ICEilt

INTERNATIONAL CONGRESS ON EDUCATION, INNOVATION AND LEARNING TECHNOLOGIES

ABSTRACTS

B O O K

Organizing Committee

President

Paulo Sérgio Duque de Brito PhD.

Technologies and Design Department

C3i/Polytechnic Institute of Portalegre, Portugal

pbrito@estgp.pt

Vice-President

Eduardo Cuerda Correa PhD.

Department of Organic and Inorganic Chemistry

University of Extremadura, Spain

Coordinator

Anabela Sousa Oliveira PhD.

Technologies and Design Department

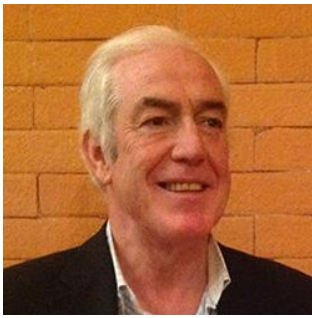C3i/Polytechnic Institute of Portalegre, Portugal

asoliveira@estgp.pt

Coordinator

Joaquín R. Domínguez Vargas PhD.

Department of Chemical Engineering and Chemical Physics

University of Extremadura, Spain

jrdoming@unex.es

Coordinator

Antonio Macías García PhD.

Department of Mechanical Engineering, Energy and Materials

University of Extremadura, Spain

amacgar@unex.es

Vocal

Rafael Giménez Martínez PhD.

Associate Dean for Students, External Practices, Cultural Activities and Sports

Faculty of Pharmacy

University of Granada, Spain

Vocal

Francisco A. Ocaña Lara PhD.

Secretary

Faculty of Pharmacy

University of Granada, Spain

Vocal

Paula Maria Cerqueira de Mesquita Carneiro da Silva PhD.

Mathematics and Experimental Sciences Department

Dr. Joaquim Gomes Ferreira Alves School, Portugal

paula.carneiro@esdjgfa.org

Vocal

Anibal Cassanelli PhD.

Editor of the Iberoamerican Journal of Project Management

Vocal

Elsa Corominas Rodríguez PhD.

Executive Director of RUSC. Universities and Knowledge Society Journal official Journal of ICEILT

Vocal

Gonzalo Fernández-Sánchez PhD.

Editor of the Iberoamerican Journal of Project Management

Technical Secretary

Mónica Martins

ScienceKNOW Conferences

Scientific Knowledge Conferences

+34 695 961 908

info@iceilt.com

info@scienceknowconferences.info

Scientific Committee

Cassanelli, Anibal PhD.

Editor of the Iberoamerican Journal of Project Management official Journal of ICEILT

Spain

Corominas Rodríguez, E. PhD.

Executive Director of RUSC. Universities and Knowledge Society Journal official Journal of ICEILT

Spain

Del Moral Garcia, Ana Isabel PhD.

Dean, Faculty of Pharmacy

University of Granada

Spain

Duque de Brito, Paulo PhD.

Technologies and Design Department

C3i/Polytechnic Institute of Portalegre

Portugal

Cuerda Correa, Eduardo PhD.

Department of Organic and Inorganic Chemistry

University of Extremadura

Spain

Domínguez Vargas, Joaquín R. PhD.

Department of Chemical Engineering and Chemical Physics

University of Extremadura

Spain

Do Couto Jacob, Silvana PhD.

Human Study Center for Worker's Health and Human Ecology

National School of Public Health, Oswaldo Cruz Foundation

Brazil

Fernández-Sánchez, Gonzalo PhD.

Editor of the Iberoamerican Journal of Project Management official journal of ICEILT

Spain

Gallego Arrufat, Maria Jesús PhD.

Didactics and Scholar Organization Department

Faculty of Educational Sciences

University of Granada

Spain

Giménez Martínez, Rafael PhD.

Associate Dean for Students, External Practices, Cultural Activities and Sports

Faculty of Pharmacy, University of Granada

Spain

González Montero, T. PhD.

Chemical Engineering Department

University of Extremadura

Spain

Macías García, Antonio PhD.

Department of Mechanical Engineering, Energy and Materials

University of Extremadura

Spain

Marius Costel, Esi PhD.

Stefan cel Mare University of Suceava

Romania

Márquez Moreno, María del Carmen PhD.

Department of Chemical and Textile Engineering

University of Salamanca

Spain

Moreira, Josino PhD.

Human Study Center for Worker's Health and Human Ecology

National School of Public Health, Oswaldo Cruz Foundation

Brazil

Ocaña Lara, Francisco A. PhD.

Secretary

Faculty of Pharmacy, University of Granada

Spain

Quiles Morales, José Luis PhD.

Associate Dean for Investigation, Innovation and Knowledge Transference

Faculty of Pharmacy, University of Granada

Spain

Recalde Manrique, Luis PhD.

Deputy Chief for International and Institutional Relations

Faculty of Pharmacy, University of Granada

Spain

Sánchez Polo, Manuel PhD.

Associate Dean for Economic Affairs, Equipment and Environmental Management

CFaculty of Pharmacy, University of Granada

Spain

Sousa Oliveira, Anabela PhD.

Technologies and Design Department

C3i/Polytechnic Institute of Portalegre

Portugal

Rodrigues, Luiz PhD.

Technologies and Design Department

C3i/Polytechnic Institute of Portalegre

Portugal

Sousa da Silva, Luís M. PhD.

Chemical Engineering Department

ISEP – School of Engineering, Polytechnic Institute of Porto

Portugal

Talavera Rodríguez, Eva Mª PhD.

Associate Dean for Academic Planning and Quality Assurance

Faculty of Pharmacy, University of Granada

Spain

Vieira Ferreira, Luís PhD.

Chemical Engineering Department

Lisbon Technical University

Portugal

Organization

INSTITUTO POLITÉCNICO de PORTALEGRE

UNIVERSIDAD DE EXTREMADURA
UEX

INSTITUTO POLITÉCNICO de PORTALEGRE
ESCOLA SUPERIOR DE TECNOLOGIA E GESTÃO

C3i Coordenação Interdisciplinar para a Investigação e Inovação
INSTITUTO POLITÉCNICO DE PORTALEGRE

ESCUELA DE INGENIERIAS INDUSTRIALES

Universidad de Granada

FACULTAD DE FARMACIA · UNIVERSIDAD DE GRANADA

Technical and logistic assistance from:

ScienceKNOW
Scientific Knowledge Conferences
for education

Sponsors

Gold Sponsor

Other Sponsors

Presentation

The **International Congress on Education, Innovation and Learning Technologies** will be held in Granada, from 21 to 23 September 2015.

This congress is organized by academics and researchers belonging to different scientific areas of the C3i/Polytechnic Institute of Portalegre (Portugal) and the University of Extremadura (Spain) with the technical support of ScienceKNOW Conferences.

The event has the objective of creating an international forum for academics, researchers and scientists from worldwide to discuss worldwide results and proposals regarding to the soundest issues related to Education, Innovation and Learning Technologies.

This event will include the participation of renowned keynote speakers, oral presentations, posters sessions and technical conferences related to the topics dealt with in the Scientific Program as well as an attractive social and cultural program.

The papers will be published in the Proceedings e-book. Those communications considered of having enough quality can be further considered for publication in International Journals. At the authors' choice, those works not suitable for publication in any of the congress journals, will be published in an Extended Abstracts book of the International Congress on Education, Innovation and Learning Technologies, once the event has finished.

The Conference will also have a space for companies and/or institutions to present their products, services, innovations and research results. If you or your company are interested in participating of this exhibition, please contact the Technical Secretariat here.

Finally, on behalf of the Organizing Committee, I would like to invite all the Scientific Community to participate in this project, presenting papers or communications related to any of the proposed areas.

Index

[15]

Education

Cultural awareness through english textbooks: an analysis and evaluation of new headway series

C. Ozisik

Istanbul Kultur University (TURKEY)
cemozisik@gmail.com

Considering the fact that language and culture are two notions which affect, shape and are embedded into each other, it is impossible to think that foreign language teaching can be free from culture. Communication, which is seen as the main aim of foreign language teaching, is given more importance day by day as it is understood that learning a foreign language cannot be possible by merely learning the meanings of source language's words and phrases in target language, in other words, by simply changing codes between source and target languages. Textbooks written from this point of view are expected to pave the way for correct and effective communication among individuals from different cultures, and take them to a level of awareness which will raise their understanding and tolerance towards differences. The first aim of this study was to put forth the importance of providing learners of English as a foreign language with cultural clues. In addition, a specific analysis and evaluation of New Headway English textbook series, used in the prep school of İstanbul Kültür University, was made to find out the extent to which this 4-level series was successful in conveying the culture of the target language. For this purpose, each level from beginner to upper-intermediate was analyzed unit by unit, focusing on the cultural aspects a foreign language learner should know in order to achieve effective interpersonal relationships and avoid feelings of alienation in the target culture. Then, similar cultural points among the units were classified under different categories, making it possible to see which points were emphasized most. Finally, the results were evaluated based on the relevant literature, and it was concluded that both the content and the way of presentation made this series a good example among English textbooks in highlighting the importance of culture, thus helping the learners see that there is so much more to learn in a language other than grammar.

Culture heritage, language learning and ICT

CHATEAUREYNAUD Marie-Anne

Espe d'aquitaine Université de Bordeaux LACES (1) .

0684 20 34 05

marie-anne.chateaureynaud@u-bordeaux.fr

2 regan 33113 Cazalis France

1.Introduction

This paper will present an experience on using Information and Comunication Technology in a language learning context through cultural heritage. International and official programs try to developp cultural heritage education, as the United Nations does. In a multilingual education, with respect language diversity, we've stated the benefits of using new technology to enrich the way of teaching and to the students'learning. Cultural heritage needs to be preserved and accesible[1]. One of the tasks of the schooling is to increase awareness of the existence and significance of the cultural heritage. In many subjects this necessary transmission can be done, but a multidisciplinary approach seems to be more efficient[2]. In the language learning context to start with the cultural heritage transmission with ICT offers a more complete access and the development of others skills.

2. Experimental

We will present the experiment carried out in a secondary school with four classes (two control groups) Two groups used the programs with a multidisciplinary approach with ICT during mainly the language lessons and two groups studied the same documents without ICT and only from a linguistic aspect. The program consisted of two examples of written cultural heritage: One about medieval archives in occitan (a minority language mainly settled in the south of France), using ict and increasing historical, paleografic and linguistics skills by virtual visits (in preparation for real ones), paleografic workshops on line, and a web site creation. The second program was about Spanish poetry, especially texts from the eminent author from Granada F.Garcia Lorca. : it included access to important texts of the Spanish literary heritage, developping understanding and apropriateness, with technological tools and organizing collaborative poetry workshops, in order to improve linguistics and cultural skills in Spanish, and skills of creativity when working with ICT.

3. Results and Discussion

The results of these experiments were quite convincing and a large part of the students involved in this program improved their level within the evaluated skills. 81% improved their linguistic level, 79% their cultural heritage evaluated skills, and they also improved by the use their ICT skills. The two control groups improved by 61% their linguistic skills and by 65% their cultural hertiage skills. So the program including multidisciplinary approach seems to be more efficient .

4. **Conclusions**

Finally we would recommend on the necessity of teacher training to ensure the transmission of cultural heritage, to do it in a multidsciplinary approach, preserving language diversity, and using the richness of the new technological tools.

5. References

[1] J.Levy , "*Culture, culture learning and new technologies towards a pedagogical framework" in Language Learning & Technology,* Volume 11 , Number 2, June 2007, p. 104-127.

[2]N. Gonzales Monfort, J. Pagès i Blanch,*Algunas propuestas para mejorar el uso didactico del patrimonoi cultural en el proceso de ensenanza aprendizaje de la historia.*2005, Journées d'études de la géographie et de l'histoire, ENS Lyon.

Teaching and learning of BIM concepts in a technical high school

Alcinia Zita Sampaio

University of Lisbon, Dep. Civil Engineering, Av. Rovisco Pais, Lisbon, Portugal

Tlf: +351218418336, zita@civil.ist.utl.pt

Introduction – Building Information Modelling (BIM) is changing the way projects are constructed. This emerging practice requires new mind-sets and technological know-how in order to achieve significant improvements in building efficiency. Universities must focus on the strategy of using BIM as an innovative technology to allow the acquisition of new skills by students and prepare them for their future activity in a more competitive world. Based on this perspective, the text presents some educational measures on offer at the Technical University of Lisbon. It focuses on the importance of teaching BIM: the involvement of students in research projects, PhD theses and MSc dissertations, and the dissemination of BIM through professional short courses and workshops addressed to the AEC community outside the school. Some of these have already been carried out in the school; others are presently being proposed or currently in progress. It is clear from this paper that school is an important driver for the growth of BIM knowledge and practice through the preparation of new and existing professionals.

Image 1. Architectural BIM model

Methodology – The school of Architecture and Engineering has the mission to teach different topics relating to issues necessary for the education of an architect or engineer. Additionally, the school must be focused to the changes at the level of information technologies used in the project office that could contribute to the realization of collaborative, interconnected, and therefore more effective projects. It is up to the school to teach new technologies in order to form future architects and engineers more qualified and kept up to date. The text describes how the BIM concept has been introduced in the Department of Architecture and Civil Engineering, at the Technical University of Lisbon. The school itself should promote dissemination in school, involving credible designer offices that has already use, with a greater or lesser degree, this technology. Such spreading can be made based on short training courses, seminars and technical sessions.

Following this strategy, the Department did offer professional courses coordinate by the author: Information technologies applied in buildings: BIM and RV technologies (Nov. 2011), Information technologies in construction: the BIM concept (Nov. 2012), and BIM technology in the development of projects (Feb. 2014). The main aim of these courses was the dissemination of BIM technology as a means of supporting the management life-cycle of the building, particularly directed to the activities of design, construction and maintenance. There were presented several case studies developed in a BIM environment. However the preferred target of education is the student of Architecture and Engineering because they are the future professionals and, so, they must acquire skills concerning advanced technology tools. In this context, at the level of the development of projects that promote the school to the AEC industry, the involvement of faculty and students on research projects, in the adaptation of curriculum subjects to the new paradigm, dissemination through training courses addressed to the community outside the school, in the development of doctoral and masters theses.

Conclusions - The text presents some courses, projects and research work, about BIM, which have already been carried out in the school and some proposals and actions.

Introduction to BIM-based tools in the curriculum of Technical Drawing

Alcinia Zita Sampaio

University of Lisbon, Dep. Civil Engineering, Av. Rovisco Pais, Lisbon, Portugal

Tlf: +351218418336, zita@civil.ist.utl.pt

Introduction – Changes in information technologies used in design buildings are emerging. The school must follow the changes of working in a collaborative team, supported in new technologies. The BIM base tools are today the principal way of create projects that students must know in order to be competitive in their future architect or engineering activity. The discipline of Technical Drawing implemented some changes in there curricular program to undertake BIM based tools.

BIM implementation - In construction industry, the kind of transformation normally associated to it is based on the use of advanced technologies, applied in narrow strips of the building productiveness. Building Information Modeling (BIM) methodology implementation is much more that this feeble perspective. Today it presents a unique set of challenges for the construction activity starting on mentally changes near the leaderships in each office. A large vision of how important is the use of BIM to be competitive in the business is mandatory. Leaderships must recognize the motivation to act on the infrastructures of their own office in order to integrate every sectors of the workplace, and analyzing the points where is possible to be innovative to improve a collaborative organization. This is the first step and this is the launch to BIM technology investment. So, leading with BIM needs an open mind leadership and a good corporate team to introduce with success the implementation of radical changes within the organization. As a second step, implementing BIM brings considerable increment of initial cost on software and training. The benefits and advantages of working with an efficient BIM implementation support must be very well known by the leadership's staff. So practice and improvement of modelling skills are needed.

Image 1. Modelling the architectural BIM model

Methodology – The program includes teaching BIM based tools frequently used in architecture (image 1) and engineering offices. Learning is based on practical exercises conducted in order to create an architectural model, followed by the structure model and then a sanitary equipment model. The complete model is composed by the over position of distinct disciplines that make up a construction project.

Conclusion – students learn the new technology on the basis of exercises of increasing difficulty. Students achieve a degree of knowledge that will be useful in their future activity as architects or engineers.

Evolution of Project Based learning in little groups in environmental engineering.

J. Requies[(1)], I. Agirre, V.L. Barrio, M.B. Güemez, U. Izquierdo, J.F. Cambra

[(1)] *Escuela Técnica Superior de Ingeniería Industrial (UPV/EHU), Alameda Urkijo s/n.*

phone.: +34 96 6017242, e-mail: jesus.requies@ehu.es

1. Introduction –The traditional education has been focussed on the development of the knowledge based on the figure of the professor where the students were passive agents so far [1]. A more active methodology as Project Based Learning provides the students the responsibility and the opportunity to take part in their own learning. The core idea of Project Based Learning is focused in real problems which capture students' interest and provoke serious thinking as the students must acquire and apply new knowledge in a problem solving context [2]. This idea is very appropriate to be applied in the field of environmental technology area courses where the students must design different equipments to reduce pollutant emissions. Therefore, this work consists of the development and evolution of active Project Based Learning used in "Unit Operations in Environmental Engineering" course within the Bachelor degree in Environmental Engineering.

2. Experimental – After the initial design and implementation of this methodology in 12/13 academic course, different modifications were carried out in the following academic courses. The students receive a certain scenario and a question generator. In order to solve the given scenario different activities (some in small groups, some other individual) were programmed: brainstorming, participatory master lectures, jigsaw puzzles, problem resolutions in groups, tutorials, technical visit to companies, peer to peer evaluations…. Although the scenario was changed every academic course, the goal was the design of scrubbers to minimize the emission of one specific pollutant in a power plant.

3. Results and Discussion – The evaluation of the course was also changed during this time, in the first two courses the project was evaluated with different work submissions and was also evaluated in a final individual exam ; in the last course the project was evaluated with an increased work submissions and two individual minimum tests carried out along the PBL. Although the results are strongly dependant on each student group, there are some common conclusions; for example the best projects usually correspond with the best final marks. Adding onto that, Table I shows that there is not any direct effect among the motivation of the students and their academic results. Besides, it can be observed that PBL experience was quite positive for them, although not all of them would repeat with this type of methodology. This fact is more related to the motivation degree of the student than with the final academic results. For most of the students the main problem of this methodology is the amount of work compared with the traditional methodologies.

Tabla I. Academic results and motivation of the students

Students	Project			Course			Increase in motivation		
	12/13	13/14	14/15	12/13	13/14	14/15	12/13	13/14	14/15
Number of Student	12	12	20	10 (take exam)	11 (take exam)	20	12	12	20
Excellent	-	-	-	30 %	9 %				
Good	100%	91 %	65 %	20 %	9 %	15 %	Good experience 50 %	Good experience 83,3 %	Good experience 61.25 %
Pass		9%	35 %	40 %	54,5%	40 %	Bad experience 50 %	Bad experience 17,7 %	Bad experience 38.75 %
Fail	-	-	-	10 %	27,5	45 %			

4. Conclusions - The obtained results show that cooperative learning in small groups within a PBL can enhance the self –learning capacities and can increase the academic records. However, but this does not means that the motivation of the students is also increased.

5. References

[1]D. Efstratia, Pocedia-Social and Behavioral Sciences 152 (2014) 1256-1260

[2] N. Remzyye Ergül, Elif Keskin Kargan, Pocedia-Social and Behavioral Sciences 136 (2014) 537-541

A New Innovative Undergraduate Degree Program in Enterprise Computing at Zayed University: Successes, Challenges, and Future Directions

Munir Majdalawieh, Michelle Antero, Emad Bataineh, Zakaria Maamar and Abdallah Tubaishat

College of Technological Innovation, Zayed University, United Arab Emirates

College of Technological Innovation, Zayed University, United Arab Emirates

971-4-4021161

Emad.Bataineh@zu.ac.ae

The United Arab Emirates (UAE) Government has promptly recognized the importance of the Information and Communication Technology (ICT) sector as a job creator and vital infrastructure for the growth of the UAE. The significant and rapid development of the UAE economy in the last decade has also acknowledged the importance of the knowledge economy as another source of revenue. Both public and private organizations are ``hunting'' for ICT graduates equipped with critical thinking and managerial. They would also like graduates be creative, innovative, and last but not least entrepreneurial. Simply put universities' educational programs (or curricula) need to ensure that ICT graduates are capable of tackling the 21st century challenges.

This paper reports on the experience of the College of Technological Innovation (CTI) at Zayed University (ZU) in the UAE, in offering a new specialization referred to as Enterprise Computing (EC) rolled out in Fall2012. Through this paper we would like to highlight our experience in developing this cutting-edge specialization.

The EC specialization exposes students to the latest developments and best practices in Enterprise Resource Planning (ERP), Supply Chain Management (SCM), Customer Relationship Management (CRM) and other enterprise applications. Since the launch of the EC specialization the journey has been full with challenges, successes, as well as lessons learned. The EC specialization is designed to prepare the students for a broad range of careers that are focused on providing sound solutions to organizations. The EC specialization curriculum comprises of nine core courses: CIT261 (Enterprise and Information Systems Foundations), CIT361 (Enterprise Systems), CIT362 (IT in Logistics and Supply Chain), CIT371 (Mobile Computing), CIT372 (Cloud Computing), CIT400 (Green Computing), CIT463 (Enterprise Systems Developments), CIT465 (Knowledge Management), and CIT492 (IT Infrastructure and Emerging Technologies).

Launching a new academic degree program is expected to go through various challenges and the EC specialization at CTI is no exception. During the first two years, the specialization suffered from low enrollment due to a limited understanding of the words ``enterprise'' and ``computing'', inappropriate marketing strategy, family impact on future careers, and also the dominance of some buzzwords like business and managerial positions. In fact the specialization accepted only a single digit number. Many students were unaware of or heard very little about the EC specialization that it was not considered as their major. The low enrollment concern was further compounded by the required minimum number of students in a cohort so that a specialization remains active. As a result the EC was under close scrutiny putting more pressure on the college as well as the faculty teaching in the specialization. The limited understanding of the EC specialization also impacted the process of identifying internship opportunities for the students. Many found it difficult to articulate their degrees to potential employers in both public and private sectors.

To address the aforementioned challenges several actions were taken including: (1) market the specialization properly to increase the enrollment; (2) collaborate with some enterprise system vendors through student seminars and hands-on workshops, academic fieldtrips to some organizations using enterprise applications, etc.; (3) continue reviewing the EC study plan; (4) invest in software and hardware resources to ensure proper delivery of course material; and (5)partner with an enterprise application vendor through its Academic Alliance Program.

In conclusion, the implementation of the EC specialization at ZU shows how universities can rethink their own educational systems to produce graduates who can meet the 21st century's challenges. Proper marketing of the specialization, a sound study plan and collaborative partnership are some the actions that have ensured the success of the EC specialization at ZU.

Construction of narratives as a way to introduce Geography in kindergarten

Miguel Castro

Instituto Politécnico de Portalegre. Portugal
00351 245 339 400 – miguelcastro@esep.pt

Since immemorial eras, narratives and stories have helped to transmit knowledge and culture. Fairy tales, witches, myths, mythological animals, monsters and ghosts, among other creatures and adventures, have had different purposes, always with several readings, from entertainment to the transmission of values and standardized behaviors socially accepted, which have helped people to understand reality and make it intelligible to listeners.

All main holy books, by which religions are oriented, are populated with stories built from facts, half-facts, truths or half-truths, magic, fantasy, miracles or indisputable realities. The debate about the veracity or authorship of the events is the domain of faith and are not therefore included in our reflection. However, there is a common aspect beyond religion, in the strict sense of the term – *Religare* is connected or related with the supernatural and/or divine - and consists of a goal to educate and communicate codes of conduct and social rules.

The stories and narratives have simple but extremely effective structures; they transform complex things into stereotypes that simplify reality and allow a quick and general understanding, so that people can recognize and frame the collective, with specific distinctiveness from the others, thus creating an identity and a sense of collective belonging.

In cultures where oral tradition is practically the only form of transmission of identities and the history of people's culture, as the *Tuiavii* speeches of *Tiavéa* (early twentieth century) or the reports of *Geronimo* (late nineteenth, early twentieth), the narrative is symbolic. *Symbol*, from ancient Greek, is what unites a significant number of concepts. By contrast, *diabolo* is what divides, disunites. The narrative is symbolic and gathers in itself concepts with which we identify and apprehend the world, the society, and our culture and place in the collective.

Wasting this potential for the transmission of knowledge in preschool would be foolishness. So what we propose is to reflect on the potential of introducing geographical concepts through narrative, embodying the elements or events to be closer to the child's imagination.

Kieran Egan stands that the narratives, since structured according to the children's thinking stadium, are efficient knowledge transmission ways, if they are structured with strong binary oppositions. Our position goes a bit further - we complement it with more factors, so that they can succeed in the field of Geography. The personification and attribution of feelings and self-will to the elements and natural phenomena, creates emotional situations, where you can get a child's identification with the characters and devise a plot that is capable of transporting them to the center of the action.

In the beginning of the project's implementation, with four "children gardens" in the district of Portalegre, we made some pilot experiences in real teaching practice context. The results were extremely encouraging, revealing an easier understanding of the geographical mechanisms and contexts. The relationship of natural phenomena with the children's daily experiences proved to be very obvious and effective, and they could connect those phenomena with the causes, for example an earth shaking with the tectonic mechanism that caused it.

We intend to implement a greater number of experiments that can allow us to get significant results to achieve a more sustained approach and develop a set of improved practices within the specific teaching of geography in kindergartens.

References

Castro, Miguel (2003). Reflexões sobre a introdução da Geografia na Educação de Infância. Aprender. Nº 27. ESEP. Portalegre

Castro, Miguel (2012). A Preto e Branco – A Geografia na Educação Pré-escolar. III Seminário de I&DT do IPP, Valorizar o saber, criar oportunidades – C3i. IPP. Portalegre.

Egan, Kieran (1990). Estádios da Compreensão Histórica. ESEP. Portalegre.

Egan, Kieran (1992). O desenvolvimento educacional. D. Quixote. Lisboa

Egan, Kieran (1994). O Uso da Narrativa como Técnica de Ensino. D. Quixote. Lisboa.

A technology shift for a fireworks controller

P. Vrignat [(1)], J.F. Millet [(1)], F. Duculty [(1)], S. Begot [(1)], M. Avila [(1)]

[(1)]*Indre University Institute of Technology– PRISME Laboratory – 2 av. François Mitterrand –
36000 Châteauroux (France)*

+33(2).54.08.25.50 – pascal.vrignat@univ-orleans.fr

1. Introduction – In the past, wands with polder were used to fireworks ignition. But the proximity of the operator with the explosive tubes (or parts) was very dangerous and needed a new system more safety.

Nowadays, ignition of each tube or explosive device is made from a firing case, located near the management place, using electrical igniter [1]. These igniters provide to convert electrical power in a flame which ignites mortar tube. Igniters are connected to the firing system by electrical wires called shooting wires. To provide easier network of shooting wires, which may be complex, it is possible to add electrical relays in this network to reduce the number of connexions rising management place. Then the manager selects a wire and demand ignition of selected mortar tube. This kind of classical design needs a lot of time to installation and uninstallation (Image 1). More

Image 1. Installation of a firework

difficulties can be added like: presence of water, high installation… This kind of solution is also expensive with shooting wires (copper electrical wires). Once uninstalled, electrical wires cannot be reused. Recycling needs to be done.

2. Experimental – Proposed solution, which was validated by the customer, is shown in the Image 2. This solution uses radio frequency technology (Xbee-Pro) based on Arduino Single-Board Computer (SBC Arduino [2]). Three students of bachelor's degree brought this project. One of them carries on the project during an internship of ten weeks.
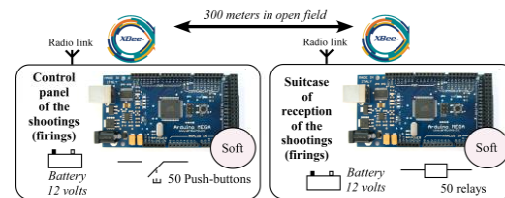
Image 2. Validated solution

3. Results and Discussion – These works require to develop PCB (Printed Circuit Board) prototypes for the Arduino SBC. This PCB is the result of an important work of design to provide connexions for all the inputs and outputs of the installation (Image 3).
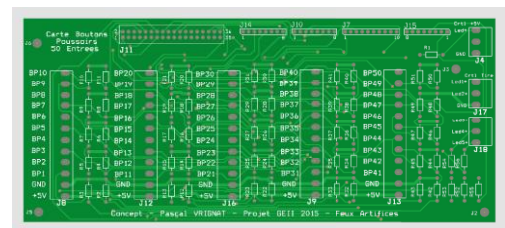
Image 3. PCB creation

4. Conclusion – These works need a lot of hours spent to search the optimal solution considering limited financial cost (nearly 1.000 euros) and various technical constraints. All constraints of the project were defined with drafting the technical specifications [3]. The next fireworks could be fired ten months after the beginning of this project, which began in September 2014.

5. References

[1] Decree No. 90-897 of October 1, 1990 on the regulation of fireworks

[2] http://www.arduino.cc/

[3] P. Vrignat, J.F. Millet, F. Duculty, S. Begot, M. Avila, "Rédaction d'un cahier des charges fonctionnel dans le cadre d'une organisation au sein d'un projet : retour sur expérience avec des étudiants Bac+2", AIPU, Association Internationale de Pédagogie Universitaire, 28ème Edition, Mons, Belgique, 2014.

Education for Employment - Innovating the STEM skills pipeline

Janet Smith-Harrison (1) Dr Nazira Karodia (2) James Machell (3)

(1) University of Bradford, Tel: 01274 232231, j.smith-harrison@bradford.ac.uk

(2) University of Bradford, Tel: 01274 232218, n.karodia@bradford.ac.uk (3) University of Bradford, Tel: 01274 233161, j.machell@bradford.ac.uk

Introduction

'Industrial Centres of Excellence' (ICE) are a new, innovative model of education being piloted in Bradford, UK, through a partnership between the local Council, University of Bradford, local schools, colleges and business partners. The ICE model enables priority economic sector employers to take a leadership role in the design and delivery of learning and to articulate and stimulate demand for progression to STEM (Science, Technology, Engineering and Mathematics) based courses, careers and higher education provision. The aim of the approach is to support the successful transition of students from school to HE and into employment. Pivotal to success is employer vision, leadership and commitment through direct investment and support with business partners leading the project board of each ICE. STEM at Bradford, the University's STEM curriculum and outreach programme, has created an innovative ICE curriculum offer built around the "Environmental Technologies" sector in partnership with 5 businesses and a large local high school.

Experimental method

There is a growing need for graduates with the right skills and qualifications to meet the demands of a diverse range of new technology and higher level skills jobs [i]The Industrial Centre of Excellence for Environmental Technologies, "CE:ET" has researched the best ways to innovate the STEM skills pipeline through a series of project based programmes of learning. Pupils have been guided by business experts, academics and teachers to research and present their findings on a range of environmental technology real world issues. Work has been submitted for award giving the pupils additional qualifications, skills and confidence to continue on this career path.

Results, discussion and conclusions

- Pupils benefit from being based at the University of Bradford's new STEM Centre with access to state of the art technology and laboratory facilities.
- Project-based learning solves real business challenges using STEM skills, with pupils helping to deliver the programme as well as learning through it.
- Business leadership from the Environmental Technologies sector in the district providing work placements, industry mentoring, site visits, specialist STEM skills and curriculum input creates change.
- Industry insight and careers guidance gives students a competitive edge in the STEM jobs market.
- STEM Teaching is enriched by university and business specialists.
- STEM subject specific HE progression is enhanced by early engagement with University and industry specialists

References

New computer-aided design tools applied on engineering design education

A. Martin-Erro (1), M. Dominguez (2), M.M. Espinosa(3)

(1) Juan del Rosal s/n.

+34616155122 alfmartin@invi.uned.es

Abstract:

Since the 80´s decade of last century, new graphic technologies changed dramatically the way of architects, designers and engineers work. Computer aided design is applied worldwide and for all design projects and so for engineering design. That meant an inclusion of CAD into the engineering curricula and so tend to apply CAD to every drafting and design tasks, since conceptual to detail. Paper and pencil drafting and sketching was then displaced as it was understood as obsolete. As it is confirmed by several studies. The consequences of this CAD abuse and sketching abandon was a decline of spatial abilities of engineering students and a lack of visual thinking skill, which are essential for engineering design practice. Some actions proposed, such as spatial abilities specific courses, the return of sketching practice on engineering curricula. Proper use of CAD must be also considered at the university, as well as we understood the need for design engineers to work with geometric models in a computer-domain world, even at earlier design stages.

Although CAD evolved to ease designers' creative work, in order to bring more user-friendly interfaces, it does not fulfil creative requirements. In addition, there is an alternative modelling software that must be under consideration: since simple modelling applications, based on constructive geometry, such as *Sketchup*, to other modelling software, closer to human creative practice, such as Digital sculpting and computer-aided sketching: Digital Sculpting is nowadays applied by artists and industrial designers. Computer aided sketching is an attractive solution for creative works, closer to usual paper and pencil sketching practice. According to future design engineer's needs, we studied these new design tools, more focused on the creative fostering that conventional CAD systems, and its application for engineering education purposes is analysed.

The results of our study shows that unless these systems cannot substitute traditional sketching, means an interesting support, in order to quickly implement design ideas into a computational environment, also as an better alternative to use CAD at earlier design stages. As well as CAD is implemented on engineering curricula, new computer aided design tools, such as digital sculpting, computer aided sketching, must be taken into consideration. That helps the consciousness of a proper use of CAD. These applications shall be mentioned and taught in engineering education, in the same manner that CAD was earlier implemented.

Towards a design of a specific Problem - Based Learning for first engineer course

E. B. Blázquez (1), F.J. Castillo (1), M.C. Ladrón de Guevara, O.D. de Cózar (1), I. Ladrón de Guevara (1), F.D. Trujillo (2)

(1) Dept. Expresión Gráfica, Diseño y Proyectos, E.P.S., Universidad de Málaga, Spain.

Phone Number: +34 951 952 282, ebeatriz@uma.es

(2) Dept. Tecnología Electrónica, E.P.S., Universidad de Málaga, Spain.

. Introduction – Problems based learning (PBL) is characterized as an approach to learning in which the students have more control over their learning, in contrast to traditional approach. Others educational researchers as Barrows [1] noted PBL has taken on a huge of definitions pushed, in part, by institutions wanting to refine theirs particular approach. Also, this kind of method has been successfully used in different disciplines at a variety of educational level [2] adapting to their needs of their discipline.

This paper shows the design of a specific part of Graphic Expression subject based on problem-design learning. One challenge in designing the BPL was to incorporate real situations in their activities.

2. Educational context – Nowadays, the advances in a digital and virtual technologic society are impressive, so it is necessary to provide students with not only instrumental, but pedagogical and methodological tools to help them build their knowledge in a rational way [3].

Graphic Expression is a subject of first course in Engineering at the Energy Degree, is underway in the second half and has a workload of 6 ECTS credits. The course is divided into three distinct blocks, Standardization, Representation Systems and Computer Aided Design. Moreover, given the size of the largest group (about 72 students) and taking into account the literature on group size, it was considered that 4 students per subgroup would be a good number, resulting in 18 subgroups.

3. Aims and planning – The objectives to be covered with this activity are closely related to the skills that are to acquire students, such as ability to use their knowledge and understanding to provide solutions to problems, also to use their technical sense to work with incomplete, complex information and technical uncertainty. Another is capacity of spatial vision and knowledge of graphic representation techniques through applications of computer-aided design and finally, ability of expression, decision making and communication equipment. In the progress of the activities there are several tasks to be undertaken by the students and other ones by the teachings staff, for instance, work distribution, final delivery work, material preparation and self evaluation, but always with a feedback between student and teacher.

4. Conclusions -

The project is designed for implementation in small groups, in which each student is essential for achieving a good work. That is called positive interdependence. All students must give an evaluation of their own work and also, of their peers. It takes an effort along self-evaluation activities that are developed to throughout the project that suppose a reflection of the performance of the group. Finally, it can be indicated that the development of interpersonal skills is achieved with materials and implemented activities such as the distribution that will do the work in the group.

5. References

[1] H.S. Barrows, Problem-based learning in medicine and beyond: A brief overview. *New directions for teaching and learning*, **68**, (1996) p. 3-12.

[2] A.Walker & H. Leary, A Problem Based Learning Meta Analysis: Differences Across Problem Types, Implementation Types, Disciplines, and Assessment Levels, *The Interdisciplinary Journal od Problem-based Learning*, **3**(1), (2009) p. 12-43

[3] J.R. Savery, Overview of problem-based learning: Definitions and distinctions. *The interdisciplinary Journal of Problem-based Learning,* **1**(1), (2006) p. 9-20.

Misconceptions in Bilingual Education in Primary Schools

T. Veronez [(1)], S. Nunes [(2)]

[(1)] *35 Green Avenue, Valley Cottage, NY, 10989, USA.*

Phone: (845) 553-0650 e-mail: prof_veronez@hotmail.com

State University of New York

[(2)] *Madeira de Freitas, 212, apto. 202, Praia do Canto, Vitoria, ES, 29055-320. Brazil.*

Universidade Federal do Espirito Santo

1. Introduction – this paper aims to identify the fundamentals of Bilingual Education according to authors Harmers & Blanc [2], dialoguing with authors Baker [1] and Rodriguero [4] in order to shed light on the positive and negative aspects of Bilingual Education in the context of early childhood. One key point in this research is the disparate between what literature defines as Bilingual Education and how primary schools in Vitoria, the capital of Espirito Santo state in Brazil implement this practice in their English as a Second Language (ESL) classes. This study places its importance on the fact that in order to satisfy the growing demand for Bilingual Education, schools have claimed to offer ESL classes when in fact they are offering an extension in the number of English as a Foreign Language class (EFL). This misconception in not only inaccurate according to Mello [3] who says that Bilingual Education takes place "when the target language is used as a means of instruction" (2010) but also misleading for parents who enrol their children in schools that are not able to provide the services they claim to, first because of their misinterpretation of Bilingualism but also because their professionals are not adequately prepared to teach ESL classes.

2. Experimental – In order to acquire the data regarding the way schools provide Bilingual Education interviews with the schools principals were conducted. The questions regarded the frequency and duration of ESL classes, the methodology used and the qualification of the teachers. The data was then compared to Mello's definition of Bilingual Education and compiled into charts.

3. Results and Discussion – Results point out that only two out of five schools that claim themselves to be Bilingual actually use English as a means of instruction instead of an extension in the quantity or length of EFL classes. It is also possible to see that only two out of seventeen teachers have adequate qualifications in early childhood education and English language teaching.

4. Conclusions – Given the multifaceted definition of Bilingualism it is desirable that the offices that regulate education in Brazil create guidelines to shape the offer of Bilingual Education and the education of the teachers who lead the ESL classes in order to avoid future implications that may incur due to lack of preparation of teachers and misconceptions or malpractices in primary schools.

5. References

[1] C. Baker. "Foundations of Bilingual Education and Bilingualism", Online. Accessed on 24 Feb 2014.

[2] J. Harmers and M. Blanc. "Bilinguality and Bilingualism", Cambridge Press, Cambridge, 2000.

[3] H. A. B. Mello. "Educação bilingue: uma breve discussão". Online. Accessed on 25 March 2014.

[4] C. R. B. Rodriguero. "O Desenvolvimento da linguagem e a educação do surdo". Online. Accessed on 02 de Abril de 2014.

Evaluation of a mobile phone-based intervention to improve healthy food choices

A. Sánchez-García[1], H. López García de la Serrana[1]

(1) Department of Nutrition and Bromatology - Faculty of Pharmacy
Cartuja University Campus - University Of Granada

18071 Granada - Spain.

+34 689 852915 aitor@ugr.es

1. Introduction – Mobile phone-based interventions have demonstrated positive effects on body composition [1] and food habits [2,3]; however, their potential role as monitoring or dietetic treatment tool has yet to be examined. According to our knowledge, there is no specific application designed able to keep in touch professionals and patients, allowing a fluid communication to register, monitor and evaluate dietetic behaviour via photographs.

Our aim was to evaluate the acceptance and impact of a mobile phone-based intervention through a mobile instant messaging application, delivering photos and counselling between patient and dietitians.

2. Experimental - During 5 days, 20 volunteers uploaded and sent their food choices to a dietitian via mobile instant messaging application. A numeric evaluation measuring how healthy the choice was (0 to 5), and another photo attached with a healthier alternative was received as a reply. No other way of communication was allowed between patient and professional. The participants filled an online survey one week after the intervention to measure the impact and feelings during the trial.

3. Results and Discussion - A total of 390 were evaluated and sent as alternative recommendation. The average number of photographs uploaded per day was $3,9\pm0,4$. 82,4% of the sample affirms have been influenced to eat healthier. 95% was "motivated to eat better during the experiment". Furthermore, 58,8% recognized had a better diet during the trial than their normal routine.

Image 1. Screenshot of an instant message cellular application which is being developed nowadays.

70,6% suggests that receive notifications would improve even more the adherence at sending photos. No one considered tiring sending photos. Besides the better results at food choices, most of the participants (82,4%) affirm to have enough criteria for identifying healthy choices after the study.

The survey results agree with fact that adherence to dietary self-monitoring were also more adherent to treatment [1-3], predicting then weight loss and change of food habits.

Tailoring and delivering a personalised diet through a mobile device is a challenge, but cellular phones may help at learning how to manage other behaviours like food choices, self-monitoring diet, healthy snacking or how to reduce caloric intake.

4. Conclusions - An application focused on food choices photographs could be a potential tool to motivate and monitor people at enhance their food habits by dietitians.

It can train how to follow a healthy diet independently also.

5. References

[1] Burke LE, et al. *Using mHealth technology to enhance self-monitoring for weight loss: a randomized trial.* American journal of preventive medicine. 2012;43(1):20-6.

[2] Turner-McGrievy et al. *Comparison of traditional versus mobile app self-monitoring of physical activity and dietary intake among overweight adults participating in an mHealth weight loss program.* Journal of the American Medical Informatics Association : JAMIA. 2013;20(3):513-8.

[3] Pellegrini CA, et al. *A smartphone-supported weight loss program: design of the ENGAGED randomized controlled trial.* BMC public health. 2012;12:1041

Evaluation of a mobile phone-based intervention to improve healthy food choices

A. Sánchez-García [(1)], M. Löf, [(2)] C. Delisle, [(2)] H. López García de la Serrana

(2) Department of Nutrition and Bromatology - Faculty of Pharmacy
Cartuja University Campus - University Of Granada

18071 Granada - Spain.

(2) Department of Biosciences and Nutrition, Karolinska Institutet, NOVUM, Huddinge

+34 689 852915 aitor@ugr.es

1. Introduction – Health education via mobile phone offers a great opportunity for designing and developing health-care interventions in order to help individuals in disease prevention and self-management. The use of mobile phones and new devices as tools in educative interventions provide a new opportunity for interactive feedback with the population.

To our understanding some reviews [1-4] have studied changes in knowledge, attitudes, general healthy behaviours and even weight loss; but not specifically the role of cellular phones in changing food habits and through those, change too anthropometrics parameters.

Our aim is to study the role of cellular phones at changing food habits and through those, change too anthropometrics parameters.

2. Experimental - A systematic revision of the literature answering the question:

"In general population, how does the use of cellular-phone based interventions versus control or comparison interventions affect healthy food habits?" This review was conducted using guidelines set forth by the Centre for Reviews and Dissemination and the PRISMA Statement for Reporting Systematic Reviews and Meta-Analyses.

3. Results and Discussion - A total amount of 11 Randomized controlled trials were included in the revision. There were mainly two types of intervention: those that were based on monitoring the activity by using mobile devices or personal digital assistance, and other group of message/reminders based interventions. All conducted in Obese or overweight population.

In general, the cellular phone-based interventions are associated with more energy expenditure and weight loss. The weight loss was higher during the first 3 months of intervention Some positive changes were founded in variables like Energy and Nutrients Intake, Food Choices, Overall diet behaviour test and portion size. Participants randomized to the mobile group interventions were also more adherent to treatment.

Cellular phones increase lightly but significantly (in comparison with traditional intervention) some of the outcomes related with anthropometrics (weight and waist circumference) and nutrition.

4. Conclusions - Cellular phone might offer a new platform in the improvement of adherence; especially in those interventions that include tailored content and personalized feedback.

5. References

[1] Krishna S, Boren SA, Balas EA. Healthcare via cell phones: a systematic review. Telemedicine journal and e-health : the official journal of the American Telemedicine Association. 2009;15(3):231-40.

[2] Cole-Lewis H, Kershaw T. Text messaging as a tool for behavior change in disease prevention and management. Epidemiologic reviews. 2010;32(1):56-69.

[3] Wei J, Hollin I, Kachnowski S. A review of the use of mobile phone text messaging in clinical and healthy behaviour interventions. Journal of telemedicine and telecare. 2011;17(1):41-8.

[4] Militello LK, Kelly SA, Melnyk BM. Systematic review of text-messaging interventions to promote healthy behaviors in pediatric and adolescent populations: implications for clinical practice and research. Worldviews on evidence-based nursing / Sigma Theta Tau International, Honor Society of Nursing. 2012;9(2):66-77.

Implementation of a teaching unit from the standard secondary-school syllabus to secondary education for adults

E.M. Perez-Soriano [(1)], C. Arévalo [(1)], I. Montealegre-Meléndez [(1)], I. Peña [(1)]

[(1)] *Universidad de Sevilla. Camino de los Descubrimientos s/n 41092 Sevilla (Spain)*

+34954487303 and evamps@us.es

1. Introduction – Due to the fact that education requires a learning process to be performed from an instructional, technical and pedagogical design, a lack of application of this process is detected in the field of secondary education for adults.

The objective of this paper is to carry out a first approximation to this process, by addressing it via the contents of a teaching unit from the standard secondary-school syllabus, so that teachers can reflect on the contrast between the most relevant aspects of the standard secondary-school syllabus and those shown in this paper, which have already been adapted to fit the level of secondary education for adults.

2. Experimental – Included data in this paper were obtained from a sample of students from a secondary school education in Seville, IES Beatriz de Suabia, for the transposition and contrast with the conditioning surroundings of a secondary school for adults, Public Centre for Adult Education Manuel Prada Rico, Bellavista (Sevilla).

The instructional design model of the teaching unit is based on concepts introduced by major authors in the issue, Knowles, Adams and Alcala, who introduced psychoeducational keys to successfully face this kind of learning. It is significant to note that the andragogic act is the propeller of cognitive and metacognitive skills, as highlighted in recent publications [1].

In the construction of the instructional scheme, Dick and Carey model is used, in which knowledge instruction based on the identified needs in the context takes place [2].

Regarding to the technical design of the teaching unit, criteria are established according to relevant authors as Chevallard, Verret or Birzea among others [3-5].

3. Results and Discussion - Latest technologies and the increasingly demanding jobmarket, make teaching not restricted to the youth period. It would be nonsense to think that lifelong learning has not come to a reality today.

Adults remain longer in contact with the acquisition of knowledge, either educational or in training levels during their professional life. On the other hand, society increasingly aged, requires its members to remain longer active, and that implies constant updating.

4. Conclusions - Research on different lines of learning instruction leads us in the right direction for the evolution in recent years has undergone society.

In this paper another step toward engineering education is done, paying attention to this increasingly demanded adult training. The aim has been to show the most relevant issues surrounding this type of teaching and how to take the first steps to implement the planning.

As forthcoming steps, a series of particular specifications for different groups of adult education, can be initiated achieving exhaustive and complete documents for such important fields as technology, medicine, economics, etc.

5. References

[1] Alonso, P. *La Andragogía como disciplina propulsora de conocimiento en la educación superior.* 2012, Educare, págs. 15-26.

[2] Dick, W., Carey, L. y Carey, J.O. *The Systematic Design of Instruction.* Harper Collins (Third Edition), 1978.

[3] Verret, M. *Le temps des études.* Paris : Librairie Honoré Champion, 1975.

[4] Chevallard, Y. *La Transposition Didactique.* Grenoble : La Pensée sauvage, 1991.

[5] Birzea, C. *Hacia una didáctica por objetivos.* Madrid : Morata, 1980.

An experience of two years promoting humanistic competences and standardization of curricula in Hydrology through soccer spirit

Feliciana Licciardello (1), Simona Consoli (1), Giuseppe Cirelli (1), Federico Lapiana (1), Adriano Caggegi (1), Agata Flavia (1), Guillermo Izquierdo (2), Sebastián Parraguirre (2), Federico Guerrero (2) María J Polo (2) Carlos Castillo (2), and Encarnación V Taguas (2*)

(1) University of Catania, Department of Agri-Food and Environmental Systems Management (DiGeSA), Italy.
(2) University of Cordoba, ETSIAM, Córdoba (Spain). E-mail: evtaguas@uco.es

In the year 2013, a group of professors of the University in Catania (Italy) and the University of Cordoba (Spain) prepared a practical exercise about hydrological planning for two subjects of the degrees of Civil and Forest Engineering with common contents. The main aim of this exercise was calculating the peak flow for a rainfall quantile in a rural catchment following the Curve Number method developed by the Soil Conservation Service (1972.) These studies involved different technical disciplines in Hydrology and Soil Sciences as well as the use of Geographic Information Systems and programming tools. The most important aspect of this experience was taking advantage of the enthusiasm and competition associated to soccer to promote learning of the technical knowledge as well as humanistic skills such as the development of oral presentations in English, team work, learning in a multicultural context, etc.

Following the philosophy of soccer leagues, the students solved and presented the exercise in teams of two or three students. The first stage was the national league competition from which the best teams of each country were selected to "play" the final match. Through videoconference, the presentation and defense of the works were done so the fans in each country supported their teams. In addition, a committee of professors made questions to the participants and determined the winner team. The winners in each country received a certificate of both Universities and the participation in the EGU Assembly 2014 and 2015 and they are coauthors of the present work.

After an experience of two years, the professors presented the strengths and weaknesses of the experience and the new ideas to follow with this motivating experience in future editions. The students found this experience very challenging but at the same time, some of them were aware of their needs of English formation in addition to the technical knowledge. For them, it was very rewarding to obtain their first international merit through the participation in international conferences. On the other hand, for the teachers the updating of teaching tools as well as the problems of academic calendar were their main handicaps. Finally, the survey results showed a very positive impact of this experience.

REFERENCES:
USDA Soil Conservation Service, 1972. National Engineering Handbook, Section 4, Hydrology. US Government
Printing Office, Washington, DC, 544.

Echoes through Portuguese: teaching practices in Portuguese language curriculum development

A. Ferreira [(1)], I. Cabrita [(2)], A. I. Andrade[(2)]

[(1)] *CIDTFF, Department of Education, University of Aveiro.*

(+351) 234 372 431 | ferreira.a@ua.pt

[(2)] *CIDTFF, Department of Education, University of Aveiro.*

. Introduction - The restructured curriculum for the Timorese general secondary education (RGSE) introduced new teaching and learning approaches, tools and materials, such as students' manuals and teachers' guides, and also the Portuguese as language of instruction [1]. New curricular instruments and materials were developed through a cooperation project established between Timor-Leste and Portugal [1]. Besides, the implementation of RGSE was followed by in-service teacher training for secondary teachers focused on the new curricular materials and on Portuguese language of instruction [1] [2]. Regarding this scenario, an impact evaluation of the RGSE is being held by a research project, entitled "Evaluating the impact of restructuring secondary education in East Timor – a study in the context of international cooperation" [2]. Considering the new curriculum orientations [1], a new model of teaching is pursued, where students must be critical and participate in class by questioning or, for instance, developing group work followed by oral presentation. At the same time, it is important to emphasise the role of teachers in the development of the curriculum [3]. Within this framework, the present study aims to analyse the teaching practice of Portuguese language teachers concerning the use of new curricular materials, students' evaluation and new strategies introduced by the RGSE.

2. Method - Addressing the main objective, this qualitative case study mobilises data gathered mainly through inquiry by focus group with six Timorese teacher trainers, also teachers of Portuguese language. In addition, non-participant observation of Portuguese classes was conducted. Data from curricular documents was also retrieved for the purpose of this study.

3. Results and Discussion - Briefly, Portuguese language teachers seem to recognise value of the teaching strategies introduced by the RGSE but show some resistance to put them into practice, mostly because of the difficulties that they find in everyday class. In this respect, teachers tend to evoke: (i) the large number of students per class; (ii) the high level standards for Portuguese language in secondary education; and (iii) the lack of curricular materials, and grounded school leadership and infrastructures. Therefore, teachers keep delivering classes through oral exposition of contents followed by exercises resolution, copy and reading, mainly supported by students' manual or other materials. They also present some curricular and didactical flaws. When used, teachers' guide supports planning of classes. In addition, evaluation is mainly based on tests and exams, despite the fact that teachers believe they also evaluate students' behaviour, attendance and class participation.

4. Conclusions - Results helped us to analyse the teaching practice of Portuguese language teachers concerning the use of new curricular materials, students' evaluation and new strategies introduced by the RGSE. They allow us to primarily conclude that teachers start to mobilise curricular materials to plan and deliver classes, mainly to transmit the curricular contents, and keep using traditional evaluation strategies and instruments. Nevertheless, they still face some school organizational problems and curricular and didactical flaws. Despite some signs of change, more in-service teacher training might be carried out to help teachers to evolve from curriculum transmitters to curriculum developers [3].

5. References

[1] ME-RDTL, *Plano Curricular do Ensino Secundário Geral*, Díli, Ministério da Educação da República Democrática de Timor-Leste, 2011.

[2] I. Cabrita (Coord.), *Implementar a reestruturação curricular do ensino secundário geral em Timor-Leste: construindo qualidade*, Aveiro, UA Editora, 2015.

[3] S. F. Shawer, Classroom-level curriculum development: EFL teachers as curriculum-developers, curriculum-makers and curriculum-transmitters, *Teaching and Teacher Education*, **26**(2), (2010) p. 173.

Acknowledgements

Upgrading *CuadernoDeProblemas* to deal with fluid properties

J.F. Coronel [(1)], L. Pérez-Lombard, I.R. Maestre [(2)]

[(1)] *Escuela Superior de Ingeniería, Universidad de Sevilla, Camino de los Descubrimientos s/n, 41092 Sevilla, Spain.+34 – 954 487 251, jfc@us.es*

[(2)] *Escuela Politécnica de Algeciras, Universidad de Cádiz, Avda. Ramón Puyol s/n, 11202 Algeciras, Spain.*

1. Introduction – *CuadernoDeProblemas* is a free online solver for engineering problems that has been developed with the aim of improving Engineering learning [1]. It proposes a general methodology to address engineering problems wherever the Internet is available (*www.CuadernoDeProblemas.es*) and allows cloud storage making information exchange easier. Although equations solvers [2] make numerical solution easier, engineering problems are commonly governed by equations including thermo-physical properties of fluids (water, air, refrigerants, etc.). So, in common practice, engineers are obliged to search for these properties in the literature by the use of disperse tables or diagrams, commonly requiring additional interpolation efforts. This tedious task could be avoided, if equation solvers would implement a library of thermo-physical property functions for engineering calculations. In this context, *CuadernodeProblemas* has been upgraded to provide fluid properties for typical substances within the field of energy engineering.

2. Creating physical properties – The open-source thermo-physical property library *CoolProp* [3] has been implemented within *CuadernoDeProblemas* to allow fluid properties calculation for most of engineering fluids. Properties are easily created once *Fluid*, *symbol*, *property, units* and *given conditions* are specified, and are represented in green in the *Data/Unknown* window.

3. Using physical properties – Once created, properties can be used in any equation. A simple vapour compre-ssion refrigeration cycle for R22 has been solved to show how simple and powerful is the solver if applied to engineering education, both to obtain refrigerant properties and to solve equations.

4. Conclusions – The free solver *CuadernoDeProblemas* has been upgraded to provide fluid properties of most of engineering fluids. This

upgrade has been crucial for the application of the solver to energy engineering problems, where fluid properties must always be calculated. Additionally, the tool has significantly reduced the time to solve problems, thus allowing to address more complex problems closer to engineering practice. The upgraded tool has been successfully used by the authors to teach Heat Transfer, Refrigeration and Air Conditioning at the School of Engineering of the University of Seville.

5. References –

[1] Coronel, J.F., Pérez-Lombard, L. Maestre I.R. 2014 *Online solver for engineering problems: CuadernoDeProblemas.* Proceedings of the International Congress on Education, Innovation and Learning Technologies. Barcelona, July 2014.

[2] Klein, S.A., Alvarado, F.L. 2001. *EES-Engineering Equation Solver*. F-Chart Software, Wisconsin.

[3] Bell IH, Wronski J, Quoilin S, Lemort V. 2014. *Pure and pseudo-pure fluid thermophysical property evaluation and the opensource thermophysical property library CoolProp*. Industrial and Engineering Chemistry Research, 53(6), 2498-2508

Education for all: The case of Nigerian Deaf students

O. Abiodun-Ekus[1], V. Edwards[2]

[1] *University of Reading: Institute of Education.*

[+] *447407035961 & onye_grace@yahoo.com*

This study examines educational provisions for Deaf students. It identifies some policies: Nigeria Policy on Education (NPE) and Millennium development goals (MDG) that support the need for equal educational access and provisions for Nigerian citizens in which Deaf students are not excluded. It further determines the relationship between theory and practice in the education for Deaf students in Nigeria with a special focus on secondary school students in a selected state from among the 36 states in Nigeria. Specific objectives are on the educational models of delivery and some other basic educational needs for Deaf secondary school students in the selected state and its relatedness to the international world on educational development. Thus the school setting is the focus of this study and findings are based on a doctoral research with the qualitative study approach using focus group discussions, interviews and observation. Although, there are numerous gaps in the relationship of actualizing the existing policies in the observed state and other states in Nigeria, appropriate educational models of delivery for Deaf students are identified as a global dilemma. This research not only reveals the situation of the Deaf students, it also contributes to the study of special and general education, in Nigeria and Africa at large. Likewise, findings are not only researcher centred but also inclusive of Participants' voices. The study serves as a springboard for further research on the importance of education for the Deaf and the practicalities of attaining "Education for All" in Nigeria and other developing countries.

B-Learning technology in the theoretical and practical teaching of Plant Physiology

M.C. Rodríguez Hernández, I. Garmendia López, V.J. Mangas Martín

Environment and Earth Sciences Department. University of Alicante.
maricarmen.rodriguez@ua.es Tel.: +34 965903400 x 2419

1. Introduction

"Plant Physiology: Nutrition, Transport and Metabolism" is a fundamental and compulsory subject taught in the second year of the Degree in Biology at University of Alicante. Together with fulfilling their teaching duties, lecturers perform a very important task of reviewing the methodological strategies in order to improve student learning. This objective could been achieved by introducing information and communication technologies of last generation, which are essential to increase teaching quality. In addition, they have facilitated the modernization of traditional educational models [1] since the incorporation of universities to the European Higher Education Area (EHEA). However, while these new teaching and learning models that use web technologies provide many benefits above the traditional model, they also have their problems and criticisms [2].

The aim of this study was to evaluate the use of B-Learning (Blended teaching model or Blended Learning) methodology in one of the 16 topics of the subject "Plant Physiology: Nutrition, Transport and Metabolism" above mentioned. Therefore, the educational resource eXeLearning was applied to design teaching materials, and once taught, a questionnaire to students was developed to express their point of view of this methodology.

The results showed that almost all of the students had never used this methodology in their Degree studies. Nevertheless, almost half of the students indicated that this resource was much more practical than the traditional methodology, against a small percentage who said that it was not an appropriate methodology for the university. Furthermore, the main advantage found by the students was that the tool had "self-evaluation activities", "forums" and "complementary activities". Another important advantages were the real-time accessibility to the lecturers' teaching`s materials or being a more interactive methodology. On the other hand, the main drawback found was the lack of experience with the eXeLearning resource. However, most of the students did not feel difficult to visualize and study in this way. Moreover, this system could be very appropriate and useful for the teaching of the subject Plant Physiology, especially in the case of students who have to balance academic education with work or to reconcile with family life. Therefore, B-Learning methodology should be seriously taken into account in the planning and selection of educational resources in the university.

2. References

[1] B. Martín-Galán and D. Rodríguez-Mateos, *Revista Iberoamericana de Educación a Distancia*, **15**(1), (2012) p. 159-178.
[2] J.Y. Ahn and K.S. Han, *International Journal of Innovation and Learning*, **2**(3), (2005) p. 274-282.

Visibility of English Academic Studies at University Level

J. Pérez Arias [(1)] , M. González Guerrero [(1)] , L. Jordá Miró[(1)] , C. Diéguez Martínez[(1)] ,

L. Rey Navarro[(1)] , C. Batalla Rosado[(1)] , C. Chaya Romero[(1)] , C. Hontoria Fernández [(1)]

[(1)] *ETSI Agrónomos, Universidad Politécnica de Madrid. Avda. Complutense, s/n 28040 - Madrid.*

+34 913363266   juana.perez@upm.es

1. Introduction-The increased demand for English as the vehicular language in higher education is the result of the current global educational and economic market. Being able to proficiently communicate in English in the chosen professional career is a must for Spanish graduates in a context of high work mobility and internationalization. The emergence of bilingual secondary school English-programmes (most of them Spanish-English) in Spain have allowed that many students request English-taught higher education and this trend is expected to increase, in the near future. Moreover, English-taught Bachelor's Degree Master and Doctorate courses allow for the best students to attend Spanish universities regardless of their country of origin.

2. Experimental-Reduced visibility of the English academic offer diminishes the power of attraction that English-taught courses can exert in recruiting national and foreign students. The aim of this study is to analyse the Spanish Universities that offer programs in English in order to evaluate visibility strategies adopted by successful Universities,that could be implemented at the Universidad Politécnica de Madrid (UPM). Defining weaknesses in the UPM's approach and identifying strategic aspects that have almost not been addressed by competing institutions would result in a competitive advantage when recruiting the best students. Towards this goal, we studied how the English-taught education offer was provided by the institutional websites of 77 chosen Spanish Public and Private Universities, as well as a selection of 68 European Universities. The following aspects were considered: a) general website design and general University information, navigation ease; intuitiveness and attractiveness for students, message directed to prospective students; promotion of the University's core values and activities, (excellence, research, internationalization, sports, cultural activities, etc. b) specific aspects relative to English academic offer: Visibility of the offer; Enrolment instructions; English level credentials of students and professors.

3. Results and Discussion-The data show important differences among the evaluated universities. There was a poor effort on the web presence of the universities analyzed. Just 50% of European universities, and a similar percentage for the Spanish universities, had attractive web sites portraying relevant information for prospective students. The others, including UPM, diluted student-oriented information with institutional information. The visibility of English language courses was similarly poor in Spanish and foreign universities, being difficult to find the English offer in most cases. In general, most of the postgraduate courses in English language were visible, but Under-graduate or Bachelor showed poor visibility, exceptionally low at our host University (UPM). International projection of Spanish and foreign universities showed similar percentages. In most of the evaluated universities, there was a web site link to internationalization, nevertheless, the information was widely dispersed highlighting very diverse aspects (information about mobility programs, language courses, accommodation, etc.). Finally, information on the English level of students and teachers was quite difficult and sometimes impossible to find at analysed Universities. Very few Universities clearly indicate that students are requested to have between B1-B2 English level credentials and even fewer indicated a C1 level requirement for teachers.

4. Conclusions- These survey results provide useful information about successful strategies that will allow the improvement of University communication with present and future students to increase enrolment in these English programs.

Beyound borders: "New Energy" – a post-graduate course on Renewable energy and energy efficiency

R. Haas [1], A. Ajanovic [1]

[1] *Vienna University of Technology, Continuing Education Centre*

Phone: ++4315880137035, E-mail: haas@eeg.tuwien.ac.at

1. Introduction – Renewable energy and energy efficiency are cornerstones for paving the way to a sustainable energy future. At universities significant progress has been made in the last decade especially regarding the integration of renewables and energy efficiency technologies (e.g. passive house, plus-energy-Buildings) into the energy system. Yet, there is a series of shortcomings in spreading the corresponding knowledge and there is a tremendous lack of knowledge and a high demand for continuing education within the work force. Another shortcoming is regional cooperation in education and research

In this paper we present the concept of the "NewEnergy course" a post-graduate programme offered at Vienna University of Technology in Austria in cooperation with universities and research institutes in Eastern and South-Eastern European countries as Czech Republic, Hungary, Slovakia, Slovenia, Croatia, Poland, Ukraine, Romania, Bulgaria and Turkey. Another important aspect is the cooperation with the "Energiepark", a company focussing on the practical aspects of the use of renewable energy. The core target group of this course are people within the work force who want to switch towards a job in renewable energy.

2. Experimental approach- The course started in 2005 and in October 2015 the 11th class will start. During this period about 60 lecturers from universities, private project planners, city civil servants and utilities taught the students. Moreover during this time specific country modules in 10 Eastern European countries including Turkey were developed. An important accompanying activity was the foundation of a very active alumni network. For the cornerstones see Image 1.

Image 1. Structure of the course	Image 2. Example of an alumni newsletter

3. Results and Discussion - The major results are: (i) Within 10 years more than 200 students graduated; (ii) A strong network between alumni, actual students, members of the faculty and companies was build up including a specific alumni newsletter see Image 2; (iii) About 50% of the students who attended the course changed their job towards one in the field of renewable energy.

4. Conclusions - The major conclusion is that by offering a post-graduate course it is possible to create a comprehensive network of professionals and to distribute the idea of a sustainable energy system in a quite large geographical area.

Cinema, diversity and children education: knowing educational possibilities of movies screening in the classroom.

Ana Carolina Resende Leite, Marly de Jesus Silveira

SQSW 304 Bloco C Apartamento 115, 70673403, Brasília DF, Brazil.

55 61 81264276, carolresende31@gmail.com

This work was the result of a study on the potential of movies use in the classroom and contributions this resource could have in children learning, concerning some contents, especially on the building up or changes in thoughts related to ideas about human differences. It has been done a theoretical explanation that justifies and emphasises the need to include cinema as an educational resource supporting school practices in a conscious and related manner to curriculum contents. It has been demonstrated that it is essential the inclusion of knowledge related to cultural diversity and the understanding of human differences in children education, emphasizing ethnic and racial relationships. The work has been oriented toward methodological procedures such as day-to-day school life observation, questionnaire filling, and conversation. It has been developed a pedagogical intervention proposal through workshops with 5-year old children at a public school in Brasília, Brazil. The workshops had movies as the main educational tool in the introduction and illustration of African cultures. The daily observation and questionnaire filling presented to the school´s teachers allowed to perceive how they work with movies and with the diversity in the schoolroom. The movie was very well received by children, which revealed a positive impact in their learning process of the adopted issues.

How to make Digital Signal Processing attractive for Computer Engineering students. The UPC case.

Antoni Grau and Yolanda Bolea

Automatic Control Dept, Technical Univ of Catalonia, Barcelona
antoni.grau@upc.edu

Digital Signal Processing (DSP) is a commonly subject given in many Computer Engineering degrees and the Technical University of Catalonia (UPC) is not an exception, and after many years of experience there are two main features when the subject is presented to students: first, the course is taught as masterclasses in a classical fashion with a lack of innovative pedagogical strategies, and second, in all the cases (except rarely situations) the laboratory practices are based on software simulations. Both factors make DSP a non-prominent subject in such degrees.

In our particular case at UPC, we propose to overcome both problems by the use of problem-based learning (PBL) in the course which the implementation will be largely explained in the final paper, and by the use of a real hardware platform based on a professional digital signal processor from Texas Instruments. We reject the use of small digital signal processor (dsPIC for instance) due to the big gap between real applications and those that can be solved with such a digital signal processor.

In the final paper authors will explain the pedagogical progress and the satisfaction of students with the new improvements in the subject.

Humanoid Robotics in Industrial Robotics Subjects

Antoni Grau and Yolanda Bolea

Automatic Control Dept, Technical Univ of Catalonia, Barcelona
antoni.grau@upc.edu

In most of the Industrial Engineering Schools, Robotics are taught at a basic level, and only advanced themes can be learnt at Master or Doctoral level. This fact makes that at engineering level, students are focused to industrial robotics (manipulators, mechanical actuators, industrial robots…) and their associated theory (direct and invers kinematics and control). Such syllabus demonstrate that students, after the end of the Industrial Robotics subject, do not have acquired any abstraction nor a way to generalized the skills taught during the course, producing a bad integration of these engineers in any industrial production process and its automation.

In order students achieve a more open mind in Robotics and an easy integration with real processes authors propose the use of humanoid robots during the practices of such a subject. Those robots present a more complex structure, with more degrees of freedom than a regular industrial robot, and with other features that are not present in real industrial robots. Instead of this fact represents a problem, humanoid robots are seen by students as a toy, and their interest increases largely; at the same time instructors can explain all the theoretical aspects present in industrial robots and students are open to changes, extensions and modification in the robot structure as well as the use of new sensors than are not regularly used at the industry.

In the final paper, authors will demonstrate how the use of humanoid robots in a regular subject of Industrial Robots improves the interest of students and prepares their mind to new real problems. The implantation of such new practices is very welcome for both students and instructors.

Working Group Technique: "Feedback Method"

M. Ortega Ortega [1], R. del Pozo Rubio [2]

(1) Department of Applied Economics. School of Economics and Business. Campus de la Cartuja s/n.18101. University of Granada
0034 958244261, mortega2@ugr.es

(2) Department of Economics and Finance. School of Social Science. Avda. de los Alfares, nº44. 16002. Cuenca. University of Castilla-La Mancha

1. Introduction –During the last years the European Higher Education Area (EHEA) has changed the conception of university teaching leading to a set of new teaching techniques necessary to achieve the convergence with Europe. These techniques are focused at getting the student the main subject of their own learning. In this sense, EHEA highlights the relevance of working groups where the cooperation between students is very important. The ECTS methodology promotes and recommends the use of small groups (seminars) and personalizes the lectures using different tools than the traditional ones. However, the higher number of students in the most of the Spanish lectures in comparison with the rest of Europe makes it much more difficult for the teacher to follow individualized learning and help the student. Therefore, the impact on the student learning can be negative. Our objective is firstly, to propose a new strategy of cooperative learning for being used in practical lectures with many students; and secondly, to facilitate learning and encourage student interest on the subject.

2. Experimental – The role of the teacher is to coordinate, control and manage the different groups. She/he will divide the classroom in 5-8 groups composed by 5-8 members. The groups and members of each group are randomized. Firstly, each group should solve the exercises proposed by the professor. Once finished, the teacher will change again the groups and members (see Figure 1). Secondly, the new groups should solve again the same exercises using the results/discussions obtained from the first group. Therefore, everybody should do the exercises twice. We called it "Feedback Method" and we compared its learning results with the one of the traditional working group method (each group of student solve the exercises during the classroom) in 139 students of Business and Management Degree at the University of Castilla-La Mancha.
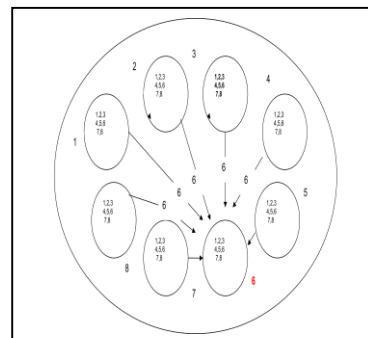
Figure 1: Feedback Method

3. Results and Discussion – Feedback Method promoted the active participation of students, developed interpersonal communication skills and personal self-learning through solving problems to colleagues. Statistically significant differences were observed between the two methodologies qualifications as both the continuous assessment and the final exam. The average score on the continuous assessment associated to the Feedback Method exercises was 8.59 ($\pm$2.36) vs. 6.02 ($\pm$2.70) over 10 points associated to the traditional methodology exercises. The average score on the final exam of the subject using the Feedback Method was 6.13 ($\pm$ 2.96) vs. 4.45 ($\pm$ 2.51) related to the traditional methodology.

4. Conclusions – 95% of the students expressed their preference for Feedback Method during the lectures as part of their learning process. Therefore, this method not only helps to a better understanding of the subject and gets higher marks but also promote cooperation between students and improve communication skills.

Education for all: Reflections on the development of STEM at Bradford

Dr Nazira Karodia [1] Janet Smith-Harrison [2]

[1] University of Bradford, Tel: 01274 232231, n.karodia@bradford.ac.uk
[2] University of Bradford, Tel: 01274 232218, j.smith-harrison@bradford.ac.uk

Introduction

The University of Bradford has led on significant externally funded STEM projects, including the North East Spoke of the National HE STEM Programme (2009 –12), Building STEM at Bradford (2010 –13) and Greening STEM (2011 –12). These projects are part of the National STEM agenda around protecting "Strategically Important and Vulnerable subjects"- a series of initiatives "geared towards creating a strong supply of scientists, engineers and technologists" (QCA, 2007). To achieve a sustained and effective programme the project designed and built an exciting and innovative STEM laboratory and learning resource suite on the University campus for use by schools and colleges. The iconic and innovative space delivers a school led programme of curriculum enhancement and enrichment activities. The aim was to increase school STEM attainment to secure a higher level of participation in undergraduate STEM based courses and to protect those subjects most at risk. University of Bradford, through its STEM Programme, is directly supporting these government priorities by partnering with schools and colleges to develop a pipeline of potential STEM employees and undergraduates with the skills, knowledge, qualifications and confidence to succeed on their chosen STEM pathway. This paper will explore some of our reflections on a collaborative approach to building a Science, Technology, Engineering and Maths (STEM) outreach laboratory and a an academic programme at the University.

Method

To understand the pedagogies to be addressed, Building STEM at Bradford engaged over 4000 pupils from 70 schools (26 of which were Bradford Secondary schools) with a programme of over 150 activities and events as well as working with 80 teachers on 20 CPD sessions. An action research approach gave intelligence to ensure the building and the programme met the curriculum needs of the STEM education pipeline. Working in partnerships with schools in the Bradford district, HE colleagues, the local authority, professional bodies and regional and national STEM partners, STEM education specialists and school students , the project oversaw the design and construction of the University's STEM Centre, development of an attainment and aspiration raising STEM programme to be delivered through it alongside a STEM Ambassador and higher education development programme

Results, discussion and conclusions

We will present our findings from qualitative research studies of the STEM outreach programme which demonstrate:

- Across the University recruitment to STEM based courses has steadily grown. The picture is an increasingly good one showing steady growth both in entrants by FTE and % of the University population. In particular, 2013/14 has seen significant growth in the number of entrants to STEM courses.
- The project reported high value of undergraduate and postgraduate STEM Ambassador activity in terms of employability and student experience.
- High interest across departments for input to mathematics elements of HE course content.
- The Greening Chemical Engineering labs project highlighted the ease of transferring learning from one discipline to another. This "adopter" model provides a framework for making a step change in curriculum development.

References

Bradford STEM Centre, N. Karodia, J. Smith-Harrison and L. Comerford Boyes, In: Gibbins, Lynda and Perkins, Glynis eds. *Laboratories for the 21st Century in STEM Higher Education: A Compendium of Current UK Practice and an Insight into Future Directions for Laboratory-Based Teaching and Learning.* Loughborough: Centre for Engineering and Design Education, Loughborough University, pp. 39–42

Exploring Linear Algebra topics

P. Semião [(1)]

[(1)] *Departamento de Matemática, Faculdade de Ciências e Tecnologia,*

Universidade do Algarve, Campus de Gambelas, 8005-139 Faro, Portugal

(+351) 289800000 – psemiao@ualg.pt

1. Introduction – The most important applications of mathematics to other areas of science, naturally involve what is known as linear methods or, another way of saying, concepts related with Linear Algebra. The applications are immense and in mathematics itself, just to give an example, the operations of differentiation and integration which are used transversally in any engineering course are also linear. In order to introduce concepts related with vector spaces and linear transformations and with the aim of a paper-based assessment of the knowledge of the students in subjects like, matrix of a linear transformation, rank of a matrix, and the evaluation of determinants of matrices, the author designed and developed an applet that has been used in his lectures of Linear Algebra (see also [1-2]).

The need to implement this interactive tool is motivated by the difficulties that occur in many engineering courses about the perception and understanding of abstract concepts that are present in subjects of this teaching unit. We are also concerned with the students' assessment that constitute a very important part of the educational process, not even for the measurements of results but also for an internal process of checking what is wrong or right and, at the end, get useful information to both students and teachers.

2. Experimental – Each academic year at Universidade do Algarve is divided into two teaching periods (known as semesters), each one of approximately 15 weeks. The study was conducted during the academic years 2011/2012 – 2012/2013 and involved 208 students of the first year courses, mainly for engineer courses. Most of the students have less than twenty years old and in terms of gender 133 (64%) were male and 75 (36%) were female, with a percentage of more than half of men than women, which is typical in engineer courses.

3. Results and Discussion – In terms of statistical results, the most significant item is the increasing of the mean score. In a scale of 20 points for tests and exams their initial value was 7.76 and the final mean score was 10.25, which corresponds to approximately 31% difference in total performance. At first sight, this is a good result and clearly reveals some progress. Several mathematical models were tested in order to get the best fitting (as shown in Fig. 1), and the goodness-of-fit tests confirmed that based on the Cramér-von Mises test, the null hypothesis that the data is distributed according to the Gamma(3.38,1.85) distribution is not rejected at the 5% level of significance.
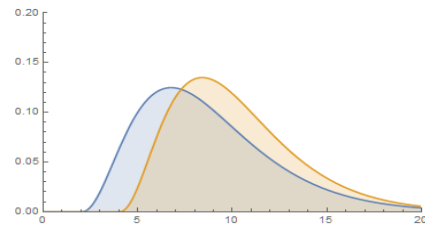
Figure 1: Comparison between the two distributions.

4. Conclusions – The study demonstrate that there is a more pre-disposition of the students to learn some topic in mathematics when in the classroom teacher combines a mixture of traditional methods of pen-paper with computer applications, which are effectively related with the subject that is taught, otherwise careful is needed since this could be a way of distraction. Another great advantage is that the student can interactively follow the resolution process of problems that are in the exercises book of the teacher, which is put at their disposal before the teaching period starts. The study also reveals that there is in general a significant difference in students' performance, with or without the use, of the applet and taking activities related with it.

5. References

[1] Kaltofen E., (1997). *"Teaching Computational Abstract Algebra"*. *J. Symbolic Comput.*, **23** (5-6), 1997, pp. 503–515.

[2] Semião, P., (2012). "*A dynamic applet for matrix operations"*. In Proceedings of the *International Mathematica Symposium (IMS 2012)*, Univ. College London, London, UK, 2012.

[3] Dimiceli V., Lang A., Locke L., (2010). "Teaching calculus with Wolfram|Alpha", Int. J. Math. Educ. Sci. Technol., **41** (8), 2010, pp. 1061–1071.

Geometric figures generated by the intersection of surfaces

P. Semião [(1)]

[(1)] *Departamento de Matemática, Faculdade de Ciências e Tecnologia,*

Universidade do Algarve, Campus de Gambelas, 8005-139 Faro, Portugal

(+351) 289800000 – psemiao@ualg.pt

1. Introduction – An important way to understand and study some geometric object is to analyse its intersection with other curves or planes. This analysis leads us to the idea that the intersection of a plane and an algebraic surface of order 2 can generate an algebraic curve of order 2 in the plane (as illustrated by Fig. 1). In this paper we present these geometric concepts and an interactive tool which was designed and developed by the author. We also report on a project aimed to explore the use of dynamic models (see [1]) in geometry to provide new ways to explore and visualise these concepts at a first year university level.

Figure 2: Intersection of a double cone and a plane.

2. Experimental - In the Departamento de Matemática of the Faculdade de Ciências e Tecnologia in which this research project was carried out, the first year for the students of engineer courses is known to be particular difficult and the rate of failure is high, namely in teaching units like Mathematical Analysis or Linear Algebra. One of the main reasons for the creation of these kind of technologies was to improve the succeed rates of the students in the first year, since they are very low. Another reason was to develop and assess dynamic models in subjects of geometry in order to create the ability to visualise and manipulate 3D geometric objects in a dynamical way. The teacher taught from a mixture of classical textbooks and their own notes, which were freely given to the students in the form of lecture notes and a problem book. The engineer courses have a duration of fifteen weeks with two tests during this period of time and two exams in the next four weeks.

3. Results and Discussion – One important point to consider is the fact that there is always a difficult balance between the creation of geometric dynamic models and the awareness of the student for the geometric concepts that were behind, since this should be tools of learning and discovery, but not of alienation. The research we report here is in an early stage, nevertheless, there is a substantial amount of data. The total number of students (n=213) involved in the project, 140 (66%) were male and 73 (34%) were female. Given the highly positive skewed nature from the distribution of scores, the median (8.8) and mean (9.6) are the best measures of central tendency.

4. Conclusions – The applet that was developed and the use of ICT's proved that they can greatly improve the knowledge and skills of the students in subjects like geometry (see [2-3]). One of the main aims of this project was to improve the knowledge and the scores of the students in order to get results that should be substantially better than the ones obtained in previous years. This was achieved since the success rates increased by twenty-five percent relatively to previous years, and the study also revealed that there are some other things need to be improved.

5. References

[1] Arzarello, F., Ferrara, F., Robutti, O., (2012). "Mathematical Modelling with Technology: The Role of Dynamic Representations", Teaching Mathematics and its Applications, 31 (1), pp. 20-30, 2012.

[2] Semião, P., Rodríguez J., and Manuel P., (2006). "A Conic Associated with Euler Lines". Forum Geometricorum, Vol. 6 (2006), pp. 17-23.

[3] Semião, P. and Rodrigues A., (2012). "*An Educational Tool to Explore Conics*". In Proceedings of the *International Mathematica Symposium (IMS 2012)*, Univ. College London, London, UK, 2012.

Diversifying assessments methods to engage students with their learning process in laboratory subjects in Mechanical Engineering

S. De la Flor [(1)], A. Fabregat-Sanjuan

[(1)] *Department of Mechanical Engineering. ETSEQ. Universitat Rovira i Virgili*

Av. Països Catalans 26, 43007, Tarragona (Spain)

silvia.delaflor@urv.net, +34977558839

1. Introduction – The Degree in Mechanical Engineering (DEM) at Rovira i Virgili University uses unique teaching methods that bolster the students' aptitudes and abilities, applying advanced experimental and practical teaching techniques. The experimental techniques are used for a number of practical subjects (laboratory subjects) that dovetail with the corresponding theoretical subjects but which have their own assessment, management and organizational structures.

The laboratory subject analysed in this paper is Laboratory of Elasticity and Strength of Materials, taught in the second semester of the second year of the DEM. Students complete 60 face-to-face teaching hours in one semester, to acquire a practical understanding of the main concepts of materials strength as applied to engineering systems. The main learning outcomes of this subject are, broadly, the ability to apply experimentally the fundamentals of elasticity and strength of materials (derived from a specific competence), the capability to apply engineering knowledge to practice (also derived from a transversal competence) and the ability to produce correct oral communication (structured, clear and appropriate to the communicative situation) (derived from a core competence). **The assessment system** for this subject focuses on both the content and the acquisition of these competences. One of the evaluation techniques used in this system is the oral exam, during which the student gives a five-minute presentation on one of the practical sessions, chosen at random, and then answers questions from the teaching staff for another five minutes. From our experience of teaching this subject, we have detected certain problems that impede or delay the acquisition of the learning outcomes, as well as significantly reducing the rate of success and increasing the dropout rate [1, 2]. In addition, a systematic decline in student satisfaction is detected each academic year. In order to reverse this trend we intend to drastically change the teaching and learning methodology used for our laboratory subject, adapting it to a more interactive system by introducing a blended-learning strategy based on the use of different teaching tools that combine face-to-face methods with e-learning technologies. The tools developed and implemented in our project are also aimed at improving autonomous learning before and after each practical session [3]. Some of the most important of these tools that are explained in present paper are a set of **self-assessment activities**.

2. Experimental - To achieve this more interactive teaching system we have introduced different **self-assessment methods**. These are a group of online activities to be done before (called "are you ready?") and after (what have you learnt?) each practical session and that are very similar to the final exam. All these activities have been implemented in the Moodle of the subject.

3. Results and Discussion – In present academic year, through an anonymous survey, students were consulted about their overall satisfaction using these strategies. From these results we can highlight positive appraisal of the interestingness and usefulness of these activities.

4. Conclusions – Different assessments strategies have been implemented in a Laboratory subject in DEM, in order to improve learning outcomes in Mechanical Engineering. The results of an anonymous student satisfaction survey show that these improvements have been very well received; students consider that the new techniques are very useful both for better understanding the subject and for preparing for the oral exam.

5. References

[1] J.E. Fernández Rico, S. Fernández Fernández, A. Álvarez Suárez, *RELIEVE.,* **13**(2), (2007) p. 203.

[2] E. Galán Delgado, P. Cabrera Guillén, *Revista Electrónica Interuniversitaria de Formación del Profesorado*, 5(3), (2002).

[3] S. De la Flor, F. Ferrando, A. Fabregat, *International Congress on Education, Innovation and Learning Technologies*, ICEILT 2014. Barcelona, July 2014.

Improvement of the learning process of manufacturing technologies laboratory subject using a blended-learning strategy

A. Fabregat-Sanjuan [(1)], F. Ferrando, S. De la Flor

[(1)] *Department of Mechanical Engineering, Universitat Rovira i Virgili*

Av. Països Catalans 26, 43007, Tarragona (Spain)

a.fabregat@urv.cat, +34977559660

1. Introduction – This paper deals about the improvement of the learning process on a laboratory subject from the Degree in Mechanical Engineering (DEM) of the Universitat Rovira i Virgili. The subject studied is the Laboratory of Manufacturing Technologies taught in the first semester of the third year of the DEM. An innovative teaching system has been introduced in the Laboratory with a number of interactive tools that enhances and improves learning outcomes. The need to implement this interactive tool is also motivated by the difficulties of perception that occur in many engineering fields such as the manufacturing technologies. These complications are related to the difficulty of exemplification of engineering problems on a blackboard. For this reason, the effect of this video-clips and self-assessment guided exercises is considered to be very advantageous to the students. Furthermore, an important factor that is positively valued with the implementation of the self-assessment exercises is that students show a greater participation in the tasks assigned by means of computer tools than the same tasks assigned manually. Another advantage and an element of motivation for students is that in each exercise they get feedback from the application, which reports if you have done well or badly.

2. Experimental – To achieve this more interactive teaching system we have introduced a number of interactive tools that enhances learning: video-clips with detailed instructions of the development of each practical session and self-assessment methods via educational moodle platform to be done before and after each practical session. An example of the experimental techniques can be seen in figure 1 and 2.
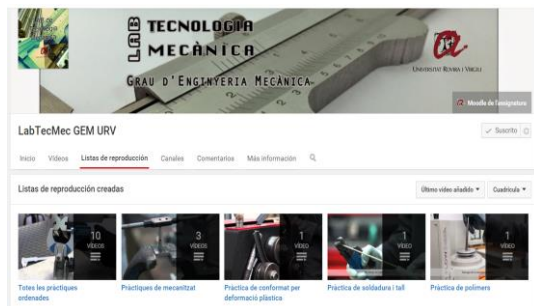
Figure 1. Youtube subject page with the videos from each

Figure 2. Educational platform (moodle) with an example of the self-assessment exercises to do.

3. Results and Discussion – In this study we analyze the results of the process of autonomous learning with the implementation of new learning strategies. For this reason, results of participation rates, successful task rates and results of students' satisfaction are analyzed. The results show that a high number of students perform the task and the majority of the students complete the task successfully. These positive results are due to the self-assessment process, because it allows students to know at any time what their level of knowledge is. Therefore, they can repeat the exercise in order to improve the mark before the final assessment. Video of each laboratory session also help students to remember the more important part of each session. At the same time videos can be reproduced as many times as students needs so the learning process is adapted to each student.

4. Conclusions – The improvement of the learning process of manufacturing technologies laboratory subject using a blended-learning strategy of the learning computer application MecMovies has led to a noticeable improvement in the quality of teaching and learning of strength of materials.

The Challenge to Teach Hydrogen Energy in Engineering. A Proposal of a Computer Simulation Tool.

M. J. Redondo, A. J. Barragán Piña, J. M. Andújar , F. Segura[1]

Research Group TEP-192

Department of Electronic, Computer Science and Automatic Engineering, University of Huelva,

Crta. Huelva-Palos de la Frontera s/n, 21819 Palos de la Frontera, Spain

[1] *Corresponding author, phone: (0034) 959 21 73 85 E-mail:* francisca.segura@diesia.uhu.es

1. Introduction – One thing in which society, scientific community and industry agree is the issue surrounding the need for cleaner and renewable energy. In this sense the hydrogen plays an essential role in providing a vital source of clean energy for the future. Moreover, the challenge to take awareness is through schools; people who will be tomorrow society are today in classrooms. Particularly, in Energy Engineering Degree one of specific competences is related to hydrogen technology. But it is not easy to find teaching resources related with hydrogen technology for undergraduate engineering students focused on promoting student learning. The aim of this work is to contribute for the development, testing, distribution, and promotion curriculum and laboratory equipment for teaching to engineering students about hydrogen technology through hands-on laboratory activities. This work aims to go away from those teaching tools reduced to a set of instructions that the students have to follow mechanically [1,2], without establishing conscious connections between the action and the knowledge in development.

Therefore, there is the challenge to design and implement a classroom mediation that integrates experimental work as it permits spaces of liberty, creativity and motivation of students based on problem solving related with everyday life.

2. Experimental - This work proposes a free simulation tool based on a virtual laboratory for the hydrogen production from water electrolysis. For this purposes, a commercial electrolyzer has been studied so the simulation tool's user will be working with a system whose performance responds to a real system.

The hydrogen production process is made up by three stages: water electrolysis, high pressure hydrogen production and hydrogen purification, see Image 1.

The whole process can be understood by the user and even the warning or failures which can happen in the real system are also included. Then the simulation tool can be used like training tool in the learning process.
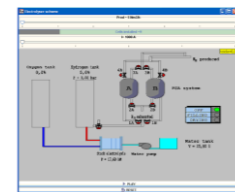
Image 1. General view of the simulation tool based on water electrolysis

3. Results and Discussion – The simulation tool has been used by 3rd year students form Energy Engineering Degree at School of Engineering from the University of Huelva (Spain). After that, it has been evaluated by students and course's teachers through a questionnaire rated on a 5-point Likert scale (1—strongly disagree and 5—strongly agree). Table I shows valuation done by students. It's worth noting the Hydrogen Production Virtual Lab has had a good acceptation from students, which will be considered the most critical users of the tool.

Table I. Evaluation Questionnaire of the Hydrogen Production Virtual Lab.

Question	Description	Students	
		Mean	Deviation
1	The application is easy to use and feasible at the university	3.80	1.28
2	The application allows learning new concepts	4.00	0.80
3	The application is useful to learn how electrolyzers work	4.25	1.10
4	After working with application, you could design an easy hydrogen system	3.20	1.60
5	The overall assessment of the application is positive	4.00	0.50

4. Conclusions - This work proposes a free simulation tool based on a virtual laboratory for the hydrogen production from water electrolysis. The acceptation between users can be proved and authors could assert this proposed learning-teaching tool can be used as resource to complete the curricula defined un Energy Engineering Degree where one of specific competences is related to hydrogen technology.

5. References

[1] Iowa State University Electrolysis Simulation (accessed on April 2015).:

http://group.chem.iastate.edu/Greenbowe/sections/projectfolder/flashfiles/electroChem/electrolysis10.html

[2] University of Cambridge Electrolysis Simulation (accessed on April 2015:

Teaching in Engineering High Schools

F. Segura[1], M. J. Redondo, A. J. Barragán Piña, J. M. Andújar

Research Group TEP-192

Department of Electronic, Computer Science and Automatic Engineering, University of Huelva,

Crta. Huelva-Palos de la Frontera s/n, 21819 Palos de la Frontera, Spain

[1] *Corresponding author, phone: (0034) 959 21 73 85 E-mail: francisca.segura@diesia.uhu.es*

1. Introduction – The structure of activities to teach engineering differs from those for the rest of university degrees. Indeed Engineering Education is typically accompanied by additional examinations and supervised training as the requirements for a professional engineering license. Teaching of their subjects needs to include as essential activities: theoretical development, problems solving and laboratory practices. Traditionally, the face-to-face sessions referred in their teaching organization plans are: the master class and laboratory practice. With new degrees in engineering accounted with ECTS (European Credit Transfer and Accumulation System) other activities can be envisaged for example studies works related with any issue which corresponds with the matter - *inverted teaching* that complements and completes the training of the future engineer. The number of these complementary activities should be that doesn't deteriorate those which have always been considered essentials; the teacher must to decide properly these complementary activities carried out, the number of students for each groups which develop them, and adjusts correctly the time devoted to each activity.

Nowadays there are a lot of technical resources (electronic whiteboard, projector, computers with Internet access, ...) which in case they are used properly, can greatly help both the teacher and the student. The use of these technical resources should not involve forgetting the use of those which traditionally have been used: "not everything new is good and using something new does not necessarily mean forgetting the old or classic."

This paper presents a methodology of teaching degree courses in engineering which makes use of new technologies without forgetting the classic resources. The developed material, useful for both the teacher and the student, is described (Images 1 and 2), and this will be specified for two courses in different engineering degrees, particularly in Computer Engineering Degree and Energy Engineering Degree. The structure shown can be understood an example in other engineering degrees.to be applied in several matters, both the methodology and the developed material.

Image 1. Example of teaching-learning material developed for theoretical class

Image 2. Example of teaching-learning material developed

2. Conclusions - Teaching in engineering degrees demands a structure which can be common for all matters, and this is generally different from those of the other university degrees.

In this paper there is proposed a possible structure and resources employed for teaching a matter in engineering degree, considering the available technology and without a huge revolution in the teaching methodology, so this proposal could be applied by any teacher at this classroom. It is necessary to take into account existing technological resources but there is no reason to forget the resources which have demonstrated their usefulness and efficiency throughout history, no matter how primitive they seem.

The proposed methodology combines the use of a primitive resource as the black board with resources relatively news as the electronic whiteboard, projector and Internet connection with corresponding hardware resources.

In the proposed methodology it shouldn't be missed the contact of student with the didactic real processes in laboratory practices; this contact is considered absolutely essential in the teaching of subjects linked to engineering degrees.

Providing tools that promote change in multilingual environments for future teachers: a case study.

Rodriguez-Miñambres, Paloma

University of the Basque Country

paloma.rodriguez@ehu.eus

The implementation of the degrees in Spanish universities has brought a change in teaching methodologies, as the aim is for students to be well prepared and to be good professionals able to face the challenges of a global world. This requires an innovative pedagogical approach to meet the diverse educational needs and to critically reconstruct the meaning of education.

This paper summarizes the efforts we have made at the Teacher Training Degree at the University of the Basque Country to bring multilingual situations that may occur in the Primary classroom for future teachers and provides an example of how to work realistically the subject of language teaching in multilingual contexts, combining languages teaching didactics with the approach of the Information and Communication Technologies through a case study.

For that case study, university students had to prepare a plan of linguistic intervention in a Primary classroom, taking into account the particularities of the case: a school located in Vitoria, educational model B (Basque language and Spanish language, bilingual model), where there are children from different social and cultural backgrounds, and have different capabilities, rhythms and styles of learning.

The objectives are:

-to know the curriculum of language and literacy in Primary, as well as theories on acquisition and development of relevant learning.

-to acquire knowledge, skills and attitudes to meet the diversity in that school.

-to design a plan of linguistic and educational intervention that takes into consideration the current inclusion criteria.

-to develop learning materials, activities and strategies focused on inclusive and multilingual diversity at school.

As far as results are concerned, students worked in groups of 4 people (to promote cooperative learning) to do two tasks: 1) they had to submit a written report that collected the didactic approach to that case; 2) they had to use new technologies by creating a GoogleSites and by making pa prezi to reflect, as if they were true professionals, the material found on the Internet, how they had adapted it and new material they had designed.

As for the conclusions, students believe that study case has been very realistic and useful to understand the complexity of multilingual settings in the primary classroom ant they also highlight the oral presentations to learn cooperatively (see what other colleagues did).

Global model for increasing skills and performance of an education system

N. Messaoudi [1], J.Khalid Naciri [2], B.Bensassi[3]

[1][2][3] *Faculty Of Sciences – University Hassan II Casablanca MAROC*

[1] *Phone Number: +212-614-000453 e-mail: najatm@univcasa.ma*

1. Introduction –

The modeling of education systems built on business models is an approach that allows the analysis of education systems from different points of view and allows to consider the control and simulation of these systems for decision support or computerization.

In the first part of this work, we propose an approach coupling the economic and educational aspects based on the definition of a meta - model suitable for training systems that incorporates both the flow simulation methods used by international organizations to simulate the educational systems [1] as well as engineering methods for the characterization of skill production systems[2]. The meta-model adopted in this work is based on the processor concept introduced by Kromm [3] which is coupled to a differential equation for the mathematical modeling of the growth of skills[4]. The purpose of this communication is to present the results of the first applications of this model

Image 1. Meta-model generic processor

to a global system of education and to highlight the potential of the developed model for measuring the performance of an education system.

2. Results and Discussion –

Based on the meta-model generic processor, a learning activity consists of a series of training sessions aimed to transform inputs Ei with input skills Ci in outputs Si having acquired skills C'i.

for this purpose, resources are mobilized to achieve the transformation according to data from realization

and in the framework of rules of conduct.To define transformations that the generic processor performs, we propose its coupling with a mathematical model that will allow to calculate the increase in skills, depending on resources and driving data. the results of this model provides access to the determination of the performance of the considered training unit and the identification of optimal rules of its operation.
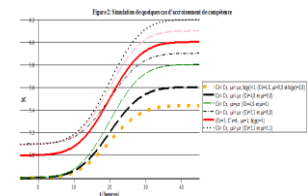
Image 2. Simulation de quelques cas d'accroissement de compétence

it should be noted that the generic processor for each training unit can take into account the reference input competence of the training unit, the input competence deficit of the student, the personal ability of the student's acquisition of skills, the number of hours of training, and group size. A global model with 18 processors coupled in a parallel and series circuit is used to simulate an educational system consisting of 6 semesters of teaching with three units each one. In the simulation, we introduced a defined number of students by semester and it was assigned to each student a personal capacity for skills per module and entry skills.

3- Conclusions –

First results allow us to verify the behavior of our model and ensure its validity for the simulation of larger education systems while taking into account both the skills acquired by each student individually and the overall performance of the system in relation with educational and financial aspects.

4. References

[1] UNESCO, "Education, Policy & Strategy : Simulation Model EPSSim Version 2.1", 2005.

[2] P. Rożewski, "Preliminaries for Dynamic Competence Management System building", Proceedings of the 2013 Federated Conference on Computer Science and Information Systems pp. 1279–1285, 2013.

[3] H. Kromm, "Contribution à une méthodologie d'analyse de la cohérence entre les objectifs de conception et d'exploitation d'un système de production", Thèse de doctorat, Université Bordeaux 1, France, 2002.

[4] N. Messaoudi, J.Khalid Naciri, B.Bensassi, " Accroissement des compétences et performances d'une unité de formation par un méta modèle de processeur", Revue scientifique internationale Management et Ingénierie des systèmes, 2014.

Motivating in the university classroom

[1] M. Alexandre Franco, [1] C. Fernández González, [1] E. M. Cuerda Correa, [2] A. Macías García, [1] V. Gómez Serrano.

malexandre@unex.es

[1] *Department of Organic and Inorganic Chemistry, University of Extremadura, Badajoz, Spain*

[2] *Dpt. Ingeniería Mecánica, Energética y de los Materiales, University of Extremadura, Badajoz, Spain*

1. Introduction – According to the spirit of the new European Higher Education Area the student has happened to have a leading role in his or her learning process. This is becoming one of the most complicated tasks, given the lack of interest that, unfortunately, students often show towards lectures. The low motivation apparently shown by the students has been identified as one of the main causes of academic failure, together with the difficulty of the subject for the student, and the assessment method used. In this paper the contribution of the evaluation process to improve student motivation has been analyzed and proved to be crucial for learning.

Evaluation should be an ongoing process in the teaching-learning process and should not be simply limited to the final results. It is therefore necessary to include evaluation methods that take into consideration both classroom and non-classroom work, hence giving a lesser weight to the final exam. Although it is difficult to compel a student to follow continuous assessment the lecturer can incentivize the student to choose freely and get actively involved in his or her assessment process.

2. Experimental - The proposed methodology is based on the students' opinions as well as on the own experience of the lecturers that suggests that one of the best solutions to poor academic performance is continuous assessment and continuous teaching feedback [1].

Accordingly, the following guidelines have been followed: 1) Literature search of the contents of the subject. 2) Design of the evaluation method to be followed, which should allow an improvement of the teaching and learning of students.

Thus, different types of assessment activities, such as conducting a wiki, interventions in a workshop, making issues, presentations, class debates, etc have been evaluated. All these activities were performed with the aim of promoting the particular skills of each student. When designing the evaluation method, the level of competence of students at the beginning of the course and the skills acquired throughout the course were taken into account. Thus, a wide variety of instruments as those referred to before have been used for the evaluation of the results obtained by the students.

3. Results and Discussion –
The results of the assessment indicate that students show a high degree of satisfaction with the different activities related to ongoing evaluation. On the other hand, the range of tests is focused on the evaluation of the acquisition of different skills[2].

4. Conclusions - Students agreed that continuous assessment is a method that enhances and motivates their involvement with the subject, improving the final results obtained and making it possible to perform the necessary tasks to pass the subject.

5. References
[1] Hernández-Pina, F., Maquilón-Sánchez, J.J. García-Sanz, M.P. y Monroy-Hernández, F. (2010). Concepciones de la enseñanza y el aprendizaje en profesorado de Educación Superior. Psicología Educativa, 16 (2), 5-12.
[2] Villardón Gallego L, (2006). Evaluación del aprendizaje para promover el desarrollo de competencias. Educatio siglo XXI, 24, 57-76.

Improving the acquisition of skills by undergraduate students through the Final Degree Project (FDP)

(1) M. Alexandre Franco, (1) C. Fernández González, (1) E. M. Cuerda Correa, (2) A. Macías García, (1) V. Gómez Serrano.

malexandre@unex.es

(1) *Department of Organic and Inorganic Chemistry, University of Extremadura, Badajoz, Spain*
(2) *Dpt. Ingeniería Mecánica, Energética y de los Materiales, University of Extremadura, Badajoz, Spain*

1. Introduction – There are many voices that claim that upper course undergraduate students of different disciplines, even when they begin to elaborate their Final Degree Project (FDP), have not acquired along their prior studies a wide variety of skills that they will be sued by both public and private companies. Among these skills academic (e.g., theoretical and practical training), instrumental (management, languages, computer ...), interpersonal (oral and written expression, leadership, teamwork ability) and cognitive (decision making, critical thinking, everyday reasoning, creativity) skills are to be mentioned. Whit the aim of making it easier to acquire these skills, an alternative development methodology for the FDP is proposed in this work. Such a methodology should facilitate the acquisition of the aforesaid skills together with other such as professional skills (e.g., ability to integrate, adaptation to change, versatility, mobility, availability, involvement and commitment with their job and the company). All these efforts aim at providing the graduate student with a high level of professionalism.

2. Experimental - The process of developing the FDP has the goal of eventually succeed in the implementation of academic activities[1] in addition to other activities that will be useful and relevant for the students to achieve their goals: These activities will be perceived by the students as likely to apply from a practical standpoint in their professional performance.
To reach this goal the steps to be followed are: 1) Adapting to work in different ways depending on the discipline technologies and specific knowledge area, i.e., adapt the resources available to the proposed objectives. 2) Gaining mastery in the different techniques required to optimize and select the resources and materials available, as well as laboratories, networks, libraries, etc. 3) Being able to adequately organize the tasks aimed at developing the FDP. In this work, different skills to be acquired by 10 students from different areas of the disciplines of Chemistry and Chemical Engineering will be presented.

3. Results and Discussion – The analysis of the performance of the students in the development of their FDP indicate that over 50% of students did not know how to bring into practice most of the skills that should be acquired throughout the process. For instance, students were not able to properly conduct a literature review, lacked of the necessary knowledge of the different experimental techniques to be used, and failed in the organization of resources and materials available in the laboratory. An adequate planning and timing of the tasks involved in the development of the FDP was also absent. Finally, the writing skills necessary to elaborate the FDP manuscript and the oral skills required for the presentation of the work in front of an examination board also needed to be improved.

4. Conclusions – The student develops his or her sense of responsibility and professionalism when the skills to be acquired in the development of the FDP are adequately patterned.

5. References
[1] Alonso Tapia, J. (2001). *Motivación y estrategias de aprendizaje. Principios para la mejora en alumnos universitarios.* En A. García-Valcárcel (coord.), *Didáctica universitaria*. Madrid: La Muralla.

New rooms for blended learning

L.P.W. Clausen [(1)], S. F. Hansen [(2)]

[(1)] *DTU-Building 113, Kgs. Lyngby, DK-2800.*

Phone Number: + 45 45 25 15 93; e-mail: sfha@env.dtu.dk

1. Introduction – A lot of research has shown that blended learning increase the learning outcome of students within the field of engineering. Similarly, there has been a lot of focus on developing new tools like e-learning, advanced learning technologies (ALT) and various types of teaching software. However, there seems to be little emphasis on the physical conditions (room design), except of working environment, in which blended learning takes place and on how to create optimal physical conditions. Here we report our experience on how physical conditions influence and facilitate blended learning in a

multi-cultural class.

Figure 3: *Top*, Ordinary single-purpose auditorium. *Bottom*, New multi-purpose class room.

2. Results and Discussion – The course "Environmental Management and Ethics", part of the education programme of environmental civil engineers, taught at the Technical University of Denmark (DTU) has previously been running in an ordinary classroom (see top of figure 1). The physical conditions of the old fashion auditoriums, single-purpose rooms, were found to impede the learning potential of blended learning. To address this issue, the teaching was moved to a new multi-purpose class room (see bottom two pictures in figure 1), no difference in technical possibilities and/or facilities but solely a change in the physical conditions. With the change in rooms, the average students performed better, the overall activity and engagement of students were higher and the course evaluations received improved markedly. Further, the results show that the physical conditions put a limiting boundary of the capabilities of blended learning.

3. Conclusions – Based on the student assignments, activity and evaluations we conclude that a change in physical conditions, shift from single- to multi-purpose room with no change in ALT or other technical facilities, have a major impact on the learning output from blended learning. Further, it is recommended that more research is initiate to explore how the physical teaching conditions can facilitate the blended learning.

Final year students' perception on their database searching skills

C. Dumitrache [(1)], N. Calet [(2)], J.A. González [(3)]

[(1)] *Faculty of Psychology, University of Granada. Campus Universitario La Cartuja.*

958 241958 cgdumitrache@ugr.es

[(2)] *Faculty of Psychology, University of Granada. Campus Universitario La Cartuja.*

958 241958 ncalet@ugr.es

[(3)] *Department of Computer Science University of Sheffield. Regent Court, 211 Portobello St.,*

S1 4DP Sheffield, U.

j.gonzalez@sheffield.ac.uk

1. Introduction – One of the main novelties of the European Higher Education Space (EHES) within the Spanish educational system is that all students need to elaborate a final-year project in order to obtain the degree title, while before the EHES final-year projects were only requested in technical degrees [1]. This new academic task is aimed at assessing specific and transversal degree abilities and requires the students to master different skills that are needed for the elaboration of the final-year project [2], among them database information searching skills, which are particularly relevant for the students' professional development because it will influence their access to knowledge [3]. The aim of this study was to analyze the perception of a group of final year undergraduate students from University of Granada regarding their level of mastery in searching for information in databases and other online resources as well as using reference management software.

2. Experimental - The sample comprised 103 students aged 20 to 31 years old (mean age=22.54, SD=2.07) who were enrolled in the fourth year of different degrees (B.A. in Teacher of Childhood Education, B.S. in Speech and Language Therapy and B.S. in Psychology and B.S. in Physiotherapy) from the University of Granada.

3. Results and Discussion- Results show that only a small percentage (6.3%) of the participants consider they completely master the skill of searching for information in Spanish, 35.2% consider they master this skill to great extent, meanwhile an important percentage of the participants (41.8%) only dominated searching for information in Spanish to a little extent and 16.7% do not master this skill at all. Regarding their skill of searching for information in English almost the majority of the participants (74.8%) considered they have very little skill or no skill at all, while 24.2% considered they master this skill to great extent or completely. Furthermore the majority of the participants (92.3%) consider they are not skilful or have very little knowledge on using reference management software. Final year students who prepare the final-year project need to receive more training and support so they can feel confident in their ability to search for information both in Spanish and in English and for using reference management software

4. Conclusions - To conclude, the present study can help us to better understand university students' training needs regarding database information searching.

5. References

[1] F. Maffioli & G. Augusti Tuning Engineering Education into the European Higher Education Orchestra, *European Journal of Engineering Education*, **28**(3), (2003) p. 251

[2] A. Blanco López, M. Altamirano Jeschke & M.J. Blanco Mena Experiencias de formación del profesorado para la tutorización y evaluación de los trabajos fin de grado. [Lecturers' training experiences on mentoring and assessing final-year projects]. *Actas del I. Congreso interuniversitario sobre el trabajo fin de grado*, Bilbao. (2014) p. 94.

[3] G. Kerins R. Madden, & C. Fulton Information Seeking and Students Studying for Professional Careers: The Cases of Engineering and Law Students in Ireland. *Information Research: An international journal*, (2004) Retrieved 10 May, 2015 from http://InformationR.net/ir/10- 1/paper208.html

Characteristics of Students of the Childhood Education Degree: motivation and learning strategies

N. Calet (1), C. Dumitrache (2)

(1) *Faculty of Psychology, University of Granada. Campus Universitario La Cartuja.*

958 241958 ncalet@ugr.es

(2) *Faculty of Psychology, University of Granada. Campus Universitario La Cartuja.*

958 241958 cgdumitrache@ugr.es

Introduction – Current university context is experiencing many changes, with the implementation of the EHES, the education in the European Union has dramatically changed. Modifications in the teaching model arise from the need to train professionals that are able to solve problems of their professional field independently [1].

In order to achieve a better adaptation of students to this new context of EHES it is important to identify university students' characteristics [2]. Among students characteristics' we emphasise the relevance of the motivation and learning strategies that students use to acquire knowledge.

2. Experimental - In this study a total of 65 students from the degree of Childhood Education Teacher Degree at the University of Granada took part (63 female and 2 men; mean age= 22.48, SD= 2.64). They were assessed on motivation and learning strategies [3].

3. Results and Discussion - Results show that participants show high to moderate levels of motivation, particularly of intrinsic motivation, high levels of self-efficacy beliefs and intermediate levels of anxiety. The most frequently used learning strategy was the elaboration strategy.

4. Conclusions - To conclude, the present study can help us to become more aware of the main features and ways of learning of university students today. The implication of results is discussed.

5. References

[1] European Comision, "El Papel de las Universidades en la Europa del Conocimiento". [The Role of the Universities in Europe], 2003.

[2] Vargas, G. M. G. (2007). Factores asociados al rendimiento académico en estudiantes universitarios, una reflexión desde la calidad de la educación superior pública. *Revista Educación*, **31**(1), (2007) p. 43-63.

[3] Pintrich, P.R., Smith, D.A.F., García, T. & Mc-Keachie W.J.. "A Manual for the Use of the Motivated Strategies for Learning Questionnaire, (MSLQ)". Ann Arbor, MI: The University of Michigan, 1991.

Educating Future Environmental Engineers to Advise Policymakers on Innovation, Ethics and Sustainable Development

S. F. Hansen [(1)], L.P.W. Clausen [(2)]

[(1)] *DTU-Building 113, Kgs. Lyngby, DK-2800.*

Phone Number: + 45 45 25 15 93; e-mail: sfha@env.dtu.dk

1. Introduction – Engineers play an important role when it comes to sustainable development as they are often heavily involved in all facets of the development of a given technology or product. This includes not only the initial R & D, but also the implementation of large-scale production. Along the chain of innovation, engineers make several value choices about, for instance, whether to create a potential (un)sustainable technology and/or product using potentially (un)sustainable materials. Engineers are also heavily involved in the potential cleaning up after environmental pollution and in advising policy-makers on what to do in order to address environmental degradation and move on to a sustainable pathway.

In contrast to the past, engineers are now being asked to take on the social responsibility that follows with their abilities to do both "good" and "bad" when it comes to sustainable development, which requires insight into - not only

Image 1. The dual role of engineers

engineering and science -, but also regulation and ethics. However, our education of engineers seldom recognize this responsibility and seldom prepares them to take on this role e.g. as policy advisors. Furthermore, some students might also perceive this beyond the scope of their "role" as engineers.

Here we present the results of our work with integrating considerations on environmental management and ethics into our education of environmental engineers at the Department of Environmental Engineering at the Technical University of Denmark.

2. Results and Discussion – In order to address the need to educate future environmental engineers so that they are able to advise decision makers on innovation, ethics and sustainable development, we developed a course on environmental management and ethics that aims at giving the students an understanding of the basic principles and tools of environmental management and regulation, with emphasis on uncertainty, regulation and the ethical challenges associated with environmental dilemmas and sustainability.

The elements taught in the course focus on key elements of unsustainable activities in our society and their common denominators e.g. what is the problem? for whom is this a problem? what can and should be done about the problem from a scientific and engineering perspective? what are the societal and ethical implications? When teaching these aspects and in the discussions with the students, outset was taken in a numerous case studies (e.g. oil drilling in the arctic, nanoparticles in the environment) that the students worked on in groups of four. For each aspect of the case study, different teaching modules on classical ethics, environmental ethics, decision-support tools, environmental management and sustainable development were introduced, taught and discussed in a Socratic manner. We used an interdisciplinary approach intended to broaden the students' vision of society's environmental challenges, such as the increased use of technologies, resource extraction, mitigation and adaptation to climate change.

4. Conclusions – Based on the student evaluations, we succeed in integrating considerations related to environmental management, ethics and sustainable development into our education program. Main challenges relate to "proving" relevance as many societal and ethical implications of engineering activities are considered beyond the scope of classical engineering by some students.
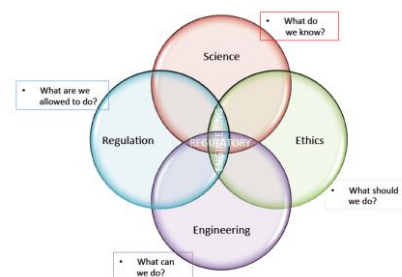
P2P a business education model which connects with companies and improves students business and technology skills for working life

Paul Gordon Dickinson

Senior Lecturer, Department of Business and Administration, Laurea University of Applied Sciences,22 uudenmaankatu,Hyvinkaa Finland +358400214246 paul.dickinson@laurea.fi

Piia Haavisto Senior Lecturer, Department of Business and Administration, Laurea University of Applied Sciences, Hyvinkää, Finland piia.haavisto@laurea.fi

1.Introduction

The objective of this study is to assess the impact of a new educational business model called Peer to Peer (P2P) and is focused on Laurea, Hyvinkaa`s Finland campus and its response to bridging the gap between education and working reality, where modern technology has a significant role. It evaluates an undergraduate business management programme. This degree programme model has been based around business projects which are rooted to the reality of working life. The students learning is directly linked to these development projects . In this unique programme there are no lectures or exams, the students work in teams to solve business problems.Teachers are regarded as "elder colleagues" whose role is to supervise the "younger colleagues" in their development projects.The themes and contents of the projects vary, but are all related to business operations, marketing, management, communications or finance. All students participate in international projects as well, and projects are generally related to Russia and European Union countries.A qualitative methodological approach is used assessing the students' experience of projects with companies and their theoretical learning without formal lectures. Student feedback via in-depth interviews form the basis which provides empirical findings from students from different countries .A total of 29 students were interviewed 21 were Finnish students and 8 were foreign exchange students who had studied in Laurea Hyvinkää P2P model. The practicality of the studies was highly valued and students felt that the practicality helped them to differ from other business and administration graduates, and it also helped them to be more adjusted to the working life after graduation. Because of the practicality, the students were more able to work better in project teams.In addition, the multicultural project environment guaranteed that the students had the opportunity to cooperate more with people from different cultural backgrounds and this was also a valued quality when it came to employers.The study concludes that although it requires a different role from both teachers and students the relevance for European education is that both academically and practically this type of model delivers a more employable graduate ready for work .

Brown, L. 1993. *The New Shorter Oxford English Dictionary on Historical Principles. Volume 1, A-M.* Oxford: Clarendon Press.

Castells, M. 1996. *The Information Age: Economy, Society and Culture. Volume I. The Rise of the Network Society.* Malden, Massachusetts: Blackwell Publishers.

Castells, M. 2000. *The Information Age: Economy, Society and Culture. Volume I. The Rise of the Network Society.* 2nd edition. Oxford: Blackwell Publishers.

Denzin, N.K. & Lincoln, Y.S. 2003. "The Discipline and Practice of Qualitative Research". In Denzin, N.K. & Lincoln, Y.S. *The Landscape of Qualitative Research. Theories and Issues.* California: Sage Publications.

Dewey, J. 1963. *Experience & Education.* New York. Collier Books, Macmillan Publishing Company. First published in 1938.

European Commission. 1995. *Green Book on Innovation.* Brussels 20,12 1995 COM (95) 688 final. Vol. I.
 Fränti M. & Pirinen R., 2006. *Learning by Developing*

George, V. & Wilding, P. 2002. *Globalization and Human Welfare.* Houndmills, Basingstoke, Hampshire: Palgrave.

Hatton, N. & Smith D. 1995. *Reflection in Teacher Education: Towards Definition and Implementation.*

Held, D. & McGrew, A. 2005. *Globalization/Anti-Globalization* (Finnish translation). Tampere: Vastapaino.

Hokkanen, S. 2001. *The Factors Contributing to the Profile of an Innovative Learning Community.* Jyväskylä: University of Jyväskylä.

Honkonen, R. & Korander, T. 2004. "Miksi uudetkin professiot ja moniammatilliset verkostot tarvitsevat ammattietiikkaa?" In Friman, M. et al. (Eds.) *Ammattikorkeakouluetiikka.* Publications of the Ministry of Education 2004:30. Helsinki: Ministry of Education, Finland, p. 94-109.

Developing student outcomes in problem sessions of Separation Processes. Comparative study between Bachelor and Master degrees.

A. Santafé-Moros, J.M. Gozálvez-Zafrilla, J. Navarro-Laboulais

Universitat Politècnica de València. Chemical and Nuclear Engineering Depart, 5L bd. C/Camino de Vera s/n. 46022 Valencia (Spain)

+34963877633, assanmo@iqn.upv.es

1. Introduction – Separation processes represent an important part of the curriculum of Chemical Engineering. Therefore, the Master of Chemical Engineering at the Universitat Politècnica de Valencia has included an advanced subject of separation processes that complements the knowledge acquired in the homologous subject in the Bachelor degree. As the competences are obtained through an evolutionary process, Bachelor and Master must represent two domains of competence levels. In the specific case of the area of separation processes, in the problem solving sessions the students learn to design the most important operation units, but they are also an opportunity to develop transversal key competences. The combination of different kinds of problem description and software tools can be used to adapt problem solving sessions to the objectives of the students' outcomes required for each academic degree.

2. Experimental – First, it was stablished which competences should be developed in the Bachelor and the Master degrees. Afterwards, problem descriptions and solution strategies were adapted to develop the new competences. From our experience, we knew that the mathematical software Mathcad is an efficient tool for problem solving [1]. In the case of the undergraduate students, we adapted the way we were using Mathcad to solve problems with a conventional structure and a close solution. In the case of the Master students, the main focus is changed to the calculation procedures towards the solution of problems with more open statement. Besides, in the master, simulation tools were introduce to make possible to rapidly study different alternatives.

3. Results and Discussion – Two example problems created for Bachelor and Master degrees were analysed to show how the students acquire the learning competences. First, it was analysed how the use of mathematical software can contribute to develop proper skills in problem solving procedures in the subject of separation processes. This is a core element for the undergraduate student that must learn how to structure the calculations to solve a design [2]. For master students with previous knowledge of separation processes, we show how the student can deal with more uncertain scenarios with the help of simulation tools in a teamwork frame. The use of simulation tools made easier to explore different alternatives and allowed the student to have a more global view of the situation. The student can also compare the simulated solution with the calculated one as a way to reinforce the comprehension of the operation and develop critical thinking. To summarize, teaching methodologies used in the different problem sessions were related with the target competences to demonstrate that the latter were covered by the set of problems selected in each academic level.

4. Conclusions – The Bachelor and Master students' opinion was assessed by two surveys performed in the Likert scale. The surveys performed showed good acceptance of the methodologies used. In particular, master students strongly support the convenience of using differentiate methodologies in bachelor and master.

5. References

[1] A. Santafé et al., "Cálculo de operaciones de separación con Mathcad". Editorial Universitat Politècnica de València, Valencia, 2013.

[2] J. Strijbos, *J. Educational Research Review*, **14** (2015) p. 18–32

Concept Maps and App-based Instant Feedback in Automation Course

E. Pérez Hernández [(1)], I. González Pérez [(1)], A.J. Calderón Godoy [(1)]

[(1)] *Department of Electrical Engineering, Electronics and Automatics.*

University of Extremadura, Spain

E-mail: {emilianoph,igonzp,ajcalde}@unex.es

1. Introduction – During last decades there have been various movements to change the perception of the most efficient way to teach at universities. The conception of the classes as being short conferences of the teacher with a passive role of student is still very widespread. Among others, innovative methodologies as project-based learning, co-assessment, gamification, flipped-classroom and service-learning are receiving increasing attention. Concept maps (CM) are graphical representations of theoretical contents as well as practical ones. These graphics are composed of concepts and the relationships between them. Besides, in recent years, several smartphone apps have been developed with educational purposes. Some of them allow to perform instant check of students' understanding in class, what we call app-based instant feedback (ABIF).
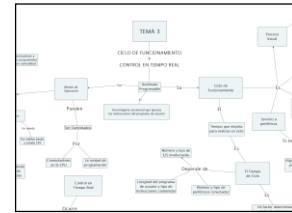
Image 1. Example of a CM designed

In the Department of Electrical Engineering, Electronics and Automatics of University of Extremadura there are various courses about automation, monitoring and supervision. This work has been developed within a course called Industrial Automation of the sixth semester of Electronics and Automation Engineering degree. This course focuses on the Programmable Logic Controllers (PLC) configuration and application to manage sequential processes. In this work we report the application of CM and ABIF in this specific course as first stage of a long-term strategy to revise the teaching procedure traditionally used with these subjects. Such strategy aims to gradually integrate innovative methodologies as flipped-classroom and gamification.

The objective of CM and ABIF utilization has been double. On the one hand, they are valuable tools to assess the performance of students. On the other hand, the teaching team aims to enhance the students' comprehension and learning results using innovative educational procedures. Moreover, we consider CM as a transversal skill whose potential utility during the degree is evident.

2. Experimental - The initial stage consisted of a simultaneous introduction to Automation and a brief explanation about what CM and ABIF are. A CM was used to illustrate the program of the course. In addition, we proposed the students to develop their own CM in groups. This step provided feedback to detect errors in the understanding of CM. Once the students learnt this tool, they began to use it autonomously. To do this, they were grouped in teams of 3 persons and they were asked to make a CM of every lesson. They had to build it following the rhythm of the theoretical classes. Weekly, a route map of the contents was published on the virtual campus platform. Previously to every class they had to read the expected contents, and incorporate information to their CM, applying the basic principle of flipped classroom. After that, we demanded to every group a list of the most relevant concepts they considered. We used them to compose a student's tag cloud of every lesson. Furthermore, periodically ABIF was applied by means of an interactive app called Zondle, which allows to pose multiple-choice questions to the class obtaining feedback information in real time.

3. Results and Discussion - An online survey at the end of the semester has been completed by the students to know their opinion and satisfaction about the introduced teaching methods. The main issue to highlight is that about the 78 % of them did not know about such methods. Regarding the usefulness of CM to improve studying tasks and assimilation of theoretical contents, the 82% revealed to have found out a resource to study and consolidate knowledge. Students felt motivated during classes to successfully complete the ABIF questionnaires.

4. Conclusions – We can conclude that Automation related courses are an interesting field of CM and ABIF application. The teachers find a powerful tool to prepare contents exposition and to assess the results. Students achieve a better comprehension of contents and skills. Future works focus on depth definition of most relevant concepts to manage and on exploiting self-assessment and ABIF.

Interactive Virtual Platform for Automation Training

I. González Pérez [1], A.J. Calderón Godoy [1]

[1] *Department of Electrical Engineering, Electronics and Automatics.*

University of Extremadura, Spain

E-mail: {igonzp,ajcalde}@unex.es

1. Introduction – A virtual and autonomous platform to be used in automation laboratory practice has been developed for process automation and supervision subjects of engineering grades. A Programmable Logic Controller (PLC) implements the control algorithm in Ladder diagram language whereas an interactive Human-Machine Interface (HMI) device represents the different subsystems involved to reflect the automation process. The learning process is enriched by the experimental configuration and simulation-based validation of the controller.

Image 1. VIPHEP assembled.

In the field of process automation and control with education purposes, simulation and software recreation are often used to evaluate and validate the developed controllers.

In the Department of Electrical Engineering, Electronics and Automatics of University of Extremadura, an interactive virtual laboratory has been designed and implemented. Called VIPHEP- Virtual Interactive PLC HMI Educational Platform, it has been conceived as a powerful tool for automation training purposes.

The motivation was to face the automation practices using the existing equipment and designing a different procedure in order to improve students' abilities. Our proposal could be considered as a hybrid approach of the hands-on and simulation laboratory. On the one hand, there are experimental tasks to develop such as PLC and HMI assembling and interconnection. On the other hand, once developed the HMI application, it is used with simulation aims. Even more, in contrast with other PC-based schemes, our system carries out simulations with an HMI device which can be found in real industrial facilities.

2. Experimental – The VIPHEP relies in the utilization of a touch screen HMI, SIMATIC KTP600, to simulate the evolution of an automated process. A PLC, SIMATIC s7-1200, implements the program developed by the students. Both devices are linked through Ethernet and are configured using a PC with Siemens TIA Portal V11 software. The HMI application has been structured to provide a friendly and intuitive interaction with the user, playing the role of simulation console.

3. Results and Discussion - The PLC is programed to automate a process which constitutes a practical case to solve in the laboratory sessions. The HMI is programed to reflect the scenario which composes each training case; even the changes associated with the control commands and input variations. A set of illustrative situations or cases such traffic lights control or industrial conveyor belt is programmed. These cases are controlled and monitored by means of the HMI and the PLC. Configuration of inputs/outputs is performed with TIA Portal. Start and stop buttons allow the student to decide when the simulation must take place. The signals corresponding to sensors of the case are automatically generated by the PLC, so the simulation evolves in an autonomous way. Image 1 show the VIPHEP assembled in the laboratory.

The virtual feature relies in the fact that the HMI act as simulator of the code executed by the PLC. Thus, this platform offers an attractive environment for the student to visualize and better understand the practice. As first stage, the platform has been used to carry out a part of the laboratory sessions in a subject entitled "Supervisory Systems". At the end of the semester, a group of 18 students has evaluated using a confidential survey to get their opinion. In summary, these students are notably satisfied with the used platform. Among other values, the results indicate that about 88% of students consider that the laboratory with HMI simulation is more profitable than using only the PLC.

4. Conclusions - The platform here described is targeted to the education of industrial automation. It combines practical characteristics with simulation environment to facilitate the learning process and to exploit the available resources. In a technical sense, students achieve knowledge, skills and experience in solving automation and supervision problems. Rubric-based and self-assessment of learning results will also be considered as further works.

Building bridges: The Czech-Austrian Winter and Summer School on energy economies and policy as an instrument of mutual understanding of energy policies

A. Ajanovic [(1)], R. Haas

[(1)] *Vienna University of Technology, Austria*

ajanovic@eeg.tuwien.ac.at

1. Introduction – In 2002 the "Energy Partnership" between the Czech and the Austrian Governments was established. The aim of this group is to jointly study energy related issues relevant for both countries with the goal to reduce tensions due to different opinions regarding the use of renewable vs nuclear energy. It consists of selected energy experts from different Czech and Austrian universities and institutes. One important part of this Czech-Austrian cooperation is the organisation of joint academic courses - Winter and Summer School (WSS) - for the Czech and Austrian students on a yearly base in English language. The main objective is to teach students about the energy system in Austria and the Czech Republic in the context of whole Europe and to discuss problems from different points of view.

2. Method - Winter School takes place in Prague for a one week where Austrian students (10) and lecturers are housed by Czech university partners. Summer School takes place vice versa at Vienna University of Technology. The time between WSS is used for writing joint seminar papers, where paired Austrian and Czech students have to analyse a topic relevant for both countries. Every group has a supervisor. Final papers are presented and discussed at the end. The lectures are focused on energy and environmental issues in heating, electricity, transport, industry, analysing advantages and disadvantages of the renewable and nuclear energy as well as costs associated with different energy policies, followed by open discussion, see Image 1. In addition, as illustrative examples, technical excursions are provided – at least three in the Czech Republic as well as in Austria.
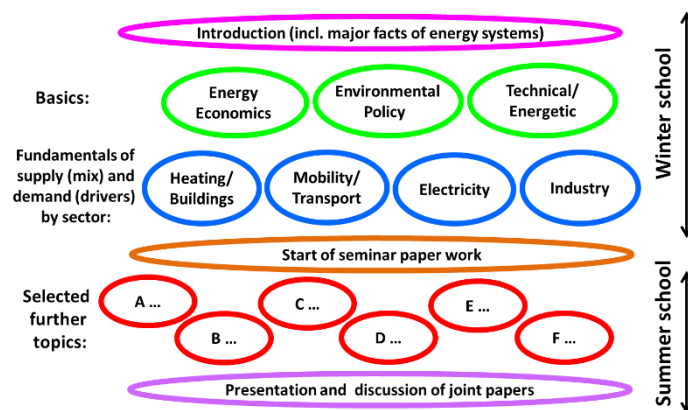
Image 1. Major topics of the Winter-Summer School

3. Results and Discussion – The work of the WWS has contributed to a much better communication and exchange between Austrian and Czech Universities. As a result of this cooperation we have already written three joint books. However, the most important result of our programme is that in the scope of the last ten years we have enabled knowledge exchange and open mind discussions between new generations of future decision and policy makers. Until now we have had over 200 students.

4. Conclusions – The major conclusion is that young people – the students of the WSS – have much less prejudices with respect to discussing energy issues than the "old" scientists. And this finding could pave a way where mutual exchanges on diverging ideas regarding energy policy issues can be discussed more based on facts than on emotions. Since the results of this cooperation were very positive and due to the fact that interest in this programme is increasing we are currently discussing an extension of the WSS. In the next years also students and experts from Slovakia could join this project.

A practical protocol to improve achievement and evaluation of the cross-curricular skills in the Final Year Dissertation (FYD)

O. Martínez[(1)], I. Etaio, A. Saracibar, J. Miranda, D. Rada, I. Txurruka, A. Lasa, E. Simón , F. Sarrionandia.

[(1)]*Faculty of Pharmacy, University of the Basque Country (UPV/EHU),Vitoria-Gasteiz.*

Telephone number: +34-945-013078/e-mail address: olaia.martinez@ehu.eus

1. Introduction – The common European framework in Higher Education claims graduate students must achieve some cross-curricular skills simultaneously to the specific ones of each degree. Improvement of these competences should be progressive all along the degrees, also throughout the Final Year Dissertation (FYD), last stage for undergraduate students. These skills can be summarized as follows: ability to organize and plan, capacity to analyze and synthesize and critical thinking [1-2]. However, there is a lack of references of possible standardized methodologies for the FYD supervisors to continuously evaluate and implement the degree of acquisition of cross-curricular skills [1]. In this context, a multidisciplinary group of teachers of the Facultay of Pharmacy of the UPV/EHU has developed a constructive protocol, based on active methodologies, which allows assuring achievement of the cross-curricular skills during FYD and their continuous evaluation [3].

 2. Experimental - The protocol was initially designed and assessed during 2012-2013 academic year with a limited group of students from the Degree on Human Nutrition and Dietetics. After evaluating the results and correcting some important aspects, the improved protocol was extended to students from Food Science and Technology and Environmental Sciences Degrees during 2013-2014 academic year. It mainly consists in various collaborative activities among students from the same or different Degrees, which are easily evaluated by each supervisor in a continuous way. An online learning platform was used as permanest support.

3. Results and Discussion – Cross-curricular skills involved areshown in Table I related to each assignment . In the first place, students should be able to communicate a clear and coherent idea addressed to the main objective of their work, as well as to select appropriate references to contextualize it. The evaluation indicators of this first deliverable are: the number sources, the quality of them together with a reasoned justification for the choice and the adaption of selected sources to the work itself. In the second assignment, students participated in an on line forum, presenting the main characteristic of their work (title, objectives and a structured outline) and giving a critical point of view of some of the works in the platform. In this case, the rationalized critical thinking is evaluated (originality, clarity, consistency and improvement proposals and bibliographic sources). The final assignment consists in an evaluation of the oral presentation of the FYD works by the other colleagues, without the presence of the supervisor. In order to complete this, after listening his/her colleagues presentation, each student fills out the evaluation rubric usually utilized by Faculty evaluators during the FYD defence.

Table I. Assignments of the protocol related t the cross-curricular skills

Skill	Analysis and sinthesis	Argument	Critical thinking	Oral defense
Assignment				
Initial: Bibliography and coherent ideas.	X	X		
Monitoring. on-line forum discussion	X	X	X	
Final: Others oral presentation evaluation	X	X	X	X

4. Conclusions -

The proposed protocol ensures continuous monitoring of the learning process and the improvement of students´ transversal skills during their FYD. It is a simple and systematic methodology which prioritizes studet´s personal work and is adaptable to any degree.

5. References

[1] Rullán, M., Fernández, M., Estapé, G. y Márquez, M.D. *REDU*, 8(1), (2010) p. 74-100.

[2] Bonilla M.J., Fuente, L., Vacas, C. y Guerrero, T (2012). Análisis del proceso de evaluación del Trabajo Fin de Grado en las nuevas titulaciones. Educade, nº3, p.5.[3] Txurruka, I., Etaio, I., Lasa, A., Sarrionandia, F., Rada, D., Saracibar, A., Simon, E., Labayen, I. y Martinez, O. *Proceedings of ICERI2013 Conference*. (2013), p. 1714-1720.

Acquisition of generic competences through classroom activities in the first year of agricultural engineering

I. Bautista[1]

GRUPO INNOVACIÓN E INVESTIGACIÓN EN METODOLOGÍAS ACTIVAS (GIIMA)

Universitat Politècnica de València Camino de Vera s/n 46071-València ESPAÑA

[1] ibautista@qim.upv.es. 963877346

1. Introduction – In the context of the knowledge society**,** higher education has become part of a new way of creating and using knowledge (1). The professionalization of University curricula has brought about deep changes in the traditional concept of academic education faced to the introduction of more professional courses into the university systems. One response to these changes was to clarify the relationship between university education and graduate skills, leading to a competence-based model for curriculum development in universities. The Tuning Project (2) made a distinction between generic competences (transferable skills) and subject-related ones. The importance of generic competences and their acquisition through teaching and learning is now widely recognized. Institutions of higher education have a key role in developing appropriate strategies. The Polytechnic University of Valencia (UPV), through an institutional programme is trying to assess these competences. In this context teaching techniques must include the student learning activities and the assessment of learning achievements.

2. Experimental – In the first year of agricultural engineering, students of soil science face experimental sciences. They have to measure soil properties using a multiplicity of methods and to work with changing units. Problem-solving sessions have been performed in order to implement these skills. To customize the exercises, input data come from a combination of random factors such as the number of letters in their names or surnames. To facilitate learning, the sequence of steps leading to resolve the exercise is shown. Each student must advance with his own data and compare their results with their peers. The teacher uses a spreadsheet program allowing different input values to correct each exercise step by step and the exercises were returned to the students. In this way they can analyse their failures and go to tutorials to solve doubts both before and after delivery. The opinion of the participants has been collected by means of qualitative and quantitative questionnaires

3. Results and Discussion - When students are facing to the exercise they have freedom to form groups according to common data and to establish a dialogue that helps them to remember concepts. They begin to work and learn collaboratively. In the absence of a unique result, the students are forced to follow the procedure step by step. This activity not only was found to be very useful for learning but highly satisfactory by the students. Also a high percentage of students consider that these kind of activities increase the acquisition of generic competences such a teamwork and responsibility.

4. Conclusions - The design and implementation of active methodologies improves the student learning and their integration in the classroom during first year.

5. References

(**1**) Ramsden, P. (2003) Learning to teach in higher education, 2nd edition. RoutledgeFalmer

(**2**] Tuning Educational Structures in Europe. **www.unideusto.org/**tuning**eu/ (accessed 5/05/15).**

6. Acknowledgements

From classroom research to teachers training

I. Bautista Carrascosa[1], J. Atienza Boronat, J.D. Badía Valiente, M.J. Climent
Olmedo, B. Gómez Ángel, S. Iborra Chornet, M.J. Labrador Piquer, Ll. Monreal
Mengual, I. Morera Bertomeu, J.M. Navarro Jover, F. Olmo Cazevieille, A. Ribes
Greus

[1]*GRUPO INNOVACIÓN E INVESTIGACIÓN EN METODOLOGÍAS ACTIVAS (GIIMA)*
Universitat Politècnica de València. Camino de Vera s/n. 46071-València ESPAÑA

[1]*ibautista@qim.upv.es, matien@qim.upv.es, jdbadia@itm.upv.es, mjcliol@qim.upv.es,
bgomez@idm.upv.es, siborra@itq.upv.es, mlabrado@upvnet.upv.es, lmonreal@mat.upv.es,
imorera@upvnet.upv.es, jnavar@dig.upv.es, folmo@idm.upv.es, aribes@ter.upv.es*

1. Introduction - At the university the teacher must not only be an expert in his/her discipline but also in techniques that promote deep learning in their students (1). Nowadays, the idea of sharing experiences with other colleagues and reflecting about the teaching duties is taking more active role as a innovating and improving quality tool in education. In this context, the multidisciplinary team "Innovation and Research Group in active methodologies (GIIMA)" emerged at the Politechnical University of Valencia (UPV) in 2002. The classroom research and the reflection carried out by the group members confirm that the activity is a key factor in the procces of learning and it is neccesary use specific strategies to achieve this. The experience acquired by the team is shared trought training workshops for teachers, in collaboration with the technical services of the UPV, in order to reflect on our classroom experiences and to promote the use of active methodologies in our university. The aim of this paper is to describe the methodology used in the workshops and analyse the opinions of the participants about their design and development.

2. Experimental – The workshops are designed using active methods so that participants can learn how to use different strategies and active techniques by practicing them. The contents are learned through activities based on cooperative learning and discovery. The opinion of the participants was collected by means of qualitative and quantitative questionnaires**.**

3. Results and Discussion- The opinions of the teachers who participate in the workshops about the usefulness and the degree of personal satisfaction has been analysed. The results show a general agreement of the participants about that the workshop achievements, consider them very practical and applicable to their teaching work. Most people considered that contents have been properly selected and the workshop motivated them to get involved and proposed extending it. The opportunity to share experiences with other teachers was highlighted as a very positive one. A recapitulation closure with conclusions was suggested as an aspect to improve.

4. Conclusions – The development of this workshop represented a challenge for the GIIMA team but has been very rewarding. We have found that peer training workshops are scenarios that lead to the knowledge acquisition to promote both opportunities for the exchange of ideas and analysis and reflection about teaching practices. Also for the team, the fact of working with teachers as students has been a feedback that enriched our experience in the use of active methodologies.

5. References

(1)Ramsden, P. (2003) Learning to teach in higher education. 2nd edition. RoutledgeFalmer. London and New York 272 pp.

Effect of Shifting to Outcomes-based Accreditation on a Canadian First-year Engineering Design Course

J. Bazylak, Senior Lecturer

Mechanical and Industrial Engineering Department

University of Toronto

001 416 946-5066   jbazylak@mie.utoronto.ca

1. Introduction - Due to government legislation the Canadian engineering profession is tightly controlled and self-regulated. "Engineer" and related terms are owned by the profession in Canada and only members of the professional associations are allowed to use the title "Engineer". A significant part of this self-regulation is the professional accreditation of all Canadian engineering undergraduate programs by the Canadian Engineering Accreditation Board (CEAB).

Prior to 2014 CEAB accreditation was entirely input-based. At least every seven years CEAB representatives would review programs including a determination of the percentage of course content that fell within a series of curriculum component categories, such as Engineering Design, Natural Sciences, Complimentary Studies, etc. These percentages multiplied by the student contact hours determined the Accreditation Unit (AU) score for each curriculum component. If the program met a minimum AU score in each of the curriculum components the program was likely to be accredited.

After 2014 CEAB accreditation has followed in the footsteps of other engineering accreditation bodies such as the Accreditation Board for Engineering and Technology (ABET) in the United States, and added a significant measure of graduate outcomes to the required process. 12 outcomes (See Image 1), called "Graduate Attributes", were determined to be necessary for a graduating engineering student to be successful in the profession. These attributes, while not new to engineering educators, were forced out of the invisible curriculum and into the syllabus.

Image 1. 12 Graduate Attributes (Outcomes) for Canadian Accreditation

Engineering Strategies and Practice is a two course sequence taken by approximately 1000 first year engineering students at the University of Toronto in Canada. The course content consists of instruction and assessment of non-technical professional practice skills that fall into 11 of the 12 graduate attributes (all except Knowledge Base for Engineering), the most for any course sequence at the university.

2. Results and Discussion - This presentation details how in a highly complex two course sequence we were are able to introduce and assess 11 non-technical professional practice graduate attributes. The skills set of the teaching team, primarily engineers, lent itself nicely teaching and assessing technical skills, but we ran into difficulties when asked to assess skills such as "Life Long Learning". This necessitated the tapping of new resources in the design and running of the course, such as dedicated Communication Instructors.

This shift in assessment philosophy lead to the development of new assignments, rubrics, data collection methods, and at times an entirely new way of looking at our teaching. For instance the recognition that Critical Thinking, a long time component of humanities courses, needed equal instruction time in our engineering course was to shake up some long standing practices.

3. Conclusions - Meeting the new accreditation needs with this course sequence has demanded a rethinking of our previous teaching and assessment methods. In struggling to overcome the challenges we faced, and still are facing, we have expanded and greatly improved our teaching abilities and our students' learning. This presentation will be useful to those considering a shift in teaching philosophy, whether accreditation driven or not, towards outcome-based teaching and assessment in engineering.

Content and Language Integrated Learning with Appreciative Inquiry

MT Leal Cavalcante[1], G. Riberas [2], G. Rosa[3],

[1] Carrer de Santaló, 37, 08021 Barcelona.

934 15 25 51 – mtleal@peretarres.org

[2][3] Carrer de Numància, 149-151, 08029 Barcelona.

1. Introduction

We present an innovative Content and Language Integrated Learning (CLIL) experience carried out at Facultat Pere Tarrés, Universitat Ramon LLull - Barcelona, Spain. As many other universities in Spain, we have been facing the challenge of improving English competences among our social work and social education students. At the same time, the recent economic crisis indicated the necessity to go beyond the traditional ways of thinking about social action, which implies innovation and creativity. Those were the precedents for the development of a new obligatory subject for third year students: "International Perspectives on Social Innovation". The objective of the subject is to provide students a broader vision regarding social intervention, considering that classic approaches are not enough in times of economic and social welfare crisis, endured stagnation or even degrowth [1]. Nonetheless, the subject goes beyond the theoretical understanding of the concept of social innovation. It challenges students to think about our current social welfare crisis with a prospective approach to the theme. English is the main language, though Spanish is a useful resource. All content and literature are in English and final essays must be delivered in English.

2. Experimental – The subject was carried out from January-May, 2015 along 15 sessions of 1.5 hours. There were 100 students in three groups, without English level assessment. The innovative aspect was not language itself, but a combination of methodology, content and language. We proposed students to develop a project using Appreciative Inquiry (AI), a tool used to promote change and innovation in organizations. The objective of the AI Project was to promote problem solving and creative thinking, as well as content assimilation. We used an adapted version of its 4-D Cycle in order to think of possible scenarios for Social Education and Social Work in Spain 20 years from now. By using the AI methodology, we invited students to discover, dream and design a social destiny that is worth working for. The students worked in small groups and delivered 3 intermediate tasks and a final product (a video or a web presentation in English). Students had supervision in class but active learning was also part of the method. We used Moodle and Facebook for content sharing.

3. Results and Discussion – Subjects developed in English in a non-native environment could be very frightening and stressing. Spanish students regret the extended image of speaking poor English. Doing a subject in English, with a new methodology and thinking how to innovate in social action was challenging. However, finding and dreaming about social innovations all around the world was motivating, and enabled them to think out of the box. Allowing intermediate tasks in Spanish generated predisposition to work. The tool itself was also a learning experience, as students are now able to use AI for promoting social change in the institutions or communities they will be working with. The final products reflected a very positive image of the perspectives of innovations in the social sector (and their motivation to innovate). English was not an issue, as expected. To assess the experience we formally asked students about their perception on the acquired competences and the feedback was highly positive.

4. Conclusions - The main contribution is the combination of three innovative aspects: multilingual environment, positive methodology and content. It created an atmosphere of confidence by using an inclusive approach that allowed students to innovate and create contend in English – something unthinkable on the first day of class. It also favoured positive engagement to their future profession.

5. References

[1] Mulgan G.(2007). Social innovation: What it is, Why it matters and How it can be accelerated. Skoll centre for social entrepreneurship. Working paper. Oxford Business School.

Dehesa-Montado Virtual Tool in the Alentejo-Centro-Extremadura Euroregion

M. Murillo Vilanova, J. Berdón Berdón, R. Lanzo Palacios , MJ. Trinidad Lozano

ICMC-CICYTEX. Pol. Industrial el Prado, C/ Pamplona, 06800 Mérida (Badajoz)-Spain.
+34 924 003138. monica.murillo@gobex.es

Introduction – The dehesa (montado in Portugal), is one of the most unique landscapes of the Iberian Peninsula, considered by the European Union as a High Natural Value System. It extends for one million hectares in Portugal and more than 4 million hectares in Spain, where Extremadura is the region with the largest dehesa area, almost a 38% of its territory. This ecosystem, consisting of grasslands with scattered trees, enables livestock, agriculture and forestry, along with other uses such as hunting, fishing and tourism. It is a model of sustainable development with great ecological, economic and social value. As well as being the main economic engine of the Alentejo-Extremadura-Center Euroregion, also offers a number of environmental and socio-cultural services with difficult economic valuation.

Despite its importance, the dehesa remains a great unknown, both inside and outside the territory it occupies. For this reason, it was decided to develop a virtual tool with the objective of raising awareness of this ecosystem, as well as of the resources, products and the services it offers, the industry and the employment it creates and the values it represents. In this way, students can be sensitized and educated, from the classrooms, about the importance of the dehesa and its weaknesses, threats, strengths and opportunities in the territory.

The Dehesa-Montado Virtual Tool is a task developed within the MITTIC project. "The MITTIC Project, Modernisation and Technological Innovation based on ICT in strategic and traditional Sectors, is Jointly Financed by the European Regional Development Fund (ERDF) through the Operational Program of Cross-border Cooperation Spain - Portugal (POCTEP) 2007-2013". This project focuses its activities in the geographical area of Extremadura (Spain), Alentejo and Centro (Portugal), regions with common problems requiring common solutions through modernization and innovation.

The Dehesa-Montado Virtual Tool, http://mittic.cenits.es/ (Image 1), shows the main features of the dehesa ecosystem. It is a web platform carried out with WordPress®, a free technology with sufficient power for the treatment of multimedia files, compatible with most current browsers, accessible and usable on different devices. The web, presented in two languages (Spanish and Portuguese), is very easy to use. It consists of an informative tutorial that explains through videos, texts and images, in a simple way, what a dehesa is, its characteristics, its exploitation, its products and its economic, environmental, social and cultural values.

This tool has been offered to teachers for its use as teaching material in classroom. On-site demonstrations have been also carried out by a group of experts on dehesa.
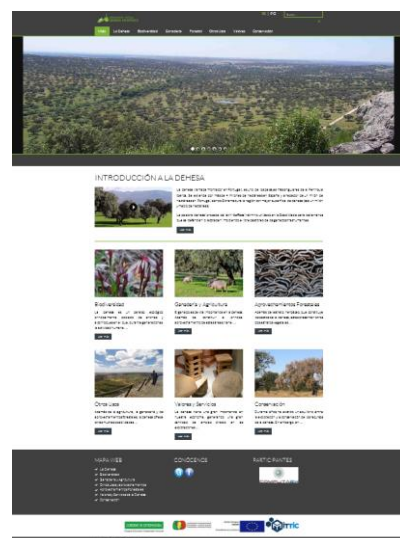
Image 1. Dehesa-Montado Virtual Tool

Relating Economic Development and Engineering Education: Brazil Regional Challenges

V. M. Caldana [1], M. T. da Silva [2]

[1] *Av. Dr. Gastão Vidigal, 1132 Ap 85A - 05314-000 - São Paulo - SP - Brasil.*

(+55 11 98395.0016) – vitor.caldana@stricto.unip.br

[2] *R. Dr. Bacelar, 1212 - 04026-002 - São Paulo - SP - Brasil*

(+55 11 5586.4145) – marcia.terra@uol.com.br

Brazil is the seventh biggest economy in the world; however due to the continental dimensions of the country (8.515.767 km²) there is a great challenge to equally develop all the regions of the country. To develop regions, it is fundamental that the regions have a strong technical background, in which engineering education is a key factor. Brazil´s GDP growth results are very inconsistent, as shown in Figure 1. The GDP results also showed that the regional disparity is still significant. The objective of this work is to compare the recent results in GDP with the current engineering educational performance and try to verify if there is a correlation between both, discussing also the regional factor. The discussion of sustainable regional development is a pressing issue, as discussed by de Oliveira[1], and are met with similar concern on the development of expertise.

Figure 1 – Brazil GDP from 2000-2014

According to ENADE (Nacional Exam of Student Performance), the number of engineer graduates who took the test rose from 25.657 in 2008 to 46.675 in 2011 however, education quality is far for optimal with only 20% with grades 4 and 5 in 2011, with a significant decrease from 2008 when the result was 29%. Curriculum design is still not what the market expects according to Lansu [2]. The discussion is focused to understand if this factors have a significant contribution as to why, according to Maciente e Araújo [3], only 38% of graduates remain with their main occupation as engineers. The discussion is also oriented on the interconnection between sustainable regional development and engineering education.

Table I – GDP / Number of Universities / Quality of Universities

	Regional % of GDP	Number of Engineering Universities		Number of Universities with 4 or 5 score	
North	5,40%	72	6,16%	0	0,00%
Northeast	13,40%	161	13,77%	4	6,15%
Central-West	9,60%	59	5,05%	3	4,62%
Southeast	65,20%	618	52,87%	43	66,15%
South	16,20%	259	22,16%	15	23,08%

It is possible to notice in Table I that the difference in regional GDP is significant. It also shows a disparity that is consistent with the relation between economic development and quality / quantity of graduates, thus showing a challenging scenario to achieve a sustainable and constant growth of Brazil´s regions.

References:

[1]   G. B. de Oliveira, "Regiões Inteligentes como Estratégia de Desenvolvimento Local," *Cons. Editor.*, 2011.

[2]   A. Lansu, J. Boon, P. B. Sloep, and R. van Dam-Mieras, "Changing professional demands in sustainable regional development: a curriculum design process to meet transboundary competence," *J. Clean. Prod.*, vol. 49, pp. 123–133, Jun. 2013.

[3]   A. N. Maciente and T. C. Araújo, "A Demanda por Engenheiros e Profissionais Afins no Mercado de Trabalho Atual," *Radar Brasília Ipea*, no. 12, pp. 43–54, Mar. 2011.

How to teach Chemistry? Is Chemistry a new universal language?

María del Mar López Guerrero[(1)], Gema López Guerrero.

[(1)] *University of Malaga, Faculty of Science, Department of Analytical Chemistry*
Spain
mmlopez@uma.es; +34952137395

1. Introduction − Chemistry has been developed greatly throughout the 20th century. Chemistry is included in the curriculum of elementary and secondary education. In general, students are not interested in science, and because of this, students tend not to make an effort to learn and understand the meaning of concepts and the chemistry language that are being taught to them. If we consider that there is a little bit analogy between chemistry and foreign languages, we should learn the symbols of the Periodic Table as symbols of an alphabet. The first knowledge that one needs to know when we are learning a second language is the new symbols of our new alphabet. It is necessary to learn more than 103 symbols, the chemical alphabet. After that, the students are ready to begin the formation of chemical words. In this case, learning the compounds names is easier when only two elements are involved, but when there are more than two, the chemical language is more complex.

The proposal of this study is intended to design and implement a teaching strategy for teaching and learning the chemical language, first of all the chemical alphabet, the Periodic Table and then, the language which it is built the chemistry. For this proposal, we will use some multimedia application (Information and Communication Technologies (ITC)), which consists in an interactive periodic table. Students will be able to push one element and they will be able to see the properties of this element and which other element will be able to combine with it, and furthermore, if this element will be able to combine with itself. When they know properly the simple language, they will be able to continue studying more complex words, in this case, the reactions. With this multimedia application, the students will be able to watch how the atoms will change, one atom changes to a new atom during a whole reaction. And finally, they will be able to watch how these new atoms have new properties, and they combine each one. With this Periodic Table, the students learn chemical formulas and equations.

2. Experimental - This study was created as a descriptive study in which the survey technique was used. The study was carried out during the course 2013/14. The sample consisted of 35 volunteer students from two different classes, at the first course of Mechanical Engineer degree at University of Málaga. But the vast majority of them were there, they did not love chemistry. Each student made one questionnaire about the utility of our multimedia application. The scale of the test was a five point Likert type scale with a range of five options. The positive items range from 1= Certainly Agree to 5 = Certainly Disagree.

3. Results and Discussion - Mostly the average of these statements showed an overall positive response statements .The majority of the each student average of the response statements shown are positive, more than 2.5.

After this study, we studied if there was some difference between the two groups studied and it can be seen that the mean and the standard deviation for the different variables according to the two investigated groups demonstrated that there was no significant difference in the level of interest or utility that they give to the multimedia application.

4. Conclusions - The results of this study are based on a survey purpose after the use of an interactive application in order to improve the learning process of the chemistry language. This information is valuable since students could watch these animations on a computer. This is based on the cognitive theory of multimedia learning, which assumes that learners process information through a dual coding capability involving a auditory/verbal channel and a visual/pictorial channel. Nevertheless, the vast majority of students recognize that chemistry knowledge is useful to interpret aspect of their everyday life, but not many of them express their wish to continue chemistry studies.

The Rhetoric of the Internationalisation of Higher Education – opportunities and challenges

T. John

41 A Onslow Road, GU1 4HU Guildford, Surrey, UK

+447447626022, T.John@pgr.reading.ac.uk

The internationalisation of Higher Education tends to be theorised in the literature at the organisational, strategic level, with an emphasis on marketization. There are still, however, few in-depth investigations of interactions between international students and academics informed by accounts of the experience of practitioners or students.

Drawing on contemporary work and thinking in the areas of cross-cultural pedagogy and globalised curriculum, my research seeks to create space for the voices and experiences of both students and staff working in international education. Within a Bourdieusian framework, I explore both cultural and linguistic dimensions, using a case study approach based on a southern English university. Data from surveys, interviews and focus group discussions with international students, academics and senior staff directly concerned with the delivery of the internationalisation agenda point to the need to reconsider contemporary realities and practices. Their accounts confirm that the presence of international students does not automatically enhance internationalisation of learning and teaching and, that more focused initiatives are required.

The presentation will explore a selection of emerging themes, including Dynamics of Multicultural Group Work, Internationalisation of Curriculum, Assessment and Feedback, and the impact of IELTS as well as possible ways forward if universities are to translate rhetoric in relation to international students into sound practice.

References:

[1] Jenkins, Jennifer (2014) *English as a Lingua Franca in the international university: the politics of academic English language policy*, Abingdon, GB, Routledge, 248pp.

[2] Montgomery, C. (2011) *Understanding the International Student Experience*. Palgrave Macmillan.

[3] Organisation for Economic Co-operation and Development (OECD) (2005) UNESCO and OECD Guidelines for Quality Provision in Cross-border Higher Education. Available at: http://www.oecd.org/edu/skills-beyond-school/35779480.pdf (accessed March 2015).

[4] Trahar, S (2011) *Developing Cultural Capability in International Higher Education: a Narrative Inquiry*. Routledge.

[5] Turner, S. & Robson, S. (2008) *Internationalizing the University*. London: Continuum.

On the effectiveness of professionals in hybrid organizations

L.R. Buning[1], S. Harperink[2], P.C. Schuur[3]

[1]*HAN University of Applied Sciences, Ruitenberglaan 29, 6826CC ARNHEM, The Netherlands.*

telephone +31 6 134 134 17, lejo.buning@han.nl

[2] *TSM Business School, Drienerlolaan 5 Bastille, gebouw 48, 7522NB ENSCHEDE*

[3]*University of Twente, Drienerlolaan 5 7522NB ENSCHEDE*

Abstract

Day by day, professionals in organizations are dealing with decisions, some of which may lead to conflicts. The role fulfillment of the professional determines the level of conflict and will be a trade off with the effectiveness of the task. Previous research on conflict, fulfilment and effectiveness focuses on single business sectors. This paper focuses on the effectiveness of professionals within a hybrid organizational structure. Such a structure mixes several sectors the interests of which may be conflicting. Specifically, we consider hybrid organizations equipped with a learning structure exemplified by two case studies: (i) the Dutch Universities of Applied Sciences and (ii) the Roman Catholic Church in the Netherlands. Here, the professional (lecturer or priest) operates within a triangle spanned by the laymen (students or parishioners), the organization (university or church) and the context (industry or society). In practice, serving the organization as well as paying attention to the context may require the professional to deal with diametrically opposed processes. This paper presents a framework to understand the behavior of the professional in a range of organizational settings. In addition to this, the framework will support professionals in enhancing their employability through effectively fulfilling their role in conflicting goal settings.

Key words: Role fulfilment, conflicting goals, task effectiveness, hybridity, hybrid organizations …

MATHEMATICS CREATIVITY AND TECHNOLOGY (GEOGEBRA) IN TEACHING OF ALGEBRA: A CASE STUDY OF 9TH GRADE OF EDUCATION BASIC.

Aldina Rodrigues [(1)]

[(1)] *Universidade de Trás-os-Montes e Alto Douro, UTAD, Quinta de Prados,*

5001-801, Vila Real, Portugal, <http://www.utad.pt>

938454755, aldina_rodrigues@iol.pt

In the current educational context it is important to investigate the development of creativity, because beyond is one of the general education purposes is important in the formation of students and resolving challenges and problems (Bailin & Siegel, 2003). The school, in addition to promoting student learning, should also allow the development of skills, teaching them to think in a creative way and to take decisions against the proposed problems. The technology currently marks the day-to-students day and therefore should be provided learning opportunities for the development of mobilization of shape creative. According Ankiewicz (1995) the students are not usually encouraged to use their creativity so as to actively participate in their learning. The Creativity allows a person to interpret, assimilate new information in a flexible way with the knowledge and use of skills in order to reason, use and create with technology (Meyer, 2012).

In that sense was implemented a teaching and learning experience based on solving tasks of exploration and investigation in content functions using dynamic mathematics software (Geogebra, 2011) which is free and available online. The principal objectives of this study were to analyze the conceptions of creativity and the evaluation of mathematical creativity dimensions in solving mathematical tasks using Geogebra. Study participants were students of a class of 9th grade of a public school in northern Portugal. The methodology was qualitative, interpretive and using the case study design. According to Stake (1995), cited by Coutinho (2005), it is not intended to comprise other cases, but the particular cases for the purpose of explore, describe, explain and evaluate (application of a questionnaire survey implemented by the end of the experiment). Data analysis focused on the content analysis of the responses of the survey participants and the productions on the task, with the development of analysis categories, according to the study objectives. Results show that participants associated the creative originality, according to Sternberg and Lubart (1999) and the dimension of valued mathematical creativity was the fluency by varying in student responses the different questions of the task. To point out that this teaching experience contributed to the development of mathematical creativity of study when students use technology in solving mathematical tasks.

Keywords: Technology, Creativity, Mathematics, Basic Education, Learning.

References

[1] Bailin, S., & Siegel, H. (2003). Critical thinking. In N. Blake, P. Smeyers, R. Smith & P. Standish (Eds.), *The Blackwell guide to the philosophy of education* (pp.*181-193).* Oxford: Blackwel.

[2] Ankiewicz, P. J. (1995). The planning of technology education for South African schools. *International Journal of Technology and Design Education, 5* (3), 245-254.

[3] Coutinho, C. (2005). *Metodologia da investigação em educação*. Braga: Instituto de Educação e Psicologia, Universidade do Minho.

[4] Geogebra (2011). Dynamic mathematics for schools, version 4.0. Salzburg: Department of Mathematics, University of Salzburg. Disponível em: <http: www.geogebra.org>.

[5] Meyer, A. (2012). Teaching for Creativity, *Science Teacher*, *79* (5), 54-56.

[6] Sternberg, R. J. & Lubart, T. I. (1999) The concept of creativity: Prospects and Paradigms. In R.J. Sternberg (ed.), *Handbook of Creativity*, pp. 3-16. London: Cambridge University Press.

Development and application of a rubric specific for the senior-year Graduation Design Projects for assessing learning outcomes

C. Yangin-Gomec [1], B. Kose-Mutlu [1], E. Dulekgurgen [1], I. Ozturk [1], A. Tanik [1]

[1] *Istanbul Technical University, Environmental Engr. Dept., 34469, Maslak, Istanbul, Turkey.*

+90 212 285 37 87 and yanginci@itu.edu.tr

1. Introduction – This paper discusses the modifications in the "*Graduation Design Project*" -a senior-year course in Environmental Engineering Undergraduate Program of ITU- which were implemented primarily for improving students' learning skills in environmental engineering design, and also for better assessment and evaluation (A&E) of the learning outcomes adopted from those set by ABET EAC in Program Criteria for Environmental and Similarly Named Engineering Programs. In accordance with Criterion 5 (Curriculum), an engineering undergrad program *must prepare the students for engineering practice through a curriculum culminating in a major design experience based on the knowledge and skills acquired in earlier coursework and incorporating appropriate engineering standards and multiple realistic constraints.* Accordingly, the following issues are required to be satisfied in the A&E Procedure of the Graduation Design Project course; (i) implementation of the review and assessment processes for PEOs (program educational objectives) and ABET (a)-(k) learning outcomes (OC); (ii) collection and assessment of students' works; (iii) demonstration of loop closing and continuous improvement; (iv) review and adaptation of the most up-to-date Accreditation Criteria, Policy and Procedures, and Questionnaire(s) on a regular basis. In this respect, a specific rubric has been developed and continuously updated at each of 6-semester cycles [1, 2].

2. Results and Discussion – For the first three semesters, realization of the OCs was above the "≥50% Satisfactory" threshold; whereas for the following three semesters, it was above the "≥60% Satisfactory" threshold set by the faculty in order to assess continuous improvement in the senior-year Graduation Design Projects at the ITU-EED. Special rubric-based assessments indicated that (e.g. for 2012-2013 Spring Semester; Fig. 1a-b), out of seven learning OCs to be satisfied by the course, five of them (OC3, 4, 7, 8, and 11) were realized above the "≥60% Satisfactory" threshold set by the faculty of the ITU-EED, whereas realization of the other two (OC1 and 5) was below the threshold [35% and 6%, respectively (Table I)].

3. Conclusions – Comparative evaluation of the assessment results from 6 semesters indicates that the senior-year Graduation Design Project falls short in achieving the targeted performance regarding OC1 (*an ability to apply knowledge of maths, science & engr*) and OC5 (*an ability to identify, formulate & solve problems in the field of Environ Engr*) addressing the freshman and sophomore/junior year levels, respectively, thus needs to be reviewed/improved with respect to those, yet it is distinctly successful in realization of the learning OCs addressing junior and senior years (OC7&11), as well as those others addressing sophomore/junior/senior years (OC3,4&8). In sum, the rubric specifically structured for this senior-year course has proven to be an ample A&E tool serving for comprehensive and realistic evaluation of the course and as a basis for continuous improvement of it.
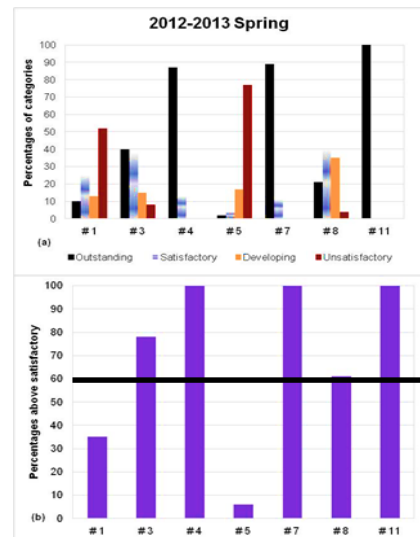
Figure 1. Percentages (a) of categories meeting the related outcomes; (b) above satisfactory

Table I. Achievement levels of the "Learning Outcomes" and the tools used in A&E Process

	Outcome	Percentages (%) of the Categories Meeting the Related OC				Assessment Tool(s)	
		Outstanding	Satisfactory	Developing	Unsatisfactory		
2012-2013	1	10	25	13	52	Outcome-Based Exam (OBE)	
	3	40	38	15	8	Rubric specific for this course	OBE
	4	87	13	0	0	Rubric for Outcome 4	
	5	2	4	17	77	Rubric specific for this course	OBE
	7	89	11	0	0	Rubric specific for this course	Presentations
	8	21	40	35	4	Outcome- Based Exam (OBE)	
	11	100	0	0	0	Drawing part of the project	

4. References:

[1] A. Cheville, M.S. Thompson, "Aligning Design to ABET: Rubrics, Portfolios, and Project Managers", 121st ASEE Annual Conference & Exposition, June 15-18, IN, USA, 2014.

[2] Rubric for Graduation Design Project: http://www.cevre.itu.edu.tr/files/abet/CEV492E_rubric.pdf.

EFFECTIVE ASSESSMENT OF AURAL-ORAL SKILLS WITH THE HELP OF ICTs

Monika Ciesielkiewicz

C.U. Villanueva, Complutense University of Madrid

mciesielkiewicz@villanueva.edu

Inés Casado Antoniazzi, C.U. Villanueva, Complutense University of Madrid

icasado@villanueva.edu

This article analyses a computer-assisted system designed for testing the aural/oral foreign language skills of students in a time efficient and objective manner. ORALEX is an easy-to-use in-house developed software program for group test- taking, executed through a LAN (local area network).

ORALEX follows the Common European Framework for Languages. It is a time-saving tool for examiners that facilitates group test-taking as opposed to individual face-to-face encounters. It provides tangible proof of the students' performance. It does not render the assessment itself and provides for transparency. It enables easy accessibility to the recorded files 24/7. It provides the tool for efficient network storage. Since exams are recorded, saved and filed through the LAN, their access is unlimited. Teachers can correct their own students' exams or they can be corrected by a third party. They can also be used for multipurpose research.

This article intends to make evident that communicative language competences might be assessed using ORALEX effectively and what benefits said program can have for students and teachers. ORALEX allows students to be active agents of their own learning.   They are in control of when to start recording, when to stop, where to stop. However, there is a time limit placed in other levels. They follow the instructions (both written and verbal) and act accordingly. The program is simple enough for them to complete the exam without asking for any help. The instructions can be in any language. ORALEX is a low-cost and cutting-edge assessment tool for educational centers, schools, universities, private or public institutions.

Case study on rubric-based assessments for senior-year Graduation Design Project and recommendations for improving the assessment tools

E. Dulekgurgen [(1)], O. Karahan Ozgun [(1)], C. Yangin-Gomec [(1)], C. Unalan [(1)]

[(1)] *Istanbul Technical University, Environmental Engr. Dept., 34469, Maslak, Istanbul, Turkey.*

+90 212 285 7419 and dulekgurgen@itu.edu.tr

1. Introduction – This study aims at presenting the results of an assessment process run by the end of the 2014-2015 Spring semester for weighing the achievement levels of several student outcomes through evaluating performance of senior-year students in their Graduation Design Project (GDP) assignments. Another main goal of the work is rapid communication of recommendations offered here for improving the A&E (assessment and evaluation) tools so to include assessments in line with renewed definitions and requirements of the Environmental Engineering Undergraduate Program (EEUP) curricula listed in ABET EAC 2015-2016 Program Criteria [1]. Accordingly, as of 2014-2015 Spring semester, those newly introduced considerations have been implemented to the senior-year GDP assignment to couple "*risk assessment, uncertainty and sustainability analyses, life cycle assessment, environmental impacts, project management*, and *application of advanced principles and practice relevant to the program objectives*".

2. Results and Discussion – Several rubrics designed by the faculty of the ITU EEUP are available to assess the achievement levels of the ABET Students Outcomes (OC) targeted by the GDP course (namely OC1, 3, 4, 5, 7, 8, and 11). Additionally, a specifically developed rubric [2], which has been in use since 2010-2011 as the main assessment tool for comprehensive evaluations related to the GDP-based performances is also in hand for assessing performances of the GDP teams. Results of those rubric-based assessments of a particular GDP team (Team-7) comprised of 4 senior-year EEEP students will be available at the time of the conference presentations, upon completion of the defense of the GDP prepared by that particular team in front of the jury members on 10th of June 2015.

On the other hand, in the course of this year's assessment process, it has been realized that although the GDP-specific rubric was designed as comprehensive as possible to meet the needs of the period between 2010 and 2014, adoption of new considerations of the EEUP curriculum listed above for design of an environmental system into the GDP assignments in 2014-2015 Spring semester has called for renewal and improvement of the GDP-specific rubric as well. Accordingly the following queries are recommended to be included in the GDP-specific rubric to be available for the next round of GDP assignments:

Table I. GDP-specific rubric modifications and proposed new queries in relation to new curriculum entries

Modified modules and points [current→future]	Recommended NEW QUERY	*Related to new curriculum entries of;*
2. DESIGN: [**60 → 45**]		
2.5. Feasibility Report	Originality (novelty, and if applicable innovative) aspects of the selected treatment process and technology	*"application of advanced principles and practice"*
4. ENVIRONMENTAL MANAGEMENT: [00 → 20]		
4.1 Risk Assessment	Risk factors /Emergency action plan (EAP) outlined	*"risk assessment"*
4.2 Uncertainty	Uncertainty factors for WWTP defined	*"uncertainty analyses"*
4.3 Sustainability	Economic sustainability/ Social impacts explored	*"sustainability"*
4.4 Life-cycle assessment	System boundaries/ Impact categories determined	*"Life-cycle assessment"*
4.5 Resilience	Interdependencies/ Extra measures (+ to EAP) presented	*"resilience"*

3. Conclusions – Above mentioned re-organization of the A&E tools of the GDP will avoid overlooking students' performances related with the new curriculum entries, and also will prevent underestimation of overall achievement levels through the GDP assignments. Accordingly, the GDP-specific rubric to be amended by addition of several new queries, some recommended above, addressing the newly incorporated aspects of the EEUP curriculum will continue to serve as an inclusive A&E tool for comprehensive and realistic evaluation of the course, and as a meaningful instrument to measure achievement level of several students OCs through the GDP course. Such remediates will not only help sharpen the GDP course-related A&E tools, but are also expected to contribute to continuous improvement of the GDP assignments, and thus design-based engineering education.

4. References: [1] ABET EAC, "2015-2016 Criteria for accrediting engineering programs, Program criteria for environmental and similarly named engineering programs," ABET, Baltimore, MD, USA, 2014, pp. 12-13. http://www.abet.org/wp-content/uploads/2015/05/E001-15-16-EAC-Criteria-03-10-15.pdf . ; [2] Rubric for Graduation Design Project: http://www.cevre.itu.edu.tr/files/abet/CEV492E_rubric.pdf.

How to increase English course offerings at Spanish Universities

M. Villarroel [(1)], L. Jordá, I. Allona, P. González-Melendi, J. Lizaso, I. Mariscal, L. Rodríguez-Sinobas, C. Hontoria

[(1)] *ETSI Agrónomos, Universidad Politécnica de Madrid, Ciudad Universiaria s/n, 28040 Madrid*

913364869, morris.villarroel@upm.es

1. Introduction – Several Spanish universities have developed Internationalization Programs or specific strategies to promote the use of English among their students and faculty, but there are several intrinsic problems that lack global solutions [1]. In this study, we report about our efforts to develop a framework to improve the internationalization of undergraduate and graduate programs at the Technical University of Madrid by increasing the number and quality of courses offered in English. That involved developing a plan based on previous efforts by other universities in Spain and presenting the results to the whole university community.

2. Experimental - We analyzed already existing plans to increase course offerings in English from 13 different Spanish universities (Universidad Carlos III, Universidad de Alcalá, Universidad del País Vasco, Universidad Politécnica de Valencia, Universidad Pompeu y Fabra, Universidad de Almeria, Universidad Autónoma de Barcelona, Universidad Politécnica de Cataluña, Universidad de Vigo, Universidad de Córdoba, Universidad Rey Juan Carlos, Universidad Pública de Navarra, Universidad de Granada). Each one was summarized and compared in order to develop a framework based on the specific needs of our university (UPM). After analysis, a plan was developed (19 pages long) that was presented to professors, administrative personnel and different representatives from Schools.

Table 1. Percentage of university programs reviewed (n=13) that provided details about certification, training, mobility and recognition of efforts to teach or learn courses in English mentioned certification.

	Professors	Administration	Students
Certification	69	23	62
Training	84	46	69
Mobility	62	31	84
Recognition	54	7	92

3. Results and Discussion - The information from other universities was grouped into one of nine categories: students, professors, administrative personnel, courses offered, other actors/institutions within the university (e.g., language departments), funds and projects, dissemination activities, mobility plans and quality control. The sections on students, professors and administrative personnel, included sub-sections on training, admission, mobility and certification (see Table 1). The section on available courses included information on preparing the course (administrative details), advertising, area of knowledge, minimum amount of students and evaluation. For institutions at the university, we included the involvement of language departments, commissions, vice-chancellorships and their specific tasks and agreements with other universities. The results from two meetings held to present the plan suggest that most professors agree with the general premise to increase course offerings in English but there is concern about how efforts will be recognized. Also, among administrative personnel and students, there is a general lack of information and funding to promote certification and training of the former.

4. Conclusions - Much of the previous effort by Spanish universities to increase course offerings in English can be summarised into three basic categories, the people involved, the course plan itself and the institutions involved at each university. Below those categories there is a wide diversity in the plans, but in general there is less information about administrative personnel in the areas of certification and recognition.

5. References

A.M. Ramos. *Porta Linguarum* 19, (2013) pp. 101-111.

Education for Sustainable Development – Reflections on Greening the STEM Curriculum

Dr Nazira Karodia

University of Bradford, Tel: 01274 232218, n.karodia@bradford.ac.uk

Introduction

Science, Technology, Engineering and Mathematics (STEM) and sustainable development are two major themes of relevance to the UK economy and the sector. STEM is and will be a major driver of future economic regeneration development, job creation and high tech innovation. It is also shaping the delivery of a low carbon future based on sustainable technologies and scientific innovation. The connections between STEM and sustainability are however often weak and fragmented. Operationally STEM infrastructure is a major, poorly understood, cost item that has the opportunity for substantial financial savings. The University of Bradford has been involved in three major transformational initiatives: our Sustainable Development Project (Ecoversity) and our Employer Engagement/Higher Skills project (ESCALATE). Each of these has made significant progress in its own area. Our recent project, Greening STEM brings these initiatives together into one holistic coherent approach. This paper will explore some of our reflections on Bradford's approach to greening the STEM curriculum.

Experimental method

Greening the STEM curriculum required cross institutional collaboration involving a wide range of staff from arcoss the institution the STEM discipline areas, sustainable development, pedagogic research and the estates team). This collective expertise was a means of ensuring a holistic approach curriculum enhancement, skill development and greening operations of relevance to key stakeholders and student engagement.

Results, discussion and conclusions

Fostering successful adoption of more sustainable practices is often a challenging process, particularly when different cultures across an institution are brought together to work towards a common goal. Key learning points will be offered in terms of working across organisational and disciplinary boundaries and change management strategies.

References

1. UKCES, The Labour Market Story: The State of UK Skills (2014) https://www.gov.uk/ government/uploads/system/uploads/attachment_data/file/344440/The_Labour_Market_Story-_The_State_of_UK_Skills.pdf
2. D Tilbury, Higher education in the world 4, GUNi, 2011, 18
3. B. Lucas, *L.Comerford Boyes, N. Karodia, T. Munshi and P. Hopkinson,* The Big Green Lab Project, Education in Chemistry, 2014: http://www.rsc.org/eic/2014/03/green-laboratory-sustainable-teaching
4. I. M. Mujtaba, R. Patel and N. Karodia, Greening The Lab, tcetoday, 2015: www.tcetoday.com
5. ECOVERSITY: http://www.bradford.ac.uk/about/ecoversity/

Virtual lab for learning experimental measurements of hydrological and erosive processes in small rural catchments

JoseÁngel Bajo(a), María Dolores Redel-Macías(a), Mary Nichols(b),Rafael Pérez(a),
Francisco Bellido(c) and Encarnación V. Taguas(a*)

(a)   *Department of Rural Engineering, Univeristy of Córdoba, Campus Rabanales, Leonardo Da Vincibuilding, Córdoba 14014, Spain (joseangelbajo31@gmail.com, mdredel@uco.es; rperez@uco.es; evtaguas@uco.es)*

(b)   *USDA- USDA Southwest Watershed Research Center, 2000 E. Allen Rd., Tucson, Az. 85719 (mary.nichols@ars.usda.gov)*

(c) Department of Electronics, University of Cordoba, Córdoba, Campus Rabanales, Leonardo Da Vincibuilding, Córdoba 14014, Spain (el1beouf@uco.es)

This work presents a virtual lab for learning to use equipment and make experimental measurements to evaluate rainfall-runoff relationships and soil losses in small agricultural catchments. These measurements are essential to protect water and soil resources in fragile environments. This tool was conceived to support the learning of complex runoff and erosion processes.

The philosophy followed was to create a virtual visit to a real site that is instrumented to make hydrological measurements. The virtual visit includes images, videos and explanations that facilitate learning. In addition, some practical cases are proposed to check the acquired knowledge. The virtual lab includes the following menus: Experimental measurements in catchments; Gallery of videos; Equipment; Practical case; Glossary and Additional Information. Their contents were carefully prepared for professors and scientists of Hydrology and Electronics.

The design criteria considered for the virtual lab were: i) its online applications and their compatibility with Moodle; ii) the use of multimedia components for visualization such as 3D images, videos and explanations and examples for the direct analysis; iii) the application of exploratory learning and inquiry-based learning through solving practical cases.

Evaluation of the tool has not been carried out yet, however, its use removes constraints associated with field trips such as expenses, time and logistical complexity. In addition, its usefulness is justified based on the opportunities offered by self-access learning tools to understand hydrologic and erosion processes across climate and land uses.

Mobility of students of Pharmacy Degree between UGR and different French Universities: Our experience in the framework of the European High Education Area (EHEA)

C. Cabrera-Vique [(1)], M.J. Ruedas-Rama [(2)], L. Recalde [(3)], G. Salguero-Esturillo [(4)].

[(1)] *Dept. Nutrition and Food Science. Faculty of Pharmacy. University of Granada. Campus de Cartuja. 18012-Granada. Phone: +34-958240749. e-mail: carmenc@ugr.es*

[(2)]*Dept. Physical Chemistry. Faculty of Pharmacy. University of Granada.*

[(3)]*Dept. Plant Physiology. Faculty of Pharmacy. University of Granada.*

[(4)] *Dept. Nutrition and Food Science. Faculty of Pharmacy. University of Granada.*

1. Introduction

The implantation of the European Higher Education Area considers among its basic principles: 1) Coordinate the European University systems with the creation of a comparable system of degrees; 2) Use a compatible, transferable and accumulative system of credits (ECTS credits); and 3) Promote the mobility of the students.

The mobility of students, teaching staff and administration staff constitutes the central core of the project of internalisation of the University of Granada (UGR). In fact, the UGR is one of Europe's top-ranking international universities, coming first in many international mobility statistics. Every year, the UGR offers over 4,000 international mobility places for undergraduate and postgraduate studies through the different programs launched during the academic year: mainly LLP/Erasmus, UGR Exchange Programme and Erasmus Mundus. All these initiatives place the UGR at the head of Europe as regards student mobility. In recognition to its continuous work to promote the European mobility since 1987, the UGR was awarded in 2007 with the Gold Star of PAP/Erasmus. Currently, the UGR is the European University that most Erasmus students receives (over 2,150), and is among the European universities that most students sends (more than 2,100) in Europe.

The Erasmus Program, as it is well known, is focused to stays (one complete academic year or one semester) to do degree studies with credit recognition in institutions belonging to the 27 States member of the European Union (EU), in addition to Island, Norwich, Switzerland and Turkey. Since 1987, year in which the program started, approximately 3 millions of students from about 4000 university centres could embrace to this exchange system.

The Faculty of Pharmacy of the UGR is one of the institutions more involved in mobility programs, especially in the Erasmus program, with a total of 193 students in the academic year 2014-2015 (112 students *out* and 81 students *in*). Currently, the Faculty of Pharmacy has 67 inter-institutional agreements with countries such as Germany, Malta, Italy, Austria, Hungry, Romania, Slovenia, Poland, Belgium, Czech Republic, Portugal and France. In particular, in France it has agreements with universities of Bordeaux, Dijon, Lille, Lyon, Marseille, Nancy, Nantes, Paris, Poitiers and Strasburg. These agreements have allowed to do stays to study courses of Pharmacy degree to 16 students (students *out*) during the last 3 academic years (2012/2013, 2013/2014, and 2014/2015), since previously there only existed the mobility for the old bachelor studies. Moreover, during the same 3 academic years the Faculty of Pharmacy of the UGR received 24 students from this country (students *in*). A summary of more detailed data is gathered below in Table 1.

In the same way as happened in other aspects of the Higher Education, it has been necessary to review and adapt the new validations and recognitions de the courses and the learning agreements to the new syllabuses. This fact, without doubts, has brought a series of benefits, but also some inconveniences regarding to the old bachelor studies.

2. Objectives

The main objective of this work is to analyze the principal difficulties and advantages that we have found as coordinators of the Erasmus Program for the mobility of students of Pharmacy degree between the UGR and 11 French Universities, in the new framework of the EHEA.

Table 1. Mobility for students between the Faculty of Pharmacy (UGR) and other French Universities to study courses of Pharmacy degree.

University of France	Academic year					
	2012-13		2013-14		2014-15	
	Students *in*	Students *out*	Students *in*	Students *out*	Students *in*	Students *out*
Bordeau02	1	0	0	0	1	1
Dijon01	0	0	0	0	0	0
Lille02	0	0	0	1	1	1
Lyon01	0	0	0	2	0	0
Marseil84	6	0	5	1	3	3
Nancy43	0	0	0	1	2	1
Nantes01	0	0	0	2	0	0
Paris05	0	0	0	0	0	1
Paris011	0	0	0	0	0	1
Poitiers01	0	0	1	0	3	1
Strasbo01	0	0	1	0	0	0

3. Results and Discussion

In our experience acquired during the last three academic years we found some troubles and difficulties for the preparation of the corresponding learning agreements. Figure 1 gathers the most notable ones. The main difficulties are detailed as follows:

- There exits important differences between the syllabus of the Pharmacy degree of the UGR and the partner French universities' ones. In addition, the differences between the French universities among them are also very significant regarding to courses, subjects, practices and number of ECTS credits.
- The fact that all courses in every syllabus of any degree of the UGR has 6 ECTS credits, unlike the majority of these French universities, creates difficulties in the design of the learning agreements for the further recognition of the credits.
- In the syllabus of the Pharmacy degree of the UGR there are some subjects divided in several courses (i.e. Pharmacology I, II and III; Pharmaceutical Technology I, II and III; Pharmaceutical

Chemistry I and II, etc); however, in some French universities these subjects are gathered in a single course. This complicates the corresponding recognitions as much in number of credits as the contents of the programs.

- Some subjects, like Food Science, does not appear in the French syllabus, but are included in the guidelines of the Spanish syllabus.
- Of especial difficulty is the management for the hospital stages for internships. The number of available vacancies normally is rather reduced in both the origin country and the host country. However, a high percentage of the *in* students wants to come to Granada to do hospital stages. Moreover, the number of credits assigned to this activity is very disparate between the different universities. In this type of academic agreements is essential the contact between the coordinators, the good will by both parts, and that the basics are well established within the inter-institutional agreement.
- The realization of the *end-of-degree project* involves the trouble of the assigned number of credits, since the UGR is 6 ECTS while in other universities use to be quite higher.
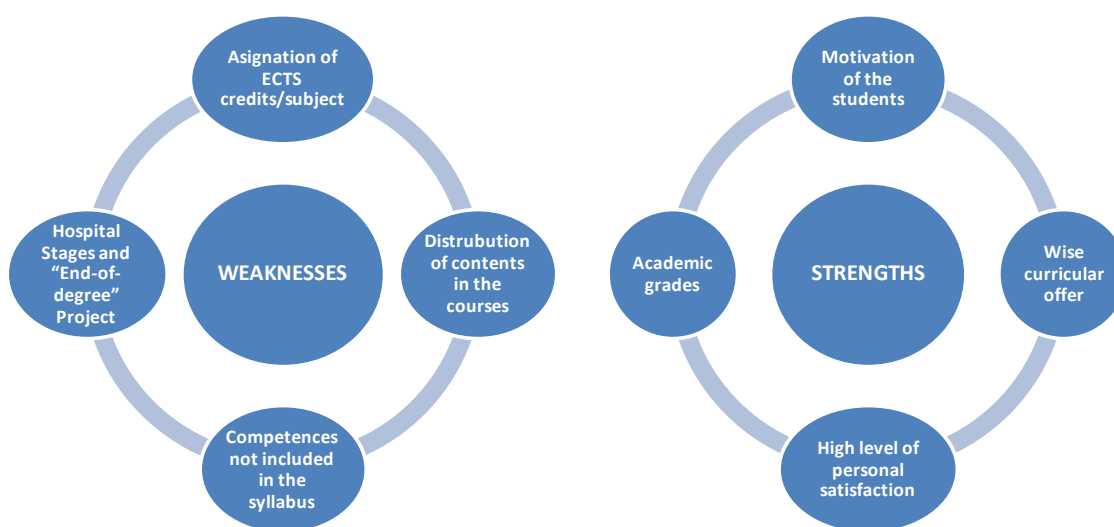
Figure 1. Weaknesses and strengths found during the preparation of the learning agreements.

Despite all these difficulties, we have also found some positive points (figure 1), such as:

- A high level of implication and commitment by the students when they prepare and process their learning agreements. In addition, many students who decide to do Erasmus mobility have very good academic records and very good grades.
- In general, the students are aware of the importance of a good level in the foreign language. In the current inter-institutional agreement a B1 or B2 level is recommended, depending of the host university.
- Most students decide study in the host university all the subjects corresponding to a same year of the degree (normally 2º, 3º, and 4º). There are only a few students that include into their learning agreements subjects from first year, which we consider positive, since we think that the basic training helps in the acquisition of more advance knowledge.
- The offer of optional subjects is normally quite wide, what allows to the students an easy curricular choice.
- The students who do internship in hospital stages highlight the professionalism of their tutors in the host institution, and the importance of the knowledge they got.
- The academic grades achieved by our (students *out*) during these three last years have been very satisfactory. There were no students who failed some course, and the marks were mainly "B grade", "outstanding grade", or even "student graduated with Honors". As an example, figure 2 summarizes the marks obtained by our students *out* in all the courses studied at every French university during the academic year 2013/2014.
- The interview with the students when they come back from their mobility stage shows, in the majority of the cases, a high level of satisfaction regarding to the academic marks, but also a personal satisfaction with the lived experience. The enrichment in the integral training of the

students is obvious. We are convinced that the relationship between the countries and the exchange of the university students is a tool that favours the transfer knowledge and the incorporation of innovative elements.
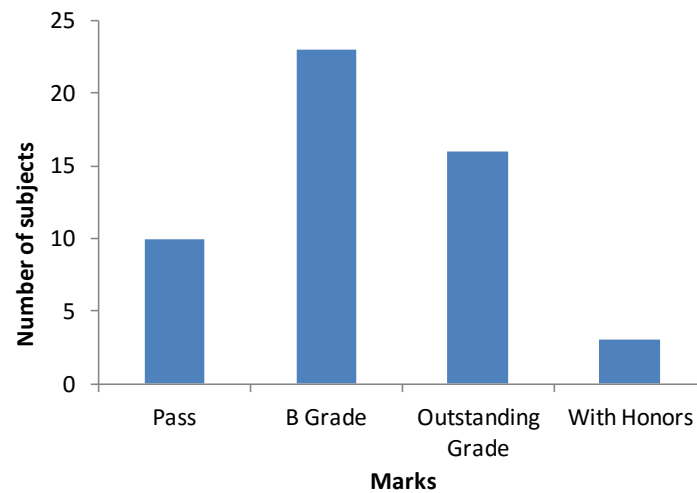
Figure 2. Marks obtained for our students *out* studying the courses in French Universities during the academic year 2013/2014.

4. Conclusions

• Far from what "*a priori*" we would expect, the adaptation of the mobility programs for students to the European High Education Area (EHEA) requires going in depth in the knowledge of the university systems, teaching methodologies and management structures of the partner universities.

• It is needed to establish a higher contact with the partner universities, in order to increase flexibility and coordinate the inter-institutional agreements and the learning agreements.

• The international experience has become one of the most important features face to the professional and personal future of the university students, thus, it must be implemented any action and initiative that improve and speed the mobility programs up.

• The relationship between the partner countries and the exchange of the university students is a tool that favours the transfer knowledge and the incorporation of innovative elements.

5. References

[1] EDUSFARM, *Ars Pharmaceutica,* **55**(2), (2014).

[2] FECIES. *Evaluación de la Calidad de la Investigación y de la Educación Superior*: Libro de Resúmenes. Deusto, Bilbao, 2014.

A conceptual insight on digital paralell workshops for urban planning

Fernández Güell, José Miguel; Higueras, Ester; Lamíquiz-Daudén, Patxi J., Benito, Manuel

Urban and Spatial Planning Department. School of Architecture.

Technical University of Madrid - UPM

Teaching activity in Urban Planning at the graduate level, is quite unique in having to combine an important role of the local components (determinants of physical and urban environment, professional or legal framework, etc.) with more widespread methods (GIS, "mapping", statistics, "big data", public control, participatory design, etc.) as well as with the increasingly complex and globalized processes of this field (real estate involvement, urban ecology, etc.). The potential for communication and academic interaction that involves the appearance of digital education offers an interesting range of experimentation on these epistemological specificities, as well as on innovative teaching approaches.

Supported in the practical background of three editions of a virtual workshop between universities in different countries, the so called DUyOT- UPM's "Parallel Workshop", this paper provides a conceptual insight of the potential of digital education environment and the specificities of academic activity in urban planning. It explores the challenges and perceived opportunities for the construction of learning activities in network urban design workshops. The aim is to understand to what extent the new digital tools pack a punch in this area and what are the next steps for enhance and extend the experience of the Paralell Workshop.

Finally, the paper intends to make a contribution, as modest as it could be, for the necessary adaptation of urban planning tolos to these phenomena that have radically changed after the bursting of the real state bubble and that arouse increasing interest in glo-local societies.

Innovation in STEM and Engineering Education: The NCTM models

Z. Nikolov[1], J. Ligon [2]

[1] *Biological and Agricultural Engineering, Texas A&M University College Station, USA*

+1-979-458-0763, znikolov@tamu.edu

[2] *National Center for Therapeutics Manufacturing, Texas A&M University, College Station, USA*

Introduction

Biopharmaceutical industry is characterized by the use of advanced technologies, harnessing new scientific advances, and highly complex research and development (R&D) business. The complex biologics drugs under development (patient level personalized medicines) and advances in manufacturing technologies are affecting biopharmaceutical industry. Several advances – in particular continuous manufacturing, process analytical technology, and single-use (disposable) systems – mark a new stage in the industry's development that are generating changes across the biopharmaceutical workforce. Education levels required for manufacturing are increasing, in part, due to the growth in biomanufacturing. Whereas a high school diploma used to be sufficient to secure some biopharmaceutical manufacturing positions, now an associate's degree, or a high school diploma plus some type certification, is generally the standard for a biopharma manufacturing operator.

The National Center for Therapeutics Manufacturing (NCTM) is an interdisciplinary education institution that provides multi-generational technical training and professional development programs for the biopharmaceutical and vaccine manufacturing industries. A member of the Texas A&M University System, the NCTM has created a diverse portfolio of curriculum that incorporates principles of engineering, health, and life sciences. NCTM's entire catalog of coursework is designed, developed, and delivered by industry-experienced instructors and academic subject matter experts.

Flexible Training, Distance Learning

NCTM has incorporated multiple delivery formats into its model, including instructional workshops on industry trends and technology advancements, hands-on training in cGMP environments, and online/distance learning at one's own pace. Many of our courses are blended, and require online coursework prior to onsite training. To deploy our online curriculum, provide digital registration, and manage our participants/trainees, NCTM has built its own web-enabled Learning Management System.

BioFORCE STEM Program

BioFORCE is an experiential science, technology, engineering and math (STEM) outreach program of the National Center for Therapeutics Manufacturing (NCTM that provides developmental activities to high school students. The BioFORCE summer program allows high school students to learn about cutting-edge research, medical discoveries, and biomanufacturing. Students participate in hands-on laboratory projects at the NCTM, learn from industry experts by visiting Texas biotechnology companies, and train with Texas A&M's faculty and researchers. The three year BioFORCE series prepares students during the summers of their high school education for college programs in engineering and science, and ultimately, to pursue a career in the biotech industry.

Table 1. ICEILT Scientific Areas that NCTM Model addresses

EDUCATION	INNOVATION & LEARNING TECHNOLOGIES	ENGINEERING EDUCATION
New tools for teaching	Platforms and environments for learning	Cooperation in education engineering between universities and industry
Learning for employment	U-Learning	New framework for engineering education
Mobility in education	Cooperative learning	Knowledge, competences and skills in engineering education
Learning focused on acquisition of competencies and skills assessment	E-Learning	International mobility (engineers, faculty, students and members of organizations)

What has the e-Virtue project achieved?

M. Matyja [1], M. Czarnecki [2]

[1] *Wrocław University of Economics*

Komandorska street 118/120

53-345 Wrocław

Poland

Telephone: 0048 604 412 433

E-mail: malgorzata.matyja@ue.wroc.pl

1. Introduction

e-Learning in all varieties has been around us since the internet emerged. Its beginnings can be found in programmed instruction and computer-based training but this has expanded to encompass distributed learning environments and virtual communities of practice. Employment opportunities in these categories are plentiful and continuously developing. Technology-enhanced learning related jobs will represent an important and growing number of jobs over the coming years and the European Training Systems have to adapt and to anticipate actual and future opportunities in these fields.

The e-Virtue research project was established to face up this new reality. The aim of the paper is to present general information about the project, its purpose, scope, partners involved, research methodology and the most significant results.

2. Results and Discussion

The title of e-Virtue project is: "ECVET for Virtual Learning Professions" (2013-1-PL1-LEO05-37880) [1]. It has been carried out under the Lifelong Learning Programme and co-funded by the European Commission. Seven institutions from five European countries have been involved in achieving the common purpose. The e-Virtue project aims at taking an in-depth look at professions related to virtual learning, especially by identifying competences and skills that are needed for jobs in this area. As a result of the project activities, including among others the research by internet search method, six role profiles for virtual learning professions were developed. They are in compliance with the principles of European Qualifications Framework [2] and European e-Competence Framework [3]. On the basis of these role profiles recommendations for vocational training in the field of virtual learning were drafted. In this way the document containing the training guidelines for training institutions was proposed.

3. Conclusion

The idea of undertaking the e-Virtue project ensued from the connections of expanding e-learning and labour market requirements. The project's results will help to increase the transparency and comparability of qualifications at European level, in order to improve the mobility of professionals working in the field of virtual learning. Moreover, they will contribute to boost the employability of professionals and reduce the mismatches between labour demand and supply.

4. References

[1] All results mentioned in this article are the collaborative work of the partners of the eVirtue project, co-funded by the Lifelong Learning Programme of the European Commission, http://www.evirtue.eu/

[2] http://ec.europa.eu/ploteus/search/site?f[0]=im_field_entity_type%3A97#, retrieved 11.07.2015

[3] http://www.ecompetences.eu/, retrieved 11.07.2015

d by the Lifelong Learning Programme of the European Commission, http://www.evirtue.eu/

Learning Optical Networking: Open-Access Simulator and Learning Experience Based on Working in a Large Group

R.J. Durán Barroso [(1)], I. de Miguel, N. Merayo, J.C. Aguado, P. Fernández, R.M. Lorenzo, E.J. Abril,

[(1)] *ETS de Ingenieros de Telecomunicación. Universidad de Valladolid. Paseo de Belén, 15. 47011 Valladolid (Spain).+34 983 423 000 (ext. 5557). E-mail: rduran@tel.uva.es*

1. Introduction –Optical Networks (i.e., systems that transmit information by means of light and, typically, by using an optical fibre) are the best alternative to develop high-bandwidth communication networks. Hence, students of telecommunication engineering must acquire basic knowledge about them. Practical tools can help the students to understand the main concepts and to increase their academic performance. However, the use of optical network equipment in classes is not a feasible solution due to its high cost. An alternative is to use network simulators. Among the different simulators of optical networks, it is possible to find commercial ones (which are fully developed but they are expensive) or using a generic and freeware simulator in which everything should be implemented almost from scratch. In [1], we started developing an Open-Access simulator that can simulate dynamic Wavelength-Routed Optical Networks (WRON) i.e., optical networks based on the establishment of on-demand optical circuits (or lightpaths) between two network nodes (even when they are not adjacent in the physical network).

On the other hand, the student should also acquire transversal skills like working in a complex project or in large teams. In the classical lab exercises in our degrees, the students work in pairs solving a very small problem (being the same problem for all the groups). For that reason, they are used to working in small groups in which they cover (due to the lack of time) a simple problem from the beginning to the end. However, in their future work environment, they will work in large groups, where each worker has its own role and solves a single part of the problem. Therefore, they also have to acquire those coordination skills to work in a real environment.

In this paper, we present the main results obtained from an internal project at Universidad de Valladolid. In that project, our freeware WRON simulator is extended to simulate more complex networks. Moreover, a learning experience was carried out using the simulator to allow the students to acquire some coordination skills when working in a large group that deals with a complex problem.

2. WRON Simulator Extension – In [1], we present the first release of the WRON simulator. It only allows the establishment of on-demand lightpaths. During the current project, two different modules were developed. The first one allows to plan the network depending on the incoming traffic and to establish a set of lightpaths (i.e., a virtual topology) to carry that traffic. The second developed module enables reserving backup resources when establishing a lightpath in order to protect the network against failures. Shared and dedicated protection schemes were implemented. One of the main advantages is that all the methods (new and old) can work together simulating a complex and heterogeneous optical network.

3. Learning experience – During course 2014/15 a learning experience was carried out in one of the subjects related to optical networks in Universidad de Valladolid. All the students (in particular, ten) had to work together to solve a complex problem: developing control mechanisms for a hybrid (dynamic and static) WRON with protection capabilities. Students have to develop their own work plan in order to comply with requirements and deadlines, and choose the project coordinator and workpackage leaders. Following the teacher advises, they worked together in the project and reached the objective. 75% of students liked this teaching methodology (the rest considered it as normal).

4. Conclusions – The main results from a Universidad de Valladolid internal project has been presented. An open-access WRON simulator has been extended and a learning experience based on working on a complex project in a large team has been carried out. The simulator works as expected and students like the learning experience and they feel that they have acquired some skills that they did not have before.

5. References

[1] R.J. Durán et al., *ICERI2014 Proceedings*, (2014) p. 2341-2347.

Virtual learning role profiles

M. Matyja [(1)], M. Czarnecki [(2)]

[(1)] *Wrocław University of Economics*

Komandorska street 118/120

53-345 Wrocław

Poland

Telephone: 0048 604 412 433

E-mail: malgorzata.matyja@ue.wroc.pl

1. Introduction

The use of technology in education has become a standard component in many courses [1]. The virtual learning, also known as "e-learning", "online learning" or "distance learning" [2], has been rapidly developing [3]. More and more people use this form of learning in their private or professional life. The new specialized professions in the area of virtual learning has emerged. The e-Virtue project ("ECVET for Virtual Learning Professions", 2013-1-PL1-LEO05-37880) [4], co-funded by the European Commission under the Lifelong Learning Programme, has taken an in-depth look in these professions. It was established to help make sure that there are the skills available in Europe to take advantage of the opportunities provided by learning technologies. E-Virtue aims to identify the competences and skills required to fulfill various roles in digital learning, not just by full-time specialists but all learning professionals. The purpose of the paper is to present six virtual learning role profiles which have been identified in the e-Virtue project on the basis of the research conducted in five European countries.

2. Results and Discussion

The abovementioned roles have been mapped to the European Qualifications Framework (EQF) and the European e-Competences Framework (e-CF). They describe the sorts of tasks that learning professionals have to undertake to take advantage of learning technologies. They are the following:

‒ architecting a digital learning strategy – responsible for the development and implementation of an organisation's longer-term strategy for the use of learning technologies,
‒ designing blended learning solutions – responsible for the top-level design of an overall learning intervention, whether or not the decision is ultimately taken to include a virtual learning element,
‒ developing digital learning content (specialist) – responsible for designing and/or developing more sophisticated forms of e-learning content, particularly those that are media-rich or highly interactive,
‒ developing digital learning content (non-specialist) – responsible for designing and developing simpler forms of virtual content as needed to support the job holder's own teaching and training;
‒ facilitating virtual classroom sessions – responsible for the delivery of real-time, online sessions making use of web conferencing software,
‒ online tutoring – responsible for the successful delivery of, and support for students engaged in, extended online and blended programmes.

3. Conclusion

The six role profiles described in the paper are the exemplary roles occurring in the virtual learning field. Their usage will help to increase opportunities for professionals to find an job and mobility of workers.

4. References

[1] Pirani J. A., "Supporting E-learning in Higher Education", EDUCAUSE, Boulder, Colorado, 2004.

[2] Moore J. L., Dickson-Deane C. Galyen K., e-Learning, online learning, and distance learning environments: Are they the same?, *Internet and Higher Education,* 14, (2011), pp. 129–135.

[3] Papadopoulou Y., Aristodemou E., Laouris Y., The Use of e-Learning in Adult Learning, A Comparative Study Between Six European Countries, retrieved from http://www.cyberethics.info/cyethics1/images/stories/pdf/ECEL08_ElearningInEurope_PapadopoulouEtAl_Revised.pdf, 11.07.2015

[4] All results mentioned in this article are the collaborative work of the partners of the eVirtue project, co-funded by the Lifelong Learning Programme of the European Commission, http://www.evirtue.eu/

How to educate a virtual learning specialist in Europe? The brief description of training guidelines

M. Matyja [(1)], M. Czarnecki [(2)]

[(1)] *Wrocław University of Economics*

Komandorska street 118/120

53-345 Wrocław

Poland

Telephone: 0048 604 412 433

E-mail: malgorzata.matyja@ue.wroc.pl

1. Introduction

Using the new technologies in education has changed the relationship between the teacher/trainer and learner [1]. New skills, competencies and attitudes are required for those planners, managers, teachers and trainers who design and develop e-learning strategy or content. As the result of the rapidly growing industry of virtual (e-, online, distance) learning there is a need of adequate training of professionals working in this area. The aim of the paper is to present the main issues that should be taken into account in the process of virtual learning specialists' education. This is done on the basis of the training guidelines which have been developed in the e-Virtue project ("ECVET for Virtual Learning Professions", 2013-1-PL1-LEO05-37880) co-funded by the European Commission under the Lifelong Learning Programme [2].

2. Results and Discussion

The paper briefly describes basic principles and helpful tips of facilitating learning events. Next, it shows a catalogue of learning outcomes and best practices in training exemplary role profiles which were identified in the abovementioned e-Virtue project. Finally, it presents background and basics for adjustment in virtual learning professions across Europe.

3. Conclusion

The paper can be treated as some kind of guidance for European training institutions and all others involved in drafting curricula and dealing with the knowledge, skills and competences that are actually needed in virtual learning professions, not only at a national, but at the European level.

4. References

[1] Gray D. E., Ryan M., Coulon A., The Training of Teachers and Trainers: Innovative Practices, Skills and Competencies in the use of eLearning, *European Journal of Open, Distance and E-Learning*, 2, 2004.

[2] All results mentioned in this article are the collaborative work of the partners of the eVirtue project, co-funde

Skills and competences needed for virtual learning professions.

Research report

M. Matyja [(1)], M. Czarnecki [(2)]

[(1)] *Wrocław University of Economics*

Komandorska street 118/120

53-345 Wrocław

Poland

Telephone: 0048 604 412 433

E-mail: malgorzata.matyja@ue.wroc.pl

1. Introduction

Education and training play an important role in meeting many socio-economic, demographic, environmental and technological challenges today and in the years ahead. However, as the recent JRC Technical report states: "to determine how education and training policy can adequately prepare learners for life in the future society, there is a need to envisage what competences will be relevant and how these will be acquired" [1]. It should be also noted that new forms of education and training has expanded. One of them, e-learning, requires from people who use it to have adequate skills and competences.

The aim of the paper is to identify skills and competences that are desirable to meet the requirements for virtual learning professions. Especially, it explores virtual learning market, virtual learning labour market and training market. This is done on the basis of research conducted in e-Virtue project ("ECVET for Virtual Learning Professions", 2013-1-PL1-LEO05-37880) co-funded by the European Commission under the Lifelong Learning Programme [2].

2. Results and Discussion

With the use of internet search method approximately 130 organizations were examined in five European countries. The research results are divided into three areas: product/services offered in virtual learning market, job advertisement in virtual learning labour market and training offer targeted to virtual learning specialists. The most popular products and services (first area) are: learning/content management system (LMS/CMS), collaboration tools/platforms, specific applications, content development, courses/e-learning and consulting/support. The second area includes a breakdown of job profiles such as: web/application development, authoring/course development, course design, management, graphics/media, training etc. Each job profile is assined with sepecific roles and requirements of knowledge, skills and competences. The third area describes three groups of training programmes in virtual learning field: those aimed specifically at higher education, those characterized as vocational in nature, and a smaller group covering both.

3. Conclusion

All partners of the e-Virtue projects conducted research into the products, services, jobs and training offerings in the virtual learning market. The research results can be used by educational or training institutions in different stages of learning (such as HE, VET) to develop a catalogue of skills and competences actually needed for virtual learning professions and on this basis to prepare adequate training programmes.

4. References

[1] Redecker, *et al.*, (2011) *The Future of Learning: Preparing for Change*, Joint Research Centre, Institute for Prospective Technological Studies report (JRC 66836/EUR 24960 EN), Publications Office of the European Union, Luxembourg [online], retrieved from http://ipts.jrc.ec.europa.eu/publications/pub.cfm?id=4719 , 2014.03.10

[2] All results mentioned in this article are the collaborative work of the partners of the eVirtue project, co-funded by the Lifelong Learning Programme of the European Commission, http://www.evirtue.eu/

Industry-Sponsored IT Interdisciplinary Curriculum for Students Majoring in non-IT Courses

Jong-Suk Ahn , Chee Sun Won , Kwangwoo Lee, Euy-Soo Lee, JongBeom Lim

Dongguk University, Seoul, Republic of Korea

{Jahn,cswon,klee,eslee,jblim}@dgu.edu

1. Introduction – The industry-sponsored capstone design programs such as Multidisciplinary Engineering Capstone Program [1] and ICIP (Internship & Capstone design Integrated Program) [2] have been considered as an effective way of university-graduate recruitment. Along the same direction, a new interdisciplinary curriculum called software convergence interdisciplinary major (SCIM) in Dongguk University financially sponsored by Samsung for students majoring in non-IT-related courses is introduced. Current job-market requires students to cultivate a competency of skilfully exploiting the state-of-art IT techniques regardless of their majors as a way to meet this job market requirement. This paper presents the principles behind our SCIM curriculum, the curriculum structure, some typical courses, and finally some preliminary evaluation results.

2. SCIM curriculum and survey results – The SCIM curriculum provides the double bachelor degree allowing students to study their major determined at their entry in parallel to IT major. Since these students should exhibit different abilities from IT engineers, we set our goal to grow students to be professionals who can apply IT software in their major field instead of coding skill. For systematically raising these two competency, our curriculum classifies the whole 16 courses, amounting to 45 credits, into three categories, namely, introduction to IT, familiarity to IT, and applicability of IT. Figure 1 depicts a diagram of courses belonging to these three classes and their precedence. As a way to confirm the validity of our proposed curriculum, Table 1 presents the survey results conducted for 30 students currently registered with our program.
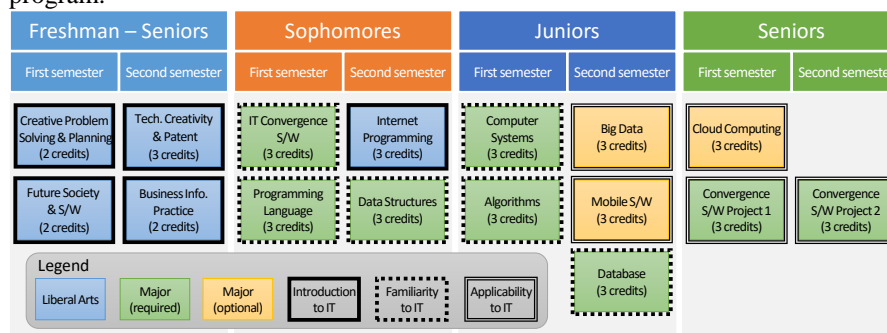
Figure 1. SCIM curriculum with categories and precedence.

Table 1. Survey questions and results.

Motivation	Getting a job	Curiosity	New experience	Scholarship	Sociality
	15%	27%	55%	0%	3%
Career plan	Getting a job (Primary major)	Getting a job (IT-related)	Getting a job (Other fields)	Graduate school	Founding a company
	35%	38%	6%	9%	12%
Course satisfaction	Strongly satisfied	Satisfied	Normal	Dissatisfied	Strongly dissatisfied
	3%	63%	30%	3%	0%

4. Conclusions – The paper presents an interdisciplinary curriculum sponsored by an IT company with a specific purpose of educating non-IT students with software skills. Even though this program has been initiated only one year before, the proposed course work is evaluated to satisfy the students' expectation. In the near future, we will collect feedback from the companies hiring our graduates to validate the effectiveness of our proposed curriculum.

5. References

[1] Allenstein, J. T., et al., "Examining the Impacts of a Multidisciplinary Engineering Capstone Design Program." Proceedings of the 2013 American Society for Engineering Education Annual Conference, Atlanta, Georgia. 2013.

[2] Lee, E.-S., et al., "LINC Project for Enhancement of Industry-University Cooperation in Engineering Education in South Korea," Proceedings of International Conference on Engineering Education - ICEE 2015.

Programme of teaching engineering courses in English offered to international and Polish students – remarks on advantages, disadvantages and organisational problems

Janusz Golas (1), Jadwiga Okafor (1)

(1) AGH University of Science and Technology in Krakow, Al Mickiewicza 30, 30-059 Krakow, Poland

phone +48 12 617 22 49, e-mail jgolas@agh.edu.pl

The AGH University of Science and Technology is ranked among the best Polish technical universities. It educates over 39 000 students and 900 Ph. D. students offering 54 fields of studies. A very limited number of them on master level is fully taught in English as a language of instruction but there is a strong demand for particular individual engineering courses in English for those who are able to acquire knowledge not only through their first language but also in English. The University with a group of Polish and foreign experienced lecturers established in 2008 the Programme of International Courses. The aim of the Programme (www.intstudies.agh.edu.pl) is the creation for Polish students of a flexible proposal for the supplementing of degree programmes, perfecting the level of an essential knowledge of specialist English as well as the creation of a course base which would be constantly offered to foreign students studying at the AGH University of Science and Technology within the framework of international programmes mainly the Erasmus, UNESCO, SMILE and others. The programme "AGH UST International Courses" now constitute ninety or so courses recommended by the Advisory Board for International Studies at AGH UST.

Subjects taught across the entire University and available for students of all faculties at the AGH University of Science and Technology including foreign students engaged in free degree programmes of study within the framework of the Erasmus programme. There is a system of reqruitement and interactive registration webpage. Each semester roughly 600 Polish and international students participate the Programme collecting ECTS points to their credits.

The Programme is a kind of a challenge and a source of new educational and organisational experience not only for the students but also for the teachers. Prof. Janusz Golas the author of this presentation and the director of the Programme will share thoughts and remarks on running such programme in non English speaking country as Poland trying to widen its international educational offer.

Using cutting-edge technologies to motivate students to Engineering research: the example of data mining

P. Magaña [(1)], A. López-Ruiz, A. Lira, J. Gallego, M. Ortega-Sánchez

[(1)] *Andalusian Institute for Earth System Research (IISTA). University of Granada. Avd. Del Mediterráneo s/n, 18006 Granada (Spain)*

Phone: +34 958249738. Email: pmagana@ugr.es

1. Introduction – Students are exposed to many cutting-edge information technologies every day while they use their computers or smartphones, although most of this applied research is used in a transparent manner for them. These technologies can be applied as new methodologies for trainee researchers in different engineering fields, reducing the gap between students and research.

One of the most important technologies developed in recent years is data mining. Data mining is an interdisciplinary subfield of computer science, whose main aim is to discover patterns in large sets of data [1]. Data mining is present many day-to-day activities, such as in most of the recommendation or shopping online platforms. For instance, data mining is applied to find music bands related to the music taste of a user or to provide other items that may be of interest after a purchase process.

Data mining techniques involves several approaches: association rules, clustering, classification and summarization, among others. In particular, association rule learning searches for interesting relationships between variables in datasets. This technique has clear potential in Applied Engineering and it was used for the present work.

2. Scope of the work - In this work, the association rule learning technique was used to find relations between the characteristics of a certain type of coastal features (shoreline undulations [2]) and typical Coastal Engineering variables as wave height or tidal range. A student without experience was the responsible of the work, using this methodology as introduction into research. During the conference, the results obtained after the application of the data mining techniques, as well as the experience of the student will be presented, highlighting the advantages of this type of technologies in both fields.
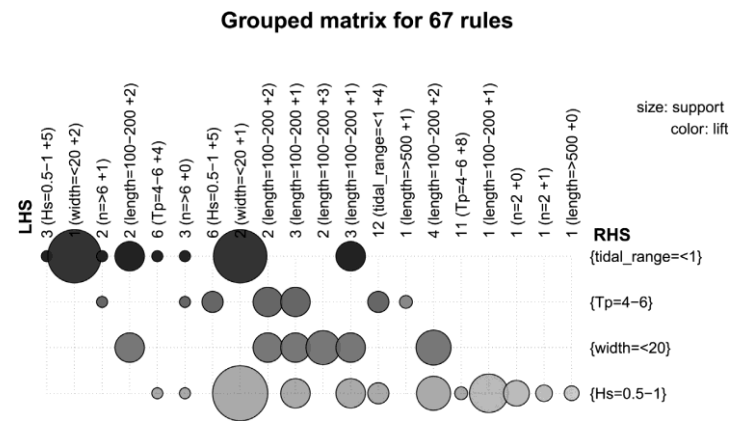
Figure 1. Example of results obtained with data mining techniques for SU.

3. Conclusions – Data mining constituted a valuable tool both for Engineering research itself, as well as for motivating inexperienced students to research. For them, using and understanding how this type of technology works constitute a sound incentive to learn new methodologies and apply the knowledge acquired during their graduate studies. Moreover, during this work, data mining was revealed as a very interesting tool for engineering proposes, since relations between natural and human-induced forcing agents and the response of natural systems such as shoreline undulations can be established.

4. References

[1] P. Magaña et al., *Applied Geography,* **55**, (2014) p. 278-291.

[2] Ortega-Sánchez et al., Shoreline Undulations, *Encyclopedia of Estuaries*, Springer, 2015.

Databases of coastal features as an introduction to Coastal Engineering research

A. López-Ruiz [(1)], P. Magaña, A. Lira, J. Gallego, M. Ortega-Sánchez

[(1)] *Andalusian Institute for Earth System Research (IISTA). University of Granada. Avd. Del Mediterráneo s/n, 18006 Granada (Spain)*

Phone: +34 958249738. Email: alopezruiz@ugr.es

1. Introduction – The advances in modelling the natural processes responsible for geographic features are strongly related to the quality, availability and temporal and spatial scale of the data, such as in the cases of forests, benthic habitats, soil mapping and coastal features. They are generally studied by remote sensing techniques, analysis of statistical surveys, field data integrated with historical maps and satellite remote sensing, which is also valuable for providing cost-effective information [1]. However, simpler, low-cost and more accessible sources of information would be of special interest for large-scale studies in which large areas are analysed. Moreover, this type of source can be an interesting starting point to introduce students into engineering research. Among other options, Google Earth has received much attention during last years. It hosts high-resolution imagery and allows the development of practical methods for studying the regions of interest in which a coarser resolution is insufficient. Google Earth has been recognized for its potential to significantly improve the visualization and dissemination of scientific data since its origin in the year 2005.

2. Scope of the work - In this work, we describe our experience using Google Earth imagery to generate an extensive database of medium to large-scale coastal features. In particular, we have focused our attention on (1) shoreline undulations (SU, Fig. 1), which can be defined as medium to large spatial-scale shoreline features that have alongshore dimensions ranging from hundreds to thousands of meters and cross-shore widths ranging from tens to hundreds of meters [2]; and (2) embayed beaches (Fig. 2), which are beaches bounded by human constraints or natural rocky coasts. During the conference, the methodology used to define the database will be presented, as well as the main results obtained after the application of data mining techniques to the information included in the database.

Figure 1. SU in Sylt (Denmark)

Figure 2. Embayed beach in Niembro (Northern Spain)

Moreover, the potential of using this type of studies and methodologies to introduce graduate students into research on Coastal Engineering will be also discussed. In this work, students were the responsible for identifying the coastal features and extracting the geometrical and wave climate information from different sources. Hence, it constitutes an excellent opportunity to apply simple analysis techniques that they have learn during the graduate studies. The supervisors checked their work, and they introduced them into the whole research processes: from the obtaining of the data and its treatment, to the dissemination of the results.

3. Conclusions - With our experience, we conclude that the definition of databases is a new research methodology of special interest for many Earth Sciences, such as Coastal Engineering. For their definition, Google Earth has been proven to be an exceptional low cost alternative. Furthermore, given it simplicity, these databases and their analysis constitutes a good method to introduce graduate student into research, since they can participate in the whole research processes.

4. References

[1] P. Magaña et al., *Applied Geography,* **55**, (2014) p. 278-291.

[2] Ortega-Sánchez et al., Shoreline Undulations, *Encyclopedia of Estuaries*, Springer, 2015.

Giving Voice to Marginalized Students: Exploring the Effects of Anonymity in Online Classroom Book Discussions

B. M. Brendler [1], V. E. Adams [2]

[1] The iSchool at the University of Missouri

221A Townsend Hall

Columbia, MO 65211

573-882-3910

brendlerb@missouri.edu

[2] The iSchool at the University of Missouri

111 London Hall

Columbia, MO 65211

870-834-0606

veatzd@mail.missouri.edu

1. Introduction – The students who speak in the classroom are the students who are heard. The thoughts and opinions of those who don't speak up are lost. The objective of this study was to explore student voice as representing students' social capital, and help them overcome participation inequality through anonymity in a technological intervention in their classrooms. This research hoped to discover the role that anonymity played in altering the participants' discussion strategies, and activity in literature discussions. The study examined how discourses about books functioned in face-to-face literature circles and in anonymous online book discussions with the same participants. We also looked at the ways anonymity may have altered the power relations and group dynamics within this group.

2. Experimental - This study was performed in three third grade classrooms at an urban elementary school in the United States. In order to provide anonymity in the online discussions, the participants were asked to use pseudonyms and to keep their pseudonym private. Data was collected through direct observation aided by the use of digital audio recorders and by interrogating the participants' online book discussions. The data was triangulated with student and teacher interviews during and at the end of the study. The study incorporated qualitative methodology, using grounded theory and critical discourse analysis techniques to understand what happened with this group of participants during the face-to-face discussions and looked at the power relations that might have affected those discussions. The data was analyzed using check coding, with both researchers coding the same data to help offset researcher bias. The same methods of analysis were used to examine the online discussions for the participant groups.

3. Results and Discussion - The teachers said the students were more thoughtful and substantive in their online responses. Only female participants mentioned being intimidated by the group dynamics in their face-to-face discussion groups. The top three online participants were females. The top speakers in the face-to-face groups were males. The males who were most dominant in face-to-face groups tended to be the least dominant in online discussions. The females who posted most online rarely spoke during the face-to-face discussions. Some of the participants were concerned about making errors or getting into trouble in face-to-face discussions. Only African American participants mentioned fearing trouble or repercussions due to their performance in the discussions.

4. Conclusions - The results of this study indicate that incorporating online book discussion into classroom pedagogy can offer students who feel silenced, for any number of reasons, an opportunity to be heard and it may provide dominant speakers some insight into the ideas and feelings of their more marginalized peers. In the case of this study, almost half of the participants would not have fully expressed themselves without the anonymous online discussions.

Moving forward: English content courses for Engineers in Spain

S. González-Rodrigo [(1)], I. Salto-Weis [(2)]

[(1)] *Dept. of Architectural Construction. School of Building Engineering. Technical University of Madrid.*

+34 91 336 76 11 / sonsoles.gonzalez@upm.es

[(2)] *Dept. of Applied Linguistics. School of Building Engineering. Technical University of Madrid.*

1. Introduction – Spanish universities, as a need to strengthen internalization and reach high competitive levels, as well as to engage a greater number of students, are largely interested in developing bilingual programs in the different curricula. However, in the area of engineering the introduction of content subjects in English is still quite scarce. In this paper we would like to expand on a teaching-learning example using English in the engineering curricula developed at the Technical University of Madrid where within the internalization program set in, a bilingual model was developed encouraged.

In the School of Building Engineering, and as a follow up from a previous bilingual pilot experience which took place 3 years ago, content courses totally taught using English as medium of instruction have been carried out for the first time in different disciplines in the Construction degree.

Table I. English level

English level	%
A2	8
B1	25
B2	50
C1	17

In one of the groups offered of the subject Steel Structures Construction, the satisfaction degree and a monitoring assessment during the development of the experience of teaching integrated English has been carried out. It is a theoretical subject but with a high practical load where the student needs to develop construction details from a given project. Both for the lectures and for all the working materials used only English has been used. Attending English groups is optional for the learner, therefore, allowing access to people who are fully interested and motivated in this respect. The group is a small group, with students who have had previous learning experiences in English language and an intermediate of English level.

2. Experimental – In order to know the perception and assessment of students, a set of questionnaires were prepared to gather information at different milestones of the semester. These questionnaires first allowed to know the profile of the students who enter this type of learning: what are their motivations, their previous experiences, their opinion about the importance of language and their expectations about different educational aspects. In the middle of the term, information is again collected on the fulfillment of these expectations together with open questions on their personal opinion. Finally, at the end of the semester, a final assessment is performed about the teaching-learning process.

Fig 1. Content English teaching – learning experience student opinion

3. Results and Discussion – Students assessed aspects related to the importance of English in the European space of higher education (ESHE), and for their future career as very high. They also consider that learning through English as a medium of instruction allows them to develop other skills and knowledge of technical language. Indeed, they do not consider it an added impediment or drawback. They are interested in having more educational opportunities and are generally very satisfied with their experience. The level of success of the group is greater than that of the groups being taught in Spanish, due to the high degree of motivation and interest of the participants.

4. Conclusions – Students are aware of the need for fully mastering English within a global and international working market. Being aware of this reality makes language a vehicle and not an anecdotal activity for their future. Academic policies are necessary to expand educational opportunities in English language at the tertiary level in engineering.

References

[1] J. Pérez y A. Ruiz, *Anales Ing. Mec.,* **14**(2), (2002) p. 1210.

[2] W.E. Dean, "Machining", Marcel Dekker, Nueva York, 1998.

[3] Foran, D. and Sancho, C. (2009). CLIL approaches in university Applied Science environments. In Dafouz, E. and M. C. Guerrini (eds). *CLIL across Educational Levels. Experiences from Primary, Secondary and Tertiary Contexts.* Madrid: Richmond Publishing, 113-124.

Evaluation of the students of the degree in human nutrition and dietetics for the period of external practices.

C. Cabrera-Vique[1], A. Peláez-Barrios[1], M.J. Rueda-Rama[2], R. Giménez-Martínez[1], J. Fonollá-Joya[3].

[1] *Dept. Nutrition and Food Science. Faculty of Pharmacy. University of Granada. Spain. Campus of Cartuja .s/n 18071-Granada. Phone: (+34)958243863. E-mail: carmenc@ugr.es*

[2] *Dept. Physical Chemistry. Faculty of Pharmacy. University of Granada*

[3] *Associate Professor for External Practices. Faculty of Pharmacy. University of Granada.*

1. Introduction - The new curriculum of the degree in Human Nutrition and Dietetics, following the guidelines of the new educational context of the European Higher Education, includes a period to perform internships in a company or other similar organizations such as hospitals, universities, totaling 18 ECTS. This period is filed during the last year of the degree supervised by a member of that agency and coordinated by a professor at the University of Granada qualified employee.

2. Objective - The objective of this work is to assess satisfaction of 60 students from the academic years 2013/14 and 2014/15 during the protective period, analyzing the strengths and weaknesses that we need to improve.

3. Results and Discussion - The satisfaction level was calculated using a survey by the student once their partition in practice. Each question was scored from 1 to 5 where "1" means "the lowest degree of satisfaction" and "5", "the greatest degree of satisfaction," if not enough is known about the question asked or considered not appropriate, available "N/C" box.
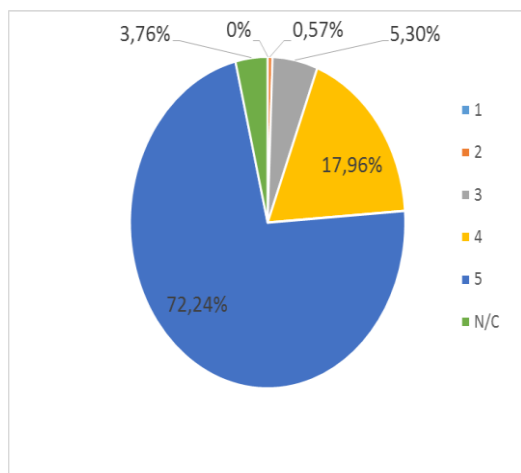
Overall 72.24% of the issues to be analyzed such as: "the activities to be performed," the "bibliography", "Motivates the student?" got a satisfaction level of "5" (the highest level satisfaction), yet all the questions analyzed is noteworthy 0.57% where a satisfaction level "2" was obtained and therefore should be improved, they are:

- How is the assessment done? (Tutor).

- Theoretical and practical activities are coordinated.

- The activities of the professional tutor help me in my learning.

- Stresses the relevant content.

- Motivate the student.

- Are you interested in the degree of understanding of their explanations?

Figure 1. Level of satisfaction of students of the Human Nutrition and Dietetics degree courses 2013/14 and 2014/15.

4. Conclusions - 72% of students shows a high degree of satisfaction after their practices, especially valuing the attention received from the professional tutor and knowledge.

Corpus-based Vocabulary Learning in EFL Classroom: How Feasible?

D.E. Lestari

University of Bristol, Graduate School of Education,35 Berkeley Square, Bristol BS8 1JA, UK

Mobile: +44 7479 365243   email: dl14722@my.bristol.ac.uk

1. Introduction

This paper focuses on the autonomous English vocabulary learning in corpus-based contexts. In the field of language teaching, learner autonomy has been an ongoing concern of foreign language educators. As an assistant tool in language learning, corpus shows how a word is used in a text and in particular context (Binkai 2006). The empirical study explored the aspects in which corpus can be applied in English vocabulary learning.

As one of the major components of language system, vocabulary is especially essential for English as Foreign Language (henceforth EFL) learners (Lewis, 2000). Among various approaches that contribute to vocabulary acquisition, corpus is one of the latest and most enlightening for a corpus makes an easy and quick analysis of great amounts of linguistic data possible (Sinclair, 2003). With constructivism as the guidance, the vocabulary teaching method based on corpus helps to develop students' autonomous learning ability. Built based on a large collection of authentic materials and advanced software, corpus helps learners to see how a word is used in contextualized and real-life setting (Halliday 2004).

The program used in the study is Wordsmith Version 4.0, developed by Mike Scott (1996). Wordsmith Tools is an integrated suite of programs for looking at how words behave in texts. The Wordlist tool shows a list of all the words or word-clusters in a text, set out in alphabetical or frequency order. By putting the search word right at the center of the screen and by looking at both sides of the search word, learners can see in what grammatical patterns it is used and what is the collocation.

2. Research Procedure

Corpus-based vocabulary learning was introduced and applied in one college in Indonesia. In order to test the effectiveness of the corpus-driven vocabulary learning, a questionnaire was designed and answered by 100 of the students at the end of the semester. Participants were asked to rate each of the treatments on a scale of choices. The questionnaire consists of 19 closed-multiple-choice questions and one open-ended question concerning the following aspects:
1. the students' opinion on the new vocabulary leaning approach and the concordance
2. the influence of the new approach on student' learning habits and methods
3. the students' assessment on the effectiveness of the learning methods.

3. Results and Discussion

On the whole, the students' attitudes toward corpus-assisted vocabulary learning are positive. 66.7% of them say they like the new vocabulary learning model and 26 (29.8%) of them like it very much. Compared to the traditional learning model, 84% of the students think the corpus-driven method is helpful and 26% of them think there is no difference between the two. This shows that most of them can accept the new learning model and the application of this learning model in the classroom is not very challenging for students. When confronting a vocabulary problem, 80% of the students will first turn to the corpus (%) and 11% will ask their classmates for help, 9% look at dictionary. It indicates that most of them have relied on the corpus as one of the learning aids. Some problems (disadvantages) are also revealed from the questionnaire. 53% of the participants admitted that sometimes they cannot understand the meaning of a word just by checking the use of a vocabulary in the corpus. They further argue that it is good for them to understand the usage of a new word in context from a corpus but it is also good to know exactly the meaning from a dictionary.

4. Conclusions

The research and the empirical study in the thesis prove that the corpus-driven approach is helpful in vocabulary learning and can contribute to autonomous learning at the same time. That can be shown in the following aspects. Firstly, corpus and concordance provide a new medium for vocabulary learning. For the students, a more active approach emphasizing discovering instead of memorizing can make learning more engaging and less intimidating. Secondly, students have more opportunity to control their own learning, so their learning awareness is promoted. Thirdly, the large amounts of data in the corpus enrich the teaching contents, and more importantly, the way the data is presented facilitates the discovery of some vocabulary knowledge, such as word frequency, collocation etc by individual users. Lastly, through the process of discovering, the students developed a sense of achievement and an impression that English is at least "learnable". The awareness that words can be learned by observing and testing hypothesis are developed and fostered.

5. References

Lewis, M. (2000). *Teaching Collocation*. London: Commercial Color Press plc.
Sinclair, J. (2003). *Reading Concordances*. London: Longman.
Halliday, M. A. K. (2004). *Lexicology and Corpus Linguistics*. London/New York: Continuum.
Binkai, J. (2006). Study on corpus-driven English vocabulary learning. *Education Exploration*, *4*, 89-91.

The role of study tours in diversifying study abroad

E. Perez, M. Slotkin, A. Vamosi

Florida Institute of Technology. 150 W. University Blvd. Melbourne, Fl. 32903

Tel: 01-561-889-5610   E-mail: Eperez@fit.edu

The heightened focus on collegiate exposure to the international community is reflected in the burgeoning number of study abroad participants. From a pedagogical perspective, experiential learning in a foreign setting is a direct recognition of current economic and political changes which emphasize the importance of both global awareness and cross-cultural literacy. Traditionally, providing students opportunities to spend a semester or year abroad has fulfilled this goal. This research focuses on an international educational opportunity that is both more accessible and affordable. Known as a study tour, it utilizes a blended learning model which includes pre-trip classroom education in the home country combined with a 1-2 week classroom and cultural experience in a foreign locale.

The primary research questions concern whether this model increased the participation of students that typically do not partake in study abroad opportunities and further, does this experience enhance an individual's confidence in traveling and negotiating internationally. The sample consists of five cohorts traveling each summer from 2011 to 2015 for a total of 75 students. Preliminary findings indicate that a large number of non-traditional students participated in the program and that after the experience students felt more confident in venturing internationally.

Key Words:

Study abroad, study tour, cross-cultural competency, international experience

A Double-degree Program: Bachelor's Degree of Human Nutrition and Dietetics and Bachelor's Degree of Science and Food Technology, an attractive and profitable option

A. del Moral[(1)], M. Olalla[(2)].

(1) Department of Microbiology, Faculty of Pharmacy, University of Granada.
(2) + 3495824392. admoral@ugr.es

(2) Department of Nutrition and Food Science. Faculty of Pharmacy. University of Granada.

1. Introduction -The adaptation of the Spanish university education to the European Framework for Higher Education has implied the design of new curricula. Since 2010, the Faculty of Pharmacy of Granada has offered the Bachelor's Degree of Human Nutrition and Dietetics and one year later, also the bachelor's degree of Science and Food Technology separately. The lack of synchronization in the establishment of both grades has resulted in the different design of their curricula, which were intended for two independent degrees.

Unlike what happened in the past, the new education system now allows modifications to teaching curricula by the so-called Agencias de Evaluación. (Evaluation Agencies). Therefore we consider of great interest to study the possibility of establishing a double degree of Human Nutrition and Dietetics and Science together with Food Technology, which will reduce the amount of time required to be spent at each in a significant way and will allow under graduates to compete under better working conditions.

2. Experimental - A total of 34 lecturers teaching 47 subject areas have participated in this project, by exchanging information of shared subjects of different materials, departments and faculties teaching in the grades of Science and Human Nutrition and Food Technology in order to set up the basis for the application for a double degree.

3. Results and discussion - The curricula of both degrees were carefully examined, planned and defined (objectives, skills, contents and activities), proposals were made in both common and related subjects and academic training has been optimized eliminating duplication of activities. In addition, the most innovative aspect of the project is that the academically supervised activities that students do in the subject areas have been adapted to the actual development of the curriculum.

Two different proposals have been made: a) keeping the current curricula while promoting the core curriculum with an overall length of 5 and half years; b) Adaptation and reorganization of key subjects, thus achieving a curricular itinerary of five years.

Moreover, after asking students by means of different surveys, it has become apparent that the CTA students regard the following subject as essential for their academic training (in the order we mention them): Food Microbiology, Food Science, Food Analysis and Chemistry and Biochemistry of Food whereas for NHD students the most relevant subject areas would be Dietetics, Nutrition Diet Therapy and Food Science.

4. Conclusions -Due to the growing demand for double-degree studies and after a detailed examination of the project, we regard our proposal for the double degree of bachelor's degree of Human Nutrition and Dietetics and bachelor's degree of Science and Food Technology as a feasible, attractive and profitable one.

5. References- [1] 12-132 Teaching Innovation Project of the Teaching Innovation Secretariat of the Vice-rector ship for Academic Organization of the University of Granada.

Factors Affecting School Safety

Necmi GÖKYER

Fırat University, Education Faculty, Educational Sciences Department

05055939790, ngokyer@firat.edu.tr

1. Introduction

Referring to the sense of physical, psychological, emotional freedom felt by students, teachers and other school personnel, school safety is an umbrella term that covers every step between children and personnel leaving home for school until their return.

School safety has come to be a major problem in recent years, particularly in developed societies (Gottfredson, Gottfredson and Hybl, 1993: 179; Welsh, 2001: 911; Agron and Anderson, 2000, 1; Verdugo, 1999:267; Benekos, Merlo and Cook, 2002: 273; Gorman and Pauken, 2003: 24; Işık, 2004). Regarding the sources of the problem, factors such as students, teachers, school administrators, families, the society, media and globalization are associated with school violence and safe schools (Debarbieux, 2009; Finger, Craven, Marh, Parada, 2005). Stephens (1995) states that a safe school is a place where students and teachers can teach and learn in a warm and close environment with no threats or fears. A safe school is at the same time an environment where behavior expectations are openly communicated and persistenly and fairly executed, and a climate in which each child is accepted and valued (Cited in Özer, 2006; Ayar, 2010:13).

This study aims to evaluate the factors affecting school safety at various education institutions based on administrator, teacher and student views. Answers to the following questions were sought with quantitative data:

1. What is the level of student views about factors affecting school safety and shuttle bus security?

2. Do student views vary based on grade level, school type, gender, and mother's and father's educational status?

The questions designed to elicit administrator and teacher views about factors affecting school safety as qualitative data are given in other sections.

The study was designed as "a survey and standard open-ended interview". The universe of the study includes 33 high schools in the center of Elazığ. The scale was developed with 250 students from these schools. The data collection instrument includes 48 items. Stratified sampling was used to determine the five high school types where the research would be conducted. Considering the size of the types in the universe, eight schools were selected by using random sampling. The number of students in these schools equalled 7354. Scales were distributed to 912 randomly selected students, and 825 were finally analyzed after excluding faulty returns. Items were named considering their content. As all items in factor one were related to school safety, this factor was called "safety at school". Items in the second factor were related to shuttle buses. This factor was therefore called "safety on shuttle buses".

2. Conclusions

The results suggested that student views about the dimensions affecting school safety are on the level *sometimes*.Female students had more negative school safety views than male students. In the *School safety* dimension, Science and Social Sciences High School students had more negative views than the students of Anatolian High Schools, Fine Arts and Sports High Schools and Vocational and Technical High Schools. In the*safety on shuttle buses*dimension, Science High School students had more nagtive views than those of Fine Arts and Sports High Schools and Anatolian High Schools. Regarding parents, high school and university graduate mothers had more negative views than illiterate mothers, while university graduate mothers had more negative views than elementary and secondary school graduate mothers in the s*afety at school* dimension. In the same dimension, university graduate fathersın had more negative views than illiterate fathers, elementary school/secondary school graduates and high school graduates. According to Pearson correlation analysis results, as school safety increases, so does safety on shuttle buses. The most negative responses given to the question about safety on shuttle buses were, respectively: Disturbing students of other schools on lunch break (abuse, bullying, etc.), shuttle bus drivers stopping in dangerous places when picking up and dropping students (crossroads, next to a highway, etc.), shuttle bus driver breaking traffic rules, and shuttle buses being filthy. Items in the safety at school dimension were, respectively: Male students humiliating female students, more senior students pressurizing junior ones, schoolbags being handled by other students without permission, and male students disturbing female students.

The following may be recommended: Parents with lower education levels may be trained in line with their needs. Families should be more closely interested in their children's lives and establish close, friendly bonds with them.

3. References

[1] Agron, J. and Anderson, L. (2000). School security by the numbers. American School ve University, 72(1), C1-C11.

[2] Benekos, P. J., Merlo, V. and Cook, B. (2002). A priliminary study of student attitudes of juvenile justice system. Journal of Criminal Justice Education, 13(2), 273-296.

[3] Debarbieux, E. (2009). School violence (Translated by: İsmail Yerguz). İstanbul: Contact.

[4] Finger, L. R., Craven, R. G., Marsh, H. W., & Parada, R. H. (2005). Characteristics of effective anti-bullying interventions: What research says. access date: 26.07.2015
http://scholar.google.com.tr/scholar

[5] Gorman, K. And Pauken, P. (2003). The ethics of zero tolerance. Journal of Educational Administration, 41 (1), 24-36.

[6] Gottfredson, D. C., Gottfredson, G. D., and Hybl, L. G. (1993). Managing Adolescent Behavior: A Multi-year, Multi-school Experiment. American Educational Research Journal, 30 (1), 179-216.

[7] Işık, H. School Safety: A Conceptual Analysis. Journal of National Education, Ministry of Education publications (2004), 32,164: 154 – 161.

[8] N. Ayar. A Different Approach to School Safety Issues: School Police Application. Sakarya University Institute of Social Sciences. Master Thesis, 2010.

[9] V. R. R. (1999). Safe schools: theory, data, and practices. Education and Urban.

[10] Welsh, W. N. (2001). Effects of student and school factors on five measures of school disorder. Justice Quarterly, 18(4), 911-947.

Teaching scientific terminology in foreign language improves the performance of undergraduate medical students

A. Ruyffelaert [(1)], B. Jaimes-Parra [(2)], F. Campos [(2)], M. Carriel-Araya [(3)], I. Garzón [(2)], M.C. Sánchez-Quevedo [(2)], V. Carriel [(2)]

[(1)] *Department of Linguistics, Ghent University, Belgium and Department of French Philology, University of Granada, Spain*

[(2)] *Department of Histology, University of Granada, Spain*

[(3)] *Faculty of Economy and Business Sciences, University of Valparaiso, Chile*

1. Introduction – Nowadays, most of the relevant scientific information is in English or in other languages such as French. Therefore, the knowledge of a foreign language in medicine is considered essential to get access to different kind of information, to communicate knowledge or diagnosis to foreign patients or to pursue an academic or scientific career. In general, most of undergraduate students improve their writing, speaking, reading or listening skills during their studies because they follow language courses or perform a study stay at a foreign university. Unfortunately, the acquisition of a high scientific lexical richness in foreign languages is difficult due to a lack of language teachers with an adequate scientific background or the lack of specific language courses focused on scientific terminology. For this reason, the aim of the present study was to develop a teaching strategy for passive acquisition of histological terms in English and French for undergraduate Spanish medical students. Furthermore, we evaluated gender differences, the student perception (for this type of activity), and students' extrinsic and intrinsic motivation to learn English or French. Finally, we analyzed the impact of this activity in students' academic performance.

2. Experimental – This study was performed with voluntary undergraduate medical students enrolled in the course of Human Histology at the School of Medicine of the University of Granada, Spain. We designed histological tests in foreign languages (English and French) and a perception and motivation survey [1,2] using the application www.thesistools.com. Each test was composed by ten histological images and multiple choice questions. For each test we calculated the scores (from 0-10), gender differences, students' perception and the impact of this test on the scores on the final histological exam.

3. Results and Discussion – The tests were performed by a high number of voluntary students (84% for English and 73% for French), and showed significantly higher scores in English as compared to French. Similarly, students found the histological test in English more useful than in French (71% and 52% respectively) and only few students found this activity useless (9% for English and 16% for French). Interestingly, both genders showed a clear intrinsic motivation for learning English or French, and it was related to leisure and travelling. Students who did the English and French test showed higher scores at the end of the course of human histology as compared to the students who did not perform the test or found it useless.

4. Conclusions – This pilot study demonstrated that medical students have an acceptable background in English which allow them to perform complex scientific activities. In addition, medical students manifested a very positive perception in this activity. These results showed that they are open-minded to follow innovative didactic strategies for the acquisition of medical terms in foreign languages. In summary, this strategy demonstrated a positive impact on the histological knowledge of the participating students. Therefore we hypothesize that the regular use of this strategy could reinforce the scientific knowledge and language skills in medical students.

5. References:

[1] A. Ruyffelaert and P. Hadermann. The impact of age and gender on the learners' motivation and attitudes towards French in secondary education in Flanders. Proceedings INTED 2012.

[2] A. Campos-Sánchez et. al. Motivational component profiles in university students learning histology: a comparative study between genders and different health science curricula. BMC Med Educ. 2014. doi: 10.1186/1472-6920-14-46.

Design and elaboration of an audivisual notebook by the students as an integrative approach of learning in tissue engineering

F. Campos [(1)], B. Jaimes-Parra [(1)], MA. Martín-Piedra [(1)], I. Garzón [(1)], A. Ruyffelaert [(1)], LA. García-Martínez [(1)], M. Alaminos [(1)], V. Carriel [(1)]

[(1)] *Department of Histology. Faculty of Medicine. University of Granada. Av. Madrid 11. 18012 Granada*

Tel: +34-958243515   e-mail: fercampossanchez@gmail.com

1. Introduction – Integration of different concepts that may or not be directly interrelated should be one of the main objectives of teaching activities. However, traditional teaching systems are often focused on specific concepts that are taught and showed to the students in a sequential manner, and very little interrelation among concepts is shown. A clear example of this is found in medical schools, especially in those cases in which the step-by-step development, quality control and clinical translation of new medical products is commonly taught with very few integration among these phases. In this regard, a novel teaching strategy that may allow a better integration of concepts is the use of audiovisual documents, often called as audiovisual notebooks, which previously demonstrated usefulness for a proper achievement of curricular objectives and offer the advantages of self-learning processes [1]. We selected the development and clinical implementation of an artificial bioengineered human cornea as a teaching model. The process will took around 10 years from the moment the artificial tissue was created in the laboratory to the final clinical use in patients, and included basic developments, genetic, histological and immunohistochemical analyses ex vivo and in vivo in laboratory animals, followed by generation in GMP facilities, approval by the Spanish Medicines Agency, design of a clinical trial and clinical implant in patients.

2. Experimental - In this work, students of the optative subject of the medical curriculum *Tissue Engineering* were selected to participate in the generation of an audiovisual document related to the whole process. First, students and teachers planned the script of the document and the different steps of the generation of the audivisual integrative notebook. Then, students and teachers elaborated the notebook by taking part in each step of this elaboration, including design, filmmaking, montaging and editing, addition of figures and notes, etc. finally, the notebook was used during the teaching sessions of the subject *Tissue Engineering* addressed to the whole class.

To evaluate the usefulness of this audivisual notebook, we used a questionnaire designed ad hoc, and we assessed the perceptions of the teachers and students that participated in the elaboration of the notebook on the usefulness of the method and on the different parts of the notebook in a Lickert-like scale from 1 to 5. Results were compared between teachers and students.

3. Results and Discussion - Our results show that both the students and teachers perceived the elaboration of integrative audiovisual notebooks as very interesting and useful. Regarding the specific parts of the document, the information displayed in the notebook, along with the images shown were the topics rated with the highest scores by teachers and students, whereas the text shown and the music used were rated with the lowest values. Interestingly, students and teachers coincided in their preferences, but statistical differences ($p < 0.05$) were found for all these components for the comparison of students vs. teachers, with the highest values corresponding to teachers for all components.

4. Conclusions - The novel approach developed in this study suggest that the use of integrative audiovisual notebooks are very useful tools for teaching complex processes requiring different interrelated steps, and students participating in their elaboration contributed to their own learning process.

5. References

[1] Campos-Sánchez A, López-Núñez JA, Scionti G, Garzón I, González-Andrades M, Alaminos M, Sola T. Developing an audiovisual notebook as a self-learning tool in histology: perceptions of teachers and students. Anat Sci Educ. 2014 May-Jun;7(3):209-18.

The use of Podcasts in the education programme of biomedical laboratory science.

Dester. Katrine Balsløw[1], Eley, Tina Ninka[1], Pedersen. Kim Blanksø[1]

[1]*University College Zealand, Bioanalytikeruddannelsen, Parkvej 190, DK-4700 Næstved. Demark*
+4572482683. kade@ucsj.dk

1. Introduction - Podcasts are one of the many new internet based technologies that has emerged in the last 10 years. The first podcasts were aired in 2004. When Apple launched iTunes 4.9 with native support of podcast there was surge in the use. Primarily by conventional broadcasters but soon anyone made podcasts on a huge variety of subjects [1].

Podcasts are monological (instructional) method along with video and article databases [2]. Monological teaching is where the teacher is the expert and the students are receiving knowledge.

At University College Zealand (UCSJ) we are teaching in the bachelor programme for biomedical laboratory scientists. We have students who are attending ordinary classes and a minor part (app. 15%) of them is e-students who only attend classes once a week on average. The classes the e-students are participating in are primarily laboratory courses. All students are working in clinical departments at different hospitals in the region of Zealand for about 40 % of the time.

Using podcasts as a teaching tool addresses all the students but of course especially the ones that easiest acquire learning auditory. At UCSJ we started the production as a supplement especially for the e-students, but we quickly learned that many students at the ordinary education programme could benefit from this auditory supplement. The podcasts include all areas of the educational programme, ranging from ethics and statistics to molecular biology.

2. Experimental – All podcast were made using the Audacity software [3]. This software package was also used for the editing and creation of MP3 files. Podcasts can be accessed directly from the website, they can be downloaded, or they can be subscribed to as a RSS-feed or via Android.

3. Results and discussion – After two months we made a survey amongst our students to evaluate how much the podcasts are used and how helpful they are in the learning process. We asked our students if they had listened to one or more podcasts. 54 % answered that they had listened to a podcast, and 67 % said they would listen to it in the future. We also asked our students how useful they found the podcasts to be. 21 % said it was useful, 31 % said it was interesting and 12 % said it was very interesting. Only 11 % thought it did not help in their learning process.

The format found to be best is usually one with two presenters. One is the "expert" and the other is the "interviewer". This combined with the fact that we do not have a manuscript but rather a list of cues gives a very dynamic and. "live" podcast.

A link to the podcasts (only in Danish) can be found at www. http://podcast.ucsj.dk/bio/

4. Conclusion – Podcast is an excellent tool to introduce students to a new subject as well as a tool for repetition. It is readily available and it is a learning tool that the student can access anywhere anytime.

5. References
[1] M. Abdous *et al*. *Computers & Education*.
[2] N. E. Pasgaard. Edidaktik; 2012-2015 http://www.edidaktik.dk/en/
[3] Audacity freeware download at: http://audacityteam.org/

Training activity on the management of participation processes in water resource planning

R. Pimentel [1], J.R. Rich[2], M.J. Pérez-Palazón[1], M.J. Polo[1]

[1] *Fluvial Dynamics and Hydrology Research Group. Andalusian Institute for Earth System Research. University of Cordoba. Edificio Leonardo da Vinci, Campus Rabanales, 14071, Córdoba. +34957212662, rpimentel@uco.es*

[2] *Rich & asociados. C/ San Fernando, nº2, 14003. Córdoba*

1. Introduction – Water resource planning and management involve decision making processes in which participation of stakeholders is either mandatory (e.g. in the European Union, by the Water Framework Directive [1]) or recommended to avoid further conflicts during the implementation of the plans. However, water resource allocation is not a simple topic for which a wide variety of options are eligible. All the contrary, in many regions water is a scarce resource and planning must rely on a rigorous calculation basis that includes many and different disciplines and approaches. Engineers from different profiles are usually the responsible professionals for the technical part, but they are also usually part of the public departments in charge of water competences or representatives of the water users (agronomy engineers-irrigation, industrial engineers-energy production, civil engineers-dam operation, etcetera). Nevertheless, engineers' competences on participation issues, consensus reaching processes, or social negotiation are not usually included as part of the academic structure of their training.

This work presents a proposal for acquiring competences on participation processes by engineer students at the postgraduate level, in the framework of water resource planning and management. The objective is to enhance their skills on negotiation through guided activities within a technical subject.

2. Methods - During the current year, a postgraduate course on Water Resource Planning and Management in the Master on Agricultural Engineering included a final work on water conflicts assessment as a group activity. Four different study cases were analysed: Are more dams needed in Spain? ; occupation of floodplains, at any cost?; is the modernization of irrigation systems a water-saving solution?; is reaching the maximum water-unit efficiency an optimum goal? Students were competed to gather information from the media, technical sources and scientific literature on the topics; each group had to explore the pros and cons of the solution under study, prepare an argumentation for their final position, and defend this in front of the rest of the groups. The teacher acted as conductor of each debate and provided a final outlook under the light of the course contents and goals. Final reports were produced by each group and shared through the learning platform. The self-evaluation additionally performed yielded a generally shared opinion of the students about discussion and negotiation skills not being professionally enhanced during their career. For the next edition of the course, this activity will be performed again with the support of a professional consultant, who has assessed on the adaption of this activity towards these additional competences.

3. Results - First, the teacher and the negotiator prepared the practical framework in which the water resource participation debates and negotiation usually take place. This stage included the partitioning of technical (including the environmental goals) and social issues in each study case. Secondly, specific techniques for basic negotiation practices and attitudes were assessed and included in the activity development during the classes, under the supervision of the negotiator. Finally, a dossier with general indications and specific recommendations for the study cases was prepared as learning materials for the course.

The activity will be repeated this year under this modified approach with the negotiator participation during these classes. His supervision will include the final evaluation of the debate and decision making process for each case, and the provision of further recommendations for future editions of the course.

4. References

[1] Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy.

Sharing questions through Forum in learning platforms: cooperative tutorial action and training

M.J. Pérez-Palazón[1], R. Pimentel [1], M. Carpintero[1], C. Aguilar[2], M.J. Polo[1]

[1] *Fluvial Dynamics and Hydrology Research Group. Andalusian Institute for Earth System Research. University of Cordoba. Edificio Leonardo da Vinci, Campus Rabanales, 14071, Córdoba. +34957212662, mj.perez@uco.es*

[2] *Fluvial Dynamics and Hydrology Research Group. Andalusian Institute for Earth System Research. University of Granada. Edificio CEAMA, Avd del Mediterráneo s/n, 18006, Granada*

1. Introduction – Current learning at University is nowadays based on both face to face and virtual activities, tutorial action being usually performed by the teacher at the office. This one-by-one process between the student and the teacher can also be implemented as an open forum activity included in the learning platform under use, instead of a private question-answer tool. The advantages of this alternative are varied: on one hand, the most usual topics are often questioned by more than one student, and the forum allows sharing the answer among all the students enrolled in the subject; on the other, a line of "discussion" regarding a given question can be followed and further issues are very likely to arise. Moreover, the forum is saved on the platform so that posterior consults can be made when preparing the subject individually. But, additionally, students can also learn from this tutorial action since both the language and the approach used by teachers when answering questions is different from those used during the class when presenting a topic for the first time.

This work shows an alternative experience of using forum as a tutorial tool on a learning platform, in which not only the teacher but also the students can answer and assist the "questioners", the answers and questions being visible for everybody enrolled in the course. The objectives are assessing the efficiency of the tutorial action and its effect on the training of the students as future mentors or group managers.

2. Methods - The experience was performed within two different courses on Hydrology for engineers, one at the graduate level (Course 1, three months, eight topics) and the other at the postgraduate level (Course 2, six weeks, five topics). To facilitate the individual study, each topic in a course included an open forum activity in which the students must pose their questions and doubts. Every time a new question was raised, the teacher let 48 hours before answering to promote the students participation as answerers; then, the teacher confirmed, modified or corrected the answer provided, depending on its quality. The process was oriented by the teacher towards provoking further questions, self-criticism, and self-assurance by raising doubts. This dynamic approach was complemented by the proposal of a final exercise or analysis after each question dialogue was closed. The students were motivated by valuing their participation in these activities up to a 10% of the final mark (5 points over 10 being the minimum to pass the subject in both cases).

3. Results - In both cases, students did not answer the first questions posed by their mates, the teacher being the "answerer" after 48 hours. However, the use of further questions as answers propitiated the participation. Students did enter in the role of "tutors" during the second topic in both courses, with a higher participation in the postgraduate course. The process reached a maximum participation after four weeks in both cases, up to a 35% and 21% of the students in Course 2 and 1, respectively. The final exercises gained in quality as the course advanced, with different results depending on the topic and course. The fraction of success was a 15% and 28% higher for Course 1 and 2, respectively, than those obtained the previous year, but the significance of these results could not be assessed due to additional sources of variance in the groups. However, the students being asked about the experience, more than an 85% of the group was satisfied with this activity and felt more secure about their skills and capacity than at the beginning of the course, and than those acquired in other subjects during the year. The forum will be implemented during future editions and results evaluated over time.

Developing intercultural competence for future telecommunications engineers: a pilot project

M. Tabuenca-Cuevas[(1)], G. Abermann [(2)]

Universidad Católica de Murcia[(1)]

Tel: 968278 181 E-mail: mftabuenca@ucam.edu

[(2)]Salzburg University of Applied Sciences

1. Introduction

This pilot project was carried out with a group of telecommunications engineering students in the last year of their degree programme. The goal of the project was to help students develop intercultural competence through reflective practice during a work placement abroad. According to the literature in the field most employers expect engineers to have soft skills like teamwork and group development [1-2-3] to be able to take on the responsibility of international projects with multicultural work groups. There is no codified method for the development of these soft skills [4], however in this project three interventions were done: the identification of the developmental stage of intercultural competence through an assessment instrument (IDI) [5], pre-departure intercultural training [6], and lastly, the writing of a guided journal [7] during the placement. The combination of the three interventions helped students to develop their intercultural awareness.

2. Methodology

The students were asked to take a test, the intercultural development inventory (IDI), in order to assess their initial intercultural stage. Once the results were collected, an intercultural training programme was designed according to the stage of development. The students were then participated on a four hour pre-departure intercultural training course at their home institution. The last step was writing an online guided reflective journal during the three month work placement abroad. The diaries were analysed at the end.

3. Results and Discussion

In this project, the majority of the students were found to be in the minimisation stage of intercultural development. This first step helped students become aware of the need for intercultural training which was focused on moving students forward along the minimisation stage to understand cultural differences. The guided diary provided the possibility for reflection in the complex and sometimes unpredictable context of a work placement abroad. Many diaries showed progress, however a few showed impasse and even reversal in the development of the intercultural competence of the students.

4. Conclusions -

The development of soft skills, such as intercultural competence, needs to be taken into consideration as changes in the global workspace for engineers demand new skills which are not always part of degree programmes. This project illustrates how intercultural skills can be acquired: by identifying the intercultural development stage of students, by providing basic training and by using work placements abroad to develop awareness of intercultural issues through guided reflection.

5. References

[1] I. Pant & B. Baroudi, *The International Journal of Project Management*, **26**(2), (2008), p.124-128.

[2] A.C. Spowage, C.M.M. Chin, K.Y. Chan & K.N. Ting. *4th IEEE International Conference Publications* (2008), p. 317-322.

[3] B. Hedeman & R. Seegers, "PRINCE2: A Pocket Guide", Van Haren Publishing, Zaltbommel, 2009.

[4] S. Henderson, M. Tabuenca, R. Eder-Baldonado, G. Abermann. *The International Journal of Learner Diversity and Identities (19)4*, p. 41-60.

[5] M. Hammer, *International Journal of Intercultural Relations 35*, (2011), p. 474-487.

[6] R. Brislin & T. Yoshida, "Intercultural communication training: an introduction", Sage, Thousand Oaks, 1994.

[7] J. Moon. "Reflection and employability", LTSN, 2004.

How to foster interdisciplinarity in a Teacher Training Master's Programme. An innovative project in online education.

S. González Lisorge [1], Mª.F. Tabuenca Cuevas [2], J. Hernández Bellot [3]

[1] *Universidad Católica de Murcia*

Phone number: 968 27 81 81, sgonzalez@ucam.edu

1. Introduction – This study describes an innovative project in higher education which was part of an online Teacher Training Master's Programme. The main goal was the development of an educational project by interdisciplinary groups of students.

2. Description – The Master's programme aims to provide students with the necessary competences to teach at the secondary education level. The students on the Master's programme have undergraduate degrees from different areas of study and are thus put into groups where all the students come from the same field of specialization train to become teachers in that field. One of the results of this grouping is that students only work with other students in their field of specialization. Generally speaking, secondary education and higher education often suffer a lack of interdisciplinary education [1-2] and this is reflected in teacher training programmes in which [3-4-5] knowledge and practice are not always clearly linked. This project aimed to resolve this disconnection through the creation of shared virtual learning spaces and the implementation of practical work directly connected to the student's future professional activity.

3. Conclusion – In this innovative project it was necessary to reframe the practical work associated with the course, reconsider the teaching methodologies used and rethink how the ICT tools available and social networks could be used. Through the use of the platform SAKAI and Youtube it was possible to encourage interdisciplinarity through learning spaces in which students and teachers from different areas of specialty participated. The learning platform in online education facilitates these types of proposals as it eliminates physical barriers (location and time) which are present in traditional education [6]. The innovation in this project stems from the interdisciplinary approach of the practical work and the teaching methodology; both required necessary coordination among teachers and students from different specialties. In addition, the use of shared learning spaces on the learning platform by teachers and students provided the opportunity to evaluate the participants.

5. References

[1] Y. Carvajal, *Luna Azul,* 31, (2010). Retrieved from: http://www.scielo.org.co/pdf/luaz/n31/n31a11.pdf?

[2] B. Sierra, A. Méndez-Giménez, y J. Mañana-Rodríguez, *Revista Complutense de Educación, 24* (1), (2013) p. 165-184.

[3] D. Gil Pérez, A. y Vilches, *Educación Química, 15* (1), 2004 p. 43-51.

[4] A. Bolívar, Mª.J. Gallego, Mª J. León, P. y Pérez, *Archivos Analíticos de Políticas Educativas, 13*, (2005) p. 1-51.

[5] E. Banet, E. *Enseñanza de las Ciencias, 25* (1), (2007) p. 5-20.

[6] Mª.J. Gallego, *Revista Iberoamericana de Educación*, 33, (2003) p. 111-131.

Crisis management terminology – a lexicological study

The paper is focused on the findings of lexicological study of crisis management terminology, the key part of the presenter´s PhD thesis. The selected corpus of crisis management includes a collection of reliable authentic texts (including NATO and EU Directives), academic papers and glossaries related to crisis and risk management. Different texts are represented, so that the frequencies of words are less influenced by individual texts. The selection of key nouns has been based on two criteria, frequency and expert judgment. The distributions of lemmas and their combinations have been identified and the frequent collocations being used in a corpus have been compared with the help of Sketch Engine, a web-based programme having a number of language-analysis functions. The Word Sketch program displays a corpus-based summary of a word´s grammatical and collocational behaviour. Besides the above mentioned frequency-based analysis an empirical approach has also been applied in an effort to find evidence of possible misconceptions about language use and to elicit the need for reassigning a lexical entry. The study may be beneficial not only for university students and public, who are required to work and live in a multidisciplinary environment, but also to experts working in the areas of risk and crisis management, who often face the challenge of continually changing terminology, sometimes even terminology developing in an unstructured manner.

HIGHER EDUCATION OF ENTREPRENEURSHIP - A WAY TO INNOVATE

Fernanda Policarpo

Coordenação Interdisciplinar para a Investigação e Inovação,

Instituto Politécnico de Portalegre

policarp@estgp.pt**;**

Abstract

This article aims to promote reflection of the characteristics of top entrepreneurship education and the benefits of cooperating with various organizations for the improvement of the learning process and the development of key innovations to obtain competitive advantages by such organizations.

Introducing an active learning by developing or improving products and services to various organizations, towards finding innovative solutions that enhance sustainability for the resolution of needs, encouraging students to create, thus assimilating an entrepreneurial attitude. Last they formed themselves professionals to be fundamentally employees. Currently, and always pointing how future alternative to creation of own business, we intend to a more active teaching as a way to create solutions to current problems in society.

Under the teaching of the course of Entrepreneurship and in order to create greater involvement with the environment, using a methodology learn by doing, is asked students to draw up a work that allows the creation or improvement of product, service or organization, with a view to sustainability and the possibility of creating your own business. Once across the stage most students have the opportunity to contact with the operational reality of organizations, awakening to the operating requirements and necessary improvements will sustainability of the same.

Keywords: higher education; cooperate; entrepreneurship; active learning.

DEVELOPMENT OF MULTIDISAPLINARY WORKSHOPS IN PRIMARY SCHOOL CENTRES

M.M. Hernández [1], S. Tejada Sanchez[2], E. Chocarro De Luis[2]

[1]*Agriculture and Food Department, University of La Rioja. CCT building. C/Madre de Dios 51. 26006 Logroño.*

Phone number +34941299747. E-mail: mara.hernandez@unirioja.com

[2]*Education Science Department, University of La Rioja. Vives building. 26006 Logroño.*

1. Introduction – The Tuning Project distinguishes two types of competences, generic ones directed at life and social interactions and other specific competences for each area of class room study. It has resulted to be interesting the design of activities which incorporate both types of competences [1]. In this sense, planning activities which integrate various materials make the alumni face activities which permit them to understand the relationship between the distinct areas of learning, ideas and contents [2].

The objective of this project was to organize an activity of learning based on workshops which integrate the distinct areas into one, thus, focusing on the design and development of the workshop which would be put into practice in the school Caballero de la Rosa.

2. Experimental – The workshops were made to graduate students of primary education which give classes in experimental sciences such as biology and geology, (dCExp: BG), or humanities with classes such as history, (dCHum: H), or Art with media expression classes, (dEPla). The activities of the workshops were suggested and designed for the students themselves which were divided into groups of four. Each group designed an activity for a primary education course. To verify the compatibility of the workshop to the age and the knowledge of the students meetings of the alumni and professors were held. Three workshops were made in every course, totaling 18 each year. The themes of the workshops incorporated three blocks, seven of which focused on plants and prehistory, five focused on animals and prehistory and six geology and prehistory.

3. Results and Discussion – Geology was the most difficult to integrate into a multidisciplinary context and the originality of its design also presented difficulty for the students. Murals and posters were the resources most used (figure 1), whereas designs with experimentation were scarcely encountered. Preferences were observed in the selection of resources distributed by theme, as illustrated in figure 2. The use of natural objects for explanations was used in only four workshops. Only 40% integrated the two materials whereas 30% developed independent activities for each material and 30% gave a theoretical explanation of history and the practical activity was centered in the course dCExp: B-G.
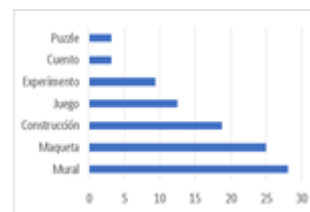
Image 1. Resources used in the workshops (%)

4. Conclusions – The workshops elaborated by the students were attractive and innovative ideas with dynamic and active development. However, the results revealed the difficulty students have integrating the materials in different contexts along with the lack of importance given to the use of experimental recourses in biology and geology. These results followed the need to introduce improvements in the programming which were a result of reflection and coordinated work.
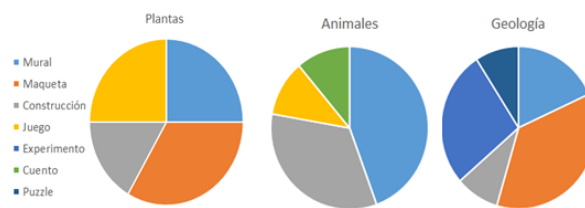
Image 2. Resources used in the workshops by theme content

5. References

[1] M.C. Lemus Varela and M.P. Treviño Fernández. *Contextos Educativos*, 11, 225-240. 2008

[2] A. Zabala, A. and L. Arnau. Cómo aprender y enseñar competencias, Barcelona, Grao, 2007

Development of multidisciplinary workshops as a practical resource to familiarize one with science

B. Robredo Valgañón [1], C.M. Menendez [1], M.M. Hernandez[1]

[1]*Agriculture and food Department, University of La Rioja. CCT building, C/Madre de Dios 51. 26006 Logroño.*

Phone number +34941299724. E-mail: beatriz.robredo@unirioja.com

1. Introduction – As a result of social and economic transformations the universities welcome a new educational paradigm which centers on imparting strategies necessary to carry out permanent learning while acquiring competencies. The professor should integrate contents designing activities which create teaching situation which motivate the acquisition of transversal capabilities and specifics which permit the students to have the opportunity to evaluate the usefulness and application of their learning [1].

The objective of this project was to design a complementary activity with the end of improving the competencies of the student while motivating the interest in science. To this end the project consisted of the elaboration of workshops which include distinct areas in one activity. These workshops were developed and carried out as practical classes with the students in the public primary school "Caballero de la Rosa" of Logroño.

2. Experimental – the workshops were carried out by university students in their experimental science course with physics and chemistry classes (dCExp: FQ), humanities with geography classes (dCHum: G) and Art with media expression classes, (dEPla). The purposed workshop themes included two disciplines, prehistory and physics or chemistry using art media in some cases. The activities in the workshops were suggested and designed by the university students themselves. Due to the difficulty combining the two disciplines the university students used the guide previously presented by the teacher of dCExp: FQ. The workshops were carried out by the university students in the public primary school "Caballero de la Rosa".

3. Results and Discussion – The University students planned the multidisciplinary workshops with raw materials and content pertinent to the reality of the classroom situation. In almost all cases the university students illustrated, with the workshops, their ability to teach and deep knowledge of the subject matter. To evaluate the compatibility of the workshop to the age and the knowledge of the students a meeting between the alumni and professor was held. Three workshops were made in every course depending on the grade of the primary students. Many workshops purposed similar activities such as the fabrication of weapons from the Neolithic times along with painting with colors obtained from minerals. The teaching resource most used was construction, followed by murals, and finally experimentation. The majority of the workshops integrated the subjects very well, which was a foreseeable result due to the support given by their teacher of dCExp: FQ.

4. Conclusions – The development of this activity served to eliminate any nervousness which physics and chemistry can often present to the university student. With this the students could investigate and verify the importance of scientific advances since prehistory. Moreover, the interest in this subject was stimulated along with motivation to control the information for their future teaching profession. The students developed overall competence in team work while gaining organization, planning and oral communication skills in a satisfactory manner. On the other hand, this activity demonstrated the difficulty students can encounter when applying their knowledge to chemistry and physics in a familiar context. This is due to the student´s consideration of these materials to be abstract and difficult to understand [2]. Therefore, in this since, the workshops resulted to be an effective tool for the university students.

5. References

[1] A. Zabala, A. and L. Arnau. Cómo aprender y enseñar competencias, Barcelona, Grao, 2007

[2] G. Demircioglu, H. Özmen and A. Ayas. *Educational Sci. Theory & Practice*, 4(1) p. 7784, 2004.

Apply 3D printing technology in Arts and Humanities course to develop students' artistic creativity

Chiu-Fan Hu, Yun-Hsuan Lee, Tsan-Chieh Huang, Yu-Tzu Lin, Cheng-Chih Wu

Graduate Institute of Information and Computer Education
National Taiwan Normal University Taipei, Taiwan

chiufan@ntnu.edu.tw

1. Introduction - The NMC Horizon Report refers to lots of trends in k-12 education: students should become a creator. To reach the goal, more and more technologies are introduced in education, and 3D printing is one of them [1]. The American Recovery and Reinvestment Act also emphasized the importance of STEM (Science, Technology, Engineering, and Mathematics), a critical factor to stimulate economy. So many scholars commenced to develop tools and technologies to facilitate STEM instruction [2][3]. John Maeda thinks Art (and Design) should be added to the equation – to transform STEM into STEAM in the 21st century [4]. Besides, many researches think students are able to overcome challenges in the career through teaching artists and designs. Applying 3D printing technology in education is a new trend, but many think highly of it in advanced countries. They think it can solve traditional teaching problems, except to improve students' design thinking. STEM education becomes more and more important, but it is taken less consideration into technologies and artistic creation in K-12 in Taiwan. The purpose of the study is to adapt STEM education, therefore, to design a teaching activity in Arts and Humanities course to provide a learning approach integrated the implementation and application. In the learning, students can develop their idea to make a creative production by 3D printing technology. Besides, the study will conduct a research through teaching activity to explore the releation between STEM eduction integrated 3D printing tecnology and artistic creativity.

2. Experimental - The research is an Quasi-Experimental Design, conducting a period of ten weeks in grade 5 in Arts and Humanities course. The study compares results between two groups: one group of students assigned to create productions using 3D printing (experimental group) and the other group of students (control group) use tranditional tools. Data collected through qualitative and quantitative methods. Qualitative methods include field observations, interviews, working sheets, active records, screen capture, and students' artifacts. Quantitative tools include pretest, posttest and questionnaire to realize the artistic creativity and attitude, and learning attitude of students.

3. Results and Discussion - The study in the first year develops the teaching materials for 3D printing in Arts and Humanities course. Students in the experimental group design and print action figures by 3D printing technology. Also, the study analyze the needs for 3D printing design software used in the class and design the user interface based on students'cognition in grades.The aims of the course include: students can distinguish elements, make a prototype, and evaluate and appreciate productions.

Image 1. Follow the teaching processes that students use the software developed by the study to draw the image of action figures

In the future, the study will analyze the effect of artistic creativity and attitude, and learning attitude.

4. Conclusions - The study is to develop teaching materials and activities for 3D printing, implementing STEM education to promote students to integrate knowledge. It is expect that students can present their artistic creativity, and the abilities of collaborative learning, problem solving and integrating knowledge in different fields. Finally, the materials and tools can be provided for K-12 teachers in Taiwan.

5. References

[1] New Media Consortium. The NMC Horizon Report: 2015 K-12 Edition.

[2] Mataric, M., Koenig, N., & Feil-Seifer, D. (2007). Materials for Enabling Hands-On Robotics and STEM Education. *AAAI Spring Symposium on Robots and Robot Venues: Resources for AI Education*, Stanford, CA.

[3] Connor, K., A., Ferri, B., & Meehan, K. (2013). Models of Mobile Hands-On STEM Education Models of Mobile Hands-On STEM Education. *120th ASEE Annual Conference & Exposition*.

[4] RISD (2014). STEM to STEAM. Retrieved from http://stemtosteam.org/

Influence of students' background on their learning in higher education. Case of the subject of Physics in the first year of Engineering Studies

M.M. Ramos-Tejada [1], M. Quesada [1], E. Giménez-Martín [1], J.J. García[1], J.A. Peláez[1], A.J. Sáez-Castillo[2]

[1] *Dpt. of Physics. Universidad de Jaén.*
mmramos@ujaen.es (+34) 953648552

[2] *Dpt. of Statistics and Operations Research. Universidad de Jaén*

1. Introduction –First year students' background can condition their learning process. It is necessary to identify which students' preconditions are relevant to their learning process and, if it is possible to develop strategies that avoid that those preconditions have a negative impact on their formation.

In this study, we have examined the influence of eight preliminary factors on the students' academic outcomes in *Physics I* subject (content description: mechanics, oscillations and waves). Moreover, we explore how to use an e-learning management system as a didactic instrument for supporting the learning of students with lack in their Mathematics or Physics background knowledge.

2. Experimental – The influence of eight preconditions on the first year Industrial Engineering students' academic outcomes in *Physics I* subject has been studied. Those preconditions were: initial test results about their Physics, Mathematics and vectors background knowledge, type of secondary education (if they have finished Spanish Baccalaureate or a Superior-level Training Cycle), access to the support material (if they have accessed to the supplied material), students' motivation (if they wanted to study Engineering as first option), and their own appreciation of their Physics and Mathematics knowledge (i. e. if they think that they have the adequate Physics and Mathematics knowledge to study the Physics contents).We have fitted a multiple linear regression model considering the final score in *Physics I* as the response variable and considering as covariates the eight factors described above. Thus, we can identify which covariates are significant for the final score in *Physics I* and estimate their effect size.

As support material, initially it has been developed Physics and Mathematics basic tests to work by using the ILIAS learning management system. In those tests, the pupils can see which are their weaknesses and receive a specific feedback.

3. Results and Discussion - The main results are shown in table I. The only significant variable is the students' Mathematics score on the initial test. This indicates that students with a better Mathematics score have a better final score in *Physics I*. Once this variable is taken into account, no other variable is significant. Access to the support material is not significant on the final *Physics I* results. The explanation could be that only a 15% of the students have accessed to the material and mostly of them have not finished the tests. The R^2 of the fit shows that the model explains the 65% of the total variability of the final score in *Physics I*.

Table I. Fitting data to a multiple linear regression model considering the final score in *Physics I* as the response variable and covariates the eight factors (coefficients).

Coefficients	Estimate	Std. Error	t value	Pr(>|t|)
(Intercept)	7.98	1.98	4.038	0.001
Physics test score	-0.12	0.24	-0.526	0.607
Math test score	0.71	0.29	2.415	0.030
Vectors test score	-0.26	0.19	-1.340	0.201
Come from Superior-level Training Cycle	1.12	1.27	0.885	0.391
Access to the support material	-2.41	1.37	-1.762	0.100
Firs option	-1.56	1.54	-1.008	0.331
Appreciation of their Physics knowledge	-0.98	0.61	-1.589	0.134
Appreciation of their Mathematics knowledge	-0.10	0.64	-0.156	0.878

4. Conclusions – The students' success in the first year at the university is clearly affected by their background. In the case of the students from the degree of Industrial Engineering at the University of Jaén, the lack of Mathematics background knowledge affects their learning outcomes in *Physics I*. We have begun to develop e-learning strategies to avoid that those preconditions have a negative impact on their formation. Those strategies are not being significant on the final score, and it is necessary to improve them

Group project work for the last-year graduate students: An evaluation for Civil Engineering courses

Guirao [1], J. Escobar [1], R. Jurado [1], J. Gallego [1]

(1)ETSI Caminos UPM. Avda. Prof. Aranguren, s/n. 28040 Madrid
+34 913366784 bguirao@caminos.upm.es

1. Introduction – A large body of research has demonstrated the benefits of collaborative learning strategies: these benefits include student reports that team work is beneficial, motivating and confidence- and responsibility-building. It is widely understood a successful civil engineering project is often a highly collaborative team-based activity and the engineering education community must prepare graduates to be employed in such work environments. In recent years, the whole Civil engineering education community in Spain has been immersed in a vigorous debate trying to fix the skills (competences) needed for current and future engineering practice. The School of Civil Engineering of Technical University of Madrid (UPM) is still immersed in these changes. The new Degree in Civil Engineering was implemented in September 2010 and the Master´s degree in Civil Engineering started in the academic course 2013-2014.

This paper contributes to the debate by reporting research findings about the first experiences of group project work of students who are in their last year of higher education (Degree in Civil Engineering). The subject of the study was "Road Design", implemented in the first semester of the last-year of the Degree, where student work teams were self-selected (4 students per group) and all the project team works (traffic study, road layout, road drainage and geotechnical estimations) were based on the same scenario: the same road location. It is important to remark that all the team work was carried out in the classroom and handed in with no possibility to finish it at home.

2. Experimental - The research methodology is based on the evaluation of the team work, using a survey to students after they completed their projects. The paper builds on earlier work undertaken by Garvin et al. (1995) and Bournes et al. (2001) in terms of the research design and provides a comparative discussion about the conclusions arising from the two studies. The surveys were carried out in November 2014 and the response rate was 91%; altogether we distributed 105 questionnaires and 96 completed questionnaires were returned**.**

3. Results and Discussion – The findings of the study show that the group experience was seen by students as being very beneficial to them against the "traditional learning", and the aspect of the project that they like best was in-depth work in a real organization (like a civil engineering company). Surprisingly, compared to Garvin and Bournes studies, the aspect that they liked least was not related to the common difficulties found when working in a team (interpersonal relationship within groups) but to time management. They said (66%) they do not have enough time to finish the work in the classroom. This result encouraged us to review the previous team work developed by the students in the courses of the Degree, discovering that our work project was the first one the students had experimented with a time limitation.

4. Conclusions – Introducing changes always has its attendant difficulties in the first years of their implementation. Our experience shows that our students of the last courses need training on time management when working inside a work team. As a conclusion, more coordination is needed between the teaching staff dealing with group projects in our School of Civil Engineering (UPM).

5. References

[1] Garvin, J.W., Butcher, A.C. (1995). Group projects for first-year university students: An evaluation, *Assessment & Evaluation in Higher Education*, Dec 95, Vol. 20 (3). 273-288

[2] Bourner, J., Hughes, M., and Bourner, T. (2001). First-year undergraduate experiences of group project work. *Assessment & Evaluation in Higher Education*, 26(1), 19-39.

[3] Lejk, M., Wyvill, M. and Farrow, S. (1999) Group learning in systems analysis and design: a comparison of the performance of streamed and mixed ability groups, *Assessment & Evaluation in Higher Education*, 24(1), pp. 5-14.

[4] López-Real, F. & Chan, Y. R. (1999) Peer Assessment of group project in a primary mathematics education course, *Assessment & Evaluation in Higher Education*, 24(1), pp. 67–80.

[5] Dingel, M, Wei, W. and Huq, A. (2013) Cooperative learning and peer evaluation: The effect of free riders on team performance and the relationship between course performance and peer evaluation. *Journal of the Scholarship of Teaching and Learning*, Vol. 13, No. 1, February 2013, pp. 45 – 56.

Teaching partial derivatives using digital images in mathematical engineering lectures

Acho [1]

[1]*Polytechnic University of Catalunya (UPC-Barcelona Tech) and Technical Industrial Engineering University School of Barcelona (EUETIB), Spain*
(+34) 93-41-37-240, leonardo.acho@upc.edu

1. Introduction – Teaching partial derivatives in mathematical engineering lectures is an important task to motivate students to go further on this important topic. Most of the mathematical engineering books use partial derivatives mainly to teach how to find the absolute and relative extrema of functions. But no one of them uses digital images, even when an image can be viewed as a real function in two variables [1]. Moreover, many basic digital image processing tools use concepts on partial derivatives [1]. Furthermore, applications to medical diagnosis and other fields can be easily motived by applying digital image processing in engineering mathematical lectures on topics related to partial derivatives concepts.
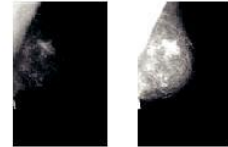
2. Experimental, results and discussion So, the main objective of this paper is to show the academic result obtained when digital image processing *was* used to support teaching partial derivatives in mathematical engineering lectures at the *Technical Industrial Engineering University School of Barcelona* (EUETIB). This process was realized as follows. After teaching the basics concepts on partial derivatives to functions in two real variables, a written material was delivered to the students [2, in Spanish]. This writing introduces basic concepts on grey scale images and discusses some digital image processing applications by employing partial derivatives in discrete domain. This writing also has activities to develop by the students. These activities involve the realization of computer applications of digital filters obtained by invoking partial derivatives tools, among other issues. See a sample in Figure 1. So, the students developed these activities and these were taken into account as part of his/her final lecture score. Then, each student, anonymously, evaluated this labor through a satisfaction evaluation questionnaire. According to this questionnaire, this task was received by them with enthusiasm. Finally, this written material was prepared as an *autonomous reading material*. As an annotation, at the EUETIB school, no all grades offer a course on image processing.

Figure 1. *Top*: left is the image to process, and right is the processed image by using the Laplacian. *Bottom*: left is the image to sue, and right is the worked on image by utilizing first partial derivatives.

3. Conclusions According to [3], using computers (*technology innovations*) to teach mathematics with engineering applications is an important matter, and justified by citing the next Chinese proverb [3, p. 82]:

`I hear and I forget I
see and I remember
I do and I Know.´

So, we confirm this pragmatism in our academic experiment.

4. References
[1] R. C. González, R. E., "Woods Digital Image Processing," Third Edition, Pearson Int. Edition, New Jersey, 2008.
[2] https://dl.dropboxusercontent.com/u/1370080/DosierPA2015.pdf
[3] B. Baumslag, "Fundamentals of Teaching Mathematics at University Level," Imperial College Press, USA. 2000.

Using atmospheric models at the lowest altitudes in teaching introductory thermodynamics

A.A. Moya

Departamento de Física, Universidad de Jaén, Campus de Las Lagunillas, 23071-Jaén, Spain.
Phone: 953 212781; E-mail: aamoya@ujaen.es

1. Introduction – Learning of basic concepts on thermodynamics is included in the introductory course of the majority of the university specializations of engineering. First-year undergraduate students usually approach to thermodynamics with misconceptions on temperature and heat due to the sensations experienced when the objects are touched, and a great number of them consider it boring and uninteresting because of the inclusion of tedious concepts like internal energy, entropy or thermodynamic processes. To motivate students in learning and try they get a better understanding of the theoretical concepts and a better approximation to the problems-solving strategies, different novel activities such as examples dealing with problems in daily life, innovative lab techniques, or resources based on new technologies, must be included into the teaching and learning process.

Nowadays, weather forecast, global warming and climate change are common topics in the media. Students are familiarized with basic climatic data and they are strongly motivated by this topic. Meteorological data used to predict weather include a great number of thermodynamic data, and the dry air in the atmosphere becomes an interesting thermodynamic system to motivate student in the learning process. However, a very poor effort has been done to try to adapt the basic concepts in meteorology or climatology to introductory courses including thermodynamics although meteorological and climatic topics have an increasing interest in engineering because of their utility in renewable energies or teledetection.

2. Results and Discussion – The goal of the proposed educational project is to find simple practical rules and its validity limits to evaluate the linear evolution with altitude of state variables such as temperature, atmospheric pressure, air density, specific volume, internal energy and entropy, as well as work and heat associated with a polytropic process, at the lowest altitudes in the atmosphere. In particular, decreasing of the atmospheric pressure in 12 hPa per 100 m in height is a known practical rule from the theoretical and experimental instruction in schools and colleges [1] and it is of a great interest to correct the atmospheric pressure at sea level which is presented in the weather maps. Then, instructor can propose student the challenge of finding similar rules for the remaining thermodynamic variables used in introductory courses dealing with thermodynamics by taking into account the well-known model of standard atmosphere [2]. This activity can be done in class and homework assignments as well as by means of an independent study project, and it allows first-year undergraduate students to train in thermodynamic problems solving in introductory courses, and to help them understand, in a rather intuitive approach, different classical misconceptions related with state and process thermodynamic variables.

Simple activities based on climatic topics can be done by using internet and a spreadsheet like Excel. First of all, the variation of the atmospheric pressure with height at the lowest altitudes is studied. Students plot the atmospheric pressure versus the altitude by using data obtained from the internet, which corresponds to meteorological stations placed at different altitudes up to a one kilometre in a close area. This activity allows student to learn a practical rule to correct with altitude the barometric pressure data, which usually are expressed at sea level in weather maps. Second, student is given or is required to build a dataset with pressure, temperature and specific volume for different altitudes in the atmosphere. These data could be measured by instruments, but instead are obtained from an atmospheric model where temperature varies linearly with altitude, and pressure and specific volume are obtained by using the fundamental equation for the statics of fluids and the ideal gas law. Then, students are required to introduce the data in a graphic and spreadsheet software like Excel or Origin and to plot the usual thermodynamic diagrams such as pressure versus specific volume, temperature versus specific volume, or pressure versus temperature. The data are fitted to a potential curve by means of the algorithm itself incorporated into these programs and the fitted parameters are compared to the adiabatic index of air. By means of this activity, student can approach, in a different way from typical classroom instruction and close to the methods of the scientific research, to the adiabatic state-functions for an ideal gas, which are widely used in problems-solving strategies and play a main role in the study of the Carnot engine and the second law of thermodynamics.

Finally, from the standard atmosphere model with the usual lapse rate, students can evaluate the changes in molar internal energy and molar entropy of air by considering it as a diatomic ideal gas. Then, from a Taylor series at the lowest altitudes in the atmosphere, students can calculate the variation with altitude of temperature, atmospheric pressure, air density, specific volume, internal energy and entropy, as well as work and heat associated with a polytropic process. *PV* and *TS* diagrams can be also plotted by using meteorological data up to 11 km height in the atmosphere. Students can derive practical rules to calculate the variation with altitude of the main thermodynamic variables up to 1 km height in the atmosphere as well as to stablish the validity limits of such rules. This task constitutes an innovative and motivating activity using simple meteorological concepts to improve quality learning and instructional effectiveness of thermodynamics in calculus-based introductory courses.

3. Conclusions – The proposed activity allows students to train with a great number of thermodynamic exercises involving basic concepts like ideal gas law, work, internal energy, heat, the first law of thermodynamics, thermodynamics processes, entropy or *PV* and *TS* diagrams. Particularly, the activity provides us a simple daily life example and allows us to deal with topics associated to classical misunderstandings and difficulties found by the students in introductory thermodynamics courses like: i) Problems solving related with ideal gas law and adiabatic processes; ii) The relative position between the isotherm and adiabatic curves in the *PV* diagram; iii) Identification of the variations of the state variables and the signs of the process variables involved in a given process with an ideal gas; iv) Interpretation of work and heat in the *PV* and *TS* thermodynamic diagrams.

4. References
1   A.A. Moya, *Phys. Educ.*, 49 (2014) 632-634.
2   http://glossary.ametsoc.org/wiki/Standard_atmosphere (accessed May 2015).

Collaborative working on engineering studies

M.C. López-Escalante [1], Francisco Martín [1]

[1]*Laboratorio de Materiales y Superficie and Departamento de Ingeniería Química,*
Facultad de Ciencias, Universidad de Málaga, Málaga, 29071 Spain
Phone: 0034.952.13.19.14 e-mail: mclopez@uma.es

1. Introduction – The most of the tasks than an engineer has to develop during its work carrier will present a deep applicability nature. Therefore the university has an important role on this item. Nowadays this upper academic institution must implement new didactive learning techniques for this goal. Collaborative learning, learning based in problem solving and case-study method are some of the new tools [1]. Nevertheless their implementation is not easy for large student groups. Regarding the reasons they are related with the number of groups and the number of student inside of each one and obviously with the following that the teacher can carry out.

This work is focused on the study of an application work implementation for numerous classes. Furthermore, each group will have to select and develop each own project. The interest of the student is absolutely necessary for this work because it will be necessary a high feedback level between each team and the teacher.

2 Experimental - The study has been carried out on two stages: the first one is to know which are the most interest industries for them and secondly which kind of work they would like to develop during their work carriers. This information will be obtained by a common session with all the students where they introduce themselves, explain their engineering inquisitiveness and indicate the main tasks that they think they have to develop in the selected industry. After that, the teacher point out the specification for the indicated jobs and related them with the explanations of the students. This session will answer many of their doubts and it will give them rigorous information. After that, a brief and individual report has to be written by them where they have to indicate their expected professional carried and an industry where they can develop their future job.

There summaries will be used by the teacher to make groups with compatible professional orientations and similar industries. Therefore they will be able to make a small industrial team which have to select their own project

The second stage of this work is focused on the project development and the feedback between students and teacher.

3 Results and Discussion - The first part of this work allowed an approximation between the student and the teacher. This leads to a well channel communication which was crucial for the study. They understood that the collaborative work was something really common in the current industry. Nevertheless they expected to make groups with their usual collaborators [2]. Apart from this, the main difficulty was the selection of the project. Some of the groups were well connected and were motivate. On the other part, other groups present big problems to select their job mainly due to a lower interest on this type of works or more traditional academic vision.

4 Conclusions – The implementation of collaborative working have been carried out on engineering large classes. The student motivation on this type of teaching is crucial to reach satisfactory results. Groups were made regarding their professional interest and this led to good results because that promoted their personal motivation.

5 References

[1] Pozo, J. I.; Scheuer, N., Pérez Echeverría, M.P., Mateos, M., Martín E. y de la Cruz, M. (2006) Nuevas formas de pensar la enseñanza y el aprendizaje. Barcelona Grao.
[2] *Júlia Garrigós Sabaté, Miguel Valero García,* Vol.10 nº3 (Octubre-Diciembre, 2012).- Monográfico: "Innovaciones en el diseño curricular de los Planes de Estudio". HYPERLINK   "http://red-u.net/redu/index.php/REDU/article/view/484/0" Garrigós Sabaté

Fostering Employment through Interdisciplinarity: A Project-Based Case Study in Mechanical and Industrial Electronics & Automation Engineering Degrees

Aznar [1], A. González[1], J. I. Silvestre[1], J. López [2], R. Sánchez[3],

[1]Dept. of Engineering. Florida Universitària. Rei en Jaume I, 2, 46470 Catarroja (Valencia). +34.961220380 maznar@florida-uni.es

2. Dept. of Electronics. Universidad de Barcelona. C/ Martí i Franquès, 1, 08028 Barcelona.

Dept. of Applied Physics. Universidad Politécnica Valencia. Camino de Vera s/n 46022 Valencia.

1. Introduction – Although the implementation of the Bologna Declaration hasn´t been homogeneous, the common ground has always been a shift from traditional teaching methodologies to the development of competencies. However, present youth unemployment rates show that this hasn´t been enough and so, it is essential to deliver new initiatives that should focus on labour market realities. The objective of this paper is to present how through the Project-Based Learning (PBL) methodology, students can deliver a technical innovation project to a real company (more complex than a development project which has previously specified technical requirements, in particular with regard to coordination). The main parties involved are on the one hand, students belonging to the three years of both Mechanical and Industrial Electronics & Automation Engineering Degrees; and on the other, all the teachers who conduct classes in the Degrees curricula. As encouraging the acquisition of transversal competencies is fundamental towards employability [1], a description will be given on how these are gradually introduced throughout the Degrees. Likewise, interdisciplinarity cannot succeed without the coordination and integration among all the parties involved [2] and therefore, this paper will present how the students, the faculty, and the company worked giving input on both positive results and pitfalls.

2. Experimental – This project resulted from a close cooperation between academia and the business world: an architect firm, planning to step into the technical area of construction, presents students their product concept which intends to get rid of the traditional machinery and slow methodologies in construction; and then, students come out with plausible designs that fit the purpose. This paper will focus on one of those solutions, i.e. a robotic climbing tower.

3. Results and Discussion – At the end of the project timeline, students must complete a questionnaire in order to assess the methodology and the work developed within their teams. Very positive results can be observed in issues such as employability, teamwork, competencies, or learning methodology. However, there are certain areas that need further improvement in order to facilitate and enhance both students' and teachers' implication, as for instance a closer coordination among the various parties involved.

4. Conclusions – We believe PBL is a relevant methodology in order to implement significant professional competencies and technical expertise, in such a way that it would not be feasible through traditional methodologies. Students enjoy it and particularly, the application of an assignment towards a real company´s needs. However, the coordination and implication of all the teachers towards a common project turns out to be very complex: if these two factors fail, the whole project fails.

5. References

[1] A. Ortega, J. Llorca, M. Aznar, "3rd year interdisciplinary project of the degrees in Mechanical Engineering and Industrial Electronics and Automation Engineering", *XXI CUIEET (Congreso Universitario de Innovación Educativa en las Enseñanzas Técnicas)*, Valencia (2013).

[2] M. Aznar, V. Contreras, J. Llorca, J. López, R. Sánchez, J. Zacarés, "Design, development and outcomes of a teaching methodology based on an industrial project during the second year of the Bachelor Degree in Mechanical Engineering", *ICEILT (International Congress on Education, Innovation and Learning Technologies)*, Barcelona, Spain (2014).

Identity, Agency and Transformational Learning - Unveiling a Confucius Institute Teacher's Experience in Britain through Blogs

Wei Ye

Institute of Education, University of Reading

+44 7423220562 w.ye@pgr.reading.ac.uk

1. Introduction

Second language (L2) identity has attracted much attention in recent education research. Previous studies focus mainly on immigrants or study abroad students; relatively little attention, however, has been paid to the growing numbers of teachers of Chinese as a second language working abroad.

The Chinese government started in 2004 to recruit teachers to work in Confucius Institutes, non-profit public institutions that aim to promote Chinese language and culture, support local Chinese teaching, and facilitate cultural exchange. By 2012, more than 2200 teachers and 10,000 volunteers had been recruited and sent to 387 Confucius Institutes and 509 Confucius classrooms (local hubs in schools) in 108 countries.

2. Results and Discussion

This paper reports a longitudinal case study undertaken with a Confucius Institute Chinese Teacher (CICT) working in Britain. The focus is on exploring the way she interprets and makes sense of her experience, how she exerts agency to overcome the obstacles she encounters and is empowered in the process. Underpinned by post-structuralist perspectives on identity, it employs a critical ethnography approach and draws, in particular, on blog entries over the period of two years which shed light on the negotiation, formation and expansion of her identity as a CICT.

3. Conclusions

The paper concludes with suggestions for ways forward for international education professionals and programme supervisors.

Global Engineering– a cooperative course for next generation engineers

Marc Zupan [(1)], Abel D. Santos [(2)], J. Bessa Pacheco [(2)], A. Barbedo de Magalhães [(2)]

[(1)] *UMBC- University of Maryland Baltimore County, Department of Mechanical Engineering,*
Baltimore County, Baltimore, MD 21250, USA
[(2)] *FEUP– Faculty of Engineering, University of Porto, R. Dr. Roberto Frias 400, 4200-465 Porto, Portugal*

1. Introduction

Globalization has transformed engineering practice. Our interconnected world demands *global engineers*: a new generation of graduates adept at working in culturally diverse and geographically dispersed teams to solve large-scale technical challenges. Within this new paradigm, technical preparation is not enough. To be "globally competent," engineers must demonstrate certain "defining" technical skills as well as the "enabling skills" that allow them to operate effectively on international projects [1]. Historically, these enabling skills – in communication, teamwork, and cultural awareness – have not been a priority of engineering education [qtd. in 2]. According to a recent study by the Royal Academy of Engineering, most engineering graduates are technically proficient but lack the cultural and communication skills necessary for success in the global arena [1]. To address this gap, a growing body of research explores the definition, teaching, and assessment of global engineering competence [3].

Experimental

The target of this work is to establish a course, within the traditional engineering sequence, which develops and evaluates these global engineering competencies in students. As such engineering students can gain certain global engineering competencies in a system that is both fee and time neutral to their academic career. In 2007 FEUP- Faculdade de Engenharia da Universidade do Porto mechanical engineering course created a discipline to address ethical, social and sustainability problems at national and world level, and to develop the students' awareness, skills and competencies in those fields. In 2012 a cooperation between UMBC- University of Maryland Baltimore County in USA and FEUP in Portugal gave rise to a proposal of creating an international course in Global Engineering.

Global Engineering establishes an interdisciplinary course of study intersecting engineering technology, entrepreneurship skills and the influence of the global society/culture on problem solving. The course uses explicit technological examples and presents how different engineering cultures use a dissimilar solution path to meet the engineering objective (both the path and final solution have differences). Topics addressed include but are not limited to how engineering is practiced globally, cultural issues, differences in engineering around the world, how to conduct oneself in a foreign environment, and preparing for an international educational experience. During the course students work in multi-cultural and multi-level teams to solve engineering tasks giving them direct experience working in a global team.

Results and Discussion -

Our work presents Global Engineering educational best practices for developing and replicating interdisciplinary Global Engineering education programs and partnerships. We will present rules, methods, tools and evaluation/assessment schemes within the context of the available literature and our direct student experimental observations. Student Global Engineering competencies achieved within the course will be compared to those gained by students having a traditional expatriate experience.

References-

1   The Royal Academy of Engineering (2007), Educating Engineers for the 21st Century, London: The Royal Academy of Engineering.
2   Sunthonkanokpong, W. (2011), "Future Global Visions of Engineering Education," Procedia Engineering, Vol. 8, 2011, pp. 160-164. P 161.
3   Lohmann, J. et al. (2006), "Defining, Developing and Assessing Global Competence in Engineers, European Journal of Engineering Education, Vol. 31, No. 1, pp. 119-131.

Art And Structural Funcionality

Fidel Franco

Departament of Applied Physics.

Escuela Técnica Superior de Arquitectura de Barcelona

Politechnical University of Cataluyna (Spain)

 Avinguda Diagonal 649

08028 Barcelona(Spain)

Fidel.Franco@upc.edu

Abstract
The learning in architecture has a complexity that is a field that must be synthetize aesthetics and functionality. Somehow students are not very effective when they try to mix this terms, in most of the physical topics.
To reach this there is a subject " Applied Physics to Structures " that shows development of a unification process for learning, crucial to energetic parameters where Energy is the most fundamental parameter for all processes.
After the theoretical explanation, a practical application of this knowlodge is propose to existing buildings with a method that is applicable to rehabilitation and allows the study of structural elements without any kind of intervention, as show in the examples of this study as la Sagrada Familia, the Gotic Cathedral of Leon and an application to the cathedral of Vitoria and other buildings..
Key words: *Learning Architecture, Applied Physics to Structures, Study of structural elements , Rehabili tation,*

Traducción:

El aprendizaje en la arquitectura tiene la complejidad de ser un campo que debe sintetizar la estática y la funcionalidad. De alguna manera, los estudiantes no son muy eficaces cuando tratan de mezclar estos términos en la mayoría de temas prácticos. Para llegar a esto hay una asignatura " Física Aplicada a las Estructuras" donde la energía es el parámetro fundamental de todos los procesos y que mostró el desarrollo de un problema de unificación para el aprendizaje, crucial por los parámetros energéticos. Después de la explicación teórica, una aplicación práctica de este conocimiento se propone en edificios ya existentes con un método aplicable a la rehabilitación y que permite el estudio de los elementos estructurales sin signo de intervención, tal como se muestra en los ejemplos de este estudio: La Sagrada Familia, la Catedral Gótica de León y una aplicación a la Catedral de Vitoria.

Innovation and Learning Technologies

Using videos to Assess Statistic Competences in Criminology Degree

M. Dominguez-Serrano[1], A.D. López-Sánchez[1]

(1) *Pablo de Olavide University. Department of Economics, Quantitative Methods and Economic History. Ctra. Utrera, km 1. 41013 Sevillr (Spain)*

ABSTRACT

In this paper an experiment is carried out at the Course Introduction to Statistics to assess both statistical knowledge as some transversal competences of the Degree in Criminology and Double Degree in Law and Criminology. This course was lectured during the first and second year, respectively, during the academic year 2014/15 at the University Pablo de Olavide in Seville (Spain).

In particular, the goal is to work with students in an entertaining way and in line with their concerns, closely linked to the use and management of audiovisual material. Thus, students can combine these personal interests with the development of digital skills useful not only during the academic background of the degree but also during the course (using statistical software SPSS and Excel) and at the same time, are likely to be evaluable as well as the course content.

In order to do this, students first chose a statistical database related to a criminological topic, then they apply their knowledge about statistical analysis by using the knowledge acquired during the course, and finally and optionally, they videotaped (in a free format but no more than 5 minutes).

The results were quite satisfactory because although the activity was voluntary but it was assessable, most of all groups videotaped.

Making online learning real with Adobe Connect

Malcolm Hardy

Head of School, School of Applied Technology, Bay of Plenty Polytechnic, Tauranga, NZ

Email: Malcolm.hardy@boppoly.ac.nz

Scientific area: learning technologies

Today's working and learning population are highly mobile, and this is particularly true of the construction industry. This presentation outlines the measures adopted by one regional provider in New Zealand to ensure long-term sustainability for a suite of certificates and diplomas where prospective students are situated in various locations all around the country. When investigating alternative approaches to meet the market, the Applied Technology team gathered strong evidence that students valued the face-to-face connection with teachers and peers, and active class participation. This clearly ruled out the typical online delivery model of posting recorded lectures, having students view these and then submit a response. Instead, we have invested in a software platform and a programme of delivery which allows a teacher to simultaneously deliver classes to a room full of students, either in the same location or hosted elsewhere at another institute, as well as to individual students at home or in their workplace. The Adobe Connect product allows all members of a session to see and talk to one another, and supports breakout groups who can work together in "rooms" set up by the teacher, then come back and report to the whole class in a totally interactive manner. The graduate outcomes verified by feedback and support from industry achieved to date show overwhelming support for this totally interactive face to face model of on line learning. This presentation describes our journey, including the considerable investment in time and money required, and the learning for staff and managers, as well as sharing our future directions into new programme areas and international arenas.

Virtual Teaching in Chemistry. Development of monitored online activities: interactive problems/questions solving

J. M. Rodríguez Mellado*[1], R. Rodríguez Amaro[1], M. Mayén[2]

[1] Departamento de Química Física y Termodinámica Aplicada. Universidad de Córdoba. Campus de Rabanales, CEIA3, edificio Marie Curie 2ª planta. 14014-Córdoba (Spain)

*Phone: +(34)957218647, e-mail: jmrodriguez@uco.es

[2] Departamento de Química Agrícola y Edafología. Universidad de Córdoba. Campus de Rabanales, CEIA3, edificio Marie Curie 3ª planta. 14014-Córdoba (Spain).

1. Introduction – A key element of the European Higher Education Area convergence process is the innovation in the learning process, which demands a wide number of actuations directed to the methodological renovation. This will imply a continuous adjustment by the student-teacher couple to new forms of teaching and learning, the new technologies playing an important role. In this way, the student must be able to access to the contents of the course materials in any moment and place. This implies the introduction of online tools.

A goal for the educational group UCO22 of the Cordoba University is the use of the Virtual Campus both in and out the classroom, to imply the students in the learning [1]. This must led, sooner or later, to a gradual change in the paradigm of the actual education to a delocalization of the teaching (e-learning). To achieve this objective is needed the active participation of both the teachers and the students. This communication presents the development of virtual tools to prepare and evaluate the common parts of matters with basic chemistry contents.

2. Results and Discussion - The selected platform was Moodle because it permits the development of a variety of tasks. In addition, the teacher can follow the activities of the students in real time and even make an evaluation. Finally, this platform is accessible to many Spanish Universities and colleges, as well as in other European countries.

The concrete actions were:

   a) *Development of the contents:*
   A collection of themes integrating the knowledge of a degree level in two levels: basic and advanced, this allowing the use for a Chemistry degree and for other degrees, in this case as a zero course in Chemistry.

   b) *Flash presentations*:
   *I*ntegrated in Moodle through html documents. From the index, it is possible to access to theoretical contents and interactive collections of solved problems and exercises.

   c) *Tests:*
   An offline tool that allows the random generation of ten questions in the mode true/false/not answered. The program generates a global result, and the student can see the valid answers to each question as a feedback.

3. Conclusions - Contents and activities of the common parts of matters with basic chemistry contents, as Stoichiometry, Chemical Equilibria, Ionic Equilibria (Acid-base and Solubility), Chemical Thermodynamics and Chemical Kinetics have been integrated using methodologies, tools and resources in a virtual context. The items developed were: a) contents in two levels, b) presentations for interactive platforms, complementing the contents, c) tests of the type True/False, multiple answers and matchmaking, and d) collection of solved problems/exercises accessible interactively from the platform. The virtual environment selected was Moodle platform (as html and flash documents) and they were tested in part with students of two degrees in Cordoba University, with promising results.

4. References

[1] J. M. Rodríguez Mellado, M. Mayén, R, Rodríguez Amaro and M. Ruiz Montoya, *J. Lab. Chem. Ed.* **1**(2) (2013) p.19

Several proposals for using ICT in Education environments

J. Javier Samper. [1], José F. García [1], Francisco R. Soriano [1], Ricardo Olanda [1] and

Enrique V. Bonet [1]

[1] *Instituto de Robótica y de las TICs. Parque Científico, Universitat de València*

C/ Catedrático José Beltrán 2, 46980, Paterna (Valencia, Spain).

+34963543567, jjsamper@uv.es

1. Introduction – This paper discusses the use of ICT in university environments for several completely different purposes. On the one hand, the use of resources / external infrastructure technologies such as cloud computing and on the other technologies like semantic wikis and linked open data that can be applied in classroom teaching and that enable collaborative learning by students, is addressed.

2. Technology in Education - In government, business or education organizations, money is invested annually in maintenance of servers, computers, network equipment, and other devices. The same happens with the software, being this, the factor that requires more hardware features for execution. Regarding organizational network services, specialized department that manages it, cannot guarantee availability 7 x 24 and also a reliability of 99%, without huge costs to achieve it. Parallel to the increase of users and services offered, it is necessary to increase processing capacity, storage, bandwidth and upgrade software on servers. At the same time if required to perform a technological implementation it can last for months to years. So in this way, it is argued that the process of buying, manage and maintain, demand a large investment of financial, human and time resources. Cloud computing [1] is a paradigm that solves problems such as extending the physical hardware infrastructure of an organization in a short term, update the software and security. This technology saves costs and time to acquire and set up computer equipment for use. On the other hand, Wikis [2], being an important component of Web 2.0, have the necessary features to manage a constructivist model of collaborative learning. As described in "Wikis in Teaching" learn in a wiki environment is to learn technology literacy, create content in a digital environment, collaboration, build consensus, create explicit knowledge from tacit understanding and communicating ideas so effectively to others through network communication environments. Nowadays, Wikis have become a very usefulness tool. However, the traditional Wikis have several limitations inherited from the web technology. The principal limitation is the impossibility to exploit contained information by automated processing information systems. It turns Wikis only suitable to be used by humans. Semantic annotation of contents allows overcome this limitation using ontologies. The content is annotated, either manual or partially assisted, by the end user. Semantic wikis, however, offer the possibility to record the information about the data contained on the pages, as well as the relationships between pages, so it can be viewed or exported as a database. From the perspective of students, Semantic Wiki ensures a learning of contents in a structured and reliable way, and it lets consistency of the information. Furthermore, Linked Open Data (LOD) for education is currently, a very important research to be taken into account.

3. Results and Discussion - In this paper is shown and discussed: a) theoretical and practical information to guide universities to the adoption of the paradigm of Cloud Computing for saving costs, b) an overview of the state of the art of LOD technology applied to the teaching and learning, c) a proposal of semantic content manager, whose main function is to check the consistency of the information to share in an educational community, in the domain of mathematics education, and d) at last, details of an innovative educational project conducted at the University of Valencia on the implementation and use of technologies web 2.0 and 3.0 (semantic wikis) in courses and master of engineering degrees.

4. Conclusions – There are different ICT that will allow us to properly improve the quality in education environments. The use of Cloud Computing, Semantic Wiki and LOD are recommended.

5. References

[1] W Luokkanen, et al., Grid and Cloud Computing: A Business Perspective on Technology and Applications. Springer. 2010.

[2] Bruns, A. & Humphreys, S.: "Wikis in Teaching and Assessment: The M/Cyclopedia Project", in OLT 2005 Conference: "Beyond Delivery", Brisbane, Queensland, Australia.

General Instruction Language

P. Valožić

University of Applied Sciences Zagreb (CROATIA)

+ 385 99 2119582   pvalozic@tvz.hr

Introduction – For many years the GUI (Graphical User Interface) is a standard user´s interface on PCs. Navigation through application is with a mouse, the process selected is started by clicking a mouse button or the required information is entered in the selected field by a keyboard. For a decade we already have computers with touch screen, a mouse missed and a virtual keyboard as well. Using the application is simplified and accelerated but the manuals are more complex; like the comic book with a lot of pictures and with a little of text. The instructions are due to the images "heavy" several MBytes, even for a simple action. Size of a manual is not a major part of the problem; most of them are in the cloud and wireless communication is fast and accessible. The problem is that it is difficult to follow the instructions that occupy most of the small screen and at the same time to apply them in the application which remains in a small portion of the screen or is in the background. Overlapping screen and user´s attention to instruction - application - instruction - application ... is troublesome and frustrating especially for a user, novice.

Is it possible to compact the instructions?

Formal language GIL (General Instruction Language) is used to record the sequence of instructions which represents the user manual for an application with a GUI user interface. The space for application is a screen (desk top) of a personal computer, tablet PCs or a smart phone. GIL instructions do not depend on the platform (HW or OS) but may vary if the GUI objects have different names. Instructions written in GIL are short enough so that their column width is 20% to 30% of the active width of the screen.

Conclusion - GIL has emerged in the Communication and Computer Techniques division at the Department of Electrical Engineering of the University of Applied Sciences (former Polytechnic), Zagreb, Croatia. In the test phase, GIL is with a standard Latin alphabet as the set of symbols used. Dictionary is Croatian and English. Syntax of instructions is simple and well defined in order to be suitable for efficient automated translation from one language to another.

Implementation of Distance Education from Face to Face Education of **an** Engineering Program in Science and Food Technology.

José Daniel Corona Flores, EdD

Profesor e Investigador, Subdirección de Planeación y Desarrollo Institucional de la Universidad Autónoma Agraria Antonio Narro

josedaniel.corona@gmail.com

Abstract

This study has the purpose to identify, from the point of view of a Mexican university teachers, the factors from the personal, professional, organizational and technological, that affect the implementation of distance education mode, in the Educational Program in Food Science and Technology, which was the topic for the Doctoral Dissertation by the author, based on the model of innovation decision-Rogers (2003) that describes the attributes of the innovation theory and the clustering model of the barriers to the implementation of distance education process by Berge, Muilenburg and Hanegham (2002); Muilenburg and Berge and (2001). For information processing parametric statistics were used for the application of t tests for a one sample that evaluated the significance of the dependent factors depending on the personal professional organizational and technological variables.

The results showed that personal factors, professional factors and the organizational and technological factors had a significant effect $t(21) = 4$, $p < 0.0001$; $t(21) = 8$, $p < 0.0001$; $t(21) = 2.13$, $p < 0.0349$ and $t(21) = 3.45$, $p < 0.0009$, respectively, indicating that the project is easily implementable.

Key words: Distance Education Implementation, Distance Education Barriers, Distance Education Technology Attributes, Distance Education Transition

The experience of a digital ELE -portfolio as a tool for the development of students' independent work and their ability to learn to learn.

M.R. Leal Bonmati

School of Technology and Management of the Polythecnic Institute of Portalegre

Lugar da Abadessa, Apt 148 7300-901 Portalegre

934743961/677861532

mrlealb@estgp.pt

1. Introduction

This communication is focused on the experience of implementing a portfolio in an ELE class (Spanish as a Foreign Language) for each student in digital format, based on the proposal of a PLE (Portfolio of Foreign Languages), of the Department of Language Policy of the Council of Europe [1], during the last semester of this year (2014-2015).

The main objective of introducing this new tool aims to generate in students their own learning autonomy and capacity of learning to learn

After examining various digital portfolios, the chosen tool to create the site was Google Site because it was down due to the proximity of the students. It was told to students that all oral and written texts generated by them should be uploaded to the site; then the teacher could give them a feed -back that would be reflected on their pages and by themselves could recognize their own way of learning [3].

2. Results and Discussion –

After a period of adjustment to the new tool and its functioning, in which the teacher was involved from the very beginning, it was found out how students came to this site to check their own corrections, upload their own audios, and especially to express in writing their own advances in learning "Spanish for business ".

4. Conclusions:

It has been a very successful experience for both the teacher and the students, but for the next year, the following points should be improved:

1. communication and learning of the Google Site tool;

2. greater cooperative dynamism between students ;

3. creating activities that involve the handling of the tool.

5. References

[1] Council of Europe*, European Language Portfolio: accredited model No 59.2004,* awarded to Ministerio de Educación y Ciencia de España. Documento disponible en: http://www.oapee.es/documentum/MECPRO/Web/weboapee/iniciativas/portfolio/portfolios-validados-esp/adultos/peladultosimpresos2004.pdf?documentId=0901e72b80004497 [Consulta: 4 de marzo de 2015].

[2] Instituto Cervantes. 2002. Marco Común Europeo de Referencia para las Lenguas: Aprendizaje, Enseñanza, Evaluación. [En línea]. Documento disponible en: http://cvc.cervantes.es/obref/marco [Consulta: 25 de marzo de 2015].

[3] Parrondo, J. Análisis de un caso práctico de implantación de un portfolio como herramienta de evaluación formativa/ sumativa en el Instituto Cervantes de Salvador, *MarcoELE, Revista de Didáctica ELE*, nº 18, 2014. Documento disponible en: http://marcoele.com/descargas/18/parrondo-portafolios.pdf[Consulta: 12 de abril de 2015].

Chemistry learning at the university degrees by employing ITCs

M. M. López Guerrero [1], S. Rojano Ramos [2], G. López Guerrero [3]

[1] *University of Malaga. Department of Analytical Chemistry*
Phone Number: +34952137395, E-mail; mmlopez@uma.es

[2] *University of Malaga. Department of Didactic of Experimental Sciences.*

[3] *University of Malaga. Department of Didactic and Scholar Organization*

1. Introduction.

Teaching of Chemistry has different difficulties in general; especially by the lack of interest and low motivation in students. Chemistry has a negative connotation due to the environmental pollution caused by the products of chemical industry and the incorrect use of chemicals. This is called "chemophobia", a term denoting the absurd fear for chemical and chemistry (Kafetzopoulos, Spyrellis, N., & Lymperopoulo-Karaliota, A., 2006). With the rapid advancement of information and communication technology, teachers are faced with the challenge of integrating ITC tools into de classroom setting for effective teaching and learning. These changes are influencing the educational systems in general and instructional methods in particular. Thus, it was thought that the use of ICTs could be very beneficial for students in order to achieve an adequate learning about this subject. ICT can increase participation and motivation of the students in the development of the subject. The experience consists of using a virtual application to understand chemical processes. It was identified student misconceptions and misinterpretation for Mechanical Engineering students as they are attempting to interpret and explain the chemical processes. Oxidation-reduction reactions were identified the most difficult concept.
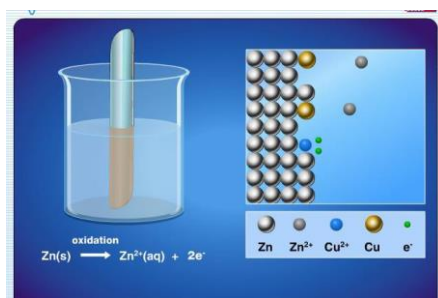
The objective has been to carry out a proposal for teaching contents of chemistry using didactic resources for virtual environment, the use of a simulation that lets students to construct useful mental models. The Image 1 shows a multimedia application used for redox reactions (provided from http://highered.mheducation.com/). In this case, the survey technique was used. The sample consisted of 50 students from the first course of Mechanical Engineer. The experience took place during the course 2013/14.

2. Results.

The use of animation has been demonstrated that enhancing motivation to students, and finally, allows them to practice about the topic. So significantly increased the number of scientifically acceptable ideas in student's conceptions of redox reactions. On the other hand, with this type of learning we obtain some advantages as construct scientifically acceptable mental models of substances and reactions at the molecular level which will be able to apply in other new models to new substances and reactions. Furthermore, it will be possible that the student use their models to understand new chemistry concepts that require a molecular level.

3. Conclusion.

The use of the simulation can be helpful in improving problem solving. In this particular case, a simulation help to students to understand better the redox processes. This encourages students to develop new ideas about science, and allow them to create a memory from viewing animations, leading to confirmation or modification of the existing mental model previous.

4. References

- Kafetzopoulos, C., Spyrellis, N., & Lymperopoulo-Karaliota, A. (2006). The Chemistry of Art and the Art of Chemistry. *J. Chem. Educ., 83*, 1484-1488.

EVO-RPGE an Interactive Role Playing engine

F.M.Sacerdoti [(1)], S.Maraffi [(2)]

[(1)] Temple University +39 3355824909 - francesco.sacerdoti@temple.edu

[(2)] Liceo Scientifico A.Labriola - e-mail: sabina@maraffi.net.

1.Introduction: The game seems to be a perfect vehicle for education, cooperative playing more than single student's game, because the acquisition of knowledge and enhancing skills requires now more actual approaches. The use of tablets, socials, likes, etc. are more comprehensible by young people.

Therefore we decide to prepare a Role Playing Engine to easily create new didactic games

2.Description: EVO-RPGE is a new engine to easily build interactive role-playing games which involves all students which partecipate to the game through their personal mobile or tablet giving a total interaction of the whole class to the game.

The teachers can create their own "adventure" writing a text file filled with texts, image names, questions, jumps, etc. The system is multi-language allowing different text files one for each idiom.

The system has also a translation help module.

The role playing games are based on a "class" subdivision in roles.

The students, for example, can be divided into physicist, chemists, disseminators, technicians, historians, etc. to highlight the same arguments from many points of view and the importance of cooperation to achieve results.

During the game, the students have to pass some doors in teamwork; they allow assessment and represent the main sharing/disclosure moment. The doors allow to modulate the activities according to single lesson, teaching unit, module.

3. Experimental: We applied one game focused on mineralogy and the myths of Campi Flegrei to a class lasting about one hour. and half, with great interest and followings.

4. Results and Discussion:

2.   The system allows students to partecipate all together to the games as an active group and route them, providing real-time feedbacks and evaluations.

3.   Role-playing helps students to reach their goals easily through cooperation; this in order to avoid the risk of loneliness of Inquiry Based Science Education, preserving entirely the educational value.

4.   The system can be easily adapted to different scenarios and it is multi-language in order to be adopted all over the world.

5.   Science Research now is based on field expert interaction: the role-playing game categories reflect the necessary team to get their goal.

6.   The game's features are also ideal for a personalized teaching to be used as compensatory measures for a full inclusion of Special Education Needs (SEN) students, saving the cooperative learning.

4. Conclusions - Will be narrated, on a brief way, the main conclusions of the work and it's most relevant contributions.

5. References

[1] Maraffi S., Sacerdoti F.M. et al. "GeoQuest, an Interactive Role Playing game", EGU General Assembly 2015, Poster Session EOS3

[2] Sacerdoti F.M. et al. "Autonomous system to use web educational contents in a classroom", Patent Pending NA2013A000048

Shell Eco-Marathon Projects: an efficient platform for improving students' global competence and research mindset at Qatar University

F. Touati [(1)], M. Benammar [(1)]

[(1)] *College of Engineering, Qatar University, PoB 2713, Doha, Qatar*

+974-66239470, touatif@qu.edu.qa

1. Introduction – Global competence and research mindset in corporate world have emerged as critical skillsets, engineering students need to acquire by graduation. Since its first participation in 2011 Shell Eco Marathon (SEM) Europe in Lausitz Germany, the College of Engineering of Qatar University (QU-CENG) found that SEM objectives support achieving the Students Learning Outcomes (SLs) and Educational Objectives (EOs) of its program. The competition acts as a huge educational platform where experiences are shared. This fosters the key performance area 1 (KPA1: Prepare globally competent and socially responsible graduates by providing quality education) of the 2013-2016 strategic plan of the CENG. Nevertheless, Participating in such races is expected to specifically impact positively design and research skills, global competitiveness, and

Image1. Team's participation in SEM ASIA Manila 2014

soft skills (team/multidisciplinary spirit, communication skills, awareness of contemporary issues). We present a case study on improvements injected into the CENG curriculum of QU to help students cultivate these capabilities when still on campus.

2. Experimental - Students at different levels were encouraged to participate voluntarily or by proposing subjects for their capstone design projects (CDP) that have to mesh into one of the Mega Projects the CENG is undertaking, such as SEM solar car design platform. We provide an overview of previous CDP model. Then, we describe how the new model defines CDP subjects through well-defined course term projects since early stages that would culminate into and pave the way to well prepared CDPs. Then, we compare SLOs of SEM-involved students with others not involved, focusing on global competence and research mindset.

3. Results and Discussion – The results discuss how to harvest students' research mindset and global competence. We focus on a real-word five-year experience (2011-2015) in SEM competition of both Europe and Asia in energy efficiency that enables students, across the study plan till graduation, to experience the entire cycle of solar car design and competition is explored. We show that the students who had been exposed to the new CDP model acquired hired degree of competence and research skills and mindset, all along with quite improved soft skills

4. Conclusions – A new model of capstone design project for engineering students at Qatar University was proposed. This new model was found to foster achieving global competence and research mindset, which is one of the key performance indicators in quality education target in the college of engineering strategic plan.

Evaluation Tools for Online Learning for the Bradford Robotic Telescope

J.P. Machell [1], Dr J.E.F. Baruch. [2],

[1] University of Bradford.

(+44)1274 233161 and j.machell@bradford.ac.uk

[2] University of Bradford (+44)1274 234024 j.e.f.baruch@bradford.ac.uk

1. Introduction – The Bradford Robotic Telescope science education programmes are described along with the systems and tools that allow for an integrated approach to the evaluation of the learning materials. The Bradford Robotic Telescope has over the past ten years provided remote autonomous access to a real telescope based in Tenerife with the aim of providing inspirational science and promoting physics and related STEM subjects [1][2]. The telescope website helps to support none specialist teachers to introduce astronomy and the use of the telescope by their pupils. It allows pupils to first learn about key concepts and then to test these concepts by using the telescope to take images and collect data, pupils are then able to share their images and results with each other. It embraces the educational principles elucidated in the Laurillard Conversational Framework [3].

As the content and extent of the site has grown it has become increasing important to evaluate the teaching materials and the effects of changes. The Kirkpatrick model as recommended by the Higher Education Academy evaluating across reaction, learning, behaviour and results[4] has been used and tools have been developed and tested to see their effectiveness of measuring the impact of the resource using the remote interactions of pupils with the telescopes.

2. Experimental - The development of the evaluation tools focused on methods of evaluation which are integral to the use of the site rather than additional surveys or observations. In order to do this it is essential that the learning process is captured, through tools central to the teaching process.

The telescope provides pupils with an almost unique chance to use a telescope remotely and this provides a key indicator of success through behavioural changes of pupils. A pupil satisfied with the experience of learning is more likely to be inspired to use the system to continue learning in their own time. This however provides a blackbox measurement of success. Understanding the learning experience within the system is key to a more insightful understanding of where effective learning is taking place. In a face to face environment a teacher is able to gauge not only the knowledge of a pupil but also from the way they respond their confidence in their understanding. From this they are able to judge the effectiveness of their current approach. Tools have be developed in order to measure confidence in learners, all assessment is accompanied with the opportunity to risk stars on answering correctly, thus the system is given not only an answer to each question but a number to represent how confident they were in the answer. To provide motivation a high score table was used but the stars had no other purpose in the system.

3. Results and Discussion – Two approaches to educational material were compared to look at the effects this had pupils uptake of the site in their own time. Confidence measurements were tested separately. Over 500 pupils used a multiple choice question system, 15000 answers were examined to look for trends that could help indicate effects on confidence. The results from both of these experiments will be discussed along with the extension of the approach into other tools developing these core principals.

4. Conclusions - Results have shown that it is possible to measure the impact of teaching materials remotely. Of particular interest is how these tools can be used together to look at the balance of changes and how to make sure that the experience remains inspirational whilst still providing the required educational content.

5. References

[1] J.E.F. Baruch, J. Machell and K. Norris, (2005) *Watching the Moon from Tenerife.* Primary Science Review 88, p7-9.

[2] A. Camacho, R. Holt, S. Marley and S. Roberts, (2009) *Robotic telescopes – classroom activities at the cutting edge of science.* Secondary Science Review 90(333) p73-82

[3] D. Laurillard, M. Stratfold, R. Luckin, L. Plowman & J. Taylor, (2000) *Affordances for Learning in a Non-Linear Narrative Medium.* Journal of Interactive Media in Education, 2000 (2)

[4] Higher Education Academy (25/5/2015) https://www.heacademy.ac.uk/resources/resource2328

E-Network of teachers for sharing experiences and methodological resources for the internationalization of education.

N. Nebot [(1)], C. Rosa Jiménez [(2)]

[(1)] *Paseo Antonio Machado 28, 5º 4, 29002 Málaga, Spain.*

+34 690290011/ nurianebot@uma.es

[(2)] *Plaza de El Ejido, s/n. Escuela Técnica Superior de Arquitectura de Málaga, Málaga.*

1. Introduction. The innovative educational project which is presented is developed as a pilot project within the framework of the commitment made by the School of Architecture of Malaga with the internationalization of education. This School has offered recently the possibility of studying a part of Architecture degree in English (apart of the Spanish language) in order to consolidate a bilingual line along all its courses in the following years. All this process implies, a great effort from teachers who face, in most cases, the challenge of teaching in a non-native language, and the need to reformulate their programs and teaching methods.

This project proposes the creation of a network of teachers to share resources as an answer to that additional effort. This whole process of collaborative learning between teachers has been developed on a virtual platform -the virtual campus of the University of Málaga- with an interface well suited for the exchange of knowledge and discussions through forums. This virtual platform has also become a useful tool for sharing different kinds of information such as programs, surveys and training materials as a support of the work of teachers.

2. Results and Discussion. This network of teachers and the virtual platform has allowed in a first phase, generating an initial methodological knowledge base that can be completed in future courses. Teachers have already turned the first specific materials for teaching in English so that the platform can be a helpful tool from the first moment, although the main point is having a database to be gradually increased in the future. The idea is that this knowledge acquired as a result of the participatory process and all the documentation made by teachers - teaching materials and programs- can be accessible open knowledge and serve as a basis of learning to other teachers and students in the future, whether the Architecture degree or other discipline.

On the other hand, it has facilitated collaborative learning between teachers of different subjects and departments, even between different international universities. The innovation project itself is an opportunity to establish relationships with foreign universities as XJTLU, XI'an Jiaogtong-Liverpool University (China-UK) as an example of partnership started from the project of educational innovation. The virtual platform has been crucial in this respect, as it has become the meeting place of teachers, easy to use and effective in terms of creating synergies between users in different areas of knowledge and geographic origin.

3.Conclusions. The creation of this virtual network of teachers has led in part to fulfill the aim of providing support and guidance in the early years of teaching in a non-native llanguage, although it is presented as a tool of opportunity in the consolidation process that has to be completed in the following years. This tool can be interesting as an open knowledge base to help teachers to develop their own methodologies and teaching resources. And moreover, if we consider it as a tool to encourage participatory synergies between teachers from different areas of knowledge and universities.

4. References

[1] Revuelta, F.; Pérez, L. Interactividad en los entornos de formación on-line. Barcelona: UOC(2009) p.13
[2] Glassman, M. & Kang, M.J. The logic of wikis: The possibilities of the Web 2.0 classroom. Interantional Journal of Computer-Supported Collaborative Learning 6(1), 93-112 (2013).
[3] Alcón, E. La internacionalización de los estudiantes universitarios. *La cuestión universitaria*, 7. (2011) p. 32-39.

Conception, Entrepreneurship and Know How to Make

J. Martins [1], A. Barbedo Magalhães [2], A. Torres Marques [2]

(1) IDEIA.M
(+351) 220 301 570, Júlio Martins <martins@ideiam.com>

UPTEC – Science and Technology Park of University of Porto
Edifício Central, Rua Alfredo Allen, 455
4200 – 135 PORTO, PORTUGAL

[2] *Department of Mechanical Engineering, Faculty of Engineering, University of Porto,*

Rua Dr. Roberto Frias, s/n, 4200-465 Porto, Portugal

1. Introduction – based upon the philosophy of Project Based Learning and Learning by Doing, and considering actual pedagogic tendencies [1], in 2004, an initiative was launched to promote student active participation in the learning process. It has been called PESC – Projetar, empreender e Saber Concretizar (Conception, Entrepreneurship and Know How to Make).

Image 1. Guitar made with composite materials – PESC 1- Ideia.M

The idea has been to engage students in developing skills regarding entrepreneurship and achievement, socially useful, sustainable and valued ethically.

The big difference in the approach used, has been the LEADERSHIP. In fact, students should be organized in groups and choose their only LEADER. Faculty staff had the role of advisor.

Despite being based on a voluntary basis, both for students and faculty staff, several groups, including students from different courses, were organized in different years and all projects were evaluated.

PESC projects worked until 2008 and we will report experiences and findings.

2. Case Studies – Although most projects had interesting results some difficulties also occur. Besides some case studies, we will report also on a very successful case, see Image 1, that ends up in a *spin off* company Ideia.M.

3. LIDERA - The results of PESC were enthusiastic and, in 2008/2009, it has been decided to extend the idea to all faculties of Universty of Porto. The experience will be described, particularly, the reasons why it didn't work well.

4. Conclusions – The belief of the authors is that we need to reinvent the idea, as very positive results and enthusiasm from the students occurred. Hence, we, in cooperation with UPorto Rectorat, are preparing a new initiative with the aim of Learning and Serving the Community.

5. References

 [1] McCOWAN et al, An Integrated and Comprehensive Approach to Engineering Curricula, Int. J. Engn Ed. Vol 18 nº 6, (2002).

Student's Attitudes towards E-learning at Faculty of Economics and Business in Croatia

I.Strugar, PhD, Professor, N. Osmanagić Bedenik, PhD, Professor

Faculty of Economics and Bussines, UNIVERSITY OF ZAGREB

Trg J. F. Kennedya 6, 10000 Zagreb, Croatia

Phone.: +385 1 238 3283, +385 1 238 3124
E-mail: istrugar@efzg.hr , nosmanagic@efzg.hr

Abstract

We are witness of continuous changes in our environment and habits as result of technology and specifically information technology development. But acceptance of new technology and solutions depends on different and numerous conditions. E-learning has numerous advantages in comparisons with traditional classroom learning, and it gains importance in education in different countries. The Universities and Faculties in Croatia are made significant efforts for e-learning popularization among students and business, but the e-learning acceptance in Croatia is still much lower in comparison with other development countries. This paper is present attitude of the students towards e-learning on Faculty of Economics. Although majority of students has positive attitude towards e-learning, still large portion of them are still reserved, and favours traditional classroom learning model. The research results confirm that largest portion of students still makes difference between diplomas gain by traditional classroom learning and distance learning model, and favours traditional learning model. Since every new student generation which comes to the study brings new and improved experiences related with technology usage, and specifically information technology usage, we compare results with previous researches led on our faculty and with similar researches done in some other countries. We can conclude that new student generation has a slightly more positive attitude towards e-learning than previous one, and much more positive for Internet as a source for knowledge. Almost all students use Internet frequently or on daily basis to get knowledge. But almost half are still uncertain about possibility to enrol distance learning study, they are not well informed about e-learning possibilities and still small portion of them has experience of e-learning usage. Almost all of students agree that e-learning is future and they are ready to participate as well as employees, or in the role of employer. The conclusion is that attitude towards e-learning among students can be improved but it requires additional effort to inform students how e-learning can improve their learning experience and how they can benefit from it.

Technology vocational centre (CVT) for agroecology and organic agriculture in Brazil: educating, researching and *rural extensioning* in favor of sustainable agriculture

Ana Maria Resende Junqueira; Juliana Martins de Mesquita Matos

University of Brasília, Agronomy and Veterinary Sciences Faculty, PO Box 4508, 70910970 Brasília-DF, Brazil.

556131077186 anamaria@unb.br

1.Introduction – CVT for Agroecology and Organic Agriculture is a centre of excellence which deals with knowledge creation and dissemination of sustainable production techniques. Established in 2013, CVT counts 18 students from the Agronomy course and 14 professionals. Among the lines of work are technicians, university students and farmers training; production of literature material; implementation of demonstrative field models of organic and agroforestry production; research, rescue and multiplication of traditional vegetables; development of non-timber forest products technology aiming at reaching 100% of products coming from plant extractivism of the Brazilian savannah (Cerrado) such as paper making and organic compost from the peelings of pequi (*Caryocar brasiliense*) fruit. CVT reaches for the dissemination of information and sustainable technologies which are built in a collective way.

2.Experimental - Activities of research, learning and rural extension are performed with students. Development of new technologies is done in a collective way by teachers and small farmers. Surveys of farmers' demands are done, which are worked upon at CVT with the purpose to obtain new production technologies with a focus on sustainable extractivism.

3.Results and discussion - Agronomy students are being trained at CVT to do research and studies directed to paper making and organic compost from the peelings of pequi. Parts of the fruit are used in the making of a culinary cream. However, peelings which are 62% of the fruit are discarded.

4. Conclusions – Students involved in training, research and rural extension practices have the opportunity to strengthen their professional formation and to reinforce their commitment to the environment and sustainable production chain, bringing about their ability to make technical interventions for the improvement of farmers' quality of life and instigating them on the perception and creation of new sustainable technologies. Those assisted by these technicians is stimulated to adopt sustainable techniques in order to protect the environment and generate extra income. On the other hand, small farmers who receive training become multipliers in their communities and, at the same time, provide important feedback information to CVT to act in the improvement of technologies with the participation of students. CVT has been integrating University and Society and working in a collective way for the rise of environmental, social and educational sustainability in the region.

Transforming Traditional Engineering Education into Team-Based Learning Pedagogy: An insight to success and challenges

RD Mendoza [1], Gagnon, PD[1], SH Teoh [2]

[1] *Division of E-Learning and IT Services, Lee Kong Chian School of Medicine,*

Nanyang Technological University, Singapore

+65 9633 5669 | mendozaredante@ntu.edu.sg

[2] *Director, Renaissance Engineering Programme, NTU, Singapore*

1. Introduction – The Nanyang Technological University is an internationally-ranked university in Singapore with particular strength in engineering. The Renaissance Engineering Programme is NTU's premier engineering course with highly selective admission coupled with universal provision of scholarship grants. Beginning in 2014, several courses within the programme were converted into a paperless Team Based Learning pedagogy. This presentation details the journey and the results of the conversion of the Engineering modules from

Image 1. REP Class during TBL Session

2. Method – In the first semester of Academic Year (AY) 2014, 3 of the 10 required modules of REP year 1 were initially converted into Team Based Learning. These are RE1006 Materials and Manufacturing Engineering I, RE8003 Fundamentals of Management and RE1003 Mechanical and Structural Engineering I. The professors underwent intensive training on delivering the TBL Pedagogy, while the physical infrastructure was converted into a Learning Studio with 12 tables of 6 seats each. Each table has a microphone and provided with a connection to a monitor. Each student was provided with iPad Air.

In our version of TBL, the preparatory materials are pushed online through a specially created app (called iREP) to be accessed by the students as early as 2 weeks before the required session. In-class, the students perform a series of activities beginning with an individual readiness assurance (iRA) that checks on their grasp of concepts from the preparatory materials. Then they repeat the questions a second time, but they are to submit a team answer. This is the team readiness assurance (tRA). The professor can see their on- time performance on iRA and tRA. The professor then clarifies these concepts, and may field some (very few) questions. The student then proceeds to the Application Exercises, where the professors design real-life industry relevant questions/scenarios/cases that use the conceptual knowledge from the preparatory materials and applies them to these exercises.

3. Results and Discussion – The REP students are extremely high performers under Lecture-Tutorial and TBL conditions, grades were not used to compare student performance.

Dimensions	Methods	Findings
Student and Teacher Perception	Focused Group Discussion and Interviews	Students: Generally positive. Issues: Perceived heavier workload compared to lecture-tutorials.
		Teachers: Improvement in the students' ability to discuss and unpack the problems. Issue: Masking, where the strong group members mask the weak performance of some members.
Student Behavior	Teamwork Quality Measurement	Measured at week 15 and 26, there is a significant improvement in overall team quality and in coordination of team resources.[1]

4. Conclusions and Follow up Studies

The experience in doing TBL is generally positive for both students and teachers. The students have to be prepared for the "perceived" heavier workload. The teachers need to utilise the available tool to pinpoint weak students and difficult concepts. The teamwork study will be conducted earlier, to measure the crucial points of team development.

5. References

[1] Lim FS, *Teamwork Quality Survey for REP TBL Implementation Yr1 (NTU Internal Document),* 2015

Approach of the Cooperative Learning method focus on students in their final year doing their degree final projects

I. Montealegre-Meléndez [1], C. Arévalo [1], E.M. Perez-Soriano [1], I. Peña [1]

[1] *Universidad de Sevilla. Camino de los Descubrimientos s/n 41092 Sevilla (Spain)*

+34661623296 and imontealegre@us.es

1. Introduction – Nowadays, there is a significant competitiveness between the university students in order to achieve scholarship. Moreover, the engineering students in their final year have to work in a project to complete their degree. These facts could promote individualistic attitudes of the students being a negative lack in their education; however the professional engineers need to have team working skills.

The present work is carried out according to the bases of cooperative learning method, which was developed as a means to reduce competition in American schools [1] identifying this competivity as a negative component of the education system. Considering the three concepts that are fundamental to all cooperative learning/Student Team Learning techniques [2], the investigation is conducted at the Seville University in engineering students performing their degree final projects: i) nineteen university students have been rewarded as a several teams (see Table I) but have been graded individually , ii) the success of the studied team has not been conditionally based on individual performance of one of its member, and iii) all students must help each other in the same team to achieve learning goals focused in their projects and to complete their education.

2. Experimental – Once the teams were defined according to several subject areas, three research-lectures were named as tutors of the students (see Table I). Teams were not formed in the same way by an identical number of students. Moreover, the student degrees were not necessary the same in each team. These two factors were evaluated as influence parameters on the efficiency of the work based on the previous works [3, 4]. In addition to investigate the effect of cooperative learning on academic performance, effectiveness of cooperative learning on students' self-esteem, social skills and academic motivation were also studied.

Table I. Relation Tutor- student's team studied

Team	Student nº.		
	Tutor 1	Tutor 2	Tutor 3
A	3	4	2
B	2	2	2
C	1	2	1

3. Results and Discussion - Previous investigations indicate that cooperative learning results in cognitive and affective growth of students [3, 4]. It is confirmed by this research. Students working alone finished their work later than students in teams with more than two members. However, cooperative learning was thought simply as 'group work,' but groups of students working together might not be working collaboratively as it was observed in one of the studied teams with four students.

4. Conclusions –

In the present study the model of cooperative learning was used on university subject, namely Universidad de Sevilla. This model was tried out on engineering degree subjects. The main conclusion addressed the need of the application of cooperative learning method in order to promote team attitudes in engineer students encouraging their skills.

5. References

[1] J.S. Coleman, *The Adolescent Society*. New York, 1961.

[2] R. Slavin. *Using Student Team Learning*. 4th ed. Baltimore: Johns Hopkins University, Center for Social Organization of Schools, 1994.

[3] A. Woolfolk. *Educational Psychology*. Singapore: Person Education, Inc., 2004.

[4] S. Parveen- *Effect of Cooperative Learning on Academic Achievement of 8th Grade Students in the Subject of Social Studies*. International Journal of Academic Research, **3** (1), (2010). pp. 950-955.

In contact with the business reality to promote the entrepreneurship and the motivation in engineering students

M. L. Martínez Cartas

Department of Chemical, Environmental and Materials Engineering
Higher Polytechnical School of Linares. University of Jaén
C/ Alfonso X, el sabio,28-23700 Linares (Jaén) Spain
Phone number*: +34953648541; e-mail address*: lcartas@ujaen.es

1. Introduction – To reach high levels of economic growth an innovation policy makers consider that more entrepreneurship is required [1]. The aim of this work has been to promote a entrepreneurial attitude among students of engineering. Souitaris et al. [2] found that entrepreneurship programmes raise some attitudes and the overall entrepreneurial intention and that inspiration (a construct with an emotional element) is the programmes most influential benefit. Although Oosterbeek et al [3], did not find relation between entrepreneurship education treatments realized and the development of entrepreneurship skills and motivation, with the realized experience based on the contact with a entrepreneurial company, that beside promoting the business entrepreneurship, attitudes as the motivation towards the study have been woken up in the students.

2. Experimental – The experience has been developed with students of the last course of the Energetic Resources Engineering Degree of University of Jaen and financed by Vice-Chancellor´s Office for Students and Employability of this University. A company of the energetic sector, accredited to do laboratory analysis of fuels for other companies, was contacted in order to students carried out some of these analyses to establish the similarity between the work of the company and the knowledge that they are acquiring during their training. The company showed them the different activities that it performs, emphasizing the need to adapt to the social demand to survive as a company.

3. Results and Discussion – The students were informed about the managerial activity that the company develops. Different situations of adaptation to new circumstances to be able to be kept as company were exposed, emphasizing the need to adapt to what the society demands. The students had the chance to solve the questions raised consulting professionals of their labour sector, showing an unusual interest.
On the other hand, a sequence of laboratory practical classes of energetic parameters analysis that the company performs as managerial activity was carried out. The similarity of this activity with the teaching practical classes that the students have received inside their training has revealed that what they study is not remote from the labour world, being possible to observe in the students enthusiasm and motivation.
By means of a survey in which there appear items of valuation of the activity with a punctuation of 1 (lower value) - 5 (higher value), 90 % of the polled students values the activity between 4 and 5, while 10% remaining assigns the punctuation 3.

4. Conclusion – The experience has turned out to be a whole success from a teaching point of view, as a complement of training since the student has verified that the practices that the company develops keep similarity with those who form a part of his education and from the point of view of acquisition of learning experience of entrepreneurship, being possible to observe motivation and enthusiasm in the student attitude and a very positive assessment of the activity. To check the acquisition of entrepreneurial skills it would be interesting to follow-up the professional work of students, once concluded their studies.

5. References

[1] M. van Praag and P. Versloot. "What is the value of entrepreneurship?. A review of recents research". *Small business Economics*, 29, **4** (2007) 351-382.

[2] V. Soutaris, S. Zerbinati and A. Al-Laham. "Do entrepreneurship programmes raise entrepreneurial intention of science and engineering students? The effect of learning, inspiration and resources". *Journal of Bussiness Venturing*, 22 (2007) 566-59.

[3] H. Oosterbeek, M. Van Praag and A. Ijsselstein. "The impact of entrepreneurship education on entrepreneurship skills and motivitation". *European Economics Review*, 54 (2010) 442-454.

Design of practical classes with CES Edupack software for teaching in Engineering

L. Pérez-Villarejo [1], D. Eliche-Quesada[1], M. Cuevas-Aranda [1], B. Carrasco-Hurtado [2], M.L. Martínez-Cartas [1]

[1] *Department of Chemical, Environment and Materials Engineering.*

[2]*Department of Graphics, Engineering, Design and Projects. University of Jaén.*

Alfonso X el Sabio s/n, 23700 Linares (Jaén)

+ (34) 953 648633; lperezvi@ujaen.es

1. Introduction – EduPack® CES is a software package widely used, which in its educational version offers the possibility to respond to the issues arising in the selection and design of materials [1]. The properties of materials limit their performance, a form of inspection to get a sense of the limits that the properties have in the design is needed. A property can be displayed on a table with the different specified materials, but it is strange that the performance of one component depends only on a particular property, so it is normal that a combination of properties are those that determine the selection of a particular material, so it is necessary to map the property fields for each type of material and the possibility of create subfields for individual materials.

2. Experimental - This software is intended to enhance the (self) learning problem-based but also the (auto) learning project oriented [2] as well as a new teaching tool is used for application in the scope of Engineering in the field Science and Technology of Materials. More specifically, the contents to be treated by this new method of teaching through the proposed software are teaching materials and manufacturing processes that involve and affect all aspects of design and industrial production from the aspects regarding the first Engineering stages such as the selection of materials to the design thereof, the method of production, environmental issues such as energy footprint, eco-design, low-carbon energy, etc. Environmental issues will be addressed as "Eco Audit" that helps to explore the concepts of ecological design, making it possible to analyze the carbon footprint and energy efficiency during the product design. Secondly, a guide to basic use will be developed for the student to become familiar with the software to be used and also as a platform for starting to use. The proposed software allows you to apply a structured methodology for engineering projects, being able to compare and select materials and processes as well as creating graphic materials selection. The next step will be to implement the software in the teaching of the subjects taught. Practical exercises or exercises with varying degrees of difficulty with the software will be proposed and also a list of practical situations that the students have to solve will be begun. Each of the practical examples will consist of an approach of the problem, the objectives pursued, the topic and its difficulty, and a few pictures or graphics that help in solving the case.

3. Conclusions – All is about an implementation in teaching of new practices in which students are taught to develop new products, to select alternative materials for those existing or to optimize new productive systems. This will serve to promote innovation and entrepreneurship among students especially those who develop the end-of-degree project.

4. References

[1] CES EduPack 2015, Granta Design, Cambridge (2015), www.grantadesign.com.

[2] T. Ben, D.L. Sales, L. López, P. Perdomo, M. Herrera and R. García. Contribución a la educación para la Innovación y el emprendimiento en estudiantes de las Ingenierías industriales, Jornada innovación Docente-RIMA 2012, Recerca i Innovació en Metodologies d'Aprenentatge.

KNOWLEDGE, COMPETENCIES AND TECHNICAL SKILLS NEEDED FOR ENTREPRENEURS FROM THE LIFE SCIENCE FIELD

Nicoleta Radu[1], Ana Aurelia Chirvase[1],Frangu Octavian[1] Ovidiu Popa[2], Narcisa Babeanu[2], Fantxoa Hastaran[3], Serge Priselkoff[3], Birute Velikyene[4], Renata Steponaviciene[4]

[1]I.N.C.D.C.P. Biotechnology Department. Bucharest Romania; [2]U.S.A.M.V. Biotechnology Department, Bucharest Romania; [3]A.F.M.R. Etcharry, France; [4]Kaunas Inovacju Centras, Lithuania.

Corresponding author: Nicoleta Radu, e-mail: nicolbiotec@yahoo.com

One of the aim of the european project entitled "IMPROVED CURRICULA AND MODERN LEARNING SYSTEM TO PROMOTE THE NEW DIRECTIONS OF BUSINESS ENHANCEMENT IN LIFE SCIENCES APPLICATIONS" was the elaboration a learning content for technical key competencies needed to start and develop an innovative SME. Technical key competencies were established on the basis of Questionnaires, at which were invited to respond the people who have entrepreneurial skills or they who have or want to have their own company. During this survey, in which were involved three European country, respectively Romania, Lithuania and France we obtained 204 valid answers from the respondents. The results obtained from analysis of these answers reveals the following: 1) Regarding **technical skills respectively knowledge and understanding**, 87% of the respondents consider that they have need of deeper knowledge's about technologies in order to generate products and services in bio economic sector, 89 % are interested in deeper knowledge about industrial life sciences, 89 % of them considered that is necessary to has a proper knowledge and understanding of Intellectual property Rights regarding bio economic sector, 82% are interested to knowledge of multidisciplinary characteristic of the life sciences, and 78% are able to express their knowledge regarding importance of life sciences research for the innovation process. **2)Regarding the evaluation of skills and abilities**, the results obtained reveals the following: 86 % have the ability to communicate and participate at business networks and feel business opportunities based on innovative processes, 87% are able to take the initiatives, to perform a quickly analyses and make the decision, and think creatively. Only 82% from respondents are determined to be independent, 78 % are able to judge based on limited information and 86% are persuade others. From the all persons, only 81 % are able to work hard but independently, 84% are able to manage projects holistically, 86% are oriented to achieve, 88% are able to use knowledge in an innovative way and 83% are able to direct and lead the R&D activities. Based on results obtaining during survey, we build a training content named "Sustainable Life Sciences Applications" which will be adapted as a blending learning products.

Key words: entrepreneurship technical competences life science

ACKNOWLEDGEMENTS

LEARNING FOCUSED ON THE ACQUISITION OF BUSINESS AND MANAGEMENT COMPETENCIES IN THE FIELDS OF LIFE SCIENCES

Nicoleta Radu[1], Ana Aurelia Chirvase[1],Frangu Octavian[1] Ovidiu Popa[2], Narcisa Babeanu[2], Fantxoa Hastaran[3], Serge Priselkoff[3], Birute Velikyene[4], Renata Steponaviciene[4]

[1]I.N.C.D.C.P. Biotechnology Department. Bucharest Romania; [2]U.S.A.M.V. Biotechnology Department, Bucharest Romania; [3]A.F.M.R. Etcharry, France; [4]Kaunas Inovacju Centras, Lithuania

Corresponding author: Nicoleta Radu, e-mail: nicolbiotec@yahoo.com

During the Leonardo da Vinci programme, we achieve a project, in which we aim to develop a curriculum and a training content which will be delivered to the target group. The content was established using a survey analysis, which contains specific questions, regarding personality characterisation respectively the knowledge and skills in business and management, needed for entrepreneurs which activate in the fields of life sciences. From this survey, in which are involved the people with superior studies, from three European countries (Romania, Lithuania and France) we obtained 200 valid answers. The results obtained after the analysis of these answers, reveal the following: 1) **Regarding personality characterization**, 78 % are willing to take the risk, 93% of this persons are determinate to accomplish the difficult tasks, 84% considered that the own life was determined by their actions, not by other or by chance, 73% preferred to be independents if they have a business idea, 81% of the respondents say that they cannot be stopped by other persons which think differently, 89% are inventive persons, 94% are optimistic regarding their future, 82% of the respondents preferred situations in which compete with others, 77% says that they are often appreciated and encouraged by others in their work, 90% have the capacity to communicate their ideas to others. **2) In terms of knowledge and skills in business and management**, the majority of respondents (88%) are totally agree that they need the adequate knowledge regarding project's financial evaluations, 98% of them are agree that the technical, practical and ethical issues are important to manage the company which activate in the field of life sciences; 89% from all are interested to know how can get access to financing for their innovative company; 94% of respondents consider as useful a deeper knowledge and understanding, in order to assess the market of a product; 85% of the persons is interesting in knowledge regarding manufacturing and commercialization capabilities, and 95% from all persons consider that is importance to have in depth knowledge of economic regulatory issues from national or international perspective. Based on results obtained during survey, we will build a training content named "Enterprise business and intellectual property in life sciences" which will be entirely adapted as e-learning system.

Key words: life science, skills assessment, entrepreneurs

ACKNOWLEDGEMENTS

3d Printing: Unit Plan Proposal

A. Guerrero [(1)], M.M. Espinosa [(1)], M. Dominguez [(1)]

[(1)] *Ingeniería del Diseño. Universidad Nacional de Educación a Distancia - UNED*

C/ Juan del Rosal, 12. 28040 Madrid.

(+34) 678 417 791. aguerreromier@gmail.com

1. Introduction – In this paper we propose a methodology for conducting a pilot studio of 3D printing in high school classrooms. We will use Azara RepRap printers, a model developed by ourselves that doesn't need external computer. We propose the establishment of a unit plan based on the Project-Based Learning methodology (PBL). We suggest several possible projects, their goals, their basic content and key competences covered, their evaluation criteria and the basic content of the satisfaction surveys.

2. Unit Plan - We propose two consecutive projects: First, the assembly of 3D printer, and second, the design and build of a 3D model, about a topic selected by teacher.

We propose to use a RepRap Azara[1], a RepRap[2] improved 3D printer. That printer is able to process 3D models alone, without any external computer. We propose the following phases in every project:

2.1. Surveys (Pretests) – A surveys campaign will be launched before the project's start. The surveys will be validated and their level of reliability will be computed. The internal consistency index will be evaluated through Cronbach's alpha.

2.2. Training on 3D Design and Printing – The teachers will conduct two training sessions:

a) Basic training regarding principles of 3D Printing and fused deposition modelling (FDM) printers.

b) A second training adapted to the project that will be conducted, with the following contents: assembly of a 3D printer (for the 1st project), and 3D modelling software (for the 2nd project)

2.4. Practical work - The practical work is adapted to the project content:

a) 1st project: Assembly of 3D printer. The students will assemble, calibrate and test the printer.

b) 2nd project: It is based on the designing and printing of 3D models, about a topic selected by teacher. Possible options are: local or famous monuments, a bridge, a vehicle, or a Sculpture competition.

2.5. Marketing - The goal of this phase is to design a marketing campaign to sell the products built in the previous phase, including calculation of sell prices and manufacturing costs.

2.6. Trials and Final presentations - The teams will practice their presentations in front of the class. Finally, after testing once or twice, all the teams will make their final presentations in a public event.

2.7. Surveys (Postests) - A surveys campaign will be launched after the project's end.

3. Key competences –.The key competences covered by the Unit Plan are: linguistic (reports), mathematical, science and technology (3D models, printer assembly), digital (applications), social and citizenship (teamwork), cultural (presentations, brochures and some models), learning to learn (trials) and sense of initiative and entrepreneurship (prices and costs calculation, marketing).

4. Conclusions -The unit plan covers all key competences established on the curricula for Secondary Education in Spain. We are going to develop this Unit Plan in two Educational Centres in Andalusia(Spain), during the next program year.

5. References

[1] JL. Romero et al, *Additive manufacturing with RepRap methodology: current situation and future prospects*. 25th Annual International Solid Freeform Fabrication (SFF) Symposium, Univertity of Texas. Austin. 2014

[2] A. Bowyer et al, *Reprap: the replicating rapid prototype*, Robotics (2011), vol. 29, pp. 177-191

On an Efficient Telecommunications Approach to Science and Engineering E-Learning

M. Porat

Computer Vision Lab., Department of Electrical Engineering,

Technion, Haifa 32000, Israel

Email: mp@ee.technion.ac.il and mporat@ieee.org, Phone: +972526333261

1. Introduction – A significant part of E-learning is based on transmitted images, voice and video over telecommunication lines. This increasing amount of information transmitted via band-limited channels has to be considered efficiently, especially in wireless mobile communication. Information compression is thus becoming an inherent part of many systems, with the goal of allowing high quality reproduction of the visual and auditory information despite a reduced data rate.
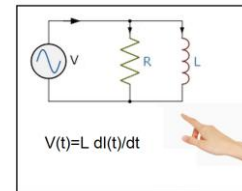
Image 1. An example of a typical video frame from an electrical

2. Basic Assumptions - The approach developed in this study assumes specific properties related to the nature of the data streams for E-learning. The main assumption is that a significant part of the visual information in each frame remains mostly unchanged in several consecutive frames, while smaller details (e.g., a hand pointer as in Image 1) are likely to appear repeatedly moving in the next frames at different locations. Such details of the video information may be also rotated or scaled versions of previous movements [1]. Furthermore, if a specific moving detail cannot be matched accurately according to coarse partitioning of the data, a more refined description can be used [2]. Similarly, the audio stream is also likely to use words that have been used already (e.g., 'current', 'voltage' in the case of electrical engineering).

2. Implementation - Based on the above assumptions, a machine-learning system has been developed to learn the recent history of the data stream. According to recent changes in each video frame, codebooks of typical details are constantly created, allowing for compact description of future details in the stream. Thus, instead of transmission of full future frames, only an index of code-words in the created codebook is needed to indicate details of a new frame. An experimental telecommunication application has been implemented in this work. To avoid the need to transmit the codebook itself to the receiving end, the history of the transmitted sequence is used also for the machine-learning system at the remote receiver [3, 4].

3. Results and Conclusions - Experimental results show a high compression ratio of over 100:1, obtaining high quality reproduction with a signal-to-noise ratio higher than 1000:1. This reduction in the data rate is especially helpful for mobile wireless devices like smartphones, tablets or laptops, and in particular in situations where the student is limited in communication speed or capacity. The lower bit-rate also saves energy and reduces the amount of the required radiation. Based on its performance, it is suggested that the new technology and approach to E-learning telecommunication be integrated into presently available methods.

5. References

[1] M. Porat and Y.Y. Zeevi, "The Generalized Gabor Scheme of Image Representation in Biological and Machine Vision", IEEE Trans. on Pattern Analysis and Machine Intelligence 10:44, pp. 452-468 (1988).

[2] N.S. Jayant and M. Porat, Method and apparatus for image processing using model-based localized quantization, US patent 5,828,413. Also registered as European Patent EP0765085, Japanese Patent JP9172378, and Canadian patent CA2180298 (1998).

[3] O. Gendler and M. Porat, "On Efficient Quantization for Image Recompression", European Signal Processing Conference, Glasgow (2010).

[4] H. Kirshner, A. Bourquard, J. P. Ward, M. Porat and M. Unser, "Adaptive Image Resizing Based on Continuous-Domain Stochastic Modeling", IEEE Trans. Image Processing, Vol. 23, pp. 413-423, (2014).

Nurse Training about Environmental Sustainability

C. Álvarez-Nieto [(1)], IM. López-Medina, C. Álvarez-García, G. Parra-Anguita, ML. Grande-Gascón, M. Linares-Abad

[(1)] *Address: University of Jaén. Campus las Lagunillas s/n, Edif. B3, Dep. 243, 23071 Jaén*

Phone number: 953212575 E-mail: calvarez@ujaen.es

1. Introduction – Sustainable development is a concept vital to healthcare: due to its relatively large CO_2 emissions, the use of toxic materials and the production of vast amounts of waste, healthcare is ultimately compromising public health and damaging the ability of future generations to meet their needs. It is therefore important that nurse education incorporates elements of sustainable development into nursing education curricula[1].

The concept of sustainability in nursing can be defined from a core of knowledge in which ecology, global and holistic comprise the foundation. The use of the concept of sustainability includes environmental considerations at all levels. The implementation of sustainability will contribute to a development that maintains an environment that does not harm current and future generation's opportunities for good health"[2].

A team at Plymouth University have successfully secured Erasmus+ funding to develop a strategic partnership to work on a three-year project (September 2014 – August 2017) with universities in Jaen (Spain), Esslingen (Germany) and Maastricht (the Netherlands), titled NurSus TOOLKIT: A Teaching and Learning Resource for Sustainability in Nursing.

The aim of this strategic partnership is to: enhance the availability/relevance of a sound learning offer in Sustainability Literacy and Competency (SLC) in nurse education by developing innovative teaching and learning approaches/materials, disseminating good practice and promoting take-up of the learning approaches/materials through strategic use of information technologies.

Nurses, as primarily responsible for providing sustainable care, must be knowledgeable of how climate change affects health. To acquire this knowledge are necessary teaching strategies that address environmental sustainability in nursing degree.

2. Experimental - It has been conducted a narrative review to address these issues; for this it proceeded to a search of major research using databases of bibliographic references nursing and health sciences, and the search was supplemented by codes of publications. In addition, search engines and meta-search engines to identify Web resources, organizations and scientific publications concerned with the issue of environmental sustainability in relation to nursing and health care were used.

3. Results and Discussion - The results show the areas of knowledge that nurses must have about sustainability as well as the skills, attitudes, competences and behaviors enforceable in each. It can also appreciate educational approaches, the theoretical assumptions that support them and the types of activities that can be done for the integration of sustainability into the curriculum. Finally, we discuss the need for a deeper approach by nurses of central themes for training in environmental health, and future researches are proposed.

4. Conclusions – Sustainability teaching resources in Nursing are scarce (specific sustainable care for nurses), but it is not the case for environmental health. These resources are very useful for training, because they are very versatile, hence the importance of creating more of these.

5. References

[1] Goodman B. The need for a 'sustainability curriculum' in nurse education. Nurse Educ Today. 2011; 31(8):733-7.

[2] Barna S, Goodman B, Mortimer F. The health effects of climate change: What does a nurse need to know? Nurse Educ Today. 2012; 32(7):765-71.

Social Media in Higher Education: Penetration, Impact.

J. C. del Ama [1], F. del Ama [2], C. Saenz de Tejada [3]

[1] Central Connecticut State University

1615 Stanley Street

New Britain, CT, 06050

USA

(860) 832 3211

delamaj@ccsu.edu

[2] *Alfaisal University, Riyad, Saudi Arabia,* [3] *Universidad CEU San Pablo, Madrid, Spain*

1. Introduction – This paper explores how university instructors are introducing social media in their courses.The project is a common effort of three researchers working in very different academic environments. Dr. José Carlos del Ama is professor of communication sciences at Central Connecticut State University (USA), Dr. Fernando del Ama is associate professor of architecture at the College of Engineering of the Alfaisal University in Riyadh (Saudi Arabia) and Carlota Saenz de Tejada is research fellow and teaching assistant at the Universidad CEU San Pablo in Madrid (Spain)

The explosion of social media has become one of the most relevant phenomena in the post-modern world. They have become a necessary reference in practically all the communication contexts (interpersonal, group communication, professional communication, mass communication).

Our study has three well-defined goals:

First, we explore the scope of the role of social media in traditional face-to-face instruction (as opposed to online or hybrid instruction). The project studies which the most frequently used social media platforms are, as well as their pedagogical use. We try to establish to which extent higher education instructors are using the media as a tool to improve and open new channels for communicating with students and supporting group communication dynamics. Furthermore, the study also sheds some light on how social media are used for research, assignments, and evaluation.

Secondly, we are interested in finding out which are the academic fields in which social media are penetrating more rapidly and effectively. Since social media are more relevant in certain professional fields, we assume that instructors in those professional fields may be more inclined to introduced them, not only as curricular subject, but also as pedagogical technique.

Finally, the study also delves into the relationship between social media usage and other areas of higher education instruction, such as reading load, grades, writing expectations, volume of assignments, type of assessments or course evaluations.

2. Results and Discussion – The research group is now finishing the data collection stage of the project, which started in April 2015. By the end of the Spring term, we should have all the necessary information to start the data processing and interpretation phase of the project.

Virtual Resources in Physics (Electromagnetism): design of interactive teaching and self-assessment tools

P.J. Perez [1], M. Carrera [2], J. M. Ribó [3]

[1] *Dpto. Medio Ambiente y C. del Suelo, ETSEA, Av.Rovira Roure, 191, 25198 Lleida, Spain.*

Phone Number: +34973003730, E-mail: p.j.perez@macs.udl.cat

[2] *Dpto. Medio Ambiente y C. del Suelo, EPS, C/ Jaume II, 69, 25001 Lleida, Spain.*

[3] *Dpto. Informática e Ingeniería Industrial, EPS, C/ Jaume II, 69, 25001 Lleida, Spain.*

1. Introduction

Virtual simulations have become a useful tool in Physics teaching, since they allow to explain complex theoretical concepts in an efficient way. Some examples can be found in the internet [1-2]. In this work, in order to improve efficiency in teaching-learning of several physical principles, a set of computer tools have been developed with the aim to make easier to students the understanding of theoretical concepts of Electromagnetism. These tools are mainly graphical interactive resources allowing users participate actively with a semi-attending and online methodology [3]. They are appropriate for subjects of different Engineering degrees, and can be accessed from a specific web site:

http://sedna.udl.cat:8080/opencms7/opencms/fisica

2. Methods

The applets developed will enable students to make interactive simulations of physics problems with variable parameters. They are mainly graphic tools in 3D generating realistic simulations of physical concepts. In order to be executed directly from internet, applets have been developed using an open code language, Java Web Start and the Application Programming Interface Java 3D. These information technologies provide a great amount of high level functions allowing create interactive and graphically powerful applications.

Accessibility of applets included in the web page, makes easier constructive learning and self-assessment of students.

3. Results and Discussion

Every applet shows step by step the development of a specific theoretical concept. For example, regarding Electric Field in vacuum, a first set of three different applets show graphically how electric field around an infinite line of charge is created, and how Gauss Law has to be clearly used (Image 1). A fourth applet shows how Gauss Law can be applied to different charge distributions: volume spherical distribution with uniform charge density, spherical surface charge and a uniformly charged infinite plane.
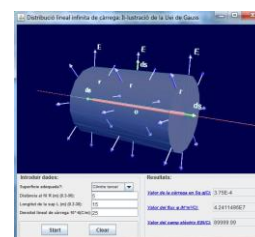
Image 1. Example of applet showing the application of Gauss Law

A different set of applets develop theoretical concepts regarding charges and currents in a magnetic field, electromagnetic induction and electromagnetic waves. At present we are working in a second phase to add and improve new tools that allow students to carry out self-assessment exercises.

4. Conclusions

These tools make easier to students the understanding of abstract and vector concepts, in which 3D representation has a relevant role. Use of the tools has increased active participation of students and slightly improved the teaching-learning process.

5. References

[1] A. Franco: Curso Interactivo de Fisica, http://www.sc.ehu.es/sbweb/fisica

[2] University of Oregon: Physics Applets, University of Oregon, http://jersey.uoregon.edu/vlab

[3] F. Esquembre, E. Martin, W. Christian, M. Belloni, "Fislets, Enseñanza de la Fisica con material interactivo", Pearson Prentice Hall, 2004.

A comparative study of Web 2.0 tools to supervise and evaluate collaborative learning

R. Olanda [1], R. Sebastián [1], J. I. Panach [1], J. M. Orduña [1], J. Javier. Samper [2]

[1] *Departamento de Informática. Universitat de València, C\ Avenida de la Universidad s/n, 46100, Burjassot (Valencia, Spain)*

+34963543557, Ricardo.Olanda@uv.es

[2] *Instituto de Robótica y de las TICs. Parque Científico, Universitat de València*

C/ Catedrático José Beltrán 2, 46980, Paterna (Valencia, Spain).

1. Introduction – this paper aims to determine which Web 2.0 tools improve monitoring and allow feedback of collaborative students work within a group.

One of the more important skills at work is the collaborative or team work. It is important that students learn to work with their peers, to hear other opinions, to negotiate, to achieve agreements, etc.

Nowadays, in most of the subjects taught in university, several teaching methods are used to develop those skills. Teamwork, puzzles, presentations, etc. motivate student to acquire knowledge in an autonomous and collaborative way.

Image 1. Moodle wiki example

The problem with these methods is the difficulty of tracking the work done by students, and assessing the contribution of each of them in its development.

The use of a Web 2.0 tool to perform students' works, can allow teachers to track the development and to perform continuous evaluations of these works.

The contribution of this work is presenting a comparative study of some of these tools; in particular, we will focus on Wiki tools, which can be used to enhance the learning process [1].

2. Comparative – In order to allow a monitoring and assessment of a Wiki, it must fulfil some requirements. We can highlight some of them:

a) It must allow an advanced user management. You need to create different students groups which can only modify their wiki. Teacher role that can view and edit all students' wikis have to be created too.

b) It must allow to record students changes, contributions, connected time, etc., in order to perform an individual assessment.

c) It must allow to share the results of each work among all the students of the subject. This enhances the sharing of knowledge.

There are many tools we can use to develop a wiki. We focus our comparative on: MediaWiki (used by Wikipedia), Wiki tool included in the learning platform Moodle, and WikiSpaces (a wiki hosting service).

3. Results and Discussion – Based on the comparative study, all the tools support c) requirement. However, MediaWiki cannot be recommended, because it does not implement a) requirement. It is intended for all users to collaborate in the same wiki, not for creating different groups of students to develop different wikis. Despite there are plugins that try to implement this functionality, MediaWiki authors do not recommend them.

Moodle and Wikispaces meet de requirements a), b) and c). In order to choose one of them, it is needed to take into account another features, like interface usability, existence of plugins which extends wiki features, or if we want to use our own installation or an external one.

4. Conclusions – There are different wiki tools that will allow us to properly monitor the students work and facilitate the implementation of an individualized student assessment. The use of Moodle wiki or Wikispaces is recommended.

5. References

[1] K. Parker & J. Chao, "Wiki as a teaching tool", Interdisciplinary Journal of e-learning and Learning Objects, 3(1),67-72, 2007.

Using a wiki to improve students' learning in the Pharmaceutical Chemistry area (Degree in Pharmacy)

M. E. Camacho,* M. D. Carrión, M. Chayah and J. M. Campos

Departamento de Química Farmacéutica y Orgánica. Facultad de Farmacia. Universidad de Granada. c/ Campus de Cartuja s/n, 18071 Granada, Spain.

Phone Number: 958243844; e-mail: ecamacho@ugr.es

1. Introduction – Online teaching systems are no longer a novelty in university learning [1]. In the last decades, technology tools have been introduced to both traditional classrooms and online teaching.

Wikis is a technology that can facilitate social interaction and collaboration, and this tool can be used to create a student-centered collaborative learning environment [2].
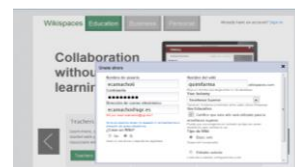
This project addresses the experience of using a wiki to promote students' learning Degree in Pharmacy, particularly in the area of Pharmaceutical Chemistry, by creating a collaborative networked for knowledge generation.

The aim of this initiative is to develop a number of skills and abilities in students to improve their academic achievement and their comprehensive training.

This work has been developed over two academic years and has been carried out with students in the subjects of Pharmaceutical Chemistry I (third year), Pharmaceutical Chemistry II (fourth year) and Advanced Chemistry of Drugs (fifth year), for a total of 140 students.

Students have worked in teams on topics related to the subjects above indicated and have used the wiki to develop their works.

Experimental – It has been used the following methodology for assessing students' learning:

- Making a private wiki tool for collective learning in "wikispaces.com" by the administrator (teacher), and to include students of different subjects as group members.
- Informational meeting about the use of wikis in university teaching.
- Offered topics or papers for students to work in group by creating different pages in the wiki, to promote teamwork and collective intelligence.
- Assessment of learning method on students who have used it by polls.

2. Results and Discussion –
- Students think the tool is useful because it promotes and encourages teamwork and active participation. It also facilitates the expansion of knowledge, it is easy to be used and is useful in other subjects.
- The wiki allows contact with the teacher and classmates as well as improving other skills.
- Students say this tool is useful for the future.
- Participation in this new learning system has been high and the initiative has been widely welcomed.

3. Conclusions –
- This method has favored collective and constant review by teachers and students.
- The performance of tasks has helped to better understand the theoretical contents of the subjects as they were issues related to them.
- Opinion polls have shown a degree of satisfaction between high and very high on their performance, highlighting the benefits of using a wiki in learning.

5. References

[1] A. Ruth. Paradigms and models of online learning: A review of the literature. Proceedings from the IT in Regional Areas Conferences (p. 238). ITiRA 2002 Conference Committee, Rockhampton, Queensland Australia (2002, August 27–29).

[2] N. Augar, R. Raitman, W. Zhou. Teaching and learning online with wikis. Proceedings of the 21st ASCILITE Conference: Beyond the comfort zone, 95-104. Perth, Australia (2004, December 5–8).

Creation and use of a wiki in higher education: results in Organic Chemistry

M. D. Carrión,* M.E. Camacho, J. M. Campos, M. Chayah

Departamento de Química Farmacéutica y Orgánica, Facultad de Farmacia, Universidad de Granada, c/ Campus de Cartuja, s/n, 18071. Granada, Spain.

Phone number: +34 958 240728; e-mail : dcarrion@ugr.es

1. Introduction – Nowadays, the new model of university is focused on the development of new skills to promote a continuous and independent learning process by students. Thus, internet technologies [1] have reached a wide social diffusion mainly among young people, so that the use of them at university have a great interest (the incorporation of Internet technologies into the teaching process is known as e-Learning). These new technologies (blogs, wikis, social networks ...) are included under the concept of Web 2.0, which is an evolution of the Web or Internet in which users are no longer passive users who only receive information to become active members, who participate and contribute to the edition of the information. This paper presents our experience based on the application of a wiki to teaching organic chemistry in Pharmacy degree. In this way a wiki is a website where a group of users can create, write, delete or change the content of a web page, in an interactive, easy and fast way. The objectives of this project are: a) To create a collective learning tool which facilitates the exchange of ideas, b) To try to promote the level of student interest in the subject c) To enhance the role of the teacher as a guide in the student learning process d) To facilitate the constant review of the work.

2. Experimental - This project was carried out with students of 2nd year of Pharmacy degree in the subject of Organic Chemistry II. The teacher created the wiki called "quimfarma5" using the website: http://www.wikispaces.com, to which later, the students joined. The proposed work plan was to give to the students a series of drugs with therapeutic activity (such as methadone, paracetamol, diclofenac...) in order that working collaboratively through the wiki, the students could look for the chemical name, propose a feasible synthetic route and the mechanism of action for the different drugs under study. This way we expect that the students use their knowledge regarding nomenclature and chemical reactions, studied along the course in the theoretical and practical lessons of Organic Chemistry II.

3. Results and Discussion – Through the wiki "quimfarma5" the students worked collaboratively on different pages created within this wiki. Among the best aspects that the students highlighted in this initiative, we can find: a) The possibility of working cloud, without having to be all the classmates gathered at a physical place. b) The implementation of a new educational way more entertaining than the typical theoretical or problem solving lessons, which allowed them to use their knowledge to the synthesis of drugs. c) To know new easy tools which are useful for the development of future projects.

4. Conclusions - To sum up, with this project we have created a wiki called "quimfarma5" in order for the students to work collaboratively among them and with the teacher. By means of this wiki, we have managed to increase the student's interest in the Organic Chemistry subject and to go in depth in the content of it. The excellent results obtained with this project let us say it is a very useful tool for its possible use in other subjects in different degrees at university.

5. References

[1] D. Tapscott, "Grown Up Digital: How the Net Generation is Changing you World", McGraw-Hill, 2009.

[2] M. J. Rosenberg, "E-learning strategies for delivering knowledge in the digital age". McGraw-Hill, 2001.

Teaching experience at the Politecnico di Torino with web2.0 technologies for the improvement of homework study

F. Barpi , M. Borri-Brunetto, S. Invernizzi [1]

Department of Structural, Geotechnical and Building Engineering,

Politecnico di Torino, 24 Corso Duca degli Abruzzi, 10129 Torino, Italy.

[1]+39.011.090.4860, stefano.invernizzi@polito.it

1. Introduction – The present work concerns the results of the first two years of a pilot project for the improvement of the teaching supported by the Politecnico di Torino (Italy). According to the Bologna process ECTS system, the workload indicates the time that students typically need to complete all learning activities required to achieve the expected outcomes. Therefore, beside the time each student devotes to lectures and seminars, there is an almost equal amount of time spent in home or self-study.

The project aims at self-study improvement using web2.0 technologies, in the spirit of the collaborative learning paradigm [1]. The project has been applied to the teaching of Structural Mechanics in classes with a mean number of about 130 students. The main objectives were to improve collaboration among students exploiting web2.0 features, trying to involve them in a collaborative learning environment and to stimulate sharing of knowledge and experiences.

2. Experimental – We adopted the Moodle [2] platform to set up the collaborative learning environment. Although the platform was used also to distribute lecture materials, like slides or small video tutorials, our main attention was devoted to stimulate social activities among the students, using dedicated forums, wiki activities, and self-assessment quizzes. The platform was made accessible through both Internet browsers and dedicated apps, available for iOS or Android systems. The platform allowed for students' activity tracing and monitoring of their progress in knowledge and skills. In addition, the platform improved the efficiency of student tutoring, allowing for better dissemination of tutor's explanations. The experimentation was carried out for two consecutive academic years, involving about 1600 students of Structural Mechanics, enrolled both at the Architecture and Engineering schools.

3. Results and Discussion – Among the positive results of this first two years experimentation we acknowledge the efficiency and stability of the system. Activity tracing allowed for better proportioning of the workload and prompt easing of unexpected difficulties. In addition, the system allowed providing GeoGebra [3] applets, which greatly improve the comprehension of complex mathematical concepts through interactive visualization. However, the experimentation revealed that collaboration among students did not emerge spontaneously, simply as a consequence of the learning platform. The highly competitive atmosphere of nowadays is a deterrent to collaborative learning, and tends to inhibit the development of student's soft skills. Moreover, the students perceive the system as "too formal", compared to the social networks they are more used with, where they are shielded by Internet anonymity.

4. Conclusions – The highly competitive atmosphere is a great obstacle to set up an efficient collaborative learning environment, and students tend to conceive themselves as isolated, especially at technical universities. Further investigation and new creative efforts are needed to establish a genuine collaborative learning environment.

5. References

[1] K. Bruffee, "Collaborative Learning", The Johns Hopkins University Press, Baltimore, 1993.

[2] https://moodle.org

[3] https://www.geogebra.org

Innovative teaching experiences in Engineering Degree to acquire skills in entrepreneurship

C. Rus-Casas[1], M. D. La Rubia García[2], D. Eliche-Quesada[2*]

[2] *Department of Chemical, Environmental, and Materials Engineering. Higher Polytechnic School of Jaen. University of Jaen, Campus Las Lagunillas s/n, 23071 Jaen, Spain*

Tel.:+34953211861; e-mail address: deliche@ujaen.es

[1]*Department of Automatic and Electronic Engineering. Higher Polytechnic School of Jaen. University of Jaen, Campus Las Lagunillas s/n, 23071 Jaen, Spain*

1. Introduction – We are currently in an increasingly competitive job market in an unstable economic environment. The financial crisis had led to an increase awareness of the value of entrepreneurship as a tool of creating employment for university graduates, through self-employment. This has prompted a significant increase of programs to promote innovation, employment generation and entrepreneurship that have garnered support from both the Regional Government and University of Jaén. Moreover, from the legislative side must be highlighted the Law 14/2013, dated 27 September, of support to entrepreneurs and their internationalization.

Engineering students appear to be very well suited to become entrepreneurs [1]. Therefore, the promotion of entrepreneurship education has to be a key objective of the universities because they must graduate engineers who not only understand science and technology, but who are also able to identify opportunities in their professional field. From this point of view, this work is presented as an opportunity of familiarizing engineering student in the field of entrepreneurship motivation. Entrepreneurship education focuses on training students regarding responsibility, commitment, effort, dedication, perseverance and spirit of work. This contributes actively to developing an entrepreneurial attitude among students.

2. Materials and methods – The activities were developed with the aim of bringing to students the entrepreneurship motivation. For this reason, students from the following courses participated in the activities: Data Acquisition Systems (Degree in Electronics Engineering), Materials Science (Degree in Chemistry), Surveying and Building Materials and Materials Technology (Degree in Mechanical Engineering). These students were asked to take an initial survey to determine their knowledge about programs and activities in the field of entrepreneurship. For advice purpose, CADE staff organized several talks to inform about supporting entrepreneurs programs that Regional Government and University of Jaén offer. A round table about entrepreneurship was also organized which brought together graduates, entrepreneurs and Head of Research Centers. And finally, a visit was made to the Science and Technology Park of Geolit located in Mengibar (Jaen), an innovative business space where companies and organizations working in different economic sectors are housed.

3. Results and discussion –. Initial survey showed that students had no knowledge either the programs or activities to promote neither entrepreneurship nor support for business creation and development. Students were positive about the usefulness of the talk given by the CADE staff. The participants could gain a better understanding of resources and tools offered by this organization to ensure that their ideas become real, viable and job- creating enterprises and stable quality employment generators. The entrepreneur talks were also considered motivational and of great value for their further educational and professional training. The visit was found very interesting as the students had the opportunity to become familiar with the services offered to entrepreneurs and to visit the facilities of the innovative and eco-efficient centralized biomass climatization system available in the Science and Technology Park.

4. Conclusions – All the participants greatly appreciate that the University of Jaen implemented programs to support entrepreneurship because all the activities have helped them to encourage entrepreneurship spirit. After having weighed the advantages and drawbacks of entrepreneurship, they have recognized that entrepreneurship could be a real job opportunity.

5. References

[1] N. Duval-Couetil, T. Reed-Rhoads y S. Haghighi, *International Journal of Engineering Education 28(2) (2012) p. 425.*

Application of a collaborative work environment for the teaching of Materials Science and Environmental Technology

D. Eliche-Quesada [1], M.D. La Rubia García [1], L. Martínez-Cartas [2].

[1] *Department of Chemical, Environmental, and Materials Engineering. Higher Polytechnic School of Jaén. University of Jaen, Campus Las Lagunillas s/n, 23071 Jaén, Spain*

Tel.:+34953211861; e-mail address: deliche@ujaen.es

[2] *Department of Chemical, Environmental, and Materials Engineering. Higher Polytechnic School of Linares. University of Jaen, 23700 Linares (Jaen) Spain*

1. Introduction – University teaching is undergoing a period of reflection and search for new pedagogical alternatives that allow professors to innovate [1]. In this sense the information and communication technologies (ICT) emerge with force as valuable and large-scale applicability tools in the teaching-learning process, where they acquire a dynamic role, giving the student a leading role in the assimilation of content, skills and the achievement of a more fluid communication that extends beyond the classroom. The University of Jaen is working hard on new technologies in the network, offering a wide range of virtual tools to the University community. Thus the virtual platform ILIAS seeks the creation of a contact point between students and professors to become an innovative platform for information, participation and education at distance. In this sense, this work aims to promote the use of the new tools of this virtual platform; as the creation of a spanish-english glossary and a wiki made by and for students. Finally, using this tool, the professor can, in an easy way, monitor (evaluate) the individual participation level of each member of the group in the work. This work is promoting the vision of e-learning called "cooperative constructivism", which despite being a redundancy of the term is correct in emphasizing the collaborative nature of learning.

2. Experimental - To generate the glossaries and wikis has been used the platform of virtual teaching ILIAS featuring the University of Jaen. The subjects involved have been Materials Science of fourth year of the Degree in Chemistry, Construction Materials of the fourth year of the degree in Mechanical Engineering and Bio-fuels in the fourth year of the degree in Chemical Engineering. A survey has been done to measure the satisfaction level of students with the proposed collaborative work.

3. Results and Discussion - The degree of participation of students in the activity exceeds 50%. From the surveys data: 42% of students participated in this activity because it raised the final mark; 33.9% because it seemed useful due to the use of new learning styles; 13.4% because they were interested in learning to create content in glossaries and wikis and only 10.6% because they liked to work collaboratively, sharing their knowledge with the rest of their partners. Regarding the utility of the activity in their learning, 11.1% considered that it had been very useful, 71.0% believed it was enough or sufficiently useful, while 17.8% considered that the activity had been unhelpful to their learning. Moreover, 95.2% of the respondents would participate in this activity again.

4. Conclusions - The academic results obtained in the subjects show that students who participate in the experience of teaching innovation have submitted to examination, being the rate of success and better performance than those who have not participated in the experience. In addition, this experience has been working on the acquisition of generic skills such as autonomous learning, problem solving, writing communication skills, motivation for the achievements, time planning or teamwork, highly valued skills in future professionals.

5. References

[1] M. Área Moreira, A.L. Sanabria Mesa, M. González Alfonso, *RIED-Revista Iberoamericana de Educación a Distancia*, **11** (1), (2008) p. 231.

Organic Chemistry Guides and Trouble Shooting by Using SciFinder

M.C. Nuñez-Carretero [(2)], A. Conejo-García [(1)], O. Cruz-López [(2)], J.F. Dominguez-Seglar [(2)], F. Ocaña Peinado [(2)], M.E. Garcia-Rubiño [(2)], J. Tamayo-Torres [(2)]

[(1)] *Faculty of Pharmacy, University of Granada (SPAIN).*

+34 958 249583 aconejo@ugr.es

[(2)]*Faculty of Pharmacy, University of Granada (SPAIN).*

1. Introduction – Organic Chemistry I subject of the Degree in Pharmacy is the first contact for students with the study of organic compounds from the point of view of its constitution, conformation, molecular configuration and chemical reactivity. Trouble shooting facilitate the understanding of the theoretical classes and avoid the sole fact of accumulating data in memory. Conventionally after each lesson a list of problems that the students must resolve is facilitated. However, based on the results obtained at the end of the academic course, this is not enough for the student to acquire the necessary knowledge to pass the final examination. Therefore, it is necessary to propose others educational tools that help to the students in the understanding of the subject and incentive their motivation [1]. The University of Granada provides a subscription to use the SciFinder web application [2], which is indispensable for advanced research in any laboratory of organic synthesis. Its use in the Organic Chemistry I subject facilitate the comprehension of the basic scientific contents that are explained in the lectures.

2. Results and Discussion - By using SciFinder, the students carried out a series of trouble shooting related to the corresponding explained lesson:

1. Draw organic structures.

2. Search enantiomerically pure compounds.

3. Search and study the H- NMR Spectroscopy of the indicated compounds.

4. Search the synthesis of the compound and describe the reaction conditions.

5. Analyze scientific articles.

Finally performed activities were exposed in class by the student. Both the communication skills and the knowledge of the use of SciFinder was evaluated.

3. Conclusions - The use of this educational resource was evaluated by means of students opinion inquiries. The main conclusions were as follows:

-        81% of the students quite agree that the use of this web application increases their motivation for the subject.

-        67% of the students consider that the use of SciFinder have made easier the comprehension of the subject.

-        92, 5% of the students opine that the involvement in the activity set the scientific research reality closer.

4. References

[1] A. Polanco-Hernández, *La motivación en los estudiantes universitarios. Actualidades Investigativas en Educación,* **5** (2), (2005) pp.1-13.

[2] http://biblioteca.ugr.es/pages/biblioteca_electronica/bases_datos/scifinder

An innovative approach in the evaluation of the optional subject "Use of agricultural and industrial solid waste" of Chemical Engineering degree from the University of Granada

M.A. Martín-Lara*, M. Calero, A. Pérez, A. Ronda

Chemical Engineering Department. Faculty of Sciences. Adva. Fuentenueva, s/n 18071 Granada.

Phone: +34 95824044; Fax: +34 958248992

1. Introduction –There are many ways to understand and, above all, to carry out the evaluation, all with significant impact on learning. In this work, an experience of innovation in the evaluation was conducted on the subject "Use of Agricultural and Industrial Solid Waste," of the fifth course of the Chemical Engineering Degree of the University of Granada during the academic year 2011-2012. The number of students enrolled was 49 and participated in the initiative 44.

Specifically, i) the opinion of the students to fix the system of evaluation of the course, guaranteeing anonymity and confidentiality of the data collected, has been considered, ii) appropriate instruments have been selected for the evaluation of the subject according to data collected, iii) co-evaluation as an important contribution of the evaluation system of the subject has been adopted and iv) collaborative learning activities to stimulate the class have been included.

2. Objectives – The objectives sought by applying this experience of innovation in the evaluation of the subject are: 1) Improve learning process helping to structure it, 2) to contribute to the acquisition of transversal competences such as critical and self-criticism, ability to make judgments and evaluate, etc., 3) encourage the student due to the novelty of assessment tools that require active participation, 4) to deepen the study of the subject and content will review the student having to evaluate their peers and can learn other ways to solve the exercises or to present information, 5) inform the teacher so you can adopt the most appropriate strategies to redirect, if necessary, the march of progress, improving teaching activities in the classroom, 6) reflect on the importance of evaluation of the teaching in the new framework of the European Higher Education Area.

3. Results and Discussion –

3.1. Initial diagnosis about the preferences of student for evaluation.

On the first day of class, a questionnaire was completed by students and preferred items were selected for the evaluation system used in the subject. Two tests that included theoretical questions and had a weight in the final grade of 30% were performed. The rest of the score was obtained from the three group work done by students throughout the course (40%), reports made on the two visits to companies (20%) and the continuing evolution of each student based on regular attendance at classes and degree of involvement of students in the teaching-learning process (10%).

3.2. Relevant assessment tools.

Co-evaluation in the oral presentation of one of the working groups of the subject.

Traditionally, the evaluation of the subject was conceived only as the judgment of the teacher about the student's work, which seemed to show a lack of motivation in students with the completion of the work. Teachers tried to change the dynamic by introducing the co-evaluation.

Activity to energize the class. Quiz games.

Students formed "small teams" after receiving instructions from the teacher. Each team prepares 25 cards with questions (as template) about the two works that have developed and do not have to present orally. Then the teacher asks two or three questions of the 25 developed by each group and the groups must correctly answer them. Within each team during the set time, students exchange information and work on solving the questions until all the members have understood and done, learning through collaboration.

Comparing the results of this way of working with traditional learning models, it has been found that students learn more when using this collaborative learning.

3.3. Academic results

Regarding the academic results obtained, there is not a great difference in the number of passes in the subject, compared to previous academic years, but an improvement in the final grades was observed. More than 65% of the students achieved a good rating and more than 22% obtained a rating of excellent.

Some activities to improve knowledge of Chemical Engineering Degree on High School students

M.A. Martín-Lara*, A. Ronda, M. Calero, G. Blázquez

Chemical Engineering Department. Faculty of Sciences. Adva. Fuentenueva, s/n 18071 Granada.

Phone: +34 95824044; Fax: +34 958248992

1. Introduction – One point very important in the motivation of the student during its studies is the feeling of having made a good choice of the degree. González Afonso et al. [1] studied the main reasons of renouncing the study degree, and between them, one of the most important was the lack of vocational interest and the unsuitable selection of the degree. This work is about possible educative actions to promote greater levels of motivation and cognitive engagement in student of first year at University bringing closer the University study with the secondary students. To reduce the number of student that drop out their studies in the Chemical Engineering degree from the University of Granada, is necessary that the prospective students have a higher knowledge in the syllabus of the degree. In this sense, authors are involved in several activities with the purpose to bring closer the high school students to the University.

2. Objectives - The purpose of this work is to show the different activities in which authors are involved to move closer the Chemical Engineering Degree to the secondary students at different levels.

The aim is divided in several specific objectives: 1) Improve knowledge of the future students in the syllabus of the Chemical Engineering Degree by performing some attractive practises of Chemical Engineering, 2) Encourage the participant students to want to try more Chemical Engineering, 3) Show high school students what research is and how it is performed (raise the general profile of science), 4) Promote the scientific vocations amongst the youth and specifically is devoted to the near-future Chemical Engineering graduate student.

3. Results and Discussion – Activities in which authors are involved are:

3.1. Science Week.

The Science Week is an activity organized by Secondary schools and University of Granada, focussed in students of third and fourth-years ESO. In this week, students participate in different workshop of Science area. In them, students see the work field of scientific degree and make activities related with each one. Concretely, in Chemical Engineering area, students carried out two experimental practices, one about "*Freeze-drying*" and other about "*Industrial wastewater treatment*".

3.2. Summer Scientific Campus.

The High school excellence students participating in this program are immersed during 7 days on different profiles of experimental sciences, technologies and innovation within a unique environment of cultural exchange. Students are integrated into research projects carried out in the university departments, in four rounds. Chemical Engineering Department participates on project "*Chemistry with natural products*". Participant students follow a working paper and answer questions about their activity according to obtained results.

3.3. Project to Introduce Research and Innovation into Secondary Schools in Andalucia (PIIISA).

PIIISA is a project to introduce research and innovation into secondary schools in Andalucia. It is focussed in students of last years of the high school. The objective of this project is show high school students what research is, getting the opportunity to get involved in research activities and projects of participant researchers. Demonstrations to show how science is in our everyday life are carried out. Currently, in this project take part 35 high school (a total of 1500 students) and 390 scientists. Concretely, the project proposed by authors is "*Removal of a dye from aqueous solution by biosorption with olive stone*" and a total of 6 students participate in it. During the project, students working in this research line by different theoretical and practise activities proposed tutor professors. Students finish the work with the presentation of a summary of results in a poster or oral communication.

The valuation of these activities by students was very positive. They think this kind of activities let them a better choose of their future studies.

References

[1] M.C. González Afonso, P.R. Álvarez, L. Cabrera, J.T. Bethencourt, *Revista Española de Pedagogía*, 236, (2007) p. 49.

COORDINATION OF SUBJECTS IN THE DEGREE OF AGRICULTURAL ENGINEERING. RESULTS OF THE FIRST YEAR OF IMPLEMENTATION

R. Tomás-Las-Heras, C. Olarte Martínez, S. Sanz Cervera, J. Martínez-Abaigar, E. Núñez-Olivera

Dpto. Agricultura y Alimentación. Universidad de La Rioja. c/ Madre de Dios, 51. 26006 Logroño (La Rioja) Ph.:34941299730; e-mail: carmen.olarte@unirioja.es

1. Introduction – With the aim that the students of the Degree in Agricultural Engineering from the University of La Rioja were able to integrate the skills that are taught in the different subjects constituting their curriculum, we developed a teaching innovation project in which the format and content of the practical classes of seven different subjects were coordinated. Thus, working with the same methodology and on the same plant material, students could collect in an integrated manner the various approaches that are dealt within each subject, coming nearer the reality of their future professional activity ("from the field to the table"). Given that the project finished in the academic year 2014/15, we aimed to assess the effect of this new teaching method on the motivation of students and their academic results.

2. Experimental – The innovation project described was developed during the academic years 2013/14 and 2014/15 and was addressed to the students of the subject Biology, included in the first year of the Degree in Agricultural Engineering. In each year, 15 students were selected among those who voluntarily agreed to participate in the project. The students, working in groups, chose a plant species (lettuce, spinach or cauliflower) and studied their botanical and agronomic respective characteristics. These same plants were further processed in the subsequent subjects of Food Technology, establishing their useful life to the consumer.

The academic results obtained by these students were compared with those obtained by the students who did not participate in the initiative, taking into account both the marks obtained in the specific activities of the working groups and the final results of the subject.

3. Results and Discussion – The proposed innovation project had a good acceptance among students and the number of volunteers wishing to participate was higher than the 15 places available. In the two evaluated years, the marks obtained in the working groups were around 2 points higher (on a rating scale from 1 to 10) in the students who participated in the project with respect to those who did not. Similarly, the percentage of students who passed the subject in the first call reached 42% among students participating in the project compared with 9.3% among non-participants.

4. Conclusions – Although it will be necessary to check the evolution of these students along the different subjects involved in this project of teaching coordination, the results obtained so far indicated that the participation in the project caused a positive effect on the academic results of the students, probably because a stronger motivation and better attitudes.

The teaching material resulting from this coordination work was published in digital format by the University of La Rioja and presented in the 2014 ICELT (Barcelona).

On-Going Assessment Based on the Practice Application of Engineering Projects through SWAD Web Platform

A. Moñino [1], A. Millares, M. Díez-Minguito, M. Ortega-Sánchez

[1] *School of Civil Engineering, Campus Fuentenueva, University of Granada.*

+34 958 249741, amonino@ugr.es

1. Introduction –The adaptation of optative subjects in the Degree of Civil Engineering has been assumed with a fairly uniform distribution between theory and practice teaching loads. That is the case of River Engineering and Coastal Engineering subjects, both included in the specialization of Hydrology, last course. They comprise 6 credits each, whose contents distribution consists of 50% theory/practice, with alike structure in fundamental concepts. The authors decided to focus the contents and evaluation from a standpoint other than the standard much theory-few problems-exam. The authors are totally aware that the evaluation by exam actually induces a change in the student's mind on the subject, which in turn affects the accomplishment of objectives. The student is neither focused on the learning of contents nor on the acquisition of competences, but in the exam as an obstacle to be passed against all odds. Those facts might be more relevant in the case of students who cannot attend all classes for several reasons, or for ERASMUS students, for which language and adaptation sometimes represent a delay. In paralell, the authors have achieved large experience in the design teaching and practicing methodologies, [1-3], specifically devoted to promote team works between students and cross-transfer of knowledge and responsibilities. The objective has been the implementation of a methodology for on-going assessment of the students of River and Coastal Engineering, based upon fundamental theoretical contents, usage of specific computer tools, and on the full practice on small pieces of real research projects. For that, the SWAD platform was used as the framework for permanent information exchange and teacher-student communication and day-to-day subject tracking was proposed as new methodological approach. This methodology and its results are part of a Teaching Innovation Project (2014-2016) headed by the authors.
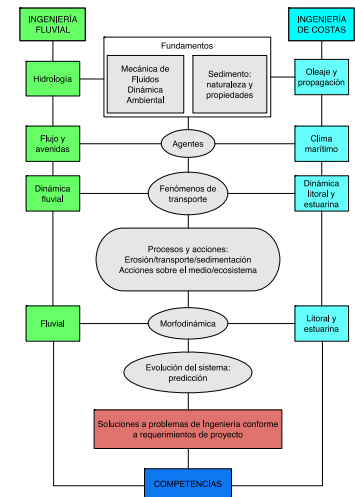
mage 1. Common structure and specific contents forRiver Engineering and Coastal Engineering

2. Results and Discussion – During the first course of implementation, the results of the methodology have been first evaluated through the survey on the students, table 1

Tabla I. Results of survey on the students.

Subject	Objectives accomplished OK	Assessment system OK	More practice would be OK	On-going assessment totally clear
River Engineering	93%	93%	20%	93%
Coastal Engineering	56%	89%	17%	78%

4. Conclusions – Accounting for the fact that 2014-2015 has been the first academic year of implementation, the proposed assessment methodology has been successfully implemented with excellent acceptance by the students. They requested more practice (rather than 50% balance) and they considered their objectives and competences where achieved.

5. References

[1] Millares A., Herrero J. Eguen M., Moñino A., Losada M. A. & Polo M. J. (2011). *Diseño de Prácticas de Campo en un Contexto de Posgrado Multidisciplinar*. VIII Foro sobre la Evaluación de la Calidad y de la Educación Superior, Santander (Spain), p. 385. ISBN: 978-84-694-3488-8.

[2] Moñino A., Clavero M., Vílchez M., López A., Navidad D., BAquerizo A. & Losada M. A. (2011). *Experiencias en Innovación Docente en Ingeniería Marítima y Costera*. II Jornadas en Innovación Docente y Adaptación al EEES en las Titulaciones Técnicas, Granada (Spain), p. 266. ISBN: 978-84-15418-00-9.

Four years of tutorial innovation in the degree courses at Faculty of Pharmacy at the University of Granada. Tutorgrados

M.J.M. Alférez [(1)]   et al.

[(1)] *Faculty of Pharmacy, University of Granada (SPAIN)*
34-958243883, malferez@ugr.es

Abstract

1. **Introduction -** The Faculty of Pharmacy, University of Granada, is developing a tutorial plan (TUTORGRADOS), for the new students of the degrees of Pharmacy, Human Nutrition and Dietetic, and Food Science and Technology. We have developed four years of tutorial innovation and our aim is to continue with this pedagogic action. All the Departments in the Faculty participated in this action. The inscription in the plan by the professorship and the students has been voluntary (92 and 1344 respectively). A maximum of 4 students per academic year has been assigned to each professor. A follow-up of the students has been performed by means of individual tutorships. Participants have organized workshops or seminars such as: advice in the matriculation, procedure of permanency, funding sources and scholarships, search of bibliographical information and elaboration of informs, teaching platforms, speaking skills and habits of study, safety and hygiene in the laboratory and mobility, seminars of reinforcement of basics subjects between many others.

2.   **Results and Discussion -** The majority of the programmed activities have been realized satisfactorily, 72% of the students think that they are beneficial for their training and for getting new skills. The demand of individual tutorships has been acceptable though it is necessary to encourage the students to reinforce their participation. The majority of the students and the professorship would recommend the adhesion to the plan to some colleague.

3. **Conclusions -** It is the only tutorial for new students of The Faculty of Pharmacy that has continuity to finish their studies. The activities are free throughout the courses offered. This tutorial plan had a very positive assessment by tutors and students and more and more are attracted by adhering fellow upperclassmen and tutors every year.

Keywords: Tutorial innovation, Higher education.

Support seminars for core subjects in the Faculty of Pharmacy of the University of Granada. Tutorgrados

R. Navarrete-Casas, M.I. Martínez-Puentedura, P. R. Bouzas, F. Castello, J.M. Paredes, M.J.M. Alférez[(1)]

[(1)]*Faculty of Pharmacy, University of Granada (SPAIN)*
34-958243883, malferez@ugr.es

Abstract

1. **Introduction -** The improvement initiatives derived from the internal quality control and analysis of the three degree course studied at Faculty of Pharmacy at the University of Granada highlight the need to provide support in a number of basic subjects, including Chemistry, Mathematics and Statistics and Physics. The mentioned situation is justified due to the lower rates of performance detected among new students, some of whom have not been taught these subjects in the previous academic years prior to beginning their University studies.

2. **Results and Discussion -** The Faculty of Pharmacy is developing a tutorial plan (Tutorgrados), for new students of the degrees of Pharmacy, Human and Dietetic Nutrition, and Food Science and Technology. During academic course 2014-15, we have developed a series of support seminars for basic subjects. The enrolment in these seminars was voluntary and free of charge.
    The satisfaction survey completed by students scored 3.45 on a scale of 0-5 and the lowest value was given to the number of sessions, suggesting that an increase in support sessions would be desirable.

	Average value	Standard deviation
Schedule	4	1.25
Number of sessions	2.83	1.27
Clarity of contents	4.25	0.79
Clarification of difficult questions	3.58	1.10
Expectations covered	3.5	1.18
Would you Recommend	3.87	1.15
Global assessment	3.45	0.77

3. **Conclusions -** This type of support seminar can be carried out in all those undergraduate subjects where a high level of failure is detected. This initiative requires additional efforts from teachers and, hence, may not be adopted in certain subject areas.

4. Keywords: Tutorial innovation, Higher education, Actions of improvement, Support seminars

Acquisition of abilities in promotion and health education by students of the University Degree on Nursing

E. Jiménez- Mejías [(1)], C. Amezcua-Prieto [(1)], R. Olmedo-Requena [(1)], I. Carrillo-Martínez [(2)], D. Rueda-Lozano [(3)], I. Salcedo-Bellido [(1)]

[(1)] *Department of Preventive Medicine and Public Health, Faculty of Medicine, University of Granada, Avenida de Madrid 11, 18012 Granada, Spain.*
+34 95824100 Ext (49895) eladiojimenez@ugr.es
[(2)] *"Severo Ochoa" High School of La Chana, Av. Las Alpujarras s/n, 18015 Granada, Spain*

[(3)] *La Chana Primary Health Centre, Health District of Granada, Andalusian Health Service, 18015 Granada, Spain*

1. Introduction – The progressive adaptation of our universities to the European Higher Education Area (EHEA) requires certain changes in traditional teaching methods, such as the employment of active methodologies. Autonomous learning and discovery by students themselves acquire a predominant role, while teachers become mediators of this process [1]. Public Health is a core subject in the first year of the Degree on Nursing at the University of Granada. However, according to the learning programme, students have no contact with patients until the last year of the Degree, which affects their motivation in learning. In this sense, it is known that motivation and learning improve when students perceive what they are learning as useful and applicable [2].

The aim is to assess the effect on first-year-degree students in Nursing of being protagonists of promotion activities and health education for patients with different diseases in primary health care centres and in high school students.

2. Experimental – This project is intended to be carried out during the public health practice lessons in first year of the degree in Nursing at the University of Granada, during the academic years 2016-17 and 2017-18. First of all, there will be exhibitions between students and teachers for evaluating and selecting the best project. Presentations will be about recommendations and care in diabetic or hypertensive patients, as well as preventive activities and health promotion in young adolescents, related to problematic use or abuse of alcohol, tobacco or illegal drugs, and also about sexually transmitted infections. Then, the best presentations will be exposed by Nursing students to diabetic or hypertensive patients or high school students, in discussions of about an hour, settled in a health centre and a high school.

3. Expected results –Results are expected to be equivalent to those obtained by other universities who have carried out similar experiences in a satisfactory manner [3, 4]. We assume that the implementation of this type of experience in Public Health practice lessons in the Degree on Nursing will contribute to positive results in students, such as: development of a positive attitude towards learning, greater satisfaction and motivation with the subject because it will be perceived as useful, development of transversal and specific professional abilities, and a global improvement in academic performance as a consequence. In addition, an evaluation of this project will be done from an external (assessment of the process by teachers, patients and higher school students) and internal perspective (evaluation of academic performance of the students).

4. Conclusions – It is expected to ensure the implementation of this experience in Public Health subject in the first year of the Degree on Nursing, as well as its continuity in time. This practice will encourage students to interact with patients, or other population groups that require health education, on certain healthy lifestyles supplying a personal motivation since the beginning of the degree.

5. References

[1] JC. Torego y A. Negro, Alianza Editorial, 2012

[2] A. Escribano y A. Del Valle, Narcea, Madrid, 2010

[3] JM. Martínez, *Educ. méd.*, **8**, (2005), p. 18.

[4] M. Solà, D. Martínez, A. Molins, *Revista Rol de Enfermería*, **34**, (2011) p. 512.

Effect of using situation tests for professional competences assessment in practice sessions of Public Health in the Degree on Nursing

E. Jiménez-Mejías [(1)], C. Amezcua-Prieto [(1)], R. Olmedo-Requena [(1)], V. Martínez-Ruíz [(1)], M. Agrela-Cardona [(2)], P. Lardelli-Claret [(1)]

[(1)] *Department of Preventive Medicine and Public Health, Faculty of Medicine, University of Granada, Avenida de Madrid 11, 18012 Granada, Spain.*
+34 95824100 Ext (49895) eladiojimenez@ugr.es
[(2)]*La Chana Primary Health Centre, Health District of Granada, Andalusian Health Service, 18015 Granada, Spain.*

1. Introduction – One of the trends of the European Higher Education Area (EHEA) in University degrees is the promotion of the student autonomous learning, through discovery and professional competences [1]. The Problem-Based Learning (PBL) is an instructional method in which students learn through problem solving [2] without a preset correct answer. This method has been proved to be a good strategy to apply in situations tests for professional competences assessments [3]. Professional competence is the habitual and judicious use of communication, knowledge, technical skills, clinical reasoning, emotions, values, and reflection in daily practice for the benefit of the individual and community being served 4]. The main objective of this project was to assess the effect of the situation tests for professional competences among the first year students of the Degree on Nursing at the University of Granada (UGR) in the Public Health subject practices.

2. Experimental – This experience was carried out in the academic year 2014-2015. A total of 126 students took part. They were distributed into 9 groups of 12-14 students each. Every week of a total of three all the students received the three implemented practices. So, every single group had the situation tests for professional competences assessment the same day of the three weeks. The first week was about health education in high pressure patients (scene 1), the second week was focused on diabetic patients (scene 2) and the third one was about vaccines and temporary administration (scene 3). A couple of doctors selected the patients with the characteristics needed (high pressure, diabetes and mother of children under 12 years old). The students had to give advice about health promotion activities –such as physical activity and healthy diet, prevention activities –such as excessive salt consume, saturated fat, alcohol and tobacco use (scene 1 and 2) and doses and types of vaccines according to the children age (scene 3). Patients were advised not to ask the students about pharmacological prescription or complex questions that required a professional expert. Only 4 to 6 students from each group were chosen to interact in the situation test with the patients. Before the scene practice, the students did not known who of them would be selected, so the previous theoretical bases about high pressure, diabetes and vaccine in the university lectures must had been learned in advance. An informed consent was required to video-record the scenes. Then, the experience process was evaluated regarding students, teachers and patients satisfaction degree.

3. Results and Discussion – Students, teachers and patients were totally satisfied (96.7%, 98.3% and 97.4%, respectively) with the situation tests for professional competences assessment in practice of Public Health in the first year of Nursing degree. The interaction between students and patients increased the student's learning (97%) motivation experience (93.7%) and also increased the student's empathy and the interviewing experience with patients (97.4%).

4. Conclusions – The students developed a high level of motivation in the Public Health Subject because they discovered its utility. Also, they developed specific professional competence with regards to health promotion advice skills and cross curricular subject, such as better communication, empathy and listening skills with the patients. Therefore, they recognized this practice fostered them to study in advance.

5. References

[1] J. Rúe. El Aprendizaje Autónomo en Educación Superior. Madrid: Nacea; 2009.

[2] A. Escribano y A. Del Valle. Madrid: Nacea; 2010.

[3] J. Del Pozo Flórez. Madrid: Nacea; 2012.

[4] RM. Epstein y EM. Hundert. *JAMA* **287** (2), (2002) p. 226-235.

A Project to develop a business model in the degrees in the Technical Engineering School of Industrial Engineering of Bilbao (Basque Country)

The project of development of a business model has been carried out in the different degrees of the University School of Industrial Engineering of Bilbao University of the Basque Country. This project was born after the introduction of a new methodology in the classroom and it has been its first year of implementation in the subject of economics and business administration.

One of the fundamental axes of our project has been the planning, development and evaluation of a method in which the students are directed to carry out, in an active way, guided learning to solve or address real problems, real situations, which may arise at the time to create and/or manage a company. These issues could come in the shape of unknown and difficult to understand issues for students who do not have prior knowledge about economics and business administration as they are the students involved in the different degrees of Engineering.

A project is defined as "work that is organized and planned carefully; and specifically designed for achieving a particular goal and determined". (Oxford Advanced Learners´ Dictionary, 1995:926).

Kearsley and Schneiderman (2001) define its benefits, highlighting both the development of skills such as the generation of knowledge:

"Through the involvement and training in projects that are significant for developing key skills in their learning, how to interact and communicate with others in relevant tasks, the students learn skills and generate knowledge about higher order, valid for both the world of work and the development of social aspects.

"One of the most-cited advantages has been the change in the role of the teacher. With this methodology the traditional role of providing information and explaining it is not abandoned, because these tasks are necessary for the implementation of the projects, but extends to other very relevant aspects: planning of the entire teaching sequence, facilitating of the students´ learning and facilitating-evaluation processes and co-assessment.

The implementation of this methodology has meant a growth in the rate of success in the academic subject because it has helped increase the number of students who have obtained a "pass" in their qualification or a higher mark in relation to the previous years in addition to an increased interest on the part of the students in the subject of economics and business administration within the degrees of Engineering.

CAPACITY BUILDING PROGRAMME FOR LOW-CARBON ENERGIES AND ENERGY EFFICIENCY IN LATIN AMERICA AND THE CARIBBEAN

M. Bravo, L. De Diego, M. Marco

CIEMAT, Avd. Complutense 40, 28040, Madrid

+34 649073649/ +34 91 3467892; mirian.bravo@ciemat.es

The advanced Capacity Building (CB) project, has been developed in the framework of the Global initiative Renewable Energy for All (RE4All) and the regional project ¨Observatory for Renewable Energy in Latin America and Caribbean¨, one of UNIDO´s most relevant initiatives in Latin America and the Caribbean (LAC), and devoted to promote capacity building and knowledge exchange in the field of low-carbon energies and energy efficiency boosting investments in this area.

The CB project in low-carbon energies and energy efficiency has been developed in cooperation with the Centre for Energy, Environment and Technology, CIEMAT, the University of Salamanca, USAL, the CEDDET Foundation and the Polytechnic University of Madrid.

This CB project aims to meet the objectives of promoting access to modern energy services through an Education and Training (E&T) program, focusing on energy production technologies. The E&T program includes 7 e-learning modules that provide specialized knowledge in the following issues and technologies: energy and climate change, small hydro power, biogas, solar-thermal energy, small-scale wind, photovoltaic systems, and energy efficiency in buildings. The innovations of the project are the design and development of a program in 2 different speeds –a module's general overview and a module's specialized training- and the process of certification.

The modules combine theoretical knowledge with practical exercises related to existing applications. All e-learning modules, available in English, Spanish and Portuguese, are composed by different training tools such as guides, videos, interactive slides and practical tests.

The result obtained is an advanced CB program focused on energy access and provides professionals and policy makers with deep and updated knowledge on the technologies that can contribute to face this challenge.

The CB program on renewable energy is open and free access and the users receive a digital certificate of participation accredited by UNIDO and CIEMAT.

The full courses are available at: http://www.renenergyobservatory.org/aplicaciones/capacitacion.html

The results have been outstanding both form the technical viewpoint as well as form the outreach: Tabla I

In March, 2015, the courses have passed the mark of 30.000 students [1].

Table I. Summary of enrolled students (May to January 2014)

	Total enrolled students	Number of sualizations
Complete Course	14.439	644.207
MOOCs	13.376	119.200
Total	**27.815**	763.407

References

 [1] UNIDO, *Report on the Capacity building program of the Observatory for Renewable Energy in Latin America and the Caribbean,* (2015).

The evaluation functional of the students in laboratory, an offer for the practical education of the subject Alterations of the Human Organism, Functional Tests

T. Nestares[1], M. Moreno, C. De Teresa, M. López-Jurado, P. Aranda, N. Kajarabille, J.L. Quiles

[1] *Department of Physiology, Faculty of Pharmacy, University of Granada*

+34 958 243879 E-mail: nestares@ugr.es

1. Introduction – We have tested the accomplishment of a functional, as complete as possible, evaluation as for the respiratory, cardiovascular system and from susceptibility to metabolic syndrome, as laboratory practice of the subject "Alterations of the Human Organism, Functional Tests ", optional semipresencial that is given in the degrees in Pharmacy and Human Nutrition in the University of Granada. The development of the practices appears as a joint study more that as a series of practices without connection and the aim it is to develop in the student the aptitude to realize different functional tests, to interpret them together and to elaborate a report of results.

2. Experimental –There was realized an evaluation of the set of the group of student s who realize the practice, for what selected a proportion of an experimental subject for every ten students. Along the duration of the practices, the students, in his respective groups were carrying out the different analytical determinations on his experimental subject and on having finished shared the results obtained with the rest of groups. There was facilitated to them information detailed about the foundations and methodology of every test, as well as bibliography to help them to his interpretation and production of the report.

The criteria to select to the subjects of experimentation as well as the distribution of tasks of the subgroups inside every group, it is detailed in the tables I and II. The tests were realized in two experimental situations: rest and submaximum exercise realized in a rolling tapestry.

Table I. Criteria of selection of the experimental subject

According to the sex (men and women)

According to corpulence (very or slightly burly)

On the basis of his physical habitual activity (sedentary, etc.)

On the basis of his smoker's condition

On the basis of slight alterations like spring allergy

Others

Tabla II. Pruebas experimentales realizadas y distribución por grupos

Subgrupo	Tarea	Nombre
1	Experimental subject, Arterial Pressure and Pulseoximetry	
2	Electrocardiogram	
3	Resting Basal Metabolism	
4		

	Metabolic syndrome and Body composition	
5	Spirometry	

3. Results and Discussion - The students understood the foundations of the realized tests, carried out them propely and realized a correct final report of results.

4. Conclusions –We concluded that the tested model is succeeded since it is useful to reach the practical competences of the subject and is accepted well by the students, for what we proposes his continuity for the next courses.

5. References

American College of Sports Medicine "ACSM's Foundations of Strength Training and Conditioning", Nicholas Ratamess, USA, 2011

Workshops to create a multimedia curriculum vitae with postgraduate students

Javier Díaz-Castro[(1)], Jorge Moreno-Fernández, Mario Pulido-Morán[(2)], Mª José M. Alférez, Yolanda Macías[(3)], Fátima Soto-Navarro[(4)], Julio J. Ochoa, Teresa Nestares, Magdalena López-Frias, Carlos De Teresa, Mª Inmaculada López-Aliaga

[(1)]Department of Physiology. Faculty of Pharmacy. University of Granada. E-mail:javierdc@ugr.es

[(2)]Department of Biochemistry and Molecular Biology II.

[(3)]Department of Evolutive Psicology.

[(4)]Faculty of Education Sciences

1. Introduction – The Curriculum Vitae (CV) is the set of the formative experiences of the aspirant, complemented by a content organized by matters. To select the content and accompany it with the study of experiences it is one of the key decisions in the draft of the CV, and therefore, a rational method of elaborating this document is a matter of great interest. The potential employers and institutions agree with the idea that a suitable combination of multimedia resources can do the employer evaluation easy to perform. The multimedia resources allow several levels of control, navigation, interactivity, and this means and advantage for the job seeker [1].

2. Experimental - We performed several workshops for the development of the multimedia CV for two academic years with those students interested in the project. For many workshops, especially those related with multimedia, we appeal external consultants, specialized in this type of tasks. The workshops offered a description of the development multimedia skills and the practice with specialized software, many of them available on-line. The workshops were accentuating how the technology might be used in specific courses for the education and for the student's participation in communicative processes. The aims in the workshops were the following ones: protocols to share files on line and web hosting, introduction to multimedia hardware and software, accentuating the educational uses, improvement of oral presentations, functioning of digital resources of image and audio, design and managing of web pages and blogs.

3. Results and Discussion –the workshop: "Autonomous learning. Portals of information and bibliographical sources" turned out to be very interesting for 85 % of the students, according to the survey. The workshop "Resolution of problems in the professional practice (professional simulation)" was useful for 90 % of the students according to the survey. The workshop "ethical commitment: a duty and an obligation" was interesting for 60 % of the students. Finally, the workshop: "Keys and advices to create the multimedia CV" was interesting and useful for 95 % of the polled students and they noted that would be positive in the search of employment.

4. Conclusions - With candidates applying to works with profiles increasingly similar and specialized, it is necessary to innovate and to offer to the possible employers attractive formats with which to show the aptitudes and capacities of the aspirants. The elaboration of a CV is crucial in any search of employment. It is frequent that the CV is the first contact with the future employer, so that the CV must call immediately the attention of the company and expose the reasons that make the aspirant suitable for an interview of work. Nowadays, with the social networks, the diffusion of the multimedia CV is easier and they allow to create very attractive presentations for the employer. With this project, the multimedia CV helped the postgraduate student to create multimedia with different professional profiles and very attractive for the employers.

5. References

[1].L.J. Najjar, *Human Factors*, **40**(2), (1998), pp. 311–323.

An ICT based design of the Degree's Final Project

F.A. Ocaña [(1)], J.L. Quiles[(1)], E.M Talavera[(1)], M. Sánchez-Polo[(1)], A.I. Del Moral[(1)]

[(1)] *Faculty of Pharmacy, University of Granada.*

focana@ugr.es

1. Introduction – The Degree's Final Project (DFP) is the latest step in the curricula given by the implementation of the Bologna process in the Spanish Higher Education area. It is embedded as a subject in the last course of the degree, where the student must demonstrate the skill acquisition through an autonomous work which is guided by some tutors.

This paper presents the design of this new subject in the Faculty of Pharmacy of the University of Granada (UGR), which was initiated in the 2013-14 academic course. This design has been conditioned by the organizational challenges for the Faculty posed by the DFP, which have been achieved by using Information and Communications Technologies (ICT).

2. Discussion and Results – The DFP in the Granada Faculty of Pharmacy is structured in several stages where the information exchange is a key factor. In a competitive process mainly based on academic marks, each student choices a project among the approved DFP proposals, which have been previously submitted to the DFP Commission. The developed work is documented through a scholar report with some given style and format guidelines. Finally, the student evaluation is accomplished by submitting the developed work to an evaluation committee, which includes the aforementioned project report, a public defense of the project and a tutor' performance appraisal.

The actors involved in the academic performance of the DFP subject include students, tutors, evaluators and some other university governing bodies. Professors and researchers can participate as both tutors and evaluators. Some recognized professionals from companies whose activity is related to either the studies or the project can also participate as tutors. The participation of students is subjected to their global academic marks and their overall of passed subjects. From an organizational point of view, the DFP is assigned to the Dean Office's responsibility, though it is also ruled by the UGR. This wide variety of interrelated actors and roles leads to identify the management of information and communication as a key task in the DFP.

The Granada Faculty of Pharmacy enters an upper level of complexity into the implementation of DFP [1] because of its three taught degrees and, also, the high involved figures (for instance, 248 students in 2014-15). All these systemic elements for such a subject, which is ruled according to high standards of transparency, led to an ICT based strategy to optimize the procedures constituting the DFP academic performance in the Faculty. Among other initiatives, this strategy mainly relied on the design of a Web application (Image 1), which was coded in PHP and JavaScript with its databases implemented using MySQL, a Web site for providing public information on DFP and a site in the educational platform SWAD [2] for managing communications with students and providing query forms for their academic DFP criteria in every stage.
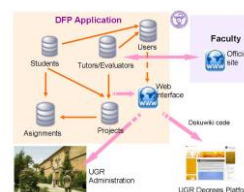
Image 1. Sketch of the DFP Web application

4. Conclusions – The regulation of the DFP subject sets up several problems, when the degrees are provided by high figures. To solve them, a design based on ICT led to a feasible solution.

5. References

[1] F.A. Ocaña, A.I. Del Moral, J.L. Quiles, E.M. Talavera, R. Giménez, L. Recalde, M. Sánchez-Polo, "El Trabajo Fin de Grado: un reto organizativo, otra oportunidad para las TIC". In: "Edusfarm 2014", *Ars Pharm.,* **55**(2), (2014) p. 30.

[2] A. Cañas, D. J. Calandria, E. M. Ortigosa, E. Ros, A. F. Díaz, SWAD: Web System for Education Support. In B. Fernández-Manjón *et al.* (Eds.): *Computers And Education: E-learning - from Theory to Practice*, Chapter 12, pp. 133-142, Springer, 2007.

ICT AS ACCESSORY FOR THE IMPROVEMENT OF TEACHING INTERNSHIP IN INORGANIC CHEMISTRY

I. Velo-Gala [(1)], A.M. Sánchez-Polo [(1)], M. Sánchez-Polo [(1)], M.I. Pérez-Toro [(1)], A. Domínguez-Martín [(1)], E. Vílchez-Rodríguez [(1)], A. Velo-Gala [(2)], H. El Bakkali [(1)], F.J. Martínez-Murcia [(3)]

[(1)] *Dept of Inorganic Chemistry, Faculty of Pharmacy, University of Granada, Granada, Spain.*

+34958243852, invega@ugr.es

1. Introduction

The **teaching model** focused on the transmission of knowledge by the professor has changed towards a **student-centered approach** and the way of promoting the process of **autonomous learning**. Department of Inorganic Chemistry, Faculty of Pharmacy is aware of the opportunity that the **information and communication technologies** (ICT) represent. Therefore, it has developed a software application (App) for its use in practical classes of the course of Inorganic Chemistry (IQ) to be taught in the first year of the Bachelor of Pharmacy.

The main **objectives** achieved by this project are:

- The **active involvement** of students in their **own learning**, who **rework** and **adapt** the information to their needs.
- The development of **new learning tools** to create reasoning activities, increasing the **motivation** to learn.
- The integration of the **self-evaluation** and **feedback** in the learning process because it provides a better understanding of the successes and mistakes.
- The obtaining of **better results in the evaluation** of the subject, with a clear improvement in the assimilation of concepts.

2. Experimental

The didactic material is designed so that allows the students to direct, control, regulate and evaluate their learning process in an objective, which affects the increase in the confidence in their skills with respect to the subject. The App was installed in the tablets which are placed in the laboratory of the subject.

3. Results and Discussion

Practical classes of the course of IQ are based on a **methodology** that combined master class with doing practice by students. Due to the large number of concepts involved simultaneously with their corresponding experimental verifications, serious errors of understanding and implementation of activities were detected. The designed App has schemes and visual material to **facilitate the understanding** of concepts and allows students to properly use them **at their pace of learning**. This tool meant the necessary step towards the **discovery learning process**, achieving very positive results in the level of student learning. It should be noted **performance improvement** especially among students with **little knowledge of the Spanish language** as well as among people who had **hearing impairment**. The **degree of involvement and motivation** detected using this new teaching tool was considerable.

4. Conclusions

This innovative project is an enriching teaching tool, with a significant contribution to the model change demanded by our knowledge society. With the App, students can remember and clarify concepts throughout the duration of every practice session by an **autonomous** and **continuous** learning. The course was overcome with a **high degree of knowledge about IQ** by students and the evaluation of this new tool made both by students and by the teaching staff was completely positive. This project was funded by the Innovation and Best Teaching Practices Program of the University of Granada.

5. References

[1] B. Frydrychova, *Procedia - Social and Behavioral Sciences,* **186**, (2015) p. 898.

[2] S. Wang, H. Hsu, T. C. Reeves, D. C. Coster, *Computers & Education*, **79**, (2014) p. 101.

Educlick for Inorganic Chemistry Teaching

A.M.S. Polo, I. Velo-Gala, M. Sánchez-Polo[(1)], R.Navarrete-Casas, E. Vilchez-Rodriguez, A. Dominguez-Martín, I. Perez-Toro

[(1)] *Inorganic Chemistry Department, Pharmacy Faculty*

e-mail: mansanch@ugr.es

1.- Introduction –

Higher learning institutions are experiencing a major change in the entire education system of today's society. Conscious of the need for renewal of traditional education systems and the opportunity that technologies offer information and communication, the field of learning varies vertiginous form [1]. The institution existing and that are being born to respond to this challenge, they should review their current references and promote innovative experiences in the teaching / learning supported by information technology and communication (ICT) and emphasizing the institutions teaching, changes in teaching strategies of teachers and communication systems, ie, in the processes of teaching innovation with the implementation of such technologies [2]. Inorganic Chemistry departament has been used a new interactive system called Educlick, enabling continuous evaluation of knowledge through the use of electronic controls during class teaching. This innovative teaching tool has been widely accepted by both parts, with the achievement of important objectives such as motivation and increase the degree of retention, ensure the degree of student-teacher feedback and the clear improvement in academic results. To improve educational outcomes and the knowledge and academic skills of students regarding knowledge of chemistry, it has set as its main objective the commitment to the implementation of new technologies as an alternative to the traditional methodology methodology.

2. Experimental –

It is considered as a point of motivation including interactivity in the classroom. This interactive teaching is achieved when the student performs exercises in class and check the resolution of the exercise using electronic clickers. This would allow the student to interact with the teacher to know the reason for the response and thus promote student-teacher feedback, providing solutions to the issues raised. Each teacher can install and manage software on your computer and in the classroom. Questions are introduced by Power Point files. The case with the controls and the receiver is transported comfortably. The exercises are test type. When the teacher considers the vote starts with the electronic controls and the results are displayed graphically, where the student look at the correct answer and correspondence with it, starting a small discussion between teacher and students.

3.- Results and Discussion –

The use of Educlick system is useful as a tool for continuous evaluation and self-evaluation, helping the teacher in three basic points: i) enhancing the degree of attention of the attendees ii) increasing the degree of understanding of the subject taught, iii) allow students actively interact. It provides a method of anonymous participation and incorporates competitive play encouraging students to their participation.

4.- Conclusions –

This system is achieved increase motivation, participation and student learning. It is an important tool to achieve student-teacher feedback. The software Educlick can be installed many computers as you like and different subjects and various departments can share control and receptor. Moreover it is not an effective system locally, but the faculties could, in future, have a set of controls and receiver for each classroom. With this routine system work facilitates better use of their potential benefits.

5. References

[1] Ozdamli, F. and H. Ozdal (2015). **182**: 718-725.

[2] Bostan, C.-G. (2015) **180**: 1444-1450.

e-learning educational strategies for students of mining degrees

J.S. Pozo-Antonio [1], I. Puente [2], J.I. Piñeiro-Di Blasi [3]

[1] [2] [3] *Department of Natural Resources & Environmental Engineering, University of Vigo, School of Mining Engineering, Maxwell s/n, 36310, Vigo, Spain.*

[1] *Tel.: +34 986 811922; E-mail: ipozo@uvigo.es*

Abstract – Since its immersion in the European Higher Education Area (EHEA), Spanish Universities have started with the introduction of new Information and Communications Technologies (NICTs) in the learning process. Students can have access to the contents explained in classroom in an asynchronous way, therefore spatial and temporal coincidence between teachers and students is not necessary.

Particularly, the study of explosives, which involves being able to recognize and identify them and to take decisions in different cases of study, requires time to achieve a full understanding. Students are normally with lack of time during the practical sessions to study the different kinds of explosives; this may lead them to fail in the exams. The Tuning project identifies the use of explosives as a specific competence of graduates in the degrees related to mining engineering. A virtual tool allowing students to view photos and explanations of different explosives shown in class seems to be a good option.

This article presents an interactive video game created by means of the free <e-Adventure> software allowing the consolidation of new concepts in a pleasant way. Moreover, the study analyzes the results of a rubric for assessing the students, showing this tool as a very useful auxiliary learning procedure, since it would have enabled them to learn this kind of subjects in an easy way.

Keywords: Information Technology, open-source, e-learning, explosives, <e-Adventure>.

Using demonstrations on YouTube to support student learning and engagement: A Case of Study in Middle School

I. Puente [(1)], J.S. Pozo-Antonio [(2)], J.I. Piñeiro-Di Blasi [(3)]

[(1) (2)(3)] *Department of Natural Resources & Environmental Engineering, University of Vigo, School of Mining Engineering, Maxwell s/n, 36310, Vigo, Spain.*

Tel.: +34 986 813 499; E-mail: ipuente@uvigo.es

Abstract – Teachers can tell you that many students are bored in school. Therefore, if we could find a way to motivate and engage them in their learning, that would be a significant progress. The aim of this study is to demonstrate that, contrary to a widespread view, it is possible to teach machines in a way that makes students enthusiastic about the subject. The paper brings our personal experience of designing a practical work in a technology laboratory, based on a demonstration from YouTube applied to a didactic unit "Machines and Mechanisms" of a classroom in middle school. The research presents two dimensions oriented to (1) share our experience on how technology can be taught in exciting ways for students, and (2) how an adapted demonstration on YouTube can significantly help to deepen students' interest and motivation in the subject in question. Although there are no significant improvements regarding academic outputs, it is remarkable that most of the students considered that the experiment is fun, develops their motivation and is a good tool for breaking up the routines in learning environments.

Effective strategy to identify bad practices while teaching

M.D. Víctor-Ortega[1], D. Airado-Rodríguez [2]

[1] Department of Chemical Engineering, Faculty of Sciences, University of Granada. Campus Fuentenueva s/n, Granada, Spain 18011.

Phone +34 958 243 308. Email mdvictor@ugr.es

[2] Department of Science and Mathematics Education, Training Teaching School, University of Extremadura, Avenida de la Universidad s/n, Cáceres, Spain 10003.

Phone +34 927 257 050. Email: airado@unex.es

1. Introduction – The lack of preparation of novice teachers in Universities is a real problem [1]. Based on this drawback innovative teaching practices and programs to support the formation of new teachers start to appear. Mentorship experiences are examples of these programs. In mentorship experiences, expert teachers or counsellors guide and supervise initiation to teaching of novice teachers, on a voluntary and collaborative process. One of the activities developed in a mentorship frame is presented in this communication.

2. Experimental – The strategy followed in this work consisted of a double improvement cycle (or clinical supervision cycle), based on the use of recordings of classes. Each of these cycles included planning, recording, viewing and analysis. Conclusions were reached in a final meeting after video analysis. In order to systematize the viewing, analysis and assessment of the videos, an observation test was employed. Class planning, contents, methodology, and verbal and non-verbal communication skills were evaluated using the test.

3. Results and Discussion – Important mistakes were identified in the teaching practise of both experienced and novice teachers. Those mistakes were related to different aspects, such as verbal and non-verbal communication, as well as didactic methodology. Those mistakes or bad practices were successfully overcome by means or re-force activities.

4. Conclusions – The usefulness of recording classes and performing systematic and critical watching of the recorded videos to identify bad practise of teaching has been proven in this work.

5. References

[1] Benedito, V.; La formación del profesorado universitario. Documentos MEC. Madrid, 1992.

Statistical assessment of the effectiveness of rubrics in evaluation among students

D. Airado-Rodríguez [(1)], M.D. Víctor-Ortega [(2)]

[(1)] *Department of Science and Mathematics Education, Training Teaching School, University of Extremadura, Avenida de la Universidad s/n, Cáceres, Spain 10003.*

Phone +34 927 257 050. Email: airado@unex.es

[(2)] *Department of Chemical Engineering, Faculty of Sciences, University of Granada. Campus Fuentenueva s/n, Granada, Spain 18011.*

Phone +34 958 243 308. Email mdvictor@ugr.es

1. Introduction – The implementation of European Higher Education Area (EHEA) has supposed revolution for the whole teaching-learning process [1]. New teaching methods, strategies and tools have been developed and the teaching-learning process is now centred in the acquisition of skills by mean of students. It is a must the development of new assessment techniques to measure the effectiveness of new methods and innovative teaching practices. At this regard, the use of rubrics is an excellent option to carry out e.g. co-evaluation experiences (assessment among students). It is also good to transfer to the students a clear idea of their possible degrees of achievement of a certain task as well as criteria to grade their assignments. A rubric is an assessment tool that lists the criteria for a piece of work or what counts and articulates gradations of quality for each criterion [2, 3], either qualitative e.g. from excellent to poor or quantitative.

2. Experimental – The experience presented here has been carried out with university last-year students. They were asked to assess a number of specific skills to their classmates while oral exhibitions. Exhibitions were done by groups of three students. They were provided with a rubric for objective assessment. The teachers carried out the assessment as well, based on the same rubric. Statistical analysis of the results has been conducted. Significance testing of the results was performed by Minitab software package, home-written Matlab scripts and excel (Microsoft Office).

3. Results and Discussion – A percentage of 96.5 % of the students took part in the experience. About 90 % of the group presented preference for some topics of interest to perform their exhibitions. In general, statistical tests revealed good correlations for specific skills between the marks provided by the students and those of the professor.

4. Conclusions – The usefulness of the designed rubric for assessment of specific skills with university students have been statistically proved.

5. References

[1] Bosón Aventín, M. (2009). Desarrollo de competencias en educación superior. En Blanco A. (Ed.), Desarrollo y evaluación de competencias en educación superior (págs. 17-34). Madrid:Narcea, S.A. de ediciones.

[2] Goodrich, H. 1997. Understanding rubrics. Educational Leadership 54 (4): 14–17.

[3] Popham, J. W. 1997. What's wrong—and what's right—with rubrics. Educational Leadership 55 (2): 72–75

How Does Joining a Community Help Us in Undertaking MOOCs? A Case Study of a MOOC Learning Community in Indonesia

M. Firmansyah

ᶦGraduate School of Education, University of Bristol

m.firmansyah@my.bristol.ac.uk

1. Introduction – The notion of massive open online courses (MOOCs) promoted by providers such as Coursera has attracted thousands life-long learners worldwide to enrol [1]. However, in the midst of its budding popularity, some problems surfaced such as high dropout and low completion rates, the latter of which fell below 10% [2][3]. Meanwhile, some face-to-face MOOCs learning communities have emerged; one of them is Indonesian MOOCs Society (IMS) based in Jakarta, Indonesia. Studies show that learning MOOCs together creates mutual support among students in universities [4], [5]. However, a little is known when it takes place in a community setting. Therefore this study aims to investigate the extent to which joining the IMS helps its members in undertaking MOOC and to make sense the benefits the members perceive. A communities of practice (CoPs)[6] theory will be used as the theoretical framework in this study.

2. Methodology – This research adopted an intrinsic qualitative case study[7]. Through purposive sampling strategy, six IMS members (four males, two females; all of them were full-time workers) with various degrees of engagement (active, moderate, and passive members) were chosen as the research participants. The data were collected in June-July 2015 using in-depth interview, direct observation, and document review whereas the approach used to analyse them was thematic analysis.

3. Findings and Discussion – The participants perceived that joining the IMS and having interactions with other members both through face-to-face and online, benefited them in undertaking MOOCs. The benefits gained can be classified into four themes: increasing motivation to learn MOOCs, enhancing information about MOOCs' practice, helping to overcome the difficulties faced, and fulfilling a sense of community. The more engaged members with the community, the more benefits gained they perceived. This echoes the findings from the previous studies and therefore may become a solution for dropout behaviour. However, instead of viewing it as a problem, some participants argued that learning MOOCs does not necessarily must 'accomplish' and get certificates. Moreover, how the IMS might afford the aforementioned benefits will be discussed further in regard to the CoPs theory.

4. Conclusions – This case study was evident that joining a learning community helps learners in undertaking MOOCs, particularly to overcome common problems associated with MOOCs' practices. Yet the definition of problems themselves was rather different between what members considered and what scholars defined. Finally, the research findings may be used as a consideration to design future MOOCs.

5. References

[1] K. Jordan, "MOOC completion rate: the data," 2015. [Online]. Available: http://www.katyjordan.com/MOOCproject.html. [Accessed: 07-Apr-2015].

[2] D. Clow, "MOOCs and the funnel of participation," in *Third Conference on Learning Analytics and Knowledge (LAK 2013)*, 2013, pp. 185–189.

[3] K. F. Hew and W. S. Cheung, "Students' and instructors' use of massive open online courses (MOOCs): Motivations and challenges," *Educ. Res. Rev.*, vol. 12, pp. 45–58, 2014.

[4] N. Li, H. Verma, A. Skevi, G. Zufferey, J. Blom, and P. Dillenbourg, "Watching MOOCs together: investigating co-located MOOC study groups," *Distance Educ.*, vol. 35, no. 2, pp. 217–233, 2014.

[5] Y.-H. Chen and P.-J. Chen, "MOOC study group: Facilitation strategies, influential factors, and student perceived gains," *Comput. Educ.*, vol. 86, pp. 55–70, 2015.

[6] E. Wenger, *Communities of practice: learning, meaning, and identity*. New York: Cambridge University Press, 1998.

[7] R. E. Stake, *The art of case study research*, 1st ed. Thousand Oaks, Ca: Sage Publications, 1995.

Preparation of bilingual teaching videos for the degree in Industrial Chemical Engineering.

T. Cotes Palomino[1], C. Martínez García[1], F.A. Corpas Iglesias[1], F.J. Iglesias Godino[1], J. Martínez Nájera, A.M. Coves Martínez

[1] *Department of Chemical, Environmental and Materials Engineering. Higher Polytechnic School of Linares, University of Jaén. 23700 Linares (Jaén). SPAIN.*

+34 953 648548, mtcotes@ujaen.es

1. Introduction. Jaen University offers more than 40 degrees in different subjects, provided in seven centers and where more and more international students come together. Given that one of the strategic objectives of our university's internationalization, it is very important to have a teaching support material, for both domestic and international students. Moreover in the center where we are, increasingly we concur students doing their training from different parts of the world, including Brazil, Germany, Equatorial Guinea ... The labs practices are a staple in the engineering studies. Through them, training in solving specific problems is facilitated and experimental practices are conducted in small groups, establishing a first connection with reality. Moreover, it can promote both self-employment and group work. In most cases the practical activities has a positive effect on student motivation since they can directly experience content. This explains the usefulness of the development of short videos of practices that students can consult at any time and facilitate their learning, reducing setup time and perform them once in the laboratory. [1-2]

2. Experimental. First it has conducted a literature review to update and improve the practices scripts available in the subjects the area of Chemical Engineering. Second it has been prepared material and reagents for the selected practices. Below were prepared scripts of the videos. Finally we proceeded to the recording thereof, the recording was made in several languages so as to facilitate the monitoring of practices for students from other countries.

3. Results and discussion. The results have been three videos lasting between 10-15 minutes. 1) Determination of fat in flour. Distillation assembly. 2) Obtaining balance data. 3) Correction in packed columns. Once developed the videos was found to have improved powers of the subjects involved as working in group and organizational skills, planning and information management. Participating students have stressed that their development has helped improve its monitoring of laboratory practices, its short duration favors consult repeatedly.

4. Conclusions. The experience has been very positive, both for students and for teachers involved, as it has improved the knowledge of the practical activity performed and its result. In addition, students have highlighted the advantage that the developed material can be used in the teaching-learning process at any time, the possibility to view it as many times as necessary. Improving understanding of the practice and the time dedicated to understanding foundation, assembly and experimental development.

How downside indicate that the achievement of these represents an additional workload high for both teachers and students, perhaps this aspect can be improved, from the experience gained in the first.

5. References.

[1] Maceiras, Rocío; Cancela, Ángeles y Goyanes, Vicente. Aplicación de Nuevas Tecnologías en la Docencia Universitaria. Form. Univ. [online]. Vol.3, (1) [citado 2015-07-30], pp. 21-26, (2010).

[2] Las tecnologías de la información y comunicación en la enseñanza universitaria : influencia sobre la motivación, el autoaprendizaje y la participación activa del alumno. Palomares Casado y col. Revista de Psicodidáctica. Vol. 12(1) , pp.51-78 (2007).

IdeMatch – a digital tool for innovative, social and transdisciplinary learning designs

Gitte Riis Hansen

Trekroner Forskerpark 4, 4000 Roskilde. Denmark

+45 72482055 grh@ucsj.dk

Introduction

IdeMatch has been designed and developed by educational programs (UCZ) in corporation with two private enterprises, Public Intelligence and Induct. Thus, IdeMatch has been developed in a transdisciplinary setting as a public private innovation.

GO PUSH!

idématch.dk

www.IdeMatch.dk

We educate for "an unpredictable future" which is characterized by hyper complexity, which provides innovative competences as skills and as a way of being a professional. In a broad sense the unpredictable future and the contingency of time calls for possession and developing of changing skills and serendipity. In that perspective the professional educations are obliged to focus on innovation, related to mode 1, and developing of the student's innovative competences, related to mode 2.

Specifically, IdeMatch is a digital platform in which it is possible to produce and disseminate ideas and concepts developed in close cooperation between education (students and lectures), work field partners communities, local authorities and others for the benefit of the region's overall development. As part of education that are more professionally oriented, as part of working with education design that is linked to real life work field, and as part of a strong focus on the students' development of competences, a need for a tool that could specifically link between the educational institution and the world outside has been emerging. IdeMatch addresses this need and addresses the need of expanding the overall societal innovation capacity.

Conclusions and challenges

- ➢ IdeMatch is a tool, that supports "bridging the gap" between theoretical and practical knowledge and a possibility for linking rigor and relevance - what Donald Stokes defines as "Pasteur´s quadrant"[1]
- ➢ IdeMatch is an educational framework that is focused and directed towards increased professional competences, founded on research - based knowledge, knowledge *in* practice, *of* practice and *for* practice.
- ➢ IdeMatch is an embodiment of a way of thinking and understanding education and learning processes based on principles as:
- • Action - oriented and practice -based learning.
- • Innovation and collaborative learning
- • Societal and transdisciplinary teaching and knowledge distribution
- • Network and networked learning

Though IdeMatch contributes to a qualification of experiences because IdeMatch is embedded in a didactic framework, there is the concern whether the students get the possibilities to develop the competencies that are actually acquired according to the executive order. That is a challenge for all participants and provides capacity to have a strong focus on project planning, didactic designing and facilitating processes. In an educational teaching design that is based on action- oriented, innovative processes with real life challenges learning is situated in a quite open environment characterized by a relatively high complexity and uncertainty. This uncertainty applies for all participants but mostly for students because they have an education at stake; they are oblique to pass exams and test that are related to the executive order. For both students and lecturers the urge to be in control with the learning process is challenged. IdeMatch is a digital tool and therefor it acquires digital competencies to be participant and to get fully educational advantage. It requires competencies according to digital cooperation between students and lecturers and the work field partners. This is a challenge especially concerning the work field.

References

[1] D. Stokes, *Pasteur´s quadrant: Basic science and technological innovation, Washington DC: Brookings institution Press,* 1997

Appling 3D printing to improve students' spatial ability and creativity

Chih-Hung Yu, Yu-Ying Huang, Cheng-Chih Wu

Graduate Institute of Information and Computer Education
National Taiwan Normal University , Taiwan

chihung@ntnu.edu.tw

1. Introduction – Spatial ability is an important factor in human intelligence. Previous studies had shown the high correlation between it and students' achievements in STEM domains [1]. A moderately positive correlation between spatial ability and creativity was also been indicated [2]. This ability will affect students' understanding while learning and their creativity performance. Spatial ability could be enhanced through proper education and training, and enable students to interact with the learning contents would cause a better effect than merely passive viewing [3-4]. Researchers had applied technologies to assist students developing spatial ability such as simulation software, augmented reality, or virtual reality and found positive effects [2-4]. Therefore, these methods usually allowed students to interact with the virtual information only, but not the corresponded physical object, and might decrease the learning authenticity. 3D printing is another emerging technology, one of the most significant aspects for education is that it enables more authentic exploration of objects and concepts that may not readily available to schools. It allows students to interact with virtual objects freely in the specialized software, build the physical object according to what they have designed, and might bridge the gap of the authenticity. Although spatial ability is an important ability to develop, there were no curriculums in schools helps students to further improve it in an effective way. Science and Technology is a regular discipline of senior high school in Taiwan, aims to help students developing practical skills, design and thinking process, and problem-solving ability. Students need to design a method or a product to solve one daily problem, and build it out after class. Traditional materials or tools, like paperboard, glue, and scissors, usually cost time and unable support students to implement their ideas completely. Therefore, this study focuses on applying 3D printing in a Science and Technology class to assist students developing spatial ability and creativity.

2. Experimental - The experiment scenario will ask students designing a gear mechanism to alter the direction of force and explain its usage. They have to select gears from the software library, customize the gear's spec, and manipulate their mental images to fulfill their design. A quasi-experimental pre/posttest research design will be applied to examine students' creativity and spatial ability. The participants are two classes of tenth grade students from a senior high school. One class will serve as the experimental group using 3D printing, while as the others will serve as the control group using traditional learning methods.

3. Results and Discussion –The research is still under development and the evaluation is yet to be done, but there are some findings should be noticed. We designed a 3D gear-authoring tool with high flexibility to fit students' need, and found a 3D printer to print the workable gears. Proposing a suitable combination for schools will be an important result in this research. We also expect the experiment group will have better spatial ability progress, and higher creativity performance than the control group.

4. Conclusions - The expected conclusion are to better understand how to incorporate 3D printing in class, and how to design specific learning experiences improving students' spatial ability and creativity.

5. References
[1] J. Wai, D. Lubinski, and C. P. Benbow, "Spatial ability for STEM domains: Aligning over 50 years of cumulative psychological knowledge solidifies its importance," *Journal of Educational Psychology,* vol. 101, p. 817, 2009.
[2] Y. Chang, "3D-CAD effects on creative design performance of different spatial abilities students," *Journal of Computer Assisted Learning,* vol. 30, pp. 397-407, 2014.
[3] K. A. Samsudin, A. Rafi, and A. S. Hanif, "Training in Mental Rotation and Spatial Visualization and Its Impact on Orthographic Drawing Performance," Educational Technology & Society, vol. 14, pp. 179-186, 2011
[4] M. G. Dominguez, J. Martin-Gutierrez, C. R. Gonzalez, and C. M. M. Corredeaguas, "Methodologies and Tools to Improve Spatial Ability," *Procedia - Social and Behavioral Sciences,* vol. 51, pp. 736-744, 2012.

Implementation of learning strategies in different degrees of University of Malaga (Spain) for the acquisition of specific skills, and its evaluation through an integrated rubric.

I. Santacruz[1]*, A. Díaz-Ramos[2], M.M. López[3], L. Aranda[4], R. Martín-Valero[5], G. Ruiz-Parraga[6], A. Gutiérrez[7], A. Jiménez-Lara[7]

[1] *Dpto. Química Inorgánica, Cristalografía y Mineralogía, Universidad de Málaga, 29071-Málaga, Spain.*

* *Principal Author's Phone Number:+34 952131992 and e-mail: isantacruz@uma.es*

[2] *Dpto. Álgebra, Geometría y Topología, Universidad de Málaga, 29071-Málaga, Spain.*

[3] *Dpto. Química Analítica, Universidad de Málaga, 29071-Málaga, Spain.*

[4] *Dpto. Psicobiología y Metodología de las Ciencias del Comportamiento, Universidad de Málaga, 29071-Málaga, Spain.*

[5] *Universidad Francisco Maldonado (Osuna), Sevilla, Spain*

[6] *Dpto. Personalidad, Evaluación y Tratamientos Psicológicos, 29071-Málaga, Spain*

[7] *Dpto. Biología Celular, Genética y Fisiología, Universidad de Málaga, Málaga, Spain*

1. Introduction – The new framework of the European Higher Education Area involves significant changes in the teaching-learning process for the acquisition of transversal and specific skills. Quality is the most relevant factor, so it is essential for the university professors and lecturers to design new educative strategies that help students to acquire skills. In addition, the assessment of the effectiveness and impact of the used strategies in the academic performance of the students is a key point [1].

In this work, an integrated rubric has been used to assess the effect of new learning strategies for the acquisition of the following skills: critical and self-critical reasoning, acquiring basic knowledge and ability to apply it to practical cases, oral transmission of information, and teamwork. The study was carried out in eight different subjects of the University of Malaga, including experimental degrees (Engineering, Biology, Biochemistry, Physiotherapy and Psychology), and an abstract degree such as Mathematics. Finally, students have evaluated the performance of these strategies through a common rubric.

2. Experimental – We have developed the following strategies for students of academic year 2013/14: a) self-assessment online questionnaires several times along the course (skill: critical thinking/self-critical).

b) application of the acquired knowledge to practical cases through the resolution of problems (skill: acquiring basic knowledge and ability to apply it to practical cases).

c) oral exposition of a particular topic (skill: oral transmission of information and teamwork).

The final assessment of the performance of these strategies is achieved via a common rubric to all subjects and degrees. This data is compared to the final scores of the students.

3. Results and Discussion – The most relevant results are explained according to the skills to be acquired by the students.

The critical/self-critical thinking turned out to be better developed by the students with higher scores. Concerning the acquisition of knowledge and ability to apply it to practical cases, independently of the degree, students with good (but not very good) scores are those who consider that they have worked harder on the exercises to achieve their respective scores. Moreover, oral presentations have been very positively accepted for several reasons, such as the scarce experience of the first year students, and the opportunity to do teamwork.

4. Conclusions - Given the characteristics of this study, it has involved a large number of students from different subjects and degrees. It seems that the surveys and questionnaires have impacted positively on the final student scores and that the students have also rated them positively and considered as very useful learning tools.

5. References

[1] F. Lasnier, "Réussir la formation par compétences". Montréal: Guérin, 2000

ScienceKNOW
Scientific Knowledge Conferences
for education