The reduction of the digital divide by improving the appropriateness of the web content

Vasileios Yfantis, Panagiotis Kalagiakos, Chrysanthi Kouloumperi, Panagiotis Karampelas

_Hellenic American University, U.S.A_

Increasing the appropriateness of the web content reduces digital divide. This paper considers the impact of culture on content understanding. Our research contributes to the study of this complex and challenging issue by analyzing some of the needs, wants, preferences, and expectations of different cultures based on the cross-cultural theory developed by Hofstede.

Curiosity Based Learning: Impact Study in 1st Year Electronics Undergraduates

Noel R Jackson, Anthony E Ward

_University of York, U.K._

There have been a number of reports over recent years on alternative approaches to teaching that concentrate on encouraging the student to take the initiative. These include but are not limited to problem-based, studio-based, inquiry-based and curiosity-based learning. The purpose of this focused study into curiosity-based learning (CBL) within a small class of first year engineering undergraduates is to develop an understanding of the way such an auto-didactic approach may affect or impact the way students achieve the required learning outcomes. By including CBL phases within the learning outcomes of a business management module, experienced teachers can motivate students to gather, analyse and present data without recourse to more established teaching methodologies. This ‘light touch’ approach may encourage students to adopt CBL methods autonomously in future, enhancing personal and collaborative group studies, improving effective communication and their willingness to challenge conventional wisdom and generally improving a student’s ‘softer’ skills. This paper describes the module, its objectives, previous literature on the topic and the research methodology used before discussing findings and implications. The main findings are that the module has enhanced student motivation, has had a significant impact on student Venturing Self-Efficacy and a positive impact on student awareness of the importance of management to their future careers.
Analysis of a Teaching and Learning Method Supported by Open Source Codes and Web Activities

Apollonia Matrisciano, Vindice Deplano, Nicola Pio Belfiore
Sapienza University of Rome, Italy.

In this paper the Authors describe a series of activities that has been planned and completed at Sapienza University of Rome. This contribution concerns the development of an original web-site that has been created for supporting the students enrolled at the course of Mechanical Engineering. The developed Site, called KinSynth, is a virtual space where the students have both download and upload privileges, which allows them to exchange a variety of information, mainly Codes written in Open Source Programming Languages. The system allows all the up-loaders to achieve Authoring credits and this feature trigs certain psychological dynamics among the learners that the Authors of the present investigation are willing to analyze. Hence, an on-line survey has been proposed to all the registered students-users with two objectives: a) understanding whether the Site is really useful to all the students, or only to a sub-group of them; b) achieving a better knowledge of the learners’ typologies and attempting to correlate them with their attitude for these Web-based activities. The questionnaire has been developed on the basis of some indicators which could identify some student typologies, such as, for example, those making reference to the Gardner’s multiple intelligence model, and some web-user styles. The results will be used next semester in order to build up new orientation activities.

Explorations on a Support System for Japanese Language Teaching Materials from the Perspective of Language Transfer

Lu Sa\textsuperscript{1}, Wang Bin\textsuperscript{1}, Guo Yuping\textsuperscript{1}, Hayashi Toshihiro\textsuperscript{2}

Ningbo University of Technology, P.R.C.\textsuperscript{1}, Kagawa University, Japan\textsuperscript{2}

Language transfer, when someone applies knowledge from their native language to a second language, is a common and typical phenomenon in language learning of bilingual students. This paper lists manifestations of language transfer of Chinese speakers in Japanese learning, puts emphasis on the meaning difference between Chinese characters and Japanese Kanji, and explores a support system for the preparation of Japanese teaching materials.
Enabling Capacity to Work in Distributed and Multicultural Teams in Technical and Vocational Education and Training Programs

Essam Rahali¹, Zenon Chaczko², Bruce Moulton²

Mecca Technical College, K.S.A.¹, University of Technology, Australia²

Technological and vocational education and training programs (TVET) play an important role in the enabling of information technology expertise in developed and developing countries. Engineering and information technology projects are increasingly involving teams of people working collaboratively from different countries. Hence training is increasingly required to enable the skills that are required for working in widely distributed teams. This paper explores issues associated with efforts to enable cross disciplinary teamwork and other skills that are likely to be required by tomorrow’s information technology workforce, with a focus on Arab societies.

PS2 10:40 - 12:20
Development and Use of IT Tools and Environments

Evaluation of Lecture Using Web-based e-learning and Development of Rapid e-learning System

Hidenori Akiyama¹, Tsuyoshi Kiyan¹, Seiichi Kamaga¹, Mariko Akiyama¹, Yasuhiro Ohshima², Kazutake Kozono³

Kumamoto University, Japan¹, Sojo University, Japan², Prefectural University of Kumamoto, Japan³

Credited lectures using the web-based e-learning in Japan began at higher education institutions in 2001. The lecture evaluation was done by using a questionnaire to students when the lecture began. The questionnaire survey is carried out again in 2012 after ten years’ separation. The load to make e-learning contents is still high for professors. A rapid e-learning system including the production and distribution of e-learning streaming contents with animation and laser pointer has been developed. This system is in use.

Development of Coastal Water Body Database on KISSEL Server

DDGL Dahanayaka¹, Hideyuki Tonooka¹, MJS Wijeyaratne², Atsushi Minato¹, Satoru Ozawa¹

Ibaraki University, Japan¹, University of Kelaniya, Sri Lanka²
Monitoring of coastal water bodies in all the relevant aspects was highly important for the sustainable use of those. To achieve this all the research findings should be easy access and presenting those in a user friendly manner will be more advantage. In Sri Lanka, there was not fully or never developed database on research findings especially on coastal water bodies. Thus we developed a Sri Lankan coastal water body database (CWBDS) on KISSEL server system which can be benefitted all the interest communities including general public. Presently it include water quality data over two decades of lagoons and estuaries and in near future it will update with support from universities and research organizations including research on biodiversity, fisheries, land use, socio economics, topography, water circulation, pollution etc.

Pre-Service Teachers’ Media Multitasking Behaviors with Smart Devices
Ki-Sang Song\(^1\), Sang Chun Nam\(^1\), Jae Kyung Kim\(^2\)

\(\text{Korea National University of Education, Korea}\(^1\), PaiChai University, Korea\(^2\)

The possibility of media multitasking with mobile devices greatly increased due to the wide spared of smart devices such as smart phones and tablet PCs such as iPad. There are controversies of the effect of multitasking to users’ work achievement, and in this paper we first surveyed the pre-service teachers’ behaviors of multitasking with information technologies during their school lives. Then we have analyzed their multitasking patterns using eye movements while they are taking an e-learning program as a main job, and distracted activities such as web surfing, listening music, and on-line chatting are allowed. From the observations, we found that students with higher frequency of media multitasking habit spend almost 63.4% of lower time to their main job, and 5.8 times more on web surfing.

SIMPEL : An Innovative Web Application Interface Supporting Online Course Management System
Mardiana Araki, Keijiro Araki

\(\text{Kyushu University, Japan}\)

A web application interface using the web service technology is required for enabling the interaction of various web applications on different platforms. This work describes a web application interface (called SIMPEL), developed to integrate the MOODLE (Modular Object-Oriented Dynamic Learning Environment) with an academic information system. The SIMPEL benefit goes beyond the mere creating synchronization between academic data and teaching/learning resource. It improves several functionalities which are lacking in the MOODLE such as the capability to use the most of input from the academic information system,
presenting the sequence of activities and providing the facility to design different activities to different group of students. In this work, Model Driven Architecture (MDA) and Service Oriented Architecture (SOA) are combined as an approach to develop the SIMPEL. The implemented SIMPEL is analyzed in the teaching/learning activities at Department of Electrical Engineering University of Lampung (Unila) during the trial period and the result showed that SIMPEL can properly perform its functionalities to guide students and teachers in their activities.

**Educational Services in Cloud with IBM Technology: A new model for open, on demand learning in higher education**

Florin Daniel Anton, Silvia Anton, Theodor Borangiu

*University Politehnica of Bucharest, Romania*

The paper describes a cloud implementation for a consortium of four universities used for on demand education. The cloud infrastructure allow a better resource allocation for laboratories, customizations of the working environment, on demand class setup and more other features which allow improvements in the learning processes. The infrastructure is composed by two IBM CloudBurst 2.1 infrastructures, located in two different geographical locations, connected by a high speed fiber optic connection, allowing fault tolerance, high availability and virtual machine relocation. The system is used by four universities: University Politehnica of Bucharest, University “Transilvania” of Brasov, Academy of Economic Studies of Bucharest and University of Medicine and Pharmacy “Carol Davila” of Bucharest. The paper is composed by six sections: an introduction presenting the actual context in for education services and the necessity for cloud computing in education, a section which describes the hardware and software architecture of the system, then the virtual machine management and monitoring system is presented, followed by section which discusses about the e-learning system implemented, the SSKE (Service Science Knowledge Environment) system is presented in another section, and the paper finishes by a conclusions section presenting further developments and first results.
Group-work Teaching and Learning Involving 3 Time Zones (3TZ) Model of Collaboration in the Global Workspace
Zenon Chaczko¹, Ryszard Klempous², Jan Nikodem², Shahrzad Aslanzadeh¹

University of Technology, Australia¹, Wroclaw University of Technology, Poland²

This paper discusses concepts of group-work teaching and learning of practice based subjects within ICT engineering programs using 3 Time Zones (3TZ) collaborative, global workspace environment. The methodology intends to explore and evaluate a new collaborative framework for teaching system analysis and design, as well as software engineering in higher education, using new convergent technologies. The project is compatible with a model of teaching and learning that involves a blend of three interrelated features: an integrated exposure to professional practice and multidisciplinary skills, a practice situated in a global environment, as well as a research inspired and integrated learning.

A Practical Approach for Redesigning System Engineering Processes
Robin Braun, Zenon Chaczko, Matthew Neilson,Shahrzad Aslanzadeh

University of Technology, Australia

This paper describes the methodology of applying Business Process Reengineering and Total Quality Management principles to a model a telecommunications service and infrastructure provider company. By applying these principles to existing processes this paper aims to provide redefined and reengineered processes for consideration of implementation into the company’s business model. The processes that this paper is focusing on are purely engineering based processes and as such, do not represent, change or consider processes outside of the engineering department. The overall aim of this paper is to demonstrate a typical use of methodology and ICT tools that can be used for training students in the improvement of engineering processes and to enable them to design a more streamlined and productive work environment.
MATLAB Case-Based Reasoning GUI Application for Control Engineering Education

Engin Yesil¹, Cihan Ozturk¹, Berk Cosardemir¹, Leon Urbas²

Istanbul Technical University, Turkey¹, Dresden University of Technology, Germany²

This paper represents using Case-Based Reasoning (CBR) in order to support undergraduate control engineering students for learning nonlinear systems and control applications. CBR is an experience-based problem solving methodology; thus, it is used for helping control engineering students to design conventional PID controllers for nonlinear systems. For this purpose, GUNT pH neutralization process is used as the experimental setup and a GUI is designed for cased-based reasoning in MATLAB. It is observed that undergraduate students can learn and increase their experience on nonlinear systems using the proposed new CBR-GUI.

Factors Influencing Engineering Students’ Performance and their relationship with the Student Satisfaction with the Teaching/Learning as well as Overall University Experiences

Muhammad Abbas Choudhary

University of Engineering & Technology, Pakistan

This paper presents the results of students satisfaction survey conducted from 25 percent of randomly selected student body of 3200 in undergraduate engineering programs. The research started with a comprehensive review of the literature and was documented. A comprehensive questionnaire containing 249 variables grouped in 15 question categories spanned all aspect of university experience both in and out of the class environment. The students were also asked about the relative importance of many variables. Respondents were generally satisfied with academic and learning facilities however were dissatisfied with the service elements of the University life like, IT and computing facilities, student housing, career and psychological counseling and recreational facilities. It was observed that most of the students have never been as a guest at a professor’s house, or had played a musical instrument or interacted with graduate students, or worked on a professor’s research project as TA or participated in inter-faculty sports. A significant number of students have never worked fulltime while attending the University, had a roommate of different race/ethnicity, participated in internship or leadership training program, participated in study abroad or taken a course at another institution or presented research at a conference. There was a statistically significant co-relation between hours spent doing certain activities and student performance and the students who were involved in extra-curricular and co-curricular activities generally performed better than those who didn’t and
female students generally spent more time on their academics than their male classmates. While majority of the students felt that their skills have become stronger after attending the university, however, a significant number of students felt no improvement in leadership/interpersonal skills, ability to get along with the people of other race/ethnicity or their foreign language ability. Although students agreed with 10 positive statement about campus life however, majority of the students were of the view that faculty is not interested in student’s personal problems and that they are dissatisfied with the level of contact with the faculty. Majority of the students never smoked cigarettes, socialized with the students of other race/ethnicity, participated in political demonstrations, political campaign, or contributed money to their family. Majority of the students have reasonably strong self image as they rated themselves as equal to average, above average and highest 10% and only difference was leadership ability in which a significant number rated them bellow average. More than 70% of high achiever plan Masters or PhD after completing their undergraduate degree. Although majority of the respondents rated 15 out of 20 variables ranging from somewhat important to essential except becoming accomplished in performing arts, influencing the political structure, having responsibility for the work of the others, keeping up to date with political affairs, or becoming a community leader.

**Learning support framework for adult graduate students of information science**

Akishi Seo, Koichiro Ochimiz

*Japan Advanced Institute of Science and Technology, Japan*

In this paper, we propose a learning support framework for adult graduate students of information science. It allows adult graduate students under time pressure to learn effectively. The course recommendation system that is a part of the framework presents an appropriate course for a student. The framework also provides a method to pursue the cause of obstructions of studies of adult graduate students.
Quality Management for E-Learning: Why must it be different from industrial and commercial quality management?

Michael H.W. Hoffmann¹, Olivier Bonnaud²

*University of Ulm, Germany¹, University of Rennes 1, France²*

Quality management for higher education differs from quality management in commerce and industry. These differences, but also similarities, will be identified in this paper. Conclusions will be drawn to facilitate an effective system of quality management at institutions of higher education. It will be shown that particularly e-supported testing and control of learning success will be a core element of such a system.

SMARTNotes: An annotation tool based on web services to promote collaborative distance learning

M. Kimit, D. Bouzidi, N. Abghour

*Hassan II University, Morocco*

The Planning, Implementation and Economics of the Knowledge Integration Server System for E-Learning (KISSEL)

Gamunu Dassanayake¹, Nalin Warnajith¹, DDGL Dahanayaka¹, Hideyuki Tonooka¹, Atsushi Minato¹, Satoru Ozawa¹, Meepagalage P. M. Perera²

*Ibaraki University, Japan¹, Bandaranayake College, Sri Lanka²*

E-learning is about bringing education to people instead of bringing people to education. It involves the delivery of contents, courses and training via electronic media such as the Internet and intranet. E-Learning provides just-in-time training delivery as well as flexible access to lifelong learning. It can help organizations retrain their staff and motivate individuals to upgrade their skills with less disruption to work and family life.

The Knowledge Integration Servers System for E-Learning (KISSEL) is a knowledge sharing platform for E-learning and sustainability sciences which is focused mainly on Asian-Pacific Countries. It is a kind of open source program to build and set-up communities. The KISSEL online courseware management system was developed by the research group of the Ibaraki University, Japan.

KISSEL can provide E-learning and information technology base training through its virtual platform. It is a student-centered E-learning environment that satisfies the learning-on-demand need of working with IT professionals, and reduces the
learning time by assembling customized courses on demand to meet specific individual needs.
The first server under this KISSEL project was established in Bandaranayke College, Gampaha, Sri Lanka in the year 2009.

**Prototype of E-Learning Management System for Secondary School in Sri Lanka**

Nalin Warnajith¹, Gamunu Dassanayake¹, DDGL Dahanayaka¹, Hideyuki Tonooka¹, Atsushi Minato¹, Satoru Ozawa¹, Meepagalage P. M. Perera²

*Ibaraki University, Japan¹, Bandaranayake College, Sri Lanka²*

With the advancement of Information communication Technology in Sri Lanka, teachers should take advantage to upgrade their teaching techniques. Because, E-learning techniques are getting very popular in Sri Lanka. Students should be allowed to learn anytime, anywhere and at their own place. Teachers should be able to keep collection attractive questions and course materials online. Teachers who are from different schools should be able to share resources and exchange ideas through the Internet. The motivation for this research is to solve the problems of shortage of online resources for students under the condition of high student-teacher ratio in Sri Lanka.

In order to solve this problem, our research group developed a prototype system called KISSEL. The Knowledge Integration Servers System for E-Learning (KISSEL) is a knowledge sharing platform for E-learning and sustainability sciences which is focused mainly on Asian-Pacific countries. Our system is mainly for school teachers and school children in Asian Pacific countries.

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**PS5**

**Distance Learning**

**15:20 – 17:20**

**Evaluating the Impact of Interactivity Issues on E-Learning Effectiveness**

Joharah G. Alzahrani, Gheorghita Ghinea

*Brunel University, U.K.*

This research investigates how interactivity affects the effectiveness of e-learning and how interactivity in e-learning can be improved. This research uses a mixed strategy; questionnaire surveys were conducted with students studying at Taibah University and semi structured interviews were conducted with the professors teaching at Taibah University. This research finds that the lack of interactivity in e-learning affects the effectiveness of e-learning and the most effective way of using e-learning is to use it in conjunction with traditional classroom learning. This
research also concludes that new and improved technologies are required to improve interactivity in e-learning which will, undoubtedly, affect the effectiveness of e-learning systems.

Supporting Presentation with Mobile PC in Distance Lecture

Kikuo Asai, Kimio Kondo

The Open University of Japan, Japan

We developed a prototype system for supporting presentation with a mobile PC in distance education, which have been designed to keep eye contact between students and a lecturer and to facilitate finger pointing by a lecturer in videoconference. Despite convenient functions supporting videoconferencing, it is often difficult to keep the awareness and attention information during remote lectures. Our solution for addressing such difficulties is to present materials using a mobile PC held by a lecturer, instead of presentation slides usually displayed on a different screen away from the lecturer’s face. We believe that this mobile-PC based presentation style makes it easy for the remote students to see the lecturer’s face and lecture materials simultaneously, facilitating eye contact and finger pointing. In addition to the support, the function of displaying an outline during a lecture with a tree-structure map is implemented into the system, so that the remote students can understand the place of each material in the whole lecture.

Using Web Conference System during The Lessons in Higher Education

Gabor Kiss

Obuda University, Hungary

The goal of this research was an analysis to see the using of the web conference system as a presentation tool is productive or not. The experience shows the majority of the students do not visit the presentations at the universities, just download the learning material and try to take a successful exam, but they do not have too much chance to pass it. First of all I wanted to see how many students take part in the virtual and traditional presentations respectively and I observed that the virtual way was preferred (~80% of students) to the classical way (~30-40%). The students in the first group were more motivated; they took this opportunity rather than the conventional educational method. My starting hypothesis was that the group where I used the web conference system as a presentation tool would achieve better results in the papers. After the evaluation of the paper results the correctness of the original presumption seemed to be proved. Significance level was 5% through the analysis. It was found significant divergence in the knowledge of the students taking part in the virtual
presentations and that of the students using the traditional way. The students could get half mark better paper results when they followed the virtual lesson. Consequently, the use of the web conference system as a presentation tool is productive; the students follow the presentations with more motivation to use this new tool in their studies and get better results when writing papers.

TEC Digital: a Case Study of an e-Learning Environment for Higher Education in Costa Rica
Cesar Garita, Mario Chacon-Rivas
Costa Rican Institute of Technology, Costa Rica
TecDigital is the e-learning project of the Costa Rica Institute of Technology (TEC). This paper describes the main characteristics of TEC Digital as a successful case study of elearning integration in higher education in Costa Rica. In particular, the paper describes TEC Digital objectives and organization, development stages, instructor involvement approach, projects and training, institutional impact, and conclusions and future work.

The Impact of YouTube Videos on the Student’s Learning
Yousra Chtouki$^{1,2}$, Hamid Harroud$^1$, Mohammed Khalidi$^2$, Samir Bennani$^2$
Al Akhawayn University in Ifrane, Morocco$^1$, Ecole Mohammadia d’Ingénieurs, Morocco$^2$
An important part of education is student’s learning. Good quality education is based mainly on how well student attain the knowledge. One way to achieve that is to simplify the content and make it as intuitive as possible. This can be challenging especially for introductory computer science courses for non-computer science students. Such courses are supposed to cover a wide range of complex computer concepts such as networking, computer internal hardware, databases, operating systems and others. In this paper we are presenting the results of a study done on the use of YouTube videos to enhance students’ learning. We have evaluated the student’s performance in an introduction to computers course for non-computer science students by comparing two groups of students, The first one is a test group in which we have supplied the students with a set of videos from YouTube to illustrate different concepts such as multiple core versus single core processor, hard disk internal components, using fiber optic cables to connect continents under water.ect. The second is a control group in which we have only used the traditional resources, such as the textbook, in class lectures and handouts. The results of the study have shown that students understand and can remember the complex concepts much better when they are exposed to a visual explanation
video. We found that most of the students if not all watched the short videos, which is not the case with textual content. One of the main advantages of YouTube is that it is a free web based service that contains short contents about specific concepts taught in schools. Educators can easily search and review videos related to a specific concept or knowledge, and then provide the students with the link. In our case the videos were downloaded using RealPlayer plugin, which allowed us to download any video streaming content on the web. Then we have uploaded the videos in our LMS (learning management system). We have opted to include the videos in the LMS so that we can track the number of students who have downloaded the videos and keep track of the number of downloads. In this study we have found that using YouTube videos encouraged students to look for similar videos, and get a habit of using YouTube as an educational resource. The only challenge is the evaluation of the reliability of the content, for that reason content selection has to done by the instructor. Lastly, YouTube videos have been a useful source of educational content, it is a free web based tool, and the impact has been important based on our study on students’ performance. Educators have used YouTube videos in other fields such as nursing in [1] and have proven to be an effective tool to enhance students learning and engagement.

**PS6**
Interactive Learning Modules

**A Game to Test Pointers: Path Finding**
Zehra Karapinar, Arafat Senturk, Sultan Zavrak, Resul Kara, Pakize Erdogmus
*Duzce University, Turkey*

Pointers are one of the most difficult to understand topics in programming courses. Since the topic is some virtual, the students of computer science face with difficulties in understanding. They hardly imagine the addresses of memory cells, their contents, and the pointers pointing to those memory cells. To test the knowledge and to reinforce the explanations done on the lecture hours, we have intended to create a game related to pointers. This game was constituted with the purpose of visualizing the concept of pointers into the students’ brains and so to increase the understanding of the subject. The students will not only listen the topic from the teacher or just write, but in an evaluation test, they will also see what is going on in the memory cells of their computer. This will make the teaching more and more permanent.
Binary Apple Tree: A Game Approach to Tree Traversal Algorithms

Zehra Karapinar, Sultan Zavrak, Arafat Senturk, Resul Kara, Pakize Erdogmus

Duzce University, Turkey

The computer science students mostly face with the difficulties in learning the topics of algorithms courses. Only listening the topic from the teacher or just writing makes the learning volatile. Instead of listening or writing, if there is something visual, it would be more permanent to learn because visuality increases the learning potential and the time for learning is minimized. The adversities of classical education techniques were intended to be eliminated in this study via computer games which are becoming more and more popular in this age. An educational convenience is provided for the subject of tree traversal algorithms. Tree traversal algorithms are one of the basic and confused concepts in algorithms and programming courses in computer science. A game called “binary apple tree” was established to teach and learn the subject easier.

Integration of ICTs into Subject Teaching in Pre-service English Teacher Education

Chen Yan, Jiang Yuhong

Southwest University, P.R.C.

The fast development of ICTs provides great opportunities and challenges as well to pre-service English teacher education in China. With ICTs students can access abundant information in English stored online, communicate and interact with one another quickly, conveniently and synchronously or asynchronously in English both orally and in written form. ICTs have been changing how English is learned in China as a foreign language and are beginning to change how English is taught as a foreign language. English teachers in China feel the strong urge to learn how to use ICTs in their teaching to facilitate their students’ learning and making the learning meaningful to their students. Various approaches of teaching technologies to pre-service English teachers can be found in colleges and universities in China. However, among them the best one is to integrate technologies into subject teaching, from which pre-service teachers can learn best how to infuse technologies into their own subject teaching. In order to enhance pre-service English teachers’ ability both as language learners and users of ICTs in their own teaching, this paper takes the course “Comprehensive English”, a compulsory course for English majors trained to be teachers, as an example to show how ICTs as educational technologies can be effectively infused into subject teaching and how the pre-service English teachers can benefit from the integration of ICTs both as English language learners and would-be teachers.
Enhancing Student Involvement in a Class Using Real-Time Response System
Andi Sudjana Putra, Ng Jun Jie, Tan Kok Kiong
National University of Singapore, Singapore

This paper presents the development of a real-time response system to enhance student involvement in a class; by means of addressing the attendance and the participation of students. The system consists of student pads on an Android mobile platform, a lecturer pad, and an Apache Tomcat server hosting the software of the system. The system allows the lecturer to keep track of the attendance of every student, as well as monitoring the comprehension of the class in relation to a subject via interactive multiple-choice-questions and short-answer questions.
The Lecture Contents with Index for Self Study and its System
Takuya Saitoh, Toshihiro Hayashi, Rihito Yaegashi
Kagawa University, Japan
We developed the system which supports user’s selfstudy by using some lecture contents, and this system can count the total number of views and show them. This paper describes the system which enables to play back the scene which users want to watch in the lecture contents. This paper also describes how this system counts the total number of views and shows them.

Self-Study Support System Using The Lecture Contents : Creation of Study Ontology from Syllabuses
Takuya Saitoh, Toshihiro Hayashi, Rihito Yaegashi
Kagawa University, Japan
Now, there are many systems to create lecture contents. However, there is no research and system for self-study support by using lecture contents. It is because we have nothing to define the study rules that we cannot study by using lecture contents. This paper describes the methods to create the study ontology which define study sequence and study rule from the syllabuses for self-study by using lecture contents.

Towards a Web-based Program Visualization System using Web3D
Gensuo Han, Koji Kagawa
Kagawa University, Japan
It is important for programming learners to understand basic control structures of programs adequately. It is even more difficult for novice learners to understand function calls including recursive ones. There are some programmers’ tools such as debuggers that can potentially help learners. However, it is, in general, difficult for learners to familiarize such tools. This paper presents the design of a Web-based program visualization system for motivating learners and for facilitating them to understand workings of function calls. Various Web3D technologies are about to become wide-spread. The system presented in this paper uses WebGL, a JavaScript API for 3D graphics and animations.
Monitoring of Learner Activity on Self Study Material Contribution and Sharing System

Toshihiro Hayashi, Hiroyuki Tarumi
Kagawa University, Japan

Recently, higher education (university education, lifelog education and so on) by e-learning has been getting increased by the development of information and communication technology. Higher education organizations have to prepare e-Learning contents appropriately. It is generally hard for e-Learning contents developers (including instructors and so on) to quickly prepare e-Learning contents with appropriate quality and quantity in short period because of heavy load for creating the contents. We proposed and prototyped an a Self Study Material Contribution and Sharing System called "S-Quiz" in which learners can make and share multi-choice questions as e-Learning contents in order to clear this problem. Learners behave as contents developers so that they create e-Learning contents they need in S-Quiz. In addition, our system provides a learning environment wherein learners can freely use the contents as common learning resources. However, this learning situation is ideal based on learners' spontaneous and positive activities. Generally, high spontaneous and positive activities cannot be expected. Therefore, we add a function which monitors learners' activities. For enhancing spontaneous and positive activities, we think teachers use this function. We believe that learners' activity can be guaranteed based on teacher control with the monitoring functions. This paper reports outlines of SQuiz and the monitoring function for teachers to check the learner's activity.

Visual Model for Managing Educational Capacity Utilization in Egyptian Universities

Mohamed Abd El-Fattah
Benha University, Egypt

The importance of quality service in Higher Education Institutions (HEI) has increased in recent years. Educational institutions need to assess and enhance their activities, in order to provide a balance of educational capacity and educational supply, and to measure future capability as well as past performance.
In this direction the design and adoption of a well-informed strategic management will increase the overall quality of those services. The number of students in Egyptian universities in each faculty varied from one to another depending on multi variables. No strategic planning to joined students. Academic workload management is concerned with distributing teaching resources in order to adequately support the university’s educational framework (faculties, degrees, courses, admission policies, teaching workload etc). The admissions process must admit students in such a manner as to achieve an efficient utilization of university resources.. This paper proposes a visual model for estimating educational capacity and planning its distribution and utilization in universities.

PhD in Electrical and Information Engineering in Europe: towards a harmonization including LifeLong Learning

Olivier Bonnaud¹, Jean-Marc Thiriet², Helene Fremont³, Hamed Yahoui⁴
Univrsite Rennes 1, France¹, Univrsite Joseph Fourier, France², Univrsite Bordeaux 1, France³, Univrsite Claude Bernard Lyon 1, France⁴

In the frame of the thematic networks devoted to the development of LifeLong Learning (LLL) in Europe, the ELLEIEC project, more especially focused on the Electrical and Information Engineering, the situation of PhD students in Europe was analyzed with the goal to highlight the differences that remain in Europe about the delivery of diploma and the adequacy of the academic institution regulations to the prior learning validation at this level. A questionnaire submitted to all the members of this network allowed an overview on 23 European countries was obtained. This paper tries to highlight the several aspects of the status and proposes recommendations in order to make easier the mobility and exchange in Europe at PhD level as well the recognition of prior studies to make suitable the LLL. On the base of the analysis, some recommendations within the global approach of Higher Education in Europe are emitted.

Teaching Multidisciplinary Engineering using Concepts and Technology of WSN

Zenon Chaczko, Jan Szymanski
University of Technology, Australia

This paper discusses teaching and learning strategies of Wireless Sensor Networks technology in a new postgraduate subject run at the Faculty of Engineering and IT, University of Technology, Sydney. The aim is to present the role of using practice based and multidisciplinary methodologies in the context of new ICT technologies. This includes shared experiences, observations and common problems experienced in teaching new concepts and paradigms, standards,
protocols and algorithms, embedded systems and sensor technologies. The theory of WSN is applied as a driver of system development for the group projects that students undertake in the subject.

**Blitzkrieg Education: Finding a System for Transforming Education**  
Ian Douglas  
_Albany College of Pharmacy and Health Sciences, U.S.A._

For decades people have been promising that technology was going to radically change education. Despite large investment and much research little deep change is evident at most institutions. This paper will argue that it is not enough just to add new technologies to an existing system; we must completely change the system to one built around a set of new technologies and methods. An initial framework for such a system is proposed based around educational approaches that have complementary technologies. The framework is based around five main components: transferable skill development, collaboration, open content, reverse teaching and user-centered design.

**PS9**  
10:40 - 12:20  
Special Session

**A Business Continuity Plan Support System for Disaster Prevention Learning**  
Kouhei Mano, Hitoshi Inomo, Wataru Shiraki, Chikako Isouchi  
_Kagawa University, Japan_

Recently, the natural disaster and the accident have happened frequently in the country and foreign countries. At that time, the construction’s business that is stopped is magnified the shattering damage. Hence, formulating the construction’s BCP is necessary. In this study, we develop the system which supports the BCP formulating for a construction company.

**A Practical Scheme for Resource and Knowledge Discovery in Reproductive Design Education**  
Masatoshi Imai^1^, Yoshio Moritoh^1^, Yoshiro Imai^2^  
_Kagawa Junior College, Japan^1^, Kagawa University, Japan^2^_

Design education is one of the most creative topics and themes in Higher Educations and Trainings. Students of the design education course also need to learn both of knowledge and techniques, the former is necessary to design some objects and the latter are essential to utilize tools as well as equipments. It is
important to provide not only knowledge but also techniques in efficient and effective ways.

One of the most attractive approaches to design in Ecological and/or Recycling methods is to utilize and discover reproductive tools and resources. It is a good way to create some reproductive objects. Especially, some furnitures are worth enough to be reused and reproduced in the above ways.

This paper focuses how to utilized recycling resources and useful knowledge for design education. And it also presents a practical scheme to utilize Resources, Knowledge and Techniques for Design Education in order to retrieve and discover in the network environment. The paper challenges to visualize practical scheme for design process by means of comparison between usual steps in the normal design education and special steps using Internet and network community. And it summaries to be important for design education to visualize scheme for resources and knowledge discovery through network environment.

**A Cloud Approach on Distributed Multiple Servers for Distance Learning**
Yoshio Moritoh\(^1\), Yoshiro Imai\(^2\)

*Kagawa Junior College, Japan\(^1\), Kagawa University, Japan\(^2\)*

Cloud Computing is currently focused from various fields of engineering. Such a strategy is widely accepted in many domains of information processing and communication. Our study also employs a cloud approach for distance learning with distributed multiple server system. Distance learning is already realized on a single server and provides its service for many learners who are in distributed network environment. This time, we have tried to migrate such a distance learning mechanism to distributed multiple servers and realize its service as a kind of Cloud Computing. So our scheme has been customized as a cloud approach which can utilize Cloud Computing for Distance Learning using distributed multiple server system.

The paper introduces our environment of previous studies about distance learning for computer architecture and others. Such an environment is tailored into distributed multiple servers and then implemented and utilized for position-independent clients to obtain some kinds of cloud services. Such a mechanism has been realized by means of virtualized-server approach and its specification can be improved to horizontal migration of virtualized servers.

**Support System WinG and an Applied Programming Exercise with Board-Game Strategy**
Kohei Yamada, Hiroyuki Tominaga

*Kagawa University, Japan*
We have proposed an applied Java programming exercise with board-game strategy for problem solving learning. During implementation of hand methods of Gogo game, students learn realization of ideas as algorithms and revision with trial and error by execution results. We have developed support system WinG. WinG-LA is a local review tool. It offers a game execution library as Java API and contains four modules for examination of a strategy. It also prepares various samples as test cases for debugging. WinG-CS is a contest management server. It executes a lot of games among uploaded students' programs. It maintains a preliminary and the final period for battle league. They decide students' scores by the result of round-robin matching. We performed an educational practice in 2011. By introducing some dummy strategies as the standard of strength, the number of submission increased. It showed the educational effect to promote the activity of the exercise.

PS10 10:40 - 12:20
Development and Use of IT Tools and Environments

A Watermarking System for Teaching Intellectual Property Rights: Implementation and Performance
Maria Chroni, Angelos Fylakis, Stavros D. Nikolopoulos
University of Ioannina, Greece

In this paper we propose a watermarking system, which we call WaterIP, that can be efficiently used in support of teaching students to respect intellectual property rights. Our system uses an efficient technique for watermarking images by exploiting certain properties of a specific 2D representation of permutations, it has a friendly graphical user interface, and shows interesting performance figures. We demonstrate the educational effectiveness of our WaterIP system by presenting ways of how it can be applied in class and show that WaterIP helps to understand what intellectual property rights really stand for. We have implemented our system and evaluated it in an simulated environment; the experimental results show that WaterIP has optimal time and space performance. Apart from that the figures show that the system provides watermarked images of high quality and everything is accessed through a user interface leading to the desired educational efficiency.
Technology applied to the Postgraduate Researcher Journey: Experiences of using the ‘Skillsforge’ system
Anthony E. Ward
University of York, U.K.

This paper reviews the postgraduate journey and current situation regarding postgraduate skills development in the UK. It leads on to reviewing some of the common reasons why the journey fails to yield a satisfactory outcome for either the student or institution and then introduces a technological solution, Skillsforge, used at the University of York and other UK Universities, to manage the journey and significantly reduce the risk of these failures. As a system Skillsforge has had 98,794 registered users (students and staff) since its launch across 6 UK Universities. The paper concludes with feedback from students and academic staff on its relevance and advantages.

A Learning Support Environment for Earthquake Disaster with A Simulation of Furniture Falling by Mobile AR
Naosuke Yamashita, Masato Soga, Hirokazu Taki
Wakayama University, Japan

Learning for earthquake disaster is important in Japan. However, it is rare to experience a big earthquake disaster even in Japan. Therefore, it is difficult to teach the importance of learning for earthquake disaster. We developed a learning support environment that can give a learner simulated experience of earthquake disaster by mobile augmented reality.

Step-by-Step Mechatronics Programming Learning for Solar Energy Education
Yoshihiko Takahashi
Kanagawa Institute of Technology, Japan

A step-by-step program learning scheme to study mechatronics is presented in this paper. We are developing a small electric vehicle development kit for solar energy education courses. The scheme was applied to develop the control program for ultra-small electric vehicles using small rechargeable batteries. This paper will present the learning scheme and the application results to a small electric vehicle.

The impact of 3D virtual environments on communication patterns
Georgios Dafoulas, Noha Saleeb, Martin Loomes
Industry-University Learning Network to create competences for Intelligent and Sustainable Manufacturing: a Case Study

Giustina Secundo¹, Giuseppina Passante¹, Aldo Romano²

University of Salento, Italy¹, Dhitech S.c.a.r.l., Italy²

The manufacturing industry today has to cope with the third millennium challenges of environmental and social sustainability. This requires more integrated approach between academia and industry in order to face the problem of engineering competences obsolescence. The aim of this paper is to present the first results of a case study, a post graduated two years training program “Experiencing i-Design”, aimed to develop a new archetype of human capital to face the requirements of intelligent and sustainable manufacturing. The article addresses the role of Industry-University Learning Network as intermediary to facilitate the virtuous integration between research and education, with the ultimate purpose to instil entrepreneurial attitudes in engineers, so fostering innovation and technological entrepreneurship in a regional context.

From Innovation to Sustainability: Transforming a specific lighthouse elearning project into a comprehensive self-financing competence center

Beat Affolter
University of Zurich, Switzerland

This paper describes the transformation from a lighthouse elearning project into a self-financing and integrated “Teaching Center” within the Departement of Banking and Finance at University of Zurich and shows how this changed the teaching and learning culture within the department.

Teaching Smartphones programming using (Android Java): Pedagogy and Innovation

Seyitriza Tigrek¹, Mohammad Obadat²
University of Colorado, U.S.A.¹, The University of Tennessee at Martin, U.S.A.²

Mobile devices are becoming indispensable tools for many students and educators. Mobile technology is starting a new era in the computing methodologies in many engineering disciplines. Students and scientists are becoming more interested in learning how to develop their own applications on mobile platforms. This paper presents an innovation in teaching and learning
principals of Android-based Java programming. A course material is developed “Introduction to Programming Java on a Mobile Platform” to teach novice programmers how to create applications in shorter than traditional time. This work also provides techniques for instructors with modest programming background to teach cutting edge technology, which is smartphone programming. Techniques developed in this work minimize unnecessary information carried into current teaching approaches with hands-on practice. It also helps the students with minimal background requirements overcome the barriers that have evolved around computer programming. The motivation of this work is to create a tailored programming introductory course to teach Java programming on Android by incorporating selected efficient methods from extant literature. The proposed mechanism is to keep students motivated by an active approach based on student–centered learning with collaborative work. Teamwork through pair programming is adapted in this teaching process. Bloom’s taxonomy, along with a knowledge survey, is used as a guide to classify the information and exercise problems. A prototype curriculum is a main deliverable of this work that is suitable for novice programmers such as engineering freshmen students.

International Dimension to Increase Lifelong Learning Possibilities in Europe

Jean-Marc Thiriet¹, Hamed Yahoui², Helene Fremont³

Universite Joseph Fourier, France¹, Universite Claude Bernard Lyon 1, France², Universite Bordeaux 1, France³

1 Thanks to the European policy, mobility of students has been encouraged via ERASMUS, allowing universities to recognise, within their programmes, semesters or complete academic years spent abroad. Within the frame of global European projects, such as the ERASMUS Thematic Networks [www.elleiec.eu], Tuning approach was proposed as a way to facilitate both exchange of students during their studies and mobility of workers during their professional life. The philosophy behind that is not to focus too much about the actual courses followed by a student (which is extremely tricky when a student is sent abroad) but more on what he gets as a whole concerning knowledge, skills and competences, taking also account of soft or generic skills like internationalization, multiculturalism, teamgroup work, foreign language... Another interesting aspect is the use of tools like RPL (Recognition of Prior Learning) which is very useful, when we want to give a worker the possibility to pass a diploma, based on the partial or total recognition of his professional knowledge, skill and competences. The present paper develops the work achieved within the ELLEIEC project, relative to International Modules (IM) and International Curricula Networks (ICN), concepts
proposed in the project and experimented practically, to facilitate the mobility of students and of citizens/workers.

**When Do Distributed Student Teams Work?**

Kathleen Swigger\(^1\), George Dafoulas\(^2\), Fatma C. Serce\(^3\), Ferda N. Alpaslan\(^4\), Victor Lopez\(^5\)

*University of North Texas, U.S.A.\(^1\), Middlesex University, U.K.\(^2\), Atilim University, Turkey\(^3\), Middle East Tech. University, Turkey\(^4\), Universidad Tecnologica de Panama, Panama\(^5\)*

The authors analyzed 2500 communication activities of student teams engaged in global software development projects during an 18 month period to determine the temporal behavior of students engaged in distributed group activities. The data revealed a number of daily, weekly, and project regularities, which provide insights into how distributed teams use their time. The results from this study show that students often work outside of the normal workday. Students’ work habits are sometimes determined by where they live and what tasks they are performing. Moreover, students tend to work on group projects in cycles, which follow a start-middle-end pattern. Knowledge obtained from this study should provide insight into current empirical research on computer-supported collaborative learning by defining the different time variables that can be used to compare temporal patterns of online teams.

**PS12**

13:20 - 15:00

**Network Based Education and Training**

**An Adaptive Conversation System to Support Workplace Learning**

Matteo Gaeta, Vincenzo Loia, Francesco Orciuoli, Saverio Salerno

*University of Salerno, Italy*

This work describes the definition of a novel conversation-based workplace learning system that leverages on semantic and adaptive technologies. The proposed approach is based on the idea that conversations are commonplace human activities to learn and share knowledge, also in the organisations, and that it is possible to exploit the organisational knowledge, represented by means of Semantic Web stack, in order to support the conversational learning processes in terms of scripting and adaptation. In particular, scripts are automatically constructed and used to guide conversation participants to the achievement of learning objectives. Moreover, two types of adaptation are provided in order to
improve learning. Macro-adaptation is focused on adapting the learning experience by selecting a more suitable conversation partner basing on intermediate assessment results. Micro-adaptation is focused on adapting the learning experience by generating and providing suggestions (for conversation participants) that aim at improving the meaningfulness of learning. The main benefits of the proposed approach are the capability to improve and capitalize intentional but informal learning experiences, to foster the organisational learning as side effect and decrease the training costs by exploiting internal skilled workers.

A Multimedia Learning System for Selected Topics of Physics
Arreytambe Tabo\textsuperscript{1}, Mohamed Hamada\textsuperscript{2}

\textit{African University of Science and Technology, Nigeria}\textsuperscript{1}, \textit{Nigerian Turkish Nile University, Nigeria}\textsuperscript{1}, \textit{University of Aizu, Japan}\textsuperscript{2}

The usage of computers in Physics Instruction began in the seventies and ever since then, several research efforts have been devoted to studying various emerging technologies and their impact on the learning process. Multimedia Learning Systems (MLSs) provide interactivity, flexibility, consistency, and modularity, all in addition to improving the learning outcomes of learners. This in conjunction with the traditional methods in Physics Instruction fosters a more robust collaborative approach to learning commonly known as B-Learning or Blended Learning. This paper is about the analysis, design and implementation of a Multimedia Learning System for selected topics of Physics. As a first contribution, we present an implementation of our system for an introductory level undergraduate course in Newtonian Mechanics. The system is portable, web-enabled, machine-independent and easy-to-use. It can be used as a stand-alone application or run as an applet in any one of the major web-browsers. It is designed to meet the active learning preferences of Physics learners and can also be used as a supporting tool for other courses.

Role of the Internet for Risk Management at School
Masahiko Fuse\textsuperscript{1}, Satoru Ozawa\textsuperscript{2}, Seiichiro Miura\textsuperscript{3}

\textit{Fukushima National College of Technology, Japan}\textsuperscript{1}, \textit{Ibaraki University, Japan}\textsuperscript{2}, \textit{Tokuyama National College of Technology, Japan}\textsuperscript{3}

In case of risky situations such as natural disasters and various accidents, safety of students is the most important for school. This paper reports the an example of risk management at school in the panic situation produced by the earthquake, the tsunami and the Fukushima nuclear power plant accident which occurred almost simultaneously in March 2011. The first thing to do at the risky situation was the
confirmation of safety of students. Telephone line was damaged but the Internet did work. Because the Internet was alive, it was succeeded to confirm the safety of students just in three days. The way how they communicated in the panic situation is described in detail. The Internet was conveniently used to take care of the students in the panic situation in various ways including their mental care. Teacher's volunteer work to measure the environmental radioactivity just after the nuclear power plant accident is also reported.

**New pedagogical experiment leading to awareness in nanosciences and nanotechnologies for young generations at secondary school**

Evelyne Excoffon\(^1\), Francine Papillon\(^2\), Laurent Fesquet\(^2\), Ahmad Bsiesy\(^2,3\), Olivier Bonnaud\(^4\)

*Academy of Grenoble, France\(^1\), MINATEC, France\(^2\), University Joseph Fourier, France\(^3\), University of Rennes 1, France\(^4\)*

In order to prepare the future of science and technology of information and communication, and due to the huge evolution of the associated techniques during the last fifty years, it is more and more important to attract good students and researchers in this field. It is well known that during the last fifteen years, a strong decrease of interest of the young pupils for exact sciences is observed in the major part of Europe, following the same trend that North America encountered several years ago. A way to invert this trend consists in educating young generations in nanotechnology and nanosciences. The peculiar environment in Grenoble with the presence of world-class research centers and an education oriented center of micro- and nanoelectronics allowed building adapted programs thanks to a strong collaboration between these centers and the secondary school administration. During the last three years, the so-called Nano@school project enabled dozens of classes a year to follow an original curriculum benefiting from this exceptional environment. This paper deals with this experiment. After a description of the project, some analysis and evaluation are presented.

**Virtual Industrial Training: Joining Innovative Interfaces with Plant Modeling**

Carla Limongelli, Giovanni Mosiello, Stefano Panzieri, Filippo Sciarrone

*Roma Tre University, Italy*

Training in industry is one of the most critical and expensive tasks to be faced by the management. Furthermore, in some cases, it is dangerous or even impossible to directly train operators on the real plants where security and safety problems may arise, making it very difficult to start training programs at low cost. For these
reasons, the field of training in industry is rapidly developing using software or hardware solutions coming mainly from the following research areas: i) Human-Computer interaction, i.e., the use of complex and interactive human-machine interfaces, ii) plant simulators, i.e., software systems which are delivered with the plant itself to test and to learn complex tasks and processes, iii) Intelligent Training Systems, i.e., the availability of intelligent and personalized training systems where a virtual tutor guides users through a personalized learning path. In this paper we present the overall architecture of a system for industrial training, embedded into an Intelligent Tutoring System that can provide more effective and personalized training and learning in a context where working directly on real plants can be difficult and very expensive. In particular we present a simulator for training operators in using power plants, based on a multimedia and on interactive interface. This system is particularly suitable to be used for training in industrial electric and oil plants. Moreover, the system allows operators for collaborative problem solving. Currently the system is under delivery to an Italian Electric industry.

PS13
Virtual Classroom, Virtual Universities

Structuring Automated Learning Discussions Using Dialog Games and Cognitive Maps
Ilker Yengkap, Martin Saerbeck
A*STAR, Singapore
This paper proposes a prototype system of learning with dialogs that enables learners to discuss topics to structure their thinking as well as keeping track of the path of their interaction in dialogs. The system helps learners to train and recognize discussion patterns. Moreover, the system enables comparing and contrasting expert thinking in order to evaluate learners’ mastery levels and to detect their knowledge gaps. This system would be applicable for dialogs in discussion boards in online learning applications and dialogs with intelligent tutoring agents.

Cyber Laboratory for Hardware Logic Experiments: A Seamless Integration of Actual Laboratory and Remote Laboratory
Nobuhiko Koike
Hosei University, Japan
Cyber Laboratory for FPGA-based logic design course is underdevelopment. It combines the existing actual hardware laboratory and the remote laboratory, with newly designed CAD services and FPGA-run services realized in the form of the Web Services. A Cloud-storage is employed to transfer large CAD files and simulation data files among laboratory FPGA-Platforms and student laptop/desktop home PCs. Design Files can be shared among students, TAs and Teachers for further consultations. Students can easily migrate from actual laboratory to remote laboratory and vice versa. The Cyber laboratory takes advantage of student PCs’ active participations in the remote laboratory mode to off-load time consuming tasks, such as logic simulation, from actual laboratory’s FPGA-design platforms. It is also effective to avoid network latency and to improve interactive response. Cyber laboratory uses commercial Verilog-HDL logic synthesis tools, FPGA Test-beds and logic analyzers, those are tightly integrated into specific hardware platforms and difficult to decouple. So, actual laboratory organization is still plays an important role in the remote laboratory mode. CAD Web services and FPGA-run Web services are developed to combine remote student PCs with actual laboratory FPGA-Platforms. Those handle compilation, FPGA-run and logic analyzer setup/measure tasks in the form of the Web services. As the laboratory FPGA-Platforms have to serve in two ways: actual laboratory services and remote laboratory services, two separate Virtual Machines are prepared for all laboratory PCs in the form of VM PC clusters. A VM managing PC handles the allocations of VMs to laboratory PCs, according to the usage of PCs. When the actual laboratory is in use, most PCs are assigned as the actual lab VMs. During off-class hours or at night-time, most PCs run the remote service VMs. In this way, a scalable and efficient FPGA based logic design cyber laboratory can be realized.

Mind The Gap! High School Students’ Attitudes Toward Computer-based Learning

N. Schaarschmidt, S. Dietsch, T. Koehler
Dresden University of Technology, Germany

This paper is devoted to the topic of e-learning in schools, addressing the question of whether the so-called “digital natives” may be found among high school students - while using the computer as a learning tool. In particular, computer-related attitudes, which may affect personal characteristics and individual learning skills, are examined in relation to their effect on the usage of computer-based learning media. The investigation is based upon the attitude scales of FIDEC from INCOBI-R which are applied to a user group of “secondary school students” (n = 763), in contradiction to “university students” usually found in the literature.
Students’ positive attitudes toward computers as learning tools were confirmed. It is noteworthy that those are even significantly more positive than toward the computer as an entertainment medium. Among education oriented respondents this gap between computers as an entertainment medium versus learning tool - as shown in the observed target population - is rather small. However, it means that students from a high educational level use the computer for both learning and entertainment.

**Teaching Computing and Programming Fundamentals via App Inventor for Android**

Murat Karakus¹, Suleyman Uludag¹, Evrim Guler¹, Stephen W. Turner¹, Ahmet Ugur²

*University of Michigan - Flint, U.S.A.¹, Central Michigan University, U.S.A.²*

In this age of growing importance for interdisciplinary studies, the field of computing, and its indispensable component, programming, have become increasingly important not only for STEM areas but also for many other fields. Computational chemistry, bio-informatics, computational linguistics, computational toxicology, etc. are just a few examples of the crossover disciplines that benefit significantly from the developments in the computing and Information Technology (IT). Instructors are facing more challenges today than ever in trying to come up with new, fresh and appealing methodologies to attract and retain students in delivering computing and IT related topics to a much broader audience. Computing courses and topics both for majors and non-majors need new approaches that motivate students to feel comfortable with the life-long learning of computing concepts and tools. The goal of this paper is to summarize our teaching experience in and the great potential of App Inventor for Android (AlA) in broadening the appeal and diffusion of fundamental computing and programming concepts. With a pedagogical foundation stemming from constructionist learning and contextualized computing education, we present our motivation and the details of courses that can greatly benefit from AlA.

**Virtualized Lab Infrastructure On a Budget for Various Computing and Engineering Courses**

Evrim Guler, Suleyman Uludag, Murat Karakus, Stephen W. Turner

*University of Michigan - Flint, U.S.A.*

Educators in Science, Technology, Engineering, and Mathematics (STEM) fields, especially in computing and engineering, must be flexible, up-to-date, and able to offer their students practical experience with continually changing information
technologies. The importance of practical work in science and engineering, supported by lab exercises, is widely known. While it is desirable to create physical laboratories for teaching these technologies, it is not always possible nor feasible. Cost, availability, and environmental effects of physical space represent constraints on building physical infrastructure. Additionally, cost effectiveness is becoming increasingly more important, and purchasing a specific technology offers no guarantees that it will not soon become obsolete.

In this paper, we present our response to these challenges in the form of an affordable, virtualized laboratory environment that can be used in a variety of computing and engineering courses, as well as in other fields, in lieu of physical computing labs. This environment allows instructors and students to build more complex settings than are typically available in physical laboratories. To date, the environment has been used at our institution for courses in computer networking, operating systems, database, programming and security, with plans in place for use in additional advanced computer science and information systems courses.

Protei Open Source Sailing Drones: a Platform For Education in Ocean Exploration and Conservation

Etienne Gernez¹, Cesar M. Harada², Rik Bootsman³, Zenon Chaczko⁴, Gabriella Levine⁵, Peter Keen⁶

Det Norske Veritas, Norway¹, Goldsmiths University of London, U.K.², TU/e Eindhoven, the Netherlands³, University of Technology, Australia⁴, Open-H2O, U.S.A.⁵, Keen Marine Ltd, U.K.⁶

The Open-H2O community is developing ocean technology with the aim of co-designing the technology; licensing under the Open Source Software and Hardware protocols; and gathering ocean data from its different technology users and developers. Protei is a fleet of autonomous, shape-shifting, sailing vessels for ocean exploration and conservation, created by the Open-H2O community. This paper presents the tools and learning environments used during the development of Protei, and the opportunities created in terms of education and engagement of the Public, Scientific and Industrial sectors. Three case studies are presented, concluding with the challenges and education perspectives lying in the growth of the Open-H2O community.
Building and Assessing deliverable aligned competence in Software Engineers
A Tool Based approach
P. Ravi Shankar, MGPL Narayana
Tata Consultancy Services Limited, India
Building and ensuring competence in people that will give project managers the
certainty that these people will deliver is very critical to success of software
industries. A scalable model that could be adopted by all with ease when the
technologies and applications are fast changing, is all the more relevant. Reliable
and scalable models to address the problem have eluded software industry for
long. This paper presents a scalable model and its tool based deployment on
people and groups to address this need.

Skill Hierarchy Revised by SEM and Additional Skills
Mitsuo Yamamoto, Takayuki Sekiya, Kazumasa Mori, Kazunori Yamaguchi
The University of Tokyo, Japan
In this paper, we reexamine the Lopez’s skill hierarchy by using structural
equation modeling (SEM), by which we can explicitly see the relationship between
variables. We also introduce two more skills, a skill to modify a given piece of
code to satisfy a given specification and a skill to write code from scratch to satisfy
a given specification. The analysis shows that these additional skills are useful.
The path diagram (model) with the highest fitness measures suggests an effective
order of training and pivotal roles of the Tracing2 and Explain skills in training.

Evaluation and Assessment Tool for Mentally Challenged Children
Johny KV, Harish G, Anoop A
Centre for Development of Advanced Computing, India
Assessment, evaluation and programming a person with mental retardation based
on the inputs from the interdisciplinary team of rehabilitation professionals is a
challenging task for Special educators. A child with mental retardation undergoes
a comprehensive evaluation to assess the nature of services required for his/her
improvement. Following this evaluation, collected data is translated into
statements of special education needs. Special educators use various tools for
assessment, but the process currently followed in India is primarily manual. Thus,
the special educator has to spend much of his/her time for writing reports,
drawing graphs/charts etc. Reference of past records and micro level analysis of
children are practically impossible in the manual system. ‘Punarjani’, the software tool developed by Centre for Development of Advanced Computing, India in association with Media Lab Asia, New Delhi, is an attempt for solving these issues. It is a web based integrated assessment tool for mentally challenged children, conforming to the Indian practice. The system follows the principle that assessment is the first necessary step in program planning, followed by the designing of Individualized Education Plan (IEP). Algorithms are drawn from the manual process which is currently followed. The tool suggests the strength and needs of each child, based on the inputs. Areas where sufficient independence is achieved, areas which are to be strengthened and problem areas are identified for each person. Based on this analysis, optimal long term goal and short term objectives are identified and suitable lesson plan is recommended for each child. A grouping algorithm incorporated in the tool helps to create homogenous groups for group teaching of mentally challenged children. The software is a great help to special educators to arrive at a comprehensive picture of an individual’s performance level in adaptive behaviors.

**Constructing Personal Concept Map Automatically via Correlative Test-Items Structure**

Li-Yu Lee, Yu-Shih Lin, Chih-Ping Chu  
*National Cheng Kung University, R.O.C.*

Concept map model has been widely used in e-learning for various applications. However, in the past researches, there are few attentions paid on constructing the personal concept map for diagnosing learner’s learning status. Actually, it is difficult to construct the individual concept maps to reflect the real knowledge structure by learners themselves. To cope with this problem, this study proposes an approach based on Correlative Test-Items Structure to construct the personal concept map automatically. Firstly, according to the standard concept map from expert, questions for examination to test learners’ abilities are formulated. After collecting individual learner’s answers, an algorithm based on association rule is used to construct the personal concept map automatically, including the learning degree of each interrelated concept and independent concept. Finally, comparing with the standard concept map of expert, a near-optimal guidance learning path for adaptive leaning is derived.

**Correcting open-answer questionnaires through a Bayesian-network model of peer-based assessment**

Andrea Sterbini, Marco Temperini  
*Sapienza University of Rome, Italy*
We have previously shown that, with the help of peerassessment and of a finite-domain constraint-based model of the student's decisions, the teacher could have a complete assessment of the answers to open-ended questions, by grading just a subset of the answers (as low as half of the lot) and having the rest of the grading inferred by the supporting system. In this paper we present a probabilistic version of the earlier model, using Bayesian networks instead than constraints. Our aims are both defining the approach and prepare its validation: 1) modeling the peer-assessment activity of a student that evaluates others' answers, 2) using peer-assessment to help the teacher with a faster/shorter assessment process, 3) inferring the student's level of competence and ability to judge, from peer-assessment and from (partial) teacher-assessment, 4) learning the conditional probabilistic tables (CPTs) of the model from student data, and 5) comparing the probability distribution of competences in the class at different course phases. The model is under development and test with real data. We are developing a web-based interface to deliver open-answer and peer-assessment questionnaires and to assist the teacher-assessment.

Alignment of Learning Outcomes and Assessment
Low Sew Ming

Monash University Sunway Campus, Malaysia
This research aims to investigate how successful are the students in achieving the intended learning outcomes in one of the electronic subject taught by the author, and how well they contribute to achieving the program outcomes set by the author’s campus. In this subject, three intended learning outcomes were set and were mapped to the four program outcomes dictated by the campus. The assessment tasks were laboratory work, mid semester test and a final exam. The results showed that the achievement levels attained by the students were 84%, 92% and 94% respectively for ILO1, ILO2 and ILO3 respectively. The results also showed achievement level of 94%, 88%, 94% and 92% respectively for PO1, PO2, PO3 and PO4. The outcomes of this research work proved a successful effort made by the author to align the learning activities and assessment tasks to the intended learning outcomes of the subject.
Blended Learning: A Long-Term Experience
Elisabeth Farmer, Benjamin Wilding
University of Zurich, Switzerland
“eCF - Get involved in Corporate Finance” is a project initiated with the aim of building a blended learning course in the field of Corporate Finance (financial and investment courses). Through interaction, application and communication elements students shall be activated and supported. Due to its flexible content and modular structure the course can be applied within different frameworks, i.e. different number of students and learning platforms. Content evolution and execution of the course are accompanied by a permanent, ongoing evaluation and continuously improved.

Multidisciplinary Study of Tutoring using Virtual Characters and Second Life
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In this article we present the planning and methodology followed in order to apply virtual tutoring sessions in different subjects and universities. The Second Life environment, together with the Voki speaking avatars will be employed. It is a multidisciplinary study that includes personal and collective tutoring sessions, answering key questions through animated avatars, virtual labs, and posters exhibition for peerevaluation. From a survey run among the students it is concluded that most of them are willing to learn and try this kind of tutoring sessions, but at the same time some feel skeptical about its utility.

Learning Games for Children with Intellectual Challenges
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This paper discuss the design of the current educational tutorials and games which are developed for children with intellectual challenges who are resident in the Shafallah center for children with special needs in Doha, Qatar. These edutainment games teach the children using multimedia elements to improve their memorization skills and proactivity. Five games have been so far developed and being evaluated. These games teach the children about counting, healthy food, home objects, fruits & vegetables. The designed games characters are selected from the local environment as the children are familiar with them.
Whenever the game is completed successfully, the child will get a virtual gift of different values based on the time he/she spent on the game and the number of right selections to reach a solution. This gift will be added to the child’s virtual space and can be substituted by a higher value gift whenever the child improves his/her performance and completes the game in a shorter time. This concept challenges the children to try to get always the best gift while learning in a funny and enjoyable way.

**Empirical Results about Efforts for Effective Teaching to y-Generation Freshman Students**

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New techniques are deployed to teach the new generation of students effectively. This work tries to share our experience in a blended course for over eleven years. It has been observed that the online portion of the course has to be adjusted carefully in order to obtain a high level of student satisfaction and overall throughput from the course.

**The Effect of Interinsic Motivation on Learners’ Behavioural Intention to Use E-Learning Systems**

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Based on the technology acceptance model, this research proposes an extended model in the context of e-learning systems. In the proposed model, enjoyment and computer playfulness were added. A sample of 54 respondents participated in the study. The results suggest that perceived usefulness is the strongest determinant towards behavioural intention, while enjoyment and computer playfulness posted a significant effect on perceived usefulness.
This paper presents the Cybernetic Education Centre (CEDUC) as a hybrid e-learning and training centre for higher education of Cybernetics and Automation fields. If we consider Cybernetics we consider basically (1) controlled systems and (2) control systems. In case of controlled systems learner is focused on the process of analyze, identification, design of the mathematical model and simulation of the controlled system. Therefore this paper deals with controlled models in the laboratories of our department (a) real laboratory models, (b) simulation models and (c) virtual models which creates one integrated hybrid architecture what represents one of new ideas in the paper (Fig. 1). Learner of control systems is focused mainly on design of control parameters, design of control algorithms, design of hardware, software and communication architectures of control systems. Overall control system is represented by Distributed Control System (DCS) which serves for learners to verify designed control systems. The verification of the control systems is very important from safety point of view to prepare learners for real production conditions. Second new idea of the paper is implementation of the Coloured Petri Nets as automata to control access to the resources (not only typical study resources but also access to the components of hybrid DCS architecture) as well as to monitor the learner activities during the study. CEDUC is supported by intensive industry-university partnership. Conclusion of the paper summarizes the results of the study process of learners in DCS environment.

**Comparison of Traditional over WEB-Based Education - Case Study "Adobe Flash"**

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Today, the rapid development of technology and Internet use has become widespread. In addition, the use of internet in education has become mandatory. The advantages provided by distance education, distance learning educational opportunities regardless of time and place has become attractive. Web-Based Training, Distance learning and remains popular. The purpose of this study is to examine the affects of WEB-Based Education over traditional for the course “Adobe Flash”. To achieve this goal, the following subobjectives have been established: Students in the experimental group is there a significant difference between the levels of readiness? Before training for experimental group students' attitudes toward computer Is there a significant difference between them? Shape of the experimental group students' teaching methods (teaching method used, auxiliary materials and learning environment). What are the expectations about? What are the expectations about the content of the experimental group of
students' course? Is there any difference between the experimental group students' learning styles? and developed web site for the course is sufficient in terms of content and functionality. The study is conducted with 240 students at 2011-2012 Fall Semester.

**Curriculum Design Tools: Using Information Modelling for Course Transformation and Mapping**
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**Facilitating Teaching and Learning: from the Proprietary to the Open Community**
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Learning Management Systems, or Virtual Learning Environments have become almost universal in institutions of Higher Education either to complement traditional classroom learning experiences in blended learning, or the only medium of interaction in virtual universities. While proprietary LMS has dominated the market since the inception of LMS, open source and community source LMS is a paradigm that holds promises in addressing pedagogical and ownership issues that face the proprietary. This paper presents a case study of an ongoing pilot for Sakai in Abu Dhabi Women’s College. Data regarding user perceptions were gathered by means of two surveys targeting students and faculty involved in the project. Responses where used as score cards to evaluate the pilot.

**Improvement of Learning Environment for Electric Work Practice using ICT**
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This paper reports the training materials of electric work based on Information and Communication Technologies (ICT), at Fukushima and Tokuyama National College of Technology. It is fairly obvious that electric work practice requires some technical knowledge and skills. We focus on technical skills that are required for electric work and have to set several examples in terms of useful electrical tools for students. Training materials including instruction videos help students to learn skills efficiently and economically. Also we also report how to improve the learning environment of electric work.