INTERNATIONAL SYMPOSIUM ON PROJECT APPROACHES IN ENGINEERING EDUCATION

Closing the Gap between University and Industry

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TITLE

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Welcome to PAEE'2013

Closing the Gap between University and Industry is the theme of the fifth edition of the International Symposium on Project Approaches in Engineering Education (PAEE'2013). This theme reflects the development of the symposium that started in 2009 as a platform created by engineering teachers and educational researchers wanting to share experiences with project approaches and learn from Project-Based Learning (PBL) practice in different settings. The emphasis of the first edition (PAEE'2009) was on team work, as this is one of the most visible changes, for both teachers and students who make the shift from traditional teaching and learning to a project approach. The second edition focused on project approaches (PAEE'2010) as a meaningful learning environment, paying attention to how to use projects in which students construct their knowledge in an authentic environment. The next step, in 2011, meant thinking about the challenges in engineering education and the role projects can play in responding to these challenges. After reflecting on why and what of PBL, last year´s theme (PAEE'2012) had a rather pragmatic theme, exploring project management and organisation and providing workshops on different aspects of project management. This edition has a focus that goes beyond the university classroom and questions how we can work together with the industry in a way that is mutually beneficial.

The Department of Production and Systems of the University of Minho, the Research Centre for Education of the University of Minho, the Curriculum Development Working Group of the European Society for Engineering Education (SEFI), and the Ibero-American Association of Institutes of Engineering Education (ASIBEI) aim to join teachers, researchers on Engineering Education, deans, students of Engineering Schools and professionals concerned with Engineering Education, to enhance active learning approaches in Engineering Education through workshops and discussion of current practice and research.

We are most grateful to Eindhoven University of Technology for hosting this fifth edition and we wish you all a fruitful symposium.

On behalf of the PAEE'2013 Organising Committee,

NATASCHA VAN HATTUM-JANSSEN

RUI M. LIMA

DINIS CARVALHO

ASIBEI Welcome Note

Palabras de Bienvenida PAEE'2013 por parte de ASIBEI

El tema que se desarrollará este año en la reunión PAEE'2013 "Closing the Gap between University and Industry" en Eindhoven, Netherlands, es una excelente oportunidad para sensibilizar a la comunidad académica sobre las brechas que existen entre las necesidades de la sociedad en materia de salud, infraestructura, medio ambiente, alimentación, entre otros, y los procesos curriculares que se imparten en las universidades e instituciones de educación superior. Es muy recurrente tener currículos descontextualizados y alejados de los problemas de la sociedad; cuerpos docentes y estudiantes apartados de las realidades de sus comunidades y también, distantes de las expectativas de la industria.

El giro requerido por la educación de los ingenieros demanda la definición de políticas y acciones institucionales que propicien el contacto de estudiantes y profesores con escenarios reales, fuente de información sobre problemas del entorno, a través de prácticas extramurales, proyectos de impacto social, investigaciones básicas sobre problemas locales.

La Asociación Iberoamericana de Instituciones de Enseñanza de la Ingeniería **-ASIBEI-** ha seguido manteniendo una alianza estratégica con PAEE (Project Approaches in Engineering Education) convencidos que estas sinergias son importantes para el presente y futuro desarrollo de nuestros países. Por lo tanto, todo esfuerzo que se haga en esa dirección, será fundamental para alcanzar el bienestar de nuestras sociedades, ya que ellas requieren de una ingeniería suficientemente robusta para procurar unas mejores y dignas condiciones de vida. Un ejercicio profesional que satisfaga esas expectativas debe estar construido sobre un conjunto de supuestos curriculares, responsabilidad de las instituciones de educación en ingeniería, que orienten a los estudiantes en la fundamentación científica – tecnológica- social, en el diálogo con sus pares en el mundo y en el desarrollo de habilidades para ofrecer alternativas plausibles de solución que permitan enfrentar exitosamente los problemas reales de la sociedad.

Estamos seguros que estas reflexiones a lo largo de la jornada académica propondrán, creativamente, orientaciones y estrategias que hagan posible disminuir la brecha entre los procesos de formación y las necesidades de la sociedad y, por supuesto, de la industria.

ASIBEI augura los mejores éxitos en el cumplimiento de los objetivos propuestos y desea destacar la organización y liderazgo desplegado por el equipo organizador adscrito al Centro de Investigación en Educación del Instituto de Educación de la Universidad de Minho, Portugal.

Sinceros deseos,

JAIME SALAZAR CONTRERAS

Secretario Ejecutivo ASIBEI

Julio de 2013

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PAEE'2013 Programme

8 July 2013		
8h00	Registration	
9h00	Opening	
9h30	Peter Willmot Loughborough University International Scholar 2012 of the Higher Education Academy	
11h00	Coffee break	
11h30	Industry panel	
13h00	Lunch	
14h30	Workshop 1	Paper sessions A
16h00	Coffee break	
16h30	Workshop 2	Paper sessions B
18h00	PAEE Networking Meeting: opportunities for Science without borders	
19h30	Get together - Effenaar Restaurant	
20h00	Symposium Dinner - Effenaar Restaurant	

9 July 2013		
9h00	Tom Ridgman Institute for Manufacturing University of Cambridge	
10h30	Workshop 1: follow-up	
11h00	Coffee break	
11h30	Student sessions	
13h00	Lunch	
14h30	Workshop 3	Paper sessions C
16h00	Coffee break	
16h30		Paper sessions D
18h00	Closing session	

PAEE'2013 Paper Sessions

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		68	**Klaus Wuersig**. Using MatLab to solve Problems in Electrical Engineering Courses
		82	**Maartje van Den Bogaard** and Pieter de Vries. The use of social media to augment an authentic learning project in engineering education.
		27	**Rui Sousa**, Francisco Moreira and Anabela Alves. Active Learning using Physical Prototypes and Serious Games
		2	**João Mendes**. To engineer is to risk and to err. Aspects of Henry Petroski`s philosophy of engineering
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		33	Carlos Alberto Prado Da Silva Junior and **Antônio Nélson Rodrigues Da Silva**. Developing learning assessment strategies with a MCDA-C (Multicriteria Decision Analysis - Constructivist) approach
		91	Simone Borges Simão Monteiro, João Carlos F. Sousa, Andre Luiz Aquere, Marco Antonio Kling, Ana Luisa Ribeiro, Rodrigo Vianna, Edgard C. Oliveira and Filipe H. S. Santos. Competencies developed by Production Engineering students: towards decision tree criteria for evaluating production system projects at the University of Brasilia
		92	Simone B. S. Monteiro, João Carlos Felix Souza, André Luiz Aquere, Marco Kling, Ana Luisa Ribeiro, Rodrigo Vianna, Edgard C. Oliveira and Filipe Henrique S. Santos. Evaluation of Student Teams Focused on Subjects Production System Projects at Universty of Brasilia
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A3 Monday 8 July 14h30-16h00 *Portuguese*	Room: **13** Moderator: Luiz Carlos de Campos	93	**Ricardo Fragelli**, Liliane Santos, Ana Nunes and Aulus Diniz. Avaliação Humanizada: Estudo sobre Possíveis Dificuldades de Ordem Emocional de Estudantes do Primeiro ano de Engenharia em Avaliações Escritas
		65	Francisco José Gomes, Danilo Pereira Pinto, José Dinis Araújo Carvalho, Natascha van Hattum-Janssen and Rui M. Lima. Implantação da Estratégia P2BL na FE/UFJF: Relato, Análise e Avaliação
		69	**Luiz Carlos Campos**, Rui M. Lima, Anabela Alves, Diana Mesquita, Francisco Moreira and Bárbara Campos. Fatores Críticos num Processo de Aprendizagem Baseada em Projetos: Percepções de Estudantes de 1o. Ano de Engenharia
		71	Edilene Amaral de Andrade Adell, Marcello Nitz, **Octavio Mattasoglio Neto** and Patricia Antonio de Menezes Freitas. Building a teacher's team to work with Project-Based Learning
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		25	**María Cristina Núñez Del Rio**, Juan Luis Bravo Ramos, Arturo Caravantes Redondo and Rosa María González Tirados. Ventajas e inconveniente del Aprendizaje basado en Proyectos: Una experiencia en la materia de Metodología y Documentación Científica.
		43	Faustino PatiÑo Cambeiro, Itziar Goicoechea CastaÑo and Faustino Patiño Barbeito.La incorporación al trabajo del post-graduado de Ingeniería/Arquitectura pilotada a través de la Universidad
		26	Leidy Rendón-Castrillón, **Margarita Ramírez-Carmona**, Yesid Vélez-Salazar, Carlos Ocampo-López, Oscar Muñoz-Blandón and Gabriel Doria-Gómez. De los residuos de fique a productos industriales de alto valor: Un caso exitoso de estudio con agricultores colombianos
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		13	**Elena Smirnova**, Peter Willmot, Vladimir Syuzev and Artur Shaykhutdinov. Experiences of Centers for Excellence of university-industry cooperation in the Russian Federation
		17	**Stevan Stankovski** and Gordana Ostojić.Improving cooperation between universities and industry
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		37	**Lisa Gommer** and Mascha van der Voort. Integrating research into project led education
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		94	Miriam Chan, Virginia Pérez and Mauricio Vargas.Vinculacion universidad-empresa: un escenario real de aprendizaje para los estudiantes de los programas educativos de la Facultad de Ingeniería Quimica de la Universidad Autonoma de Yucatán
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session	room, moderator	#	authors, title
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Invited Speakers

PAEE'2013 attracted renowned keynote speakers, who are experts at Engineering Education in general and Project Approaches in particular, working closely with industry. We are honoured to have the following inspiring keynote speakers: **Peter Willmot** (Loughborough University, UK) and **Tom Ridgman** (University of Cambridge, UK). Their ideas will most certainly inspire all of us in our teaching practice and research on teaching and learning through projects.

Peter Willmot - Loughborough University, UK

Short bio

Prior to his 30 years' experience at Loughborough University, Peter completed a mechanical engineering apprenticeship and worked in industry for several years. He is a Chartered Design Engineer who is always keen to develop links between academia and industry to enhance the employability of his students. He completed his PhD in Renewable Energy systems in 1990 while acting as a part-time consultant for a major British plc. and teaching at the university. Unsurprisingly, then, the employability of his graduates is central to his mission. Peter was Director of Undergraduate Studies in the Wolfson School for more than ten years, responsible for six highly regarded degree programmes and a population of about 800 students. He gained considerable experience in curriculum design and academic administration in this role and led the development of two Master of Engineering extended programmes, a new BSc degree and two successful bids for professional accreditation. For the last five years he has also been the mechanical engineering subject advisor to Loughborough's partner university in Cairo, the British University in Egypt (BUE). He has also been external validator at several British and Canadian Universities and is an accreditation panel member for the Institution of Engineering Designers (IED). Peter has travelled widely to participate in educational conferences and workshops and has published over 30 peer-reviewed papers. He is a Fellow of the UK Higher Education Academy, and is perhaps best known for his innovations in active and co-operative learning; in particular, team projects, leadership training and peer assisted learning. He was the originator of the award winning Web-PA peer mark-moderation project, and is currently working on innovations that enhance student engagement. More recently, he has been involved in the Royal Academy, National HE-STEM funded educational development programmes; having just completed a project to enhance engagement through the use of video media, working with Sheffield Hallam University and another to improve library resources for engineers with Nottingham University. Having been recently awarded an International Scholarship from the HEA, Peter is presently undertaking a period of study leave, in which he will travel widely to investigate the level of motivation there is for study and the pedagogies that improve engagement. He hopes to meet with many staff and students abroad, sharing his own ideas and learning about new teaching innovations.

Tom Ridgman - University of Cambridge, UK

Short bio

Tom Ridgman is Director of External Education at the Institute for Manufacturing which part of the engineering division of the University of Cambridge. He teaches manufacturing management on the Industrial Systems Manufacture and Management Masters course and has just completed setting up a Masters in Industrial innovation entrepreneurship and Management for the University of Trinidad and Tobago. His research interests span industrial development for emerging economies, industrial sustainability and education for manufacturing industry. Prior to coming to Cambridge in 1995 he spent two years at Warwick University running a research programme examining ways of reducing industrial leadtime. In his earlier career he spent 20 years in the automotive industry in a number of engineering and senior management roles. He is an active volunteer for the UK professional engineering community, is a Fellow of the Institution of Engineering and Technology, and has chaired and sat on a number of committees concerned with professional engineer registration. He is a Trustee of the Engineering Council, Chair of the Quality Assurance Committee and sits ex-officio on the Registration and Standards Committee and International Advisory Panel.

Workshops

An important feature of the PAEE Symposium is the extensive workshop programme. Projects approaches to learning are usually aimed at the increase of student involvement in learning, therefore, a symposium on project approaches like PAEE'2013 count on active involvement of its participants. Three different workshops are scheduled, meant to enable the enhancement of project practice and the reflection on practice.

Workshop 1 - Professional Doctorate in Engineering

Ward Cottaar, Department of Applied Physics, Technical University Eindhoven and Ben Donders, Coordinator 3TU SAI corporate contacts, Stan Ackermans Institute

At the Dutch Universities of Technology post-master programs are running to educate engineers (with a master degree) to become efficient designers (in a technological context). The two-year programs already run for about 25 years. Thousands of graduates work in the Dutch and global industry. Within the workshop we will first explain the present set up of the program. Next we want to explore the opportunities to further improve the program. We will do this through designing a program from scratch, using (and exchanging) all the experience from participants. We also want to investigate the possibilities to align these programs with other similar programs in other countries.

Workshop 2 - Towards a successful industry relationship

Alex Stojcevski, Deputy Head of School & Associate Head (Research) School of Engineering, Deakin University

Enhancing student exposure to engineering practice is required in order to increase engineering graduate numbers, quality, and employability. Participants of this workshop will have the opportunity to review the focus and prospective implementation of some current university-industry guidelines that include recommendations for engineering faculties and schools, engineering employers, and industry/professional bodies. Participants will also have an opportunity to model university-industry guidelines suitable for their own environment.

Workshop 3 – Rubrics for assessing project education

Sonia M. Gomez Puente, Educational Advisor and Teacher Trainer (TU/e), Gerard van de Watering, Educational Policy Advisor (TU/e) and Boudewijn van Dongen, Assistant Professor, Computer Science department (TU/e)

Rubrics are excellent tools for assessing students' work and to support students' learning process by providing feedback. Rubrics can also be used for self- and peer-assessment. If properly developed, rubrics increase assessment's construct and content validity. In this workshop participants will learn to design rubrics for their own project context in line with the learning outcomes, the instruction, and the assessment tasks. Participants will also practice with rubrics as an assessment instrument thereby experiencing the suitability of this tool.

General Information and Services

Conference Venue

All conference sessions will be held at the Eindhoven University of Technology (TU/e).

The opening/closing session, as well as the keynote speakers talk, will take place at the Auditorium, in the BlauweZaal. Please see our website for more information on the location of the venue on campus: http://paee.dps.uminho.pt/Map%20and%20route%20TU-e.pdf

The address is:
Den Dolech 2,
5612 AZ Eindhoven, the Netherlands
http://www.tue.nl

Symposium Registration and Sessions

Registration will be open at 8:00 on July 8, in the Symposium Venue.

Symposium Dinner

The Symposium Dinner will be held at the **Restaurant Effenaar** on Monday, July 8, at 20:00. More information about Restaurant Effenaar is available at http://www.effenaar.nl

The address is:

Effenaar
Dommelstraat 2
5611 CK Eindhoven
info@effenaar.nl

Guest Program

Guests may also attend the Symposium Dinner. Tickets are available at the registration desk. Contact the PAEE secretariat or members of the organizing committee for more detailed information.

Internet

Wireless internet access is available in the Symposium venue. You need to log in before coming to the Symposium with the code you have received via email from the ICT center at the TU/e. Computers and multimedia projectors will be available during presentation sessions.

Symposium Secretariat

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