for Both Traffic Efficiency and Safety under Demand Uncertainty

The impacts of road congestion charges on traffic safety are often overlooked in evaluating the benefits of congestion charging practices and searching for traffic safety strategies. This paper aims to examine how congestion pricing affects both efficiency and automobile safety. The first part of the study proposes and formulates the general traffic accident minimization pricing (TAMP) problem. Considering within-day and day-to-day travel demand fluctuations, a multi-objective bi-level optimization model under stochastic travel demand is developed based on the TAMP problem. This model is employed to determine the optimal toll levels that minimize both the negative externalities of congestion and accidents. Numerical results indicate that the traditional efficiency-oriented congestion pricing scheme, which does not consider impacts to safety, is often implemented in a less beneficial manner with regard to accident reduction.