

# The New Technologies for the Engineering and Technology Education

## Book of Abstracts

**March 02-05, 2008  
Peruíbe, Brazil**

**Edited by  
Claudio da Rocha Brito  
Melany M. Ciampi**



**Council of Researches  
in Education and Sciences**

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INTERTECH 2008 – International Conference on Engineering and Technology Education – (2008: Santos)

161a Proceedings, International Conference on Engineering and Technology Education, INTERTECH 2008, March 02-05, 2008. Published by Claudio da Rocha Brito (ISBN 85-89120-55-4) & Melany M. Ciampi (ISBN 85-89549-51-8), 2008.

1.v

1. Engineering – Congress 2. Technology – Conference I BRITO, Claudio da Rocha, ed.  
II. CIAMPI, Melany, M., ed III. COPEC – Council of Researches in Education and Sciences IV. Title

CDD - 370

## Message from the General Chair



Welcome to the International Conference on Engineering and Technology Education - INTERTECH'2008. INTERTECH had its two previous editions in Bahamas in Central America (2004) and New Jersey, USA, North America (2006). Now in 2008, in its 10th edition, it is back to South America. And we are proud of organizing it here in Perube and Santos, two cities of the Atlantic Forest Coast Region that are places with natural beauties which contains in its area one of the largest biodiversity in the world. It has a fauna and a flora that cannot be found anywhere else in the world. Once here people can enjoy not only the beautiful beaches but also be comfort with the infrastructure that the cities can offer. It is an excellent environment to meet old colleagues and to gain new ones.

I hope that you find the congress theme "The New Technologies for the Engineering and Technology Education" an interesting one and get the most out of it. In these times of fast changes issues related to engineering education have to be widely discussed. The goal is the search for new ways to defeat the difficulties that this new Century brings like new engineering practice, education efficiency, more social involvement demands, mobility not to mention motivation, curriculum flexibility and others.

COPEC staffs altogether with the Committees have worked hard to prepare an outstanding congress consisting of a rich offering of workshops, technical sessions and papers besides the social activities. The core of this Congress is the technical sessions that count with high quality papers besides the invited speakers that with their willing to make a difference in engineering education fields come contributing enormously for the success of the event.

My thanks to the host of INTERTECH'2008, UNISANTOS - Catholic University of Santos and to the Technical Cooperators in alphabetical order: AAMP (Fishing Museum Friends Society), ABENGE (Brazilian Society for Engineering Education), AENUI (Asociación de Enseñantes Universitarios de la Informática), ASEE (American Society for Engineering Education), ASIBEI (Iberian-American Association of Engineering Education Institutions), GCMM (Global Congress on Manufacturing and Management), IEEE-Ed.Soc. (Education Society of the Institute of Electrical and Electronics Engineers), IFEES (International Federation of Engineering Education Societies), IGIP (Internationale Gesellschaft für Ingenieurpädagogik), IPN (Ingeniøruddannelsernes Pædagogiske Netværk), OPASS (Organization of Researches in Environment, Health and Safety), RBE (Brazilian Network of Engineering), RCI (Réseau Carthagène d'Ingénierie), SEFI (Société Européenne pour la Formation des Ingénieurs). A special thanks to our sponsors the Ecole Nationale d'Ingénieurs de Metz (ENIM), University of Cincinnati, FAPESP (State of São Paulo Research Foundation), CNPq (National Council for Scientific and Technological Development), CAPES (Coordination for Improvement of Personnel of Superior Level) and State of São Paulo Engineers Union (SEESP).

Our special thanks to Dr. Muthar Al-Ubaidi the President of INTERTECH - International Council for Engineering and Technology Education, that consists of Scientists of Engineering and Technology areas, who believe in the development of Science and Technology as promoters of humanity welfare. The members belong to the several countries of North America, Europe, Latin America and Asia. The headquarter is in Cincinnati, Ohio in United States of America.

Once more it is my pleasure to welcome you to INTERTECH'2008 and I hope that you find the event to be productive, intellectually stimulating and enjoyable.

**Prof. Dr. Claudio da Rocha Brito**  
GENERAL CHAIR  
President of COPEC

## Message from the Technical Program Chair



First of all I would like to thank to the authors who without their contributions the congress would not be such an interesting event as it is.

The aim of INTERTECH'2008 is to provide researchers and teachers of engineering a fertile breeding ground for discussions about the new demands in engineering and technology education field enriched by the reports of recent developments in the area. It is an example of a democratic process in which students are considered citizens that will help to build up a better world for future generations.

The congress theme generated many interesting papers and it is very rewarding for us to see such variety of papers on different topics. In fact it is always a pleasure and a surprise to be the program chair of a congress in engineering field because the authors have always a special eye in interesting specific aspect of engineering. The papers reflect the trends of engineering education world wide. They show the concerns and the innovative solutions for a large number of problems always viewing the formation of the engineer, a professional who is so necessary to promote world development.

My thanks to the workshop leaders, which efforts have resulted in high quality, workshops and I extend the thanks to the keynote speakers whose panels show the new trends in the world and that certainly enlighten the congress.

Finally, I wish to thank specially the participants.

**Prof. Dr. Melany M. Ciampi**  
TECHNICAL PROGRAM CHAIR  
President of OPASS

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# The New Technologies for the Engineering and Technology Education

## Program

**March 02-05, 2008  
Peruibe, Brazil**

**Edited by  
Claudio da Rocha Brito  
Melany M. Ciampi**



**Council of Researches  
in Education and Sciences**



## INTERTECH'2008 – Program at Glance

Time	Saturday 01	Sunday 02	Monday 03	Tuesday 04	Wednesday 05	Thursday 06	Time		
8:00 am	Registration to Pre Congress	Registration	Registration	Registration	Registration	Registration to Post Congress	8:00 am		
8:30 am		Workshop I, and II	Opening Session	Plenary Session III	Plenary Session VI		8:30 am		
9:00 am				Plenary Session IV	Plenary Session VII		9:00 am		
9:30 am	Pre Congress	Coffee Break	Coffee Break	Coffee Break		Coffee Break	Post Congress	9:30 am	
10:00 am				Workshop I, and II	Plenary Session I	Technical Sessions		Technical Sessions	10:00 am
10:30 am		Plenary Session II	10:30 am						
11:15 am		Lunch	Award Session	Lunch	Lunch	11:15 am			
12:00 pm						12:00 pm			
12:00 pm		Workshop III, IV and V	Barbecue	Technical Sessions	Technical Sessions	12:00 pm			
1:30 pm				Coffee Break	Coffee Break	1:30 pm			
1:30 pm		Workshop III, IV and V		Technical Sessions	Technical Sessions	3:00 pm			
3:00 pm				Free	Free	3:00 pm			
3:00 pm		Free	Welcome Cocktail Party		Free	Banquet		Free	3:30 pm
3:30 pm					Free				Free
5:00 pm		Free	Welcome Cocktail Party		Free	Banquet		Free	5:00 pm
6:30 pm					Free				Free
6:30 pm	Free	Welcome Cocktail Party		Free	Banquet	Free	6:30 pm		
10:00 pm				Free			Free	10:00 pm	

## SESSION AND PRESENTATION CODES

Codes are used to determine when and where a paper is presented.

### Technical Session Coding

A four- character designator is associated with each technical session, as in **LDTN**

Where:

**L** – is a letter that designates the language of the session:

- E – designates English sessions and papers;
- P – designates Portuguese sessions and papers;
- S – designates Spanish sessions and papers.

**D** – is a letter that designates the day of the session:

- T – designates Tuesday sessions and papers;
- W – designates Wednesday sessions and papers.

**T** – is a number that designates the time slot for the session:

- 1 is late morning (10:30am - 12:00pm);
- 2 is early afternoon (1:30pm - 3:00pm);
- 3 is middle afternoon (3:30pm - 5:00pm);

**N** – is a letter that designates the parallel session within any time slot.

A is the first parallel session; E is the fifth parallel session, etc.

### Note.

Five minutes will be allowed for introductions and instructions at the beginning of each session. Each paper will be given 10 minutes for the total presentation, with two minutes for questions. All papers will start in 12 - minutes increments to allow conference attendees to “session hop” hear papers of interest. If there is a no-show author in a session, a 12 - minutes break will be called.

***Papers will not be moved up in sessions.***

Papers times for sessions that begin on the half-hour are shown below. (H is a letter that designates hour of the day).

Session Begins	H:30
First paper	H:35
Second Paper	H:47
Third Paper	H:59
Fourth Paper	(H+1):11
Fifth paper	(H+1):23
Sixth paper	(H+1):35
Seventh paper	(H+1):47
Session Ends	(H+1):59

## **Sunday – March, 02**

8:00 am – 5:00 pm  
**REGISTRATION**

8:30 am – Noon  
**WORKSHOP I**

Use of MATLAB in Classroom

**Dr. Janak Dave and Prof. James Everly – University of Cincinnati, Ohio, USA**

8:30 am – Noon  
**WORKSHOP II**

Mathematica 6 (in Portuguese)

**Prof. Daniel de Souza Carvalho and Prof. Guilherme Kronemberger – Universidade Presbiteriana Mackenzie, São Paulo, SP, Brazil**

Noon – 1:30 pm  
**LUNCH**

1:30 pm – 5:00 pm  
**WORKSHOP III**

Use of MATLAB in Classroom

**Dr. Janak Dave and Prof. James Everly – University of Cincinnati, Ohio, USA**

1:30 pm – 5:00 pm  
**WORKSHOP IV**

On the use of simulation software for expanding student knowledge of dynamics

**Dr. Arnaldo Mazzei - Kettering University, Flint, MI, USA**

1:30 pm – 5:00 pm  
**WORKSHOP V**

O Professor no Século XXI: Do Conhecimento Temático à Diversidade na Comunicação, abrangendo Aspectos da Prática Educacional Complexa (in Portuguese)

**Dr. Clara Amelia de Oliveira - Universidade Federal de Santa Catarina, Florianópolis, SC, Brazil**

6:30 pm – 10:00 pm  
**WELCOME COCKTAIL PARTY**

Let's start these four days of four days of intense work in a beautiful environment. On Sunday at 6:00 pm we will welcome the participants with a nice cocktail party.

## Monday – March, 03

8:00 am – 1:00 pm

### REGISTRATION

8:30 am – 10:00 am

### OPENING SESSION

Chair: **Prof. Claudio da Rocha Brito** – General Chair of INTERTECH'2008

**Prof. Melany M. Ciampi** – Technical Program Chair of INTERTECH'2008

**Prof. Muthar Al-Ubaidi** – President of Council INTERTECH

**Alderman José Antonio Marques Almeida** – Honorary Chair of INTERTECH'2008

**Prof. Maria Helena Lambert** – Rector of UniSantos

10:00 am – 10:30 am

### Coffee Break

10:30 am – 11:15 am

### PLENARY SESSION I

Chair: **Prof. Claudio da Rocha Brito** – General Chair of INTERTECH'2008

Title: **INTERTECH: YESTERDAY, TODAY AND ALWAYS - 20 YEARS OF CONTRIBUTIONS FOR ENGINEERING EDUCATION**

Speakers: **Prof. Melany M. Ciampi** – Technical Program Chair of INTERTECH'2008

**Prof. Muthar Al-Ubaidi** – President of Council INTERTECH

10:30 am – Noon

### PLENARY SESSION II

Chair: **Prof. Pierre Padilla** – Directeur de l'ENIM – Ecole Nationale d'Ingénieurs de Metz, France

Title: **LEARNING SYSTEM ENGINEERING IN THE CARTAGENA NETWORK OF ENGINEERING**

Speakers: **Prof. Olivier Bistorin** – ENIM – Ecole Nationale d'Ingénieurs de Metz, France

Noon – 1:00 pm

### ING PAED IGIP Diploma Award Ceremony

Chair: **Prof. Claudio da Rocha Brito**

ING PAED IGIP Diploma Award Ceremony for the new applicants of Americas who have been approved to receive the title of "International Engineer Educator"

1:00 pm – 1:30 pm

### INTERTECH AWARD SESSION

Chair: **Prof. Melany M. Ciampi**

3:00 pm – 11:00 pm

### BRAZILIAN BARBECUE

Local: **Palmas Island**

Let's go to "Ilha das Palmas" to spend some time to know a little bit of Brazilian Culture tasting the typical food and enjoying the good music surrounded by the beautiful nature of the Atlantic Forest and the sea. It is a time to make new friends and meeting the old ones. Bring your swimming suit, the sun block and join us in a typical Brazilian barbecue on a paradisiacal island close to Santos, from 3 pm until 11 pm.

## Tuesday – March, 04

8:00 am – 5:00 pm  
**REGISTRATION**

8:30 am – 9:00 am  
**PLENARY SESSION III**

Chair: **Prof. Luis Alfredo Amaral** – Universidade do Minho, Portugal  
Title: **OBSERVATORY OF GRADUATES IN ENGINEERING AND TECHNOLOGIES OF THE UNIVERSITY OF MINHO**  
Speaker: **Prof. Rosa Maria Vasconcelos** – Universidade do Minho, Portugal.

9:00 am – 9:30 am  
**PLENARY SESSION IV**

Chair: **Prof. Irina A. Avenarius** – MADI-TU, Russia  
Title: **DAWN OF RUSSIAN ELECTRICAL ENGINEERING**  
Speaker: **Prof. Vladimir G. Zakharov** – CRDF, Russia.

9:30 am – 10:00 am  
**PLENARY SESSION V**

Chair: **Prof. Göran Westerström** – Luleå University of Technology  
Title: **ENGINEERING EDUCATION ON A GLOBAL MARKET**  
Speaker: **Prof. Anita Westerström** – Luleå University of Technology, Sweden.

10:00 am – 10:30 am  
**Coffee Break**

10:30 am - Noon  
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James L. Mohler  
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Begoña García Zapirain

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### LUNCH

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Walter W. Buchanan

William Fitzgibbon

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Henrique Nou Schneider  
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Alexandre César Rodrigues da Silva  
Norian Marranghello

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Célia Maria Gomes Correia

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Antonio Gonçalves de Mello Junior  
Wilton Ney do Amaral Pereira

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## Wednesday – March, 05

8:00 am – 5:00 pm  
**REGISTRATION**

8:30 am – 9:15 am  
**PLENARY SESSION VI**

Chair: **Prof. María Feldgen** – Universidad de Buenos Aires, Argentina  
Title: **NANOTECHNOLOGY IN ENGINEERING AND ENGINEERING TECHNOLOGY EDUCATION**  
Speaker: **Dean Richard Newrock** – University of Cincinnati, Ohio, USA

9:15 am – 10:00 am  
**PLENARY SESSION VII**

Chair: **Prof. Osvaldo Clua** – Universidad de Buenos Aires, Argentina  
Title: **ELECTRONIC PORTFOLIO FOR LEARNING, ASSESSMENT, AND MARKETING ENGINEERS AND ENGINEERING TECHNOLOGIST**  
Speaker: **Dr. George Suckarieh** – University of Cincinnati, Ohio, USA

10:00 am – 10:30 am  
**Coffee Break**

10:30 am -Noon  
**TECHNICAL SESSIONS**

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Dulce Magalhães de Sá  
Elia Carrizo

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Liliane dos Santos Machado  
Ronei Marcos de Moraes

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Marcelo da Silva Hounsell

Marilza A. Lemos

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Juliano Schimiguel

Dilermando Piva Jr.

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**Coffee Break**

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8:00 pm – 11 pm  
**THE BANQUET**

Farwell dinner is a way to close the successful event accompanied by the colleagues in a nice and beautiful environment. The tickets will be available at the reception desk.

# The New Technologies for the Engineering and Technology Education

## Abstracts

**March 02-05, 2008  
Peruibe, Brazil**

**Edited by  
Claudio da Rocha Brito  
Melany M. Ciampi**



Council of Researches  
in Education and Sciences



## **Plenary Sessions**

### **INTERTECH: YESTERDAY, TODAY AND ALWAYS - 20 YEARS OF CONTRIBUTIONS FOR ENGINEERING EDUCATION**

Claudio da Rocha Brito, Melany M. Ciampi, Muthar Al-Ubaidi

This work is just an overview of INTERTECH over its 20 years of existence and its contributions for engineering and technology education for two decades. Some interesting data about its history can be seen in the many papers that have been part of its great work as a Council with international perspectives.

### **OBSERVATORY OF GRADUATES IN ENGINEERING AND TECHNOLOGIES OF THE UNIVERSITY OF MINHO**

Rosa M. Vasconcelos, Sílvia Monteiro

The changes verified throughout the last years on the labour market together with the evolution of the higher education system, with an increasing and more heterogeneous student population, led to a new set of requirements and responsibilities. This implies a straight link between academic education and the needs of the society with regard to professional development of graduates. The recognition of professional competencies in the curricula, with a close connection to the reality of the professional world has been particularly emphasised with the implementation of the Bologna Declaration. Because of the growing importance of professional competencies, the Council of Engineering Courses of the University of Minho has recently developed a job observatory of graduates in Engineering, Business Informatics and Architecture over the last few years. The results show that nearly of 90% of the graduates are employed, of whom a majority found a job immediately after finishing their course.

### **DAWN OF RUSSIAN ELECTRICAL ENGINEERING**

Vladimir G. Zakharov

Engineering education in Russia goes back to 18<sup>th</sup> century. The Russian engineering school had begun to develop since 1773 when Institute for Mining Engineering was established in St. Petersburg. One of most outstanding achievements of Russian engineering is a continuous progress in the electrical science and technology. The present article contains review of the very first steps of Russian electrical engineering made by the middle of the 19<sup>th</sup> century when an enormous progress in all branches of engineering took place in the United States and in other western countries. On this background, the achievements of Russian engineers in the field of electrical engineering may seem small and insignificant owing to well-developed western advertising campaigns and patent systems. However, a thorough analysis shows that in many aspects Russian engineers were rather ahead of their western colleagues presenting to the world the products of their minds and skills.

### **ENGINEERING EDUCATION ON A GLOBAL MARKET**

Anita Westerström, Göran Westerström

Engineering education at Luleå University of Technology in Sweden started in the beginning of the 1970s. There was a local need for higher education within engineering relating to natural resources and the nearby industry. For almost 30 years, the university could remain local. Now the university is transforming all education and curricula in agreement with the European Bologna process, while entering the global market. The purpose of this paper was to catch the ongoing changes and the driving forces behind this transformation from the perspective of a former local university in the periphery. The global efforts could be seen through academic cooperation and alliances, industrial cooperation and internationalization, and the use of technology. Conclusions drawn from the study were that today's engineering education must prepare the student for life long learning and employability all over the globe at any moment.

## **Session ET1A**

### **ADMINISTRATIVE AND EDUCATIONAL ISSUES IN ENGINEERING TECHNOLOGY WITH A GLOBAL IMPACT**

Walter W. Buchanan, Jerome Tapper, Alireza Rahrooh

The engineering technology programs at Purdue University in West Lafayette are conducting outcomes assessment that will satisfy multiple accreditation agencies. Procedures presented can be generalized to other situations where a program must address both regional and specialized accreditation standards. At Purdue University's Calumet campus, there is collaboration between China and the United States that shows how two distant universities have worked together in a cooperative effort to provide meaningful programs that benefit international students. The Wentworth Institute of Technology in Boston is working to introduce digital signal and wireless communications topics taught in the undergraduate electronics/computer engineering technology programs. At North Dakota State University, the faculty are evaluating learning outcomes resulting from students' participation in industry projects.

### **INTEGRATING OUTCOMES ASSESSMENT FOR MULTIPLE AGENCIES: COMPUTER GRAPHICS TECHNOLOGY AT PURDUE UNIVERSITY**

James L. Mohler, Marvin I. Sarapin

Conducting outcomes assessment that will satisfy multiple accreditation agencies is difficult at best. With continually evolving processes and requirements – and the transient nature of curricula within engineering and technology – no rulebook lays out the exact means for conducting assessment. Neither does such a manual exist for coordinating documentation for accreditation at various institutional levels. While more and more agencies are moving towards an outcomes-based model, it can still be difficult to coordinate activities and avoid paperwork overload. The proposed contribution will describe the process being used by Computer Graphics Technology at Purdue University to coordinate activities between specialize accreditation through NAIT and regional accreditation through NCA. Particular emphasis will be placed on the practical activities undertaken to create a consist process, and more importantly, consistent documentation to satisfy both organizations. Procedures presented can be generalized to other situations where a program must address both regional and specialized accreditation standards.

### **EVALUATING LEARNING OUTCOMES RESULTING FROM STUDENTS' PARTICIPATION IN INDUSTRY PROJECTS**

Reza A. Maleki

Increased emphasis on preparing students for "real world" practices through engagement in industry projects has proven very beneficial to students' learning and is an asset to faculty members. Such practices offer the challenge of developing means to effectively evaluate the learning outcomes resulting from students' participation in industry projects. In this paper, the author shares his experiences gained from the development and delivery of a business/industry project-based course that integrates research, proposal development, and design experiences based on the knowledge and skills acquired in prior course work and incorporating standards and realistic constraints. The required coursework reflects a focus on essential project management skills which include teamwork, communications, and problem solving. The main focus of the paper is on the development of the learning outcomes and tools used to measure such outcomes.

## **Session ET1B**

### **THE ROLE OF THE TUTOR IN PROJECT-LED EDUCATION: THE DEVELOPMENT OF AN EVALUATION INSTRUMENT**

Natascha van Hattum-Janssen, Rosa Maria Vasconcelos

Project-led education as implemented at a number of engineering courses of the University of Minho requires an approach to learning in which part of the teaching staff is not mainly teaching, but act as facilitators of learning. While tutoring groups of students working on a project, tutors try to guide students towards a working solution, also paying attention to the acquisition of specific technical and non-technical competencies meanwhile. The differences between the role of a teacher and that of a tutor may create some ambiguity both for students as well as teachers. A study on the evaluation of teachers acting as tutors was carried out in de second semester of the academic year 2006/2007 to identify expectations and opinions of students towards their tutors. Knowledge on project-led education, attitudes towards groups, progress of the project, development of critical thinking, group functioning, individual learning and assessment were topics included in the evaluation.

### **PYTHON AS AN OPEN-SOURCE TOOL FOR STUDENT AND FACULTY RESEARCH PROJECTS**

Susan L. Gordon, Charles K. Guse, James Wolfer

Recently a variety of programming languages have emerged to supplement traditional compiled languages for rapid software development. Examples of these languages range from commercial offerings such as Matlab and IDL to open source languages such as Perl, Python, and Ruby. This work profiles one of these languages, Python, for its use as an implementation tool and project accelerator for student and faculty research in computing. Specifically, we profile Python and the Scipy/Numpy scientific programming extensions, along with modules such as mpi4py, Pyparsing, and the PIL extensions as applied to projects in parallel processing, assembler design, and mammogram analysis respectively. A discussion of the relative advantages and disadvantages of this approach is also included.

### **MEETING PROFESSIONAL CHALLENGES: AN INTERDISCIPLINARY DEGREE APPROACH TO APPLIED MATHEMATICS AND COMPUTER SCIENCE**

James Wolfer, Hossein Hakimzadeh

The ever-increasing speed and capacity of modern computers coupled with their diminishing cost has made them a significant tool across professions ranging from business to medicine. This interdisciplinary incursion has amplified the need for professionals capable of developing custom applications in engineering, science, and mathematically driven industries. To help address this need, the Indiana University South Bend Computer Science and Mathematical Sciences departments created a joint graduate degree: an M.S. in Applied Mathematics and Computer Science. This work presents a profile of this unique degree in terms of curriculum, students, employment opportunities, graduates, and administration. It also describes pragmatic challenges such as implementation, marketing, and funding along with a discussion of future directions.

### **TECHNOLOGY BASED HANDS-ON EDUCATION IN ENGINEERING**

Zbigniew J. Czajkiewicz, Sushil Acharya

Primary mission of the University is to provide educational opportunities and to provide essential support to enhance undergraduate and graduate education. That education can be delivered in many forms using different approaches. At Robert Morris University we strongly believe in practical hands-on education with application of new technologies. This approach will provide our students with a competitive footing in the job market. The two most important characteristics of our approach are: all engineering courses have lab component and only full scale industrial grade equipment be used in engineering labs. A framework for enhanced engineering education using new technologies is presented. As examples this paper will discuss applications of new technologies in two areas - Direct Digital Manufacturing into Manufacturing Engineering Program and wireless tablet PCs in a freshman engineering course.

### **WORKSHOPS ON ELECTROMAGNETIC ECOLOGY**

Irina A. Avenarius

The course of Electromagnetic Ecology is intended for the fourth-year students specialized in "Engineering Protection of Environment". One of objectives of workshops is to cultivate in students the skill of using the scientific literature. Each student was suggested to select an article on electromagnetic ecology from recent publications. They had to analyze it and make a presentation as a brief report in front of their mates with consequent discussions. The advantages of this mode of work are: 1) If a topic is chosen by student – not by professor – he is likely to follow the way of least resistance: to copy his report from Internet; 2) Professor suggests up-to-date topics and reliable sources of information; 3) Students acquire different opinions on modern problems. In future, the students will carry out competitive reports when each student will be responsible not only for his report but also for those of his team members.

### **NEURAL IDENTIFICATION OF CONTROL SYSTEM OF CURRENT ELECTRIC MOTOR**

Victor Buyankin, Vladimir Zarharov, Svetlana Kovalyova

The article devotes to identification of non-linear static and dynamic characteristics of various electric motors and regulators or neural nets. This object has a priority, as it is not possible to create a high-quality control system without comprehensive information relating to control object. Neural identification is necessary at the initial stage of the development of multi-circuit control systems of electric motors.

### **NEURAL IDENTIFICATION OF CONTROL SYSTEM OF ALTERNATIVE CURRENT INDUCTION ELECTRIC MOTOR**

Victor Buyankin, Vladimir Zarharov, Svetlana Kovalyova

The article devotes to identification of non-linear static and dynamic characteristics of alternative current electric motors with the help of neural net. Neural identification is necessary at the initial stage of the development of multi-circuit control systems of electric motors.

## **Session PT1A**

### **REALIDADE VIRTUAL NO ENSINO-APRENDIZAGEM: UMA BREVE ANÁLISE DE OPORTUNIDADES**

Luis Alfredo Amaral

Os desenvolvimentos mais recentes dentro das áreas da realidade virtual e da realidade aumentada tornaram mais acessíveis as suas construções em termos técnicos. Também o facto de muitas dessas soluções não exigirem hoje equipamentos computacionais especiais, tornam as soluções mais baratas de serem construídas e utilizadas. Torna-se assim possível a utilização destas tecnologias em contextos de ensino-aprendizagem, quer em ambientes presenciais, quer pela utilização de plataformas de e-learning e sua conseqüente exploração à distância e em tempo diferido. Neste artigo pretende-se fazer uma breve descrição dos tipos de artefactos tecnológicos que nos parecem estar hoje acessíveis para utilização nestes contextos, bem como apontar algumas oportunidades a título de bons exemplos da sua utilidade.

### **ABORDAGEM COMPLEXA NA EDUCAÇÃO – IMPLEMENTAÇÃO DE UM TEMA DE PESQUISA EM ENGENHARIA CIVIL ENVOLVENDO OS PAÍSES PORTUGAL E BRASIL**

Clara Amélia de Oliveira, Maria do Socorro Márcia L. Souto

This paper proposes the union of an informatics modeling tool - the Object Oriented tool, and a broad engineering theme of research as an object of study. Defining the complexity of object is a core aspect according to the theoretical proposal of Thematic Modeling in technological curriculum. The chosen theme refers to Portugal-Brazil Civil Engineering context. Normally those broad themes are related to very high specialized domains of research looking forward academic and technical research publications. The aim of this paper is to show how those specialized themes can be converted in an educational proposal in engineering and informatics education. Informatics area needs for complex themes to support complex modeling tools and engineering field offer "real world" problems to be solved. Conclusion points out this wedding can help to increase potentiality of pedagogic results in engineering and also in informatics education, even in entry level courses.

### **CARACTERÍSTICAS DOS PROFISSIONAIS EM SISTEMAS DE INFORMAÇÃO: REGIÃO DE TRÁS-OS-MONTES (PORTUGAL)**

João Paulo Ribeiro Pereira, José Adriano Pires

The profile of the Information Systems Professionals remains a constant challenge for schools and employers. Constant environmental, technological and organizational changes may raise difficulties in keeping the curriculum of Information Systems updated. Thus, the knowledge and the abilities demanded of professionals are in constant transformation. School plays an essential role in the process of providing professionals with the necessary skills to operate in the Information Society. Their competence depends, largely, on an appropriate curriculum that must be adequate to the organizations necessities. This paper identifies the skills required for the IS professionals in the organizations located in the region of "Trás-os-Montes" (Portugal). This work is based in a survey, realized in 51 organizations from "Trás-os-Montes". The main objective was the identification of the skills expected from the employers for the IS professional. The study show that the soft skills are the most required.

### **DESIGN DE CURSOS PARA A EDUCAÇÃO EM ENGENHARIA: CONTRIBUIÇÕES METODOLÓGICAS AO GERENCIAMENTO DA MUDANÇA EM EDUCAÇÃO MEDIADA POR TECNOLOGIA**

Joni de Almeida Amorim, Rosana G. S. Miskulin, Mauro S. Miskulin

The use of multimedia in education can combine text, graphics, full-motion video, and sound into an integrated package. The authoring process grows in complexity with time due to the increasing multitude of possibilities available: from traditional hypertext to Web-based audio broadcast via a RSS feed. This growing complexity of the

modern educational projects and the need for a more efficient production of quality courses in the field of engineering propels the development of new instructional design approaches. Promote quality in distance, flexible and ICT-based education turned to be a priority for most institutions. The incorporation of the best methods and practices is now mandatory in order to achieve a balance between scope, schedule cost, risk, and quality. Such methods and practices may be understood and implemented via software. In this perspective, this paper presents new software for technology based education that considers aspects of the management of change.

## **FUNDAMENTAÇÕES PEDAGÓGICAS PARA UMA PROPOSTA DE AMBIENTE DE APRENDIZADO COMPUTACIONAL**

Vânia Cristina Pires Nogueira Valente

Before adopting any pedagogic strategy, it is necessary to establish the educational objectives, in other words, the competences that the student should have at the end of the course. The importance in defining the desirable objectives that the students reach clearly is emphasized by the fact of these they supply a guide for the development of computational learning environment. One of the suitable systems to address the classification of these objectives is Bloom's Taxonomy, in which the central idea is that the educational objectives can be declared from the simplest to the more compound. She presents, in a systematic way, the different levels be jumped over her/it by the apprentices.

## **DESIGNING "ARCHITECTURE BASED BACKUP SITE PROJECT" WITH A SMALL SET OF INFORMATION AND DETAILS**

Daniel de Souza Carvalho, Samuel de Barros Moraes

When information technology became closer or an important part of the company main business, it requires a non stop infrastructure to guarantee clients/partners attendance and preserve the company image to the market place in case of a disaster. In recent years small and medium companies are concerned about their disaster recovery plans, and they are looking for high availability environment to attend business continuity. To address those issues, one role of system architect is to design an effective project with a small set of information and details about the company systems. This paper presents an approach for system architecture design that succeeds, and a hypothetical scenario based in real cases.

## **A PREPARAÇÃO PEDAGÓGICA E PROFISSIONAL DO PROFESSOR DE ENGENHARIA: DISCUSSÃO E PROPOSTAS**

Zacarias M. Chamberlain Pravia, Jocarly Patrocínio de Souza, Edson Santos Acco

The present work has as objective discusses the process of the professional engineer's transformation in educational engineer, that most of the time if prepared in the master's degree courses and doctorate. In that context the professional, doesn't usually possess any didactic qualification and, much less, one lives the world of the work and then a interrogation is open over the engineering professional's formation and its effectiveness in the process of enterprising professionals' generation and committed with the development of the country. It appears like this, a proposition of establishing an I work as a trainee professional as form of tuning in the teacher with the job market, seeking the formation of that appropriate professional to the own longings of the world globalize.

## **Session PT1B**

### **UMA ABORDAGEM CTS EM CURSO TECNOLÓGICO**

Lúcia Helena Martins-Pacheco, Renato Lucas Pacheco

Science, Technology and Society (STS) approach is becoming very important and necessary around the world due to the science and technology influence over the people's lives and the environment. It includes aspects such as pollution, exhaustion of natural resources, exaggerate consumerism, income concentration, unemployment, and social exclusion, and their implications over the population's quality of life, and over the productive system itself. This preoccupation is noticed in the Brazilian National Curricular Directions of Engineering Graduation Courses that, beyond inherent technical aspects of each engineering course, demands on those curricula encompass a "generalist, humanistic, criticized and

reflexive education”, “with a ethical and humanistic vision, to attend the social demands”. This is also asserted by Curricular Directions of Computational and Informatics Courses. In this sense, this paper proposes a under graduation subject framework for technological courses that includes these issues and some reflections in such important areas.

### **O QUE É CIÊNCIA? UMA ABORDAGEM PARA CURSOS TECNOLÓGICOS**

Renato Lucas Pacheco, Lúcia Helena Martins-Pacheco

Science is often seen as something absolute in Academy, almost as a religion. The belief in Science inside Technological courses is very strong. Reporters and journalists frequently present scientists like priests. It is believed that Science can offer solutions to every human problem. However, without trying to block the scientific thoughts, there are ethical questions that need to be placed. Scientific discoveries influence the Society, changing beliefs, ways of thinking and working. Science can ignore ethical barriers producing unexpected effects and so should remain under society control, serving it. Academics of technological areas should be aware of this. Nevertheless, frequently they show resistance to study matters like Humanities and STS (Science, Technology and Society). This paper aims to soothe this resistance through developing the Science theme in a more objective and direct language, stimulating critical thinking and exposing the repercussions of Science in the society where the student belongs.

### **O QUE É TECNOLOGIA? UMA ABORDAGEM PARA CURSOS TECNOLÓGICOS**

Renato Lucas Pacheco, Lúcia Helena Martins-Pacheco

Technology is a social product that strongly influences and shapes the Society. It solves old problems and creates new ones. It is necessary that this matter becomes sufficiently clear to students of technological courses. It is important to lead such topic in a way that makes students apply Technology to serve social issues, and not the contrary. However, subjects such as Science, Technology and Society are often considered not relevant by them, but it is essential for them to know that the technological manufactured goods go beyond bringing comfort and facilities to their lives. So, this paper presents an approach of Technology based on STS principles searching for a clearer and direct language rather than a philosophical one. The focus is to motivate students about Technology highlighting how it is interwoven with science and social questions. Some examples concerning practical aspects of teaching and learning involving those matters are shown.

### **O QUE É SOCIEDADE? UMA ABORDAGEM PARA CURSOS TECNOLÓGICOS**

Lúcia Helena Martins-Pacheco, Renato Lucas Pacheco

It is common that students of technological courses show some resistance about themes like humanities. Aiming to break this resistance, it is suggested to use a more direct and objective mode of speech to teach themes concerning social ideas. It is recommended to present only classical definitions of Society. The goal is to stimulate critical thinking and to show that social knowledge does not have the same characteristics as of the called exact sciences. Based on Cultural Anthropology, it is stressed that cultural concept in societies is a humanizing factor and that it identifies the human being. The undergraduate is stimulated to study subjects related to society such as ideology, liberalism, democracy and power. This can help them to realize that human thinking is shaped by aspects inherent from the culture, where the values and beliefs that guide people's thoughts and actions come from.

### **ORIGEM E DESENVOLVIMENTO DE MÁQUINAS ELÉTRICAS PIONEIRAS: UMA ABORDAGEM EM MULTIMÍDIA**

José Carlos de Oliveira, Antonio Lopes de Souza, Thiago J. Masseran A. Parreiras, Victor Dutra Ribeiro

Este trabalho apresenta o resultado do uso das tecnologias da computação gráfica e realidade virtual no desenvolvimento de material de modelagem e visualização de máquinas elétricas pioneiras, com alto conteúdo pedagógico, visando sedimentar o entendimento dos princípios básicos que regem o funcionamento das máquinas eletrodinâmicas modernas. Ele atenta tanto para a história das máquinas elétricas quanto para o conteúdo intrínseco das mesmas. O projeto engloba a produção de um pacote audiovisual em vídeo e realidade virtual sobre seis máquinas eletrodinâmicas que marcaram a história da Engenharia Elétrica. Todas elas do século XIX: Roda de Barlow, Máquina Rotativa de Page, Máquina de Gustavo Froment, Motor Elétrico Inglês, Motor de Tesla e Máquina de Gramme. Essas máquinas são peças raras restando pouco exemplares em Museus de História da Ciência e Tecnologia. Nesses locais o acesso é restrito, não se permitindo o manuseio devido ao valor histórico das peças.

Entretanto, seria proveitoso, do ponto de vista da teoria construtivista do aprendizado, que o aluno de Engenharia Elétrica pudesse ter um contacto mais próximo e interativo com essas máquinas já que elas sinalizaram os primeiros passos na evolução de técnicas de projeto de dispositivos eletrodinâmicos. Para cada máquina será desenvolvido um modelo completo, animado e interativo, em realidade virtual usando a linguagem VRML (Virtual Reality Modeling Language – a linguagem da Realidade Virtual para a Internet). Além disso, serão apresentados: um vídeo em computação gráfica com informações históricas sobre as máquinas e uma descrição tanto do seu funcionamento como dos princípios da eletrodinâmica neles empregados.

### **ATIVIDADES COMPLEMENTARES NA FORMAÇÃO PROFISSIONAL E INTELLECTUAL DO ENGENHEIRO AMBIENTAL**

Nelson César Fernando Bonetto, Carlos Eduardo Q. Simões de Amorim

Complementary activities are those that are achieved apart from the regular curriculum organization of a given course. They perfect the professional background of the future professional from the different areas of knowledge. They promote an opportunity for the students to participate in activities that although not te curriculum, promotes their intellectual, social and professional development. In this way, the student acquires a scientific and technical understanding as a professional and a citizen. In the Environmental Engineering Course at Oswaldo Cruz School, the 160 hours of complementary activities are described in five modalities including short courses, talks, congress and publication of papers, monitory, scientific initiation programs, technical visits, field research and proficiency in foreign among others.

### **TÉCNICAS IMERSIVAS DE DESIGN INSTRUCIONAL EM CURSOS ONLINE**

Paula Carolei

Essa trabalho analisa o conceitos de imersão a partir de uma experiência com alunos de um curso de design Intrucional e discute os conceitos e esperi~encias sobre imersão em cursos online e apresenta algumas propostas de como esse profissional que produz cursos online pode aumentar a imersão dos seus usuário.

## **Session PT1C**

### **COMPETÊNCIAS DO ENGENHEIRO CIVIL NECESSÁRIAS PARA ATUAR NA INDÚSTRIA DA CONSTRUÇÃO**

José Pereira de Oliveira, Maria do Socorro Márcia L. Souto

World technological changes produces new attitudes, assets, behaviors among cultures. Civil engineer industry, like the other industry segments looks for new professional competences. Building civil engineer sub-sector from industry is focused in the present paper. This work identifies the professional competences for civil engineers in the civil engineer industry in the scope of civil engineer industry in Fortaleza-Ceara, sub-sector civil building, middle and big enterprises. The research involved twelve enterprises and forty five civil engineers. Results of this research points out: 1. necessity to aggregate other competences in the usual technical competence in the case of civil engineer professional profile, specially in terms of management competence. 2. The normal day by day activities from civil engineer in the scope of study demonstrate importance of management competences including organizational and social ones.

### **PROCEDIMENTOS TÉCNICOS PARA O APROVEITAMENTO COMPLETO DOS ALIMENTOS**

Thaís M. M. Tavares Bastos Gama, Rafaela da Silva, Eloise Schott

The nutritious principles ignorance and the no integral food utilization cause the waste alimentary resources. The Dietary Technique studies procedures to make possible the food utilization, preserving the nutrients and organoleptics characteristics. In this concept was proposed a teaching and learning method at a not governmental institution in Joinville-SC which shelters children from 0 to 18 years. The goal was to apply in the menu planning the rules of pre-prepare and prepare with the integral food utilization as an economic way. The preparations were accomplished through experimental practice classes (workshops), encouraging the use of peels, leaves, stems which are nutrients resources and many times are disposed for lacking of knowledge use. At the end of each workshop, the obtained results were compiled by means of evaluation record with values attribution for: acceptance, performance, difficulty degree and flavor.

## **ELABORAÇÃO DO MANUAL DE BOAS PRÁTICAS EM UMA UNIDADE DE ALIMENTAÇÃO E NUTRIÇÃO DE INSTITUIÇÃO SOCIAL NÃO GOVERNAMENTAL EM JOINVILLE – SC**

Thaís M. M. T. B. Gama, Madalena P. Cioni, Sandra A. Czarnobay, Silmara Richter

This study has the objective to elaborate a Good Practice Manual in the food manipulation in a Unit of Alimentation and Nutrition-UAN. It initiated by the check list defining quality standards in the food manipulation and posterior execution of the good practices praised by the valid legislation of the country regarding the preparation of food and drinks. The manual contemplates since the receipt of the raw material until its final destiny: the distribution for children from 0 to 18 years, employees and volunteers of the institution. The training programs for correction of the not conformities are in an elaboration phase. It was suggested adaptation methods close to the local administration. The development of this study possible the methods application which guarantee food safety and quality of life to the individuals who are sheltered in this institution.

## **IMPLANTAÇÃO DE LTSP NA CÂMARA MUNICIPAL DE LAGOA DA PRATA: PROMOVENDO A INCLUSÃO DIGITAL**

Cristiano Júnior da Silva, Eustáquio São José de Faria

The present study intends to demonstrate the promotion of “Digital Inclusion” in the town of Lagoa da Prata, M.G.. Further on, it’s shown how the town’s Council’s costs with this implementation have decreased by using freeware software and a LTSP server. Some of the difficulties concerning the implementation of a “Digital Inclusion Center” have also been described, as well as the results accomplished one year after its establishment.

## **TURMA DO CALISTO – AMBIENTE LIVRE PARA PORTADORES DE SÍNDROME DE DOWN: UMA APLICAÇÃO DA INFORMÁTICA NA EDUCAÇÃO ESPECIAL**

Júnio Moreira, Eustáquio São José de Faria, Márcia Aparecida Fernandes

It’s notorious the lack of systems that serves the individuals with Down’s Syndrome, mainly games, which improves the knowledge. Thinking about that, a Free Software is proposed to manage interactive games, using an Internet browser, focused on the learning institutions that help “people with special needs” – Down’s Syndrome’s carriers.

## **ESTRUTURAÇÃO DE UM CURSO DE APERFEIÇOAMENTO, À DISTANCIA, NO DESENVOLVIMENTO CIENTÍFICO E TECNOLÓGICO**

Vilmar José Zermiani

In the course of its twenty-two years of existence, the mathematics fairs held in the state of Santa Catarina have contributed to the improvement of education, either by direct participation of the students, either by constant evolving of the teachers and educational leaders involved. Despite the efforts of managers at different occasions, it was realized a lack of a better monitoring in the organization of fairs. From this finding came three Seminars of Evaluation, specifically designed for this purpose. In view of the above, this article aims to develop a module of an improvement course about “Fairs Organization,” in distance, with national coverage, to promote the training of educational leaders, teachers and students in the areas of exact science and technology. In order to recognize the manager’s role in these fairs arrangement and in the scientific / technological developing, this communication is divided into three parts: planning, operation and feedback

## **FERRAMENTA DE NIVELAMENTO : UM INSTRUMENTO DE MELHORIA DA QUALIDADE DE ENSINO**

Mario Otávio Salles, Anna Cristina Barbosa Dias de Carvalho, Waltson Gomes Neto de Limad

The graduation education comes suffering a series of problems in its beginning due to lack of formation of students in basic knowledge of mathematics, physics and portuguese. The students arrive at University with an insufficient formation and full of deficiencies. However, the graduation courses need these knowledge to develop its disciplines. The objective of this work is to present a project developed in a Logistic Institution of Education for reducing deficiencies founded by professors in the mathematics area. The project consists of developing scripts of related exercises about necessary subjects of the University formation, but that they are given in basic education. This project comes being developed approximately one year and has presented interesting results for the formation of the professional future of logistics.

## **Session ST1A**

### **NUEVO RECURSO DIDÁCTICO PARA TRABAJAR CON IMAGEJ**

Ibon Ruiz Oleagordia, Begoña García Zapirain, Amaia Méndez Zorrilla

This paper presents a resource that was produced to communicate ImageJ with the scientific calculus language Octave. The utility developed takes advantage of both softwares, widely used in teaching; that is, the advantages of JAVA language, in which ImageJ is developed, and the power of Octave for the design of mathematical algorithms. This resource will allow the students of digital and image treatment to use and design imageJ plugins in their practical work; also, they will be able to integrate developments previously carried out in Octave, into ImageJ. This considerably reduces the development time of final applications and final projects. Apart from the teaching aims obtained and verified through feedback questionnaires answered by undergraduates who have used the resource, the communication between the two softwares allows the progress and orientation of students in the implementation of multi-platform applications and free software.

### **AMPLIACIÓN DEL SOFTWARE EASYPAS PARA EL APRENDIZAJE DE PROCESADO DIGITAL DE IMAGEN Y AUDIO**

Begoña García Zapirain, Ibon Ruiz Oleagordia, Amaia Méndez Zorrilla

This article describes the extension of easyPAS software for audio and image. EasyPAS is an educative tool in the scope of the digital image processing and audio signals for degree students, PhD. student or masters. The extension tries to be an independent system learning where the student can make in Octave/Matlab the mathematical and graphical study for the analysis and processing, i.e. for the musical effects as well as detections of contour or calculation of negatives on images. In addition, out of the examples contributed in the application, where the characteristic parameters of each system will be varied to evaluate their effect. the student will be able to develop new plugins, with problems and new simulated audio and image system in Octave/Matlab. Those plugins will be in XML or Java format.

### **ESTRATEGIAS DIDACTICAS CON SIMULACIONES PARA LA ENSEÑANZA DE LA ESTADÍSTICA DE FERMI A ESTUDIANTES DE INGENIERÍA**

Susana Marchisio, Miguel A. Plano, Oscar Von Pamel, Jorge C. Ronco

The authors have identified serious difficulties in teaching the Fermi-Dirac's Statistical formulation in fundamental courses of Physics for engineering students. In order to provide the body of basic knowledge of the science of the materials and to introduce the students over to the world of the electronic elementary devices, we developed didactic resources based on TICs. Specifically, with the purpose of facilitating the learning processes, we developed a simulation program and the associated didactic strategies in the curricular context, on Fermi-Dirac statistics in the study of conductors, semiconductors and isolated materials. In this paper we discuss the theoretical frame and the basic aspects of the design. We also propose an approach in order to integrate the simulation program in curricular context.

### **DISEÑO EXPERIMENTAL PARA COMPARAR MÉTODOS DE ESTIMACIÓN DEL TAMAÑO FUNCIONAL DEL SOFTWARE**

Sergio G. Zapata, Claudia P. Gomez, Myriam Herrera, Susana Ruiz, Estela Torres, M. Inés Lund

Uno de los síntomas de la denominada crisis del software es la carencia de estimaciones certeras respecto del esfuerzo de construcción de software, cuestión de suma importancia a la hora de tomar decisiones sobre la factibilidad de un proyecto de software. Los métodos existentes de estimación de tamaño de software no son ampliamente utilizados, entre otros motivos, porque no cuentan con un alto grado de confianza de parte de los ingenieros de software. Se presenta en este trabajo el diseño de un experimento para la comparación de dos métodos de estimación de tamaño de software. Para esta experiencia se contará con la participación de alumnos avanzados de la carrera de grado de Licenciatura en Informática de la Universidad Nacional de San Juan (Argentina). Adicionalmente se evaluará la experiencia como mecanismo de aprendizaje para los alumnos participantes.

## **ROBÓTICA: UNA TECNOLOGÍA ACTUAL INTEGRADA AL PROCESO DE MANUFACTURA Y SU SIMULACIÓN DIDÁCTICA**

Arnaldo Héctor Odorico, Fernando Lage, Zulma Cataldi

The problem that gives origin to this development is owed to the difficulty that the students have on having approached the topic of the robotics using the bibliographical materials and the theoretical explanations. For this motive, it was thought about a software of simulation in order to facilitate the comprehension of the topic with the advantages that this would provide to the pupils. In addition its objective is to restate and develop new methodologies in the process of education and of learning of the contents of theoretical character and, its implementation by means of a software of simulation. For this reason, they must develop exercises or practices that take the pupil to a process of theoretical previous analysis and to a later constant real discovery of the usefulness and limitations of the same one. This carries an internalization, a significant learning of the learning process.

## **USO DE LA CÁMARA DIGITAL EN CINEMATICA**

Guillermo Sampallo, Susana Julia Meza

In this work we present the use of registered videos by a domestic digital camera to study a movement rotational - translational and a harmonic movement of a rigid body. As the camera comes accompanied with a software of edition and of processing of image, we demonstrated that the set camera y software is an excellent tool of registration and analysis of dates could be employed easily in the classroom.

## **SISTEMA DE FLUJOS DE TRABAJO AUTOMATIZADO (WORKFLOW) PARA EMPRESAS DE BIENES Y SERVICIOS**

Javier Darío Fernández Ledesma

The articulate shows the process to us of construction of a system of automated job streams (Workflow) applied to the companies of goods and services, the constructed prototype part of a recognition to the present developments in the techniques of modeled of systems type workflow to propose a methodologic frame for its construction, a model from the diagrams of cases of use and classes of UML and the construction of a system in Java for the handling of the interfaces and the simulator of networks supported in the scheme of work PERT/CPM, contributing with it to equip to the community with analysts and modeladores of processes of businesses of a tool has supported for the refinement and improvement of the quality of its enterprise processes.

## **Session ET2A**

### **ADMINISTRATIVE AND EDUCATIONAL ISSUES IN ENGINEERING TECHNOLOGY WITH A GLOBAL IMPACT – PART 2**

Walter W. Buchanan, Jerome Tapper, Alireza Rahrooh

The University of Houston in the United States is developing a cooperative interdisciplinary graduate program in technology project management. At Texas A&M University in the United States, an experiential approach using emotional intelligence is being used to teach the fundamentals of engineering leadership. At the University of Central Florida in the United States, the transformation of a project-based live course to distance learning is being developed. And at Yeditepe University in Turkey a review of levels of teaching the subject matter systems in engineering education is taking place. All of these developments will be explored here.

### **COOPERATIVE INTERDISCIPLINARY GRADUATE PROGRAM IN TECHNOLOGY PROJECT MANAGEMENT**

William Fitzgibbon, Heidar A. Malki, Michael Gibson

We present an unique interdisciplinary graduate program with international and domestic components. The program curriculum involves a multidisciplinary project management program that couples discipline specific study in a variety of technical and scientific areas with specialized study in project management while being flexible enough to grow

other disciplines. The program requires 18 hours of courses in project management and up to 18 hours of core courses in a technical or scientific professional discipline such as technology, engineering, business, and computer science. Currently, the program that leads to a Master of Science in Technology Project Management can be offered in both face-to-face and online modes. An attractive feature of the program is that all of the project management courses can be completed online. In the last three years, the program has experienced significant growth attracting both local and international students from engineering, computer science, business and other related fields.

## **ENGINEERING LEADERSHIP: AN EXPERIENTIAL APPROACH USING EMOTIONAL INTELLIGENCE**

Ben Zoghi, Walter W. Buchanan

The goal of this paper is to raise awareness about dimensions beyond intellect and technical expertise that are essential for engineering leadership success (and for life, really). Specifically, we will be focusing on social and emotional intelligence and related competencies to introduce you to a process for assessing self/others and developing plans for acquiring leadership related competencies and to catalyze new thinking and the development of new competencies in each participant. The underlying philosophy of this paper includes the following:

- You are here because you want to grow in your emotional intelligence and abilities related to success in work/school/life.
- You learn best when you are an active participant in the teaching/learning process and can choose activities best suited to your situation and your learning style.
- You have a lot to learn from harvesting your own and others' experience from past as well as future (experimental) behavior.

## **COURSE TRANSFORMATION FROM LIVE/SYNCHRONOUS TO REMOTE/ASYNCHRONOUS USING TECHNOLOGY**

Ali Mehrabian, Walter W. Buchanan, Alireza Rahrooh

A robust project-based engineering course at the undergraduate senior level, traditionally taught face-to-face synchronously, has been transformed to a distance course taught asynchronously using distance modes. In this case, pedagogical transitions, alterations, and adjustments are required for meeting the course objectives effectively and without sacrificing the instructional quality. Project collaboration in groups requires effective communication, which is made possible in this case with extensive utilization of new information technology (IT) and communication tools such as virtual meetings. Some technologies used in transition from live to distance learning modes are summarized and their effectiveness is addressed experientially in this paper. This discussion includes some benefits of implementing project-based courses in the domain of distance learning modes.

## **SYSTEMS ENGINEERING EDUCATION: A REVIEW AND SOME SUGGESTIONS FOR TEACHING THE SUBJECT MATTER**

M. Kudret Yurtseven, Walter W. Buchanan

The objective in this paper is primarily to provide a review of some issues related to systems engineering education in engineering and the related programs. First, a brief review on the historical developments in Systems Thinking and Systems Engineering is given. This is followed by the presentation of a five-layer structure of Systems Engineering (Product/Subsystem Engineering; Project Systems Engineering; Business Systems Engineering; Industry Systems Engineering; Socioeconomic Systems Engineering ). The rest of the paper is devoted to the discussion of some educational issues as they are related to conceiving, designing, and managing a Systems Engineering process at these five levels. In the discussion, the issues related to the Project Systems Engineering level receives relatively more attention in the discussion since it is "the classic" Systems Engineering concept.

## **Session PT2A**

### **PROPOSTA DE UM PROGRAMA DE EDUCAÇÃO CONTINUADA PARA DOCENTES DA ESCOLA DE ENGENHARIA**

Ana Maria Porto Castanheira, Mary Rosane Ceroni, Terezinha Jocelen Masson, Leila Figueiredo de Miranda

The objective of this work is to contribute for the formation of Engineering teachers in a way that the student can develop skills that will allow them the necessary autonomy for their continued education. Which would be the necessary characteristics to a teacher that have the power to motivate their students to take part in the academic activities, having the classroom as a reference, but also using other places and experiences that would contribute for the development of their competencies? How to develop teaching plans that contemplate a pedagogical action focused on the student, respecting their difficulties and identifying strategies that enable the development of the necessary skills? The proposal of this work is the reflection about the teaching in the university level, valuing the teacher's work and creating conditions for a critical analysis, searching for methodologies that connect owning a specific knowledge with the knowing how to teach.

### **ENSINO A DISTÂNCIA, OPÇÃO E RACIONALIDADE: O PROCESSO DE DECISÃO DOS DISCENTES DO CEULJI/ULBRA**

Renata dos Santos Luz de Oliveira, Michel Silva, Milciades Alves de Almeida, Nair Rost Lima

The study it has left of the constatação of a observed dichotomy enters the formal model of the theory of the human capital, that justifies the taking of decision by means of the investment in education. It examines the processes of decision of the colleges student of the city of São Paulo, identifying factors associates to the manning rationality, such as the choice in the time, the uncertainty, the level of information, the influences of the different situations and institutions in the behavior and the expectations of future professional performance. Search to apprehend the reality of the choice processes, at the immediate moment of the taking of decision of the college student.

### **ENSINO DE PROBABILIDADE NO SISTEMA CALCULADORA ESTATÍSTICA**

Renata Grigório Silva Gomes, Liliane dos Santos Machado, Ronei Marcos de Moraes

This paper presents the module ModProb to support learning of probability in the system Calculadora Estatística. Its goal is to help students and monitor their knowledge related to the content of the Calculus of Probabilities course. Additionally, it must evaluate restrictions and requirements to avoid the execution of invalid operations and steps. Students have as benefits the acquisition of knowledge, correction of mistakes due an inefficient learning and retaining of concepts. The module can be used locally or at distance. Its interface consists on graphical and text windows with several buttons of operations. The exception treatment of user queries is performed through the evaluation of restrictions and requirements related to the kind of distribution of probability used and the kind of action selected.

### **MODELO DE GERENCIAMENTO DE PROJETOS DE ENGENHARIA COM PADRÕES PMI**

Carlos Roberto Jóia Hozumi, José Artur Mussi, Francisco de A. Corrêa, Clésio T. de Souza Dutra

Projects of Civil Engineering requires procedures technician that facilitate its management. The "Project Management Institute" (PMI) publishes the "Project Management Body of Knowledge" (PMBOK), a practical guide that it presents the flows of processes in nine areas of knowledge: integration of the projects, management of the target, management of the time, management of the cost, management of the quality, management of the communications, management of the human resources, management of the risks and management of the acquisitions in the projects. Thus, it is considered to still present the flows of the processes in these nine areas of knowledge and a Model that contemplates best the practical ones of management of projects of civil engineering, assisting small e average Brazilian companies of the sector, making possible complementary studies in the practical ones in developing countries.

### **AValiação DO ENSINO: QUESTÕES DE APRENDIZAGEM**

Evandro Bittencourt, Jurema Iara Reis Belli

To evaluate is one of the processes most problematic and of bigger use in the activity human being, we evaluate and we are evaluated continuously, daily in all the aspects of our life, difficult would be to separate the man of the evaluation process. However it is in the school that this process more is surrounded of rules, norms and of difficulties. This work shows how much to evaluation can to move in structure of institution of education, in its picture teaching, and how much if it needs to modify the relation with this evaluative process that still separates good/bad, it provokes evasion and it can modify the life of many people. The frightful indices of repentance reflect a reality. It is needed to review the concept to evaluate and to search new formulas, more productive, that contribute with the reduction of the stigmata of notes. This article intends to show a reality of the courses of Engineering of the CCT/UDESC- Joinville-SC.

## **A UNIVERSIDADE E A IMPORTÂNCIA DO ESTUDO DO CURRÍCULO NO PROJETO POLÍTICO PEDAGÓGICO**

Jurema Iara Reis Belli, Evandro Bittencourt

This article presents reflections on the some boardings for the application of the resume in the context of the university institutions. The quarrels that come occurring in relation the organization and the attributions of the resume of the universities come contributing for a new vision of the existing educational dynamics. The curricular boarding is basic to argue the stages of the implantation of the project pedagogical politician.

## **COMPUTADOR E ADOLESCENTE – O LIMITE DO USO SAUDÁVEL**

Maria Aparecida Galhardo

The computer is each more popular time and its use has become intense, mainly, among the teenagers. Used adequately, the computer connects people of the entire world in few minutes; it is a powerful tool of research, facilitating the school works; for the parents, using the computer in house, the teenagers are far of the drugs and of the streets violence. Used inadequately, the computer acts negatively over the sleep, over the school apprenticeship, over the organism, over the teenagers social and psychological life. This work is a case study which describes the use who teenagers make of the computer.

## **Session PT2B**

### **PLUGINS DE PROCESSAMENTO DIGITAL DE SINAIS PARA O POLÍGRAFO**

Paulo Oliveira Reis, Mario Oliveira Costa Dias, Pedro Augusto Raposo e Silva

This article presents two Hardware Plugins for the Polygraph equipment. These Plugins were developed with the purpose to allow the equipment to allow automatic online analysis of the polysomnography examination. That evaluates the standard of habitual sleep of the individual to detect possible disturbs in sleeping patterns. The Plugins will be developed using the digital processing of signals. The two Plugins are: Plugin to control TCP-IP gate that will be developed using the Blackfin processor of the Analog Devices, and the Plugin of digital filtering of the biological signals that will be developed using Matlab tool.

### **AMPLIFICAÇÃO NA FAIXA DE MICROONDAS COM CONFIGURAÇÃO CASCODE POLARIZADA COM ESPELHO DE CORRENTE**

Luciano do Amaral Beraldo, C. N. M. Marins

The Cascode configuration is very suitable for low and medium amplitude stages for microwave circuits, with is why it can guarantee an adequated forward gain ( $S_{21}$ ), and also an elevated insulation ( $S_{12}$ ). This two conditions allied are ideal when applying these stages as connections of circuits that operates in a joint configuration. However sometimes it does not offer the best physical conditions for connection like oscillators and mixers.

### **DIVISORES E COMBINADORES PARA A FAIXA DE MICROONDAS**

Luciano do Amaral Beraldo, C. N. M. Marins

This work compares the most used techniques to design signal combiners and splitters for microwave. The frequency spectrum developed is between 2.0 GHz and 3.0GHz, where the applications like WI-FI and WI-MAX are located. The combiners and splitters were designed to operate with electronic systems used in front-end radios. The design techniques of combiners e splitters for microwave frequencies consider the spread parameters (S parameters) on the input and output of the device. This parameters are used to compare de performance of the studied elements.

### **PROPOSTA DE ARQUITETURA DE M-LEARNING ADAPTÁVEL**

Ivan Carlos Alcântara de Oliveira, José Roberto de Almeida Amazonas

The use of mobile technology in education is becoming a reality in many learning situations in Brazil and throughout the world. Cellular phones, PDAS, Smartphones, notebooks with wireless Internet access, allow students to break the barrier of time and space without schedules grids and fixed access points; teaching and learning at anytime, anywhere, even while in motion. This work presents the proposal of a learning environment architecture that selects learning objects for mobile devices, considering several elements of adaptation, such as characteristics of the mobile device, the learning styles, students performance, the knowledge acquired by students and the rules provided by the teacher in the content of his course.

### **SUPERVISÃO E CONTROLE DE TRANSDUTORES INTELIGENTES USANDO A REDE MUNDIAL DE COMPUTADORES**

Alexandre César Rodrigues da Silva, Tércio Alberto dos Santos Filho, Carlos Antônio Alves,  
Thiago Alexandre Prado

Internet is a conglomerate of networks in world scale of millions of interlinked computers by the Protocol of Internet that allows the access to an enormous amount of information using every type of data transfer. Since there are connected computers to the network, different types of information can be obtained independent of the location. In this work a web site dynamic and interactive capable to supervise and to control smart transducer network connected in agreement with the IEEE-1451 pattern is presented. The system generates reports of the sensors in an automatic way, graphs, visualization of the transducers through webcam and access control to the users. The system is accommodated in the site server of the LPSSD laboratory. The tests were accomplished in the models of heating system for poultry and water distribution system available on the FEIS-UNESP. The system has potential for use in engineering courses.

### **ACESSO A REDE DE SENSORES INTELIGENTES (IEEE-1451) ATRAVÉS DE CELULARES**

Tércio Alberto dos Santos Filho, Alexandre César Rodrigues da Silva

Nowadays, with the dissemination of mobile equipments (cellular and PDA's), these equipments started to work in a hybrid way, some times they are used as simple telephone, others they are used to listen to the, to reproduce videos, to access the Internet, to read e-mail and so much other activities that were exclusive of the PC. The microprocessor used in the mobile equipments allows great flexibility to users in the generation of reports, accomplishment of searches and in control of embedded devices. This paper presents the second version of the MATIUDE software, developed to have access on smart sensor network, in agreement with IEEE-1451 pattern. Besides of development of new modules for the access on sensors, the EPP protocol was implemented in JAVA language in the current version. The tests were accomplished in the models of heating system for poultry and water distribution system available at FEIS-UNESP.

### **DESENVOLVIMENTO E APLICAÇÃO DE INSTRUMENTAÇÃO VIRTUAL NA ANÁLISE DE SINAIS BIOMÉDICOS**

Fernando Araújo Garcia, Angelo Bernardo Brasil de Souza

The virtual instrumentation has been presenting a pattern of notable growth recently with special prominence in the instrumentation areas and biomedical engineering. In this paper the term virtual instrumentation and their main advantages are presented. An acquisition, conditioning and visualization system of electrocardiographic signals was developed as an example of application of this important tool. It also presents the importance of LabVIEW, the most spread out software in virtual Instrumentation area. LabVIEW is a software development application that uses graphical programming language, G, to create programs in a "block diagram" form. This software allows the development of flexible and modular programs with user-friendly interface. An amplification circuit connected to a data acquisition board linked to a personal computer composes the hardware system of an electrocardiograph.

## **Session PT2C**

### **TECNOLOGIA PARA APRENDIZAGEM DE CONTROLE DIFUSO COM SOFTWARE E HARDWARE ABERTOS**

David Daniel e Silva, Francisco E. N. de Melo, Marcelo R. Stemmer, Guilherme Bittencour

The present paper describes the basic aspects of the project of a simple fuzzy controller for learning. The project was developed in C/C++ and uses some simple electronic components to control the speed of a fan. Many projects that

use fuzzy control are not totally free or open. Thus, to present something simpler and totally open, the complexity of the system was reduced to a minimum. Therefore, the used programming environment presents only text results. Moreover, the electronic devices are all of commercial use. The system is presented of such a way that a person can construct it without major problems. This work is intended for Control and Automation Engineering and Artificial Intelligence (AI) students, and for other investigators of the area. Hence, we leave free access to the source code and the hardware, with the list of the all used electronic components.

## **PROPOSTA DE SISTEMA DE RECONHECIMENTO AUTOMÁTICO DE FALA REALIMENTADO PARA ESTUDO NA ENGENHARIA**

David Daniel e Silva, Marcelo Ricardo Stemmer

Automatic speech recognition (ASR) systems have been available in research for over forty years. However, only in recent years many companies have started to use speech recognition technology to serve the users better. Nevertheless, the human-machine interface design for speech recognition systems is still critical to achieve a wide use, as in engineering teaching and other areas. Many improvements are still needed in the man-machine relation. In this paper, a new approach is presented, called "Feedback Automatic Speech Recognition" (FASR). The idea of this system is to contribute for the improvement of the ASR using existing techniques, such as Hidden Markov Model (HMM) and Support Vector Machine (SVM), and introducing the idea of a closed loop based on the analysis and comparative processing of the utterances of input with symbols of a phonetic pattern database.

## **USO DE MÁQUINAS VIRTUAIS PARA O DESENVOLVIMENTO DE AMBIENTES DE PROJETOS**

Felipe Terror Lima, Marcelo Marques Gomes, Paulo Guilherme Seifer, Roberto Scalco

This work presents a proposal for the use of virtual machines as environment of development of projects and as environment of learning for disciplines Operational Systems and Networks I and II of the Escola de Engenharia Mauá. During the creation of a project of software it's common that diverse configurations in the computer are made, installing software and run services, until reaching an ideal situation for the conduction of the project. For each computer that the developer will have to use, these configurations have to be made again. With the use of virtual machine all the work will be made one time only and its image can be copied for many others computers of a network. Moreover, also it's possible to use these virtual machines to demonstrate the behavior of diverse operational systems as well as applying configurations in networks and visualizing the packages transmitted in virtual networks between machines.

## **DESENVOLVENDO COMPETÊNCIAS EM PESQUISA OPERACIONAL: O OBJETO DE APRENDIZAGEM LOBO**

Andre Zanki Cordenonsi, Felipe Martins Müller, Fábio da Purificação de Bastos

The Lobo (Learning Object Based on Optimization) was developed to provide a tool to support traditional and distance learning of Operational Research topics (heuristics and meta-heuristics). Using the research-action educational and methodological support, the learning object was experimented in a regular semester to support a collaborative instruction. As principal results achieved, it is possible to highlight a significant improvement in relation to the understanding of theoretical precepts covered in the classroom as well as the development of better quality codes (algorithms) for the problem addressed (Traveling Salesman Problem).

## **TV DIGITAL INTERATIVA: DESAFIOS E OPORTUNIDADES PARA A FORMAÇÃO CONTINUADA DE PROFESSORES**

Joni Fusinato, Alexandre C. dos Reis Lima, Alejandro Martins Rodriguez

The massive use of information and knowledge over the last hundred years has shaped the development of many countries and this paradigm shows no sign of change for the twenty-first century. Knowledge has boosted economic, social and cultural change. In this context, Education cannot be left out of this equation. Therefore, ongoing teacher qualification has become of the utmost importance in order to handle upcoming challenges. Solutions based on distance learning using computer aided instruction tend to be available to few educators. On the other hand, the implementation of Digital TV may enable the democratization of access to information and knowledge, thus providing new opportunities for professionals in Education, Communication and Technology.

## **DESAFIOS DA SUSTENTABILIDADE E DESENVOLVIMENTO: AQUECEDOR SOLAR DE GARRAFAS PET**

Marcelo de Lima Vasconcellos, André Luiz Freitas Dias, Danilo Derick Silva Alves

The current socio-economic development model shows clear signs of degeneration, urging a profound transformation of values and attitudes, regarding especially the planet, to guarantee the survival of humanity. In order to support this transformation, it is needed to adopt practices which introduce new ideas and alternatives, more suitable with the current needs. In this context, the present work brings into light the sustainability of our traditional development model and possible alternatives for a real sustainable future, presenting a technology capable of contributing to this process of transformation.

## **PROCESSAMENTO DE MATERIAL ABSORVEDOR DE RADIAÇÃO MICROONDAS PARA USO COMO CAMUFLAGEM ELETROMAGNÉTICA**

Luiza C. Folguera, Mirabel C. Rezende

The continuous search for new functional materials to man and the challenge to improve the performance of the already existing materials are necessary due to the increasingly fast technological advances. Radiation absorbing materials, when employed in military areas, are an important tool used in electronic war, with the importance of their domain based on applying it in camouflaging systems (low detection radar structures). The aim of this paper is to presents for undergraduate students, the in situ processing of radar absorbing materials based on polymeric substrates impregnated with polyaniline conducting polymer. The anchorage of absorbing centers on the substrate was evaluated by scanning electron microscopy and the structures that were obtained attenuated the incident radiation from 65 to 99%, which indicates that can be used as microwave absorbers. Usually, in the military area the development of radar absorbing materials the studies involve the frequency range of 8 to 12 GHz.

## **Session PT2D**

### **COMUNIDADES VIRTUAIS E A APRENDIZAGEM: UMA ALTERNATIVA PARA EDUCAÇÃO NO SÉCULO XXI**

José Carlos Santos, Henrique Nou Schneider

Although it is common sense that we can not live without computers anymore, we still have large portions of the population who are considered digital illiterate. In my experience as a graduation professor in a private institution, I see these people everyday. In this text, we will look at the virtual communities as a new paradigm for education taking into account the ideas of modern authors dealing with technology, the world of work, education and societies facing ICT. We analyze the role of virtual communities represented by the Kidlink Project in Brazil and their education proposal. The purpose of this text is to bring ideas that might help thinking about communication and new technologies in the knowledge society. We also question which is the role of education when upbringing new citizens, their knowledge and competences to the XXI century.

### **A DISCIPLINA DE INTRODUÇÃO AOS CURSOS DE ENGENHARIA COMO ELEMENTO MOTIVADOR**

Jocarly Patrocínio de Souza, Edson Santos Acco, Fernando Passold

The motivation process in engineering courses has been established through one introductory discipline that is found in many curricular grade. In general, the objective of that discipline is to present a global vision of the particular engineering course, reaching the area in question, its general features, methodological analysis and future insertion in work market. In the specific case of Electrical Engineering course at Passo Fundo University, this discipline is offered in the first semester of the course having as approach the application of methodological analysis and modeling through experimentation that consists in the development of small projects in groups, where the theoretical basis at this first stage is not so essential. It was observed this methodology has been efficient in two points: the identification of students with the course objectives and the significant evasion reduction in the beginning of the course.

### **REUSO DE DEFINIÇÕES EXISTENTES EM DOCUMENTOS DIGITAIS NO CONTEXTO DE EDUCAÇÃO A DISTÂNCIA**

Geórgia R. R. Gomes, Igor P. Curtis, Sean W. M. Siqueira, Maria Helena L. B. Braz, Rubens N. Melo

With the widespread use of Information Technology it is common to find digital documents available on the Web. Nevertheless Digital Library Systems are seen as a more reliable source of information as they store digital documents (DDs) which are semantically richer and complete. These DDs can be used to support learning and teaching activities as in distance education contexts. On the other end, documents in digital libraries tend to be monolithic and do not follow a reuse approach, as is the case of Learning Objects (LOs), which are typically found in Learning Management Systems. This paper proposes the extraction of definitions from DDs with the aim of being reused to construct LOs within learning environments. Definitions are described by rules stating how they are built, according to the categorization proposed by CISCO. The extraction uses text mining techniques as well as the rules for discovering definitions embedded in the documents.

## **TRABALHO DE GRADUAÇÃO INTERDISCIPLINAR: OPORTUNIDADES E DESAFIOS**

Marcio Eisencraft, Gustavo de Melo Valeira, Nicole A. Joseph, Tatiana Matussi

The Undergraduate Final Year Project (TGI – Trabalho de Graduação Interdisciplinar) is an opportunity for undergraduate Engineering students to apply the knowledge obtained during the course in a real interesting problem for them. When this is possible, we get relevant works that effectively contribute to the learning and satisfaction of the students with their undergraduate course. In this paper, we describe two successful cases in this sense: in the first one, an Electrical Engineering student that plays bass has written a TGI on the use of computer based digital filters to simulate musical instruments; in the second one, a couple of students of the same undergraduate course interested in Biomedicine has numerically analyzed a differential equation model of the glucose-insulin interaction in the human body. The satisfactory results of both works reflect the importance of the TGI subject and daily interest of students match.

## **RELATO DA EXPERIÊNCIA SOBRE A IMPLANTAÇÃO DO TRABALHO FINAL DE CURSO NO CURSO DE ENGENHARIA CIVIL DA UNIVERSIDADE ESTADUAL DE FEIRA DE SANTANA-BAHIA**

Eufrosina de Azevedo Cerqueira, Gerinaldo Costa Alves

This article has as purpose to report the experience about the implantation of the final course paper of Civil Engineering students at the Feira de Santana State University. We point out that the first class to live this experience concluded the graduation in January 2007. Our intent was to evaluate the difficulties that arose from the necessity of writing the Final Course Paper seen from the perception of the teaching staff and students. The methodology that was used approached a survey carried out with all the participants through the application of interviews and questionnaires. The main results show a great difficulty among the students as to the elaboration of the monograph and the problems that originated from the lack of practice in the orientation about academic works, demonstrated by the tutoring staff.

## **MEDIDA DE ATRATIVIDADE DE CURSOS DE ENGENHARIA COM MODELOS DEA**

Maria Helena Campos Soares de Mello, João Carlos Correia Baptista Soares de Mello

The Federal Fluminense University holds fourteen Engineering Courses in three different Campi. The freshmen study together in many classes and were submitted to the same admittance test. Their minimum marks were different, meaning that they have different cognitive levels and different difficulties. It is usual to point out as one of the reasons for these differences the number of candidates for each course. In this paper we develop one performance index, using Data Envelopment Analysis (DEA) in which each course is evaluated according to two criteria: the capacity of attracting students and the capacity to keep them as they get the approval in the admittance test, not losing them to other Universities. The DEA model is a CCR one, with one input and two outputs. We point out the courses that have the best attractiveness and how they achieve that figure.

## **FERRAMENTAS DE AUTORIA RÁPIDA: APROXIMAÇÃO DO CONTEÚDO À FORMA**

Kleber Sartório, Luciene Cavalcanti Rodrigues, Norian Marranghello

In the moment of to generate so much information for so many different means is fundamental to have in hands instruments that can quickly and efficiently generate quality content. The authoring tools are important resource for content creation, therefore permit that the content producers can explore several possibilities of presentation and combine several types of media without need specialists in layout, in animations or in webdesign. It shows that the authoring tools are important and aggregate a series of facilities. It seeks to emphasize which requirements should be evaluated for the choice of these fast authoring tools. In this work it show that the new fast authoring tools are approaching technology, to educational and the content. These new tools allow the own professor in easy way and with big productivity manages his own contents.

## **Session ST2A**

### **APIS DE COMUNICACIÓN ENTRE C++ Y C# CON OCTAVE PARA EL DESARROLLO DE APLICACIONES DE PROCESADO DIGITAL DE SEÑAL**

Amaia Méndez Zorrilla, Begoña García Zapirain, Ibon Ruiz Oleagordia

This paper presents the gateways between the programming languages C++ and C# and the Octave mathematical software. They have been named coPAS and monoPAS, and have been developed in free software by the PAS research group at the University of Deusto (Spain). These gateways are developed with the shape of API, and have been made available to students doing degrees in Electronics and Telecommunication Engineering, so as to assist them in their lab training in signal processing, as well as for the drafting of their final projects. The aim is to enable students to rapidly develop applications of signal treatment by using experience and simplicity in the design of graphic interfaces in the above-mentioned programming languages, which are widely used in engineering. Finally, it is important to stress the free-software nature of the developed gateways: as no licence is necessary, student access to this programme of scientific calculus is easier.

### **ADAPTACIÓN DE LA INFORMACIÓN GRÁFICA EN LAS ENSEÑANZAS TÉCNICAS DE GRADO, PARA PERSONAS CON DISCAPACIDAD VISUAL Y AUDITIVA**

Begoña García Zapirain, Amaia Méndez Zorrilla, Ibon Ruiz Oleagordia

The project that is being developed intends to provide technical degree students with some kind of visual or hearing disability with a tool designed to complement current screen readers. The latter only read plain text and the user remains exposed to the good will of the programmer to describe the existing graphic information, for example on the web pages. The remaining applications, such as text processors or electronic design programmes, lack functions that include this functionality. The proposed alternative is to provide modules that can be installed in the previously mentioned software and that will interpret the graphic content and convert it into text, by means of advanced digital image processing techniques and artificial vision. The final user will receive reliable information on graphic representation. Moreover, all the development of these functionalities will be carried out in free software.

### **A CONFLICT IN BUILDING REQUIREMENTS DEFINITION AND STATING TEAM ROLES WHEN DESIGNING HIGHER EDUCATION SOFTWARE**

Inés Casanovas

Within the frame of a major project of designing a prototype of an educational software for higher education learning process of engineers in decision-making, according to mandatory didactical indicators, a new conflict was detected: the disjunction between the mental models of the members of the development team on one hand and the users, on the other. This conflict added strong difficulties on achieving the pedagogical objective of the tool model. After the redefinition of the theoretical frame focusing on HCI, Communication and Software Engineering, interviews to experts of the knowledge required during designing the software were deeply performed and the result was the identification of a lack of accurate definition of the roles of the members of the multimedia educational software development team that makes communication and coordination difficult in order to obtain a product that is a view shared by all the people involved in the project.

### **LABORATORIO VIRTUAL PARA LA FORMACION TELEMATICA VIA WEB DE TECNICOS EN PREVENCIÓN DE RIESGOS LABORALES EN RUIDO LABORAL**

Antonio Cubero Atienza, Pilar Martínez Jiménez, Cristina Carmona, Cristina Féliz

In this work a web virtual laboratory application is presented. This Software helps and it guides in the control and evaluation of the noise like agent responsible for study in Risk Prevention and Protection at Work Unit. The computer application contains wide theoretical information with respect to the noise: the instruments and measure methods, the normative and legislation of Spain and the possible effects on the workers. The application allows the user to familiarize with some noise measure devices through the simulation and visualization of its operation in diverse work positions, like real cases that are usually presented in the work unit. The application works in "multiplatform environment". The application has an intuitive and simple handling. The software is dedicated to students and any person has not wide knowledge in this subject.

## **HAIL IMPACT MACHINE FOR TEACHING CONCEPTS OF PHYSICS AND ENGINEERING DESIGN TO FIRST YEAR ENGINEERING STUDENTS**

Jorge R. Barral, Javier H. Garnica, Rodolfo G. Stoll, Mauricio D. Príncipi

This work shows the use of a hail impact simulation machine to teach physics concepts to first year engineering students. The equipment was originally built to verify the hail resistance of photovoltaic modules in accordance with standards. Since the operation principles are based on basic physics laws, the problem is presented to students so that they get involved in the machine design from its first steps. Taking into account the progresses they make, helps are given for some advanced topics like the use of laser beams or electronic regulating circuits. The equipment allows to analyze concepts as velocity, Newton laws and collision, as well as to perform measurements of different magnitudes like velocity and pressure. In addition, in an integral approach, the students are introduced in activities of advanced topics in their careers, research and professional work, as the materials selection, design of equipment, costs analysis, and use of standards.

## **DISEÑO DE UN REPOSITORIO DE OBJETOS DE APRENDIZAJE**

Zulema Beatriz Rosanigo, Gloria Susana Bianchi, Marta Susana Saenz Lopez

In the last years there has arisen the concept of "learning object" applied to digital materials created as small pieces of content, with the purpose of maximizing the number of educational situations in which this resource could be used. To facilitate the reusability of OA is necessary to share them, locate them easily, and connect them wisely, building a broader unit of knowledge. In order to ensure the truly exploitation of these resources originated in various sources, have emerged technologies and initiatives to organize storage. A repository of OA is an ordered collection of learning objects that provides facilities to locate them by content, areas, categories and other descriptors. This paper presents the theoretical foundation and design criteria for implementing a repository of learning objects that facilitates sharing experiences and materials enabling a flexible and personalized education.

## **FORMACIÓN EN INGENIERÍA EN MODALIDAD BLENDED LEARNING, BASADO EN EL MODELO DE DISEÑO INSTRUCCIONAL ADDIE Y LA TAXONOMÍA BLOOM**

Mardones Claudio, Herrera Oriel

Nowadays it is possible to put into practice new educational methodologies, thanks to the development and growth of Information Technologies (IT), which permit giving an efficient support to training in several areas. The high availability of these technologies has produced the spreading of several e-learning proposals. However, many of them do not include an instructional model to ensure the quality of each proposal. Sometimes, the application of IT spring mainly because of a technological aspect, namely, under the assumption that its uses are always convenient. This view does not include the issues that allow extending the traditional model to a new blended one that includes both conventional delivery and e-learning. Besides, a Virtual Campus is required, in order to give the support to this model. This article presents the results obtained in an Informatics Engineering Program, where blended learning based on the ADDIE instructional model and Bloom's taxonomy were used.

## **Session ET3A**

### **RSS RESEARCH IN EDUCATION**

Ronald J. Glotzbach, James L. Mohler, Dorina A. Mordkovich, Jaime E. Radwan

Today's post-secondary students are technologically savvy and they expect faculty to use myriad web technologies for course delivery. This includes taking advantage of email, course web sites, and online learning communities. However, expectations now also include RSS, blogs, web- and pod-casting, extending the classroom experience to provide active learning materials anytime, anywhere, and in multiple modalities. This contribution outlines the novel use of RSS technology for a course announcement system at Purdue University. It begins by describing RSS technology and discussing the different possibilities for RSS within classroom. It also describes the specific RSS application for real-time course announcements, detailing its creation and implementation. Initial student feedback is also presented.

## **THE USEFULNESS AND EFFECTIVENESS OF PDA: INTEGRATION INTO THE CLASSROOM**

Ronald J. Glotzbach, Laura D. Kellogg

As technology advances, educators must continue to advance teaching styles. The low price, high portability, minimal weight, and form factor of a PDA are attributes that make it worth considering as a technology that can be successfully integrated into the classroom. This contribution tests the usefulness and effectiveness of PDAs in a university classroom for things such as attendance, quizzes, and projects. It begins by discussing the benefits and pitfalls of using a PDA in the classroom, and then suggests several ways in which the PDA can facilitate learning and ways to help ensure PDA success. Finally, initial feedback from student participants is provided and the initial findings of this study are discussed.

### **KEY CRITICAL SUCCESS FACTORS AFFECTING COLLABORATION IN THE FORM OF VIRTUAL ORGANIZATION (IN THE OPINION OF SWEDISH EXPERTS)**

Wieslaw M. Grudzewski, Irena K. Hejduk, Anna Sankowska, Monika Wantuchowicz

The article is a practical input into the virtual organization theory. The authors present the results of the experts' survey among Swedish academics on the focal factors for the success of virtual organization. The factors were determined by authors based on their knowledge and existing literature in this field. The presented results refer to the form of virtual organization what is very significant taking into account the fact that up to now there is no one, commonly agreed theoretical ground for this form and on the top of that available results for it are strongly limited.

### **GOODBYE BLACKBOARDS? - EXPERIENCES WITH A TABLET PC AS A NOVEL TOOL IN TEACHING**

Hermann Merz

Many lecturers are very positive about writing contents of teaching to a blackboard. There are really many good reasons to do so! Often lecturers (must) use at the same time a notebook to show pictures, clips, simulations, or web sites, so having a mixture of conventional blackboard and modern multi media work. But changing the media is sometimes not so easy, for example the screen is hanging in front of the blackboard and must be moved up (and down) before (after) writing on the board. A tablet PC is able to combine both the advantages of blackboard work and multi media! The author gives an account of his perennial experiences with a tablet PC (in combination with a video projector) as a writing tool in all his lectures and meetings. The handling with a tablet PC is described and its new benefits in teaching for lecturers and students are presented.

### **REAL TIME PATIENT INFORMATION MEDICAL ALERT BRACELETS**

Nikhil Chaudhary, Jyothi Nookula

Medical Alert Bracelets offers an empowering option for individuals affected with chronic illnesses or medical conditions who may present more frequently to the ER. It also provides peace of mind to both patients and to their loved ones by "speaking" on their behalf if they are unable to do so. Trying to identify an unconscious patient or patient who is unable to communicate can lead to delays in treatment. With Medical Alert Bracelets emergency departments improve efficiency while enhancing the level of patient care. If you have a medical condition such as a life threatening food or medicine allergy, a pre-existing medical condition or maybe even a rare blood type, a medical alert bracelet may be the only communication you have to let emergency medical staff know so they can provide the proper treatment for you without potentially doing more harm.

### **CURRICULUM ANALYSIS AND QUALITY IMPROVEMENT PROCESSES IN ENGINEERING TECHNOLOGY AND AIRPORT MANAGEMENT PROGRAMS**

Hossein Rahemi, Naveen Seth

The objective of this research project is to develop a quality process model that will ensure student success in engineering technology and management programs and facilitate the ABET and IACBE accreditation processes. This model proposes a methodology that changes continuously with changes in technology. It adopts new tools and skills to improve student performance through the course and program. We expect that this project will specifically achieve the following objectives:

- Develop and implement a course and program assessment process based on a course rubric score indicator used to assess courses and programs based on ABET criterion 3.
- Develop a continuous improvement process based on both course and program assessment process.
- The results of using this process along with a precise action plan will be presented at the conference. A continuous quality improvement process and chart can then be developed based on outcomes of both course and program level assessment.

## **ENHANCED LEARNING BY USING LECTURE ON DEMAND TECHNOLOGY**

Jai P. Agrawal

This paper presents that how classroom learning can be enhanced by using a twenty four-seven Lecture on Demand technology. This technology enables the classroom lecture in audio/video/pdf format available to the learners anywhere and at all times on demand. This technology also enables the distant, absent and those students who have lost concentration, the experience the classroom environment beyond the physical. Students can concentrate on learning and not be distracted by having to take notes in the classroom lectures. For instructors, the technology is as easy as writing on transparencies. The legacy classroom lecturing is preserved in this technology except the visual feedback. The method requires minimal training in transition for both the teacher and the learner.

## **Session PT3A**

### **EDUCAÇÃO AMBIENTAL E DESENVOLVIMENTO SUSTENTÁVEL**

Terezinha Jocelen Masson, Leila Figueiredo de Miranda, Ana Maria Porto Castanheira, Juan Alfredo Guevara Carrió

The science has concentrated on developing technologies savers of the human energy, without worrying about the problems caused to the environment. There is no sustainable development without technology and the technology cannot exist itself without preservation of the environment. The "sustainable development", which believes that natural resources are the basis and limit economic development. The expression "Sustainable Development" - which was born from finding that the natural resources are not infinite - is creating a revolution in the way of production, when including the right of future generations to inherit a world where they can survive. Meanwhile the richest countries and developed ones, with broad access to updated technologies, are the most polluting, causing irremediable damage to the environment. Thus, researches directed to the technology of recycling is vital for the preservation of the environment. The search for models of sustainable development, among other factors, requires the knowledge of the characteristics environmental, social and economic, combined with improvement and the application of techniques for recycling.

### **FUTURO E CARREIRA PROFISSIONAL DOS ESTUDANTES DE ENGENHARIA: POSSIBILIDADES DE PLANEJAMENTO E TREINAMENTO**

Fernando Araújo Garcia, Monique Silva de Paiva

The engineering students' future and professional career are not usually themes treated in disciplines during the graduation. In general, students face anxiety situations when they come across important questions about their future performance. The level of anxiety is high, and one can see that the students face issues in finding space in the market. Nowadays is necessary that the future professional learn to plan your own career. The aim of this paper is discuss the students' possibility to acquire a set of prerequisites so that managing - in an appropriate way - your own professional career will be made possible. Thus, this work also claims to elaborate a program of appropriate training that prevents the students' excessive anxiety. The enterprising behavior treated come from a behavioral psychology model under the engineering teaching's point of view.

### **ESTRUTURA VARIÁVEL E MODOS DESLIZANTES APLICADOS AO PROJETO DE UM CONTROLADOR E DE UM OBSERVADOR CONTÍNUO NO TEMPO PARA O PÊNDULO INVERTIDO**

Leandro José Cesini Silva, Lizete Maria C. Fernandes Garcia, José Paulo Fernandes Garcia

Based in the study of controllers that use Variable Structure and Sliding Mode, this work presents the project of a continuous-time controller for the system inverted pendulum. The variables of states of this system are respectively position and angular speed of the rod and position and speed of the car. Considering that the direct access to the position of the car and angular position of the rod exists only, then it was necessary esteem the respective speeds, since the same ones are not measured directly. For this, was projected a continuous-time observer that uses Variable Structure and Sliding Mode. The efficiency of the controller and of the observer is demonstrated through simulations using MatLab/Simulink software.

### **OTIMIZAÇÃO DA INFRAESTRUTURA DE DATA CENTER PARA ATENDER A DEMANDA DE ALTA DENSIDADE DE EQUIPAMENTOS E VIRTUALIZAÇÃO**

Samuel de Barros Moraes, Daniel de Souza Carvalho

The high availability information technology (IT) infrastructure that works 24 hours per day, 7 days per week, 365 days per year of continuous operation, and guarantees SLA (Service Level Agreement) over 99,95% supplied by data centers, needs to be adjusted and optimized to support the new virtualization and high density equipment demand, such as blade servers. This infrastructure consists of air conditioned and ventilation, redundant electric energy, physical and logical security, Internet access and telecommunications services, racks, backup services, storage, networking appliances, and so on. It requires additional energy sources and cooling, in less physical space or small areas (by square meters). This article demonstrates some ways to address these issues and to provide better usage of the existing equipment; the aim of this paper is to put this subject in discussion for new challenges and possibilities.

## **ALGORITMO PARA CALCULO DE CURTO-CIRCUITO EM SISTEMAS DE DISTRIBUICAO CONECTADOS COM GERADORES SINCRONOS DISTRIBUIDOS**

Lucélia A. dos Santos, Ailson P. de Moura

This paper presents a new computational tool developed at MATLAB software that calculates the short circuit currents in distribution power system with distributed generation connected. The calculus is based on the method of phase components which is appropriate for this type of system, because of the unbalanced degree that inherently exists on it. This theory has advantages in relation to theory of the symmetrical components in the cases where the distribution system presents branches with one phase and with two phases. The insert of the distributed generation makes the compatibility of the software with the new technologies used now. The computational program is simple, very reliable and it is formed with an only function. The distribution system analyzed in this paper is a real thirty four bus system with a wind farm connected. Computer application presented good performance in time of resolution, although program is processed in the interpreted form.

## **WEB STANDARDS: BUSCANDO ACESSIBILIDADE EM CONTEÚDOS MATEMÁTICOS**

Leila Laís Gonçalves, Evânio Ramos Nicoleit, Elisa Netto Zanette

This paper discusses the issue of accessibility in Web pages with Mathematical content. Describes as a case study, the restructuring of the site structuring of the web content of Differential and Integral Calculus´ discipline, produced by the Distance Education Research Group of Unesc. They were used the W3C standards and recommendations - XHTML, CSS, WCAG and MATHML - for: a) separate the structure of the Webpage (code and data) of the visual presentation of content, b) provide access to the information considering different support technologies to the navigation of the contents and users with special needs and; c) provide support to the mathematical notation.

## **MÉTODO DOS ELEMENTOS FINITOS APLICADO A ENGENHARIA ELÉTRICA**

Rogério Marcos da Silva, Luiz Fernando Bovolato, Elson Borges da Silva Filho

The Maxwell equations describe the whole electromagnetics phenomena, but its analytic solution is impracticable in devices with complex geometries. Therefore, the Finite Element Method (FEM) can be a great numeric tool to obtain the approximate solution of the electromagnetic field distributions in devices and electric systems. To apply the FEM, the object should have its geometry subdivided in several parts, called finite elements. This subdivision form a mesh that is usually constituted, in the bidimensional case, of triangles or quadrilaterals, whose vertexes are denominated nodes of the mesh. It creates a system of equations, whose solution allows determining the parameters of interest. In the electromagnetic case the solution is the electric potential (V) or the magnetic vector potential (A) in each node of the mesh, from which is possible to determine the magnetic or electric fields inside the Finite Elements.

## **Session PT3B**

### **ASSOCIAÇÕES DE RETIFICADORES MULTIPULSOS COM CONEXÃO ZIGUEZAGUE**

Priscila da Silva Oliveira, Falcondes José Mendes de Seixas

To reduce the harmonic current injected in the mains, a passive and robust solution is the multipulse converter. The line

currents are formed by the fundamental and the harmonic component orders  $k \cdot P \pm 1$  ( $k=1,2,3,\dots$ ,  $P = \text{pulses}$ ). This work shows the analysis of a previously implemented 12-pulse rectifier. The primary windings are connected in delta and the two secondary windings are connected in zigzag. Two three-phase independent outputs are displaced of 30 degrees from each other, to feed two six-pulse bridges. The two DC outputs are analyzed to be associated, firstly in series and after in parallel, to operation with single load. Therefore, in parallel association it is necessary to use an Inter-Phase Transformer (IPT), connected in the DC-side to absorb the instantaneous differences of voltages. The IPT is designed and the complete 1kW for 12-pulse converter, with associated outputs, is analyzed, experimented and the main results are discussed.

### **AQUISIÇÃO E TRATAMENTO DE IMAGEM APLICADA À MODELAGEM DE ESTRUTURAS ÓSSEAS**

Adriano de Souza Marques, Edson A. Capello Sousa, João Cândido Fernandes

In bioengineering, is becoming increasingly important, the use of computer models, to obtain models of bone structures that are particularly complex to be referred in its geometry, making it difficult to obtain the computer models. Traditional methods had not efficiency in the identification and segmentation of the images, especially in points of convergence. The model outlines deformable by the Gradient Vector Flow (GVF) made a great progress in that process, especially with regard to the identification of convergence of image and can achieve a high degree of accuracy in defining the perimeter of model forms that are complex in the XY plane. The model matrix obtained from each image, which in our study was to use human lower jaw, serve as the basis for formation of a three-dimensional XYZ model of the structure of the jaw, thus making structural assessments of efforts in all biomechanical.

### **ANÁLISE DE ESTRUTURA FLEXÍVEL SUBMETIDA À MATERIAIS VISCOELÁSTICOS**

José Aparecido Silva de Queiroz, Edson A. Capello Sousa, João Cândido Fernandes

The human being over the years is breaking the barrier of time and space, searching for a way to conquer territories increasingly distant. For this, we must have that researchers are aware that the technology should monitor this progress, manufacturing machines that breakage records of speeds structures with much lighter. But accompany this technology is not as easy, once regarded as rigid structures that, due to effect of large accelerations, are replaced by dynamic behaviour. This work includes in the design and implementation of a tracking system for analysis of the behaviour of these flexible structures with and without viscoelastic elements, connected to a motor controlled by PWM. In this study were presented some analytical results, obtained through strain-gauge set along the flexible structure.

### **VERIFICAÇÃO DOS NÍVEIS DE ATENUAÇÃO DE PROTETORES AURICULARES DO TIPO CONCHA, UTILIZANDO MICROFONE SONDA**

Nelson Augusto Neto, João Cândido Fernandes

Among the health harmful agents, it is conferred to the noise, one of the most presents in urban and social environments, mainly in workstations and the laser activities. It has been observed the scarcity in the comfortable auditory products of individual and functionaries protection, related to durability, face to the efficient right of the equipment. The main objective of this study, was to verify the real noise attenuation level of three Hearing Individual Protection Equipment, kind of shell of foam(3M), model 1445, AGENA model ARS and MSA, model SORDIN CC. The verification was realized companying the level of reduction of noise (NRR), on frequencies of 250Hz, 500Hz, 1KHz, 2KHz, 4KHz and 8KHz, presented in the CA's of equipment of specimen, with the values collected in this research. The results show that none of 3(three) Hearing Individual Protection Equipment presented the values of attenuation contained in the approval Certificate/license, in the frequencies studies.

### **IMPLEMENTAÇÃO DE FILTROS PARA O PRÉ-PROCESSAMENTO DE IMAGENS COM VISTAS A ANÁLISES FOLIARES EM PLANTAÇÕES**

Jacqueline Gomes Mertes, Norian Marranghello, Aledir Silveira Pereira

In this work an image preprocessing module has been developed to extract quantitative information from plantation images with various degrees of infestation. Four filter comprise this module: the first one acts on smoothness of the image, the second one removes image background highlighting plants leafes, the third filter removes isolated dots not removed by the previous filter, and the fourth one is used to highlight leafes' edges. At first the filters were tested with MATLAB, for a quick visual feedback of the filters' behavior. Then the filters were implemented in the C

programming language. At last the module as been coded in VHDL for the implementation on a Stratic II family FPGA. Tests were run and the results are shown in this paper.

## **LABORATÓRIO REMOTO DE QUALIDADE DE ENERGIA ELÉTRICA**

Luís Carlos Origa de Oliveira, Rogério Máximo Rapanello, Rodrigo Nunes de Oliveira

With the increasing importance of the study of the Electric Power Quality, the objective of this work is to make available a Remote Laboratory of Electric Power Quality via Internet for electric drive - LRQEE. In its basic conception LRQEE stands out for the several made available technical resources and for the agility in the integration among teaching institutions, contributing a lot to the evolution of the learning as well to the rationalization in the use of the financial resources. It allows the access and control to several pieces of equipment and loads that make it possible the support to a long distance practical teaching and a better understanding of this subject.

## **REAL ENVIRONMENTS MANAGEMENT THROUGH VIRTUAL CAMPUS**

Tháise Kelly de Lima Costa, Bruno Rafael de A. Sales, Ronei M. Moraes, José A. G. Lima, Liliane S. Machado

Usually, researches about three-dimensional virtual campus present three-dimensional environments as a way to provide to users a sense of location in real campus and offer access to educational tools. A university can offer information for students beyond administrative activities and services for the general society. Then, this work presents the development of a virtual environment that integrates navigation and access to several services (educational, administrative and social) of a real campus. Some services allow changing the real environment since connected to servers and use electronic circuits, sensors and actuators. Thus, the control of the real environment through a Virtual Campus provides the remote access to the physical environment allowing tasks such as connect or disconnect equipments as air-conditioning, computers, projectors and lamps, among others.

## **Session PT3C**

### **DESCRIÇÃO DO CÓDIGO DE LINHA HDB3 EM RDP LUGAR/TRANSIÇÃO**

Alexandre César Rodrigues da Silva, Norian Marranghello

This paper presents the synthesis, in FPGA, of the line code HDB3 on Petri net Place/Transition using a new methodology called 5M (Methodology of Modeling for Machines of Mealy or Moore). This methodology uses basic components such places, transitions and arches. For description of the models in Petri net the PIPE (Platform Independent Petri Net Editor) program was used. As translation tool of the PNML description can be used the PIPE<sup>2</sup>TAB<sup>5M</sup> or PIPE<sup>2</sup>VHDL<sup>5M</sup> programs which generate, respectively, the States Transition Table and the VHDL code by behavioral model of Finite State Machine. Starting from the States Transition Table other synthesis tools can be used, as example, the TABELA program (Generation of the next state table and the Boolean function minimization), AGPS (Allocation of states) and TAB2VHDL (Description of VHDL on RTL level). The 5M methodology represents a new approach for the digital circuits teaching.

### **FERRAMENTA DE SÍNTESE PARA PROJETOS ELETRÔNICOS SINAIS MISTOS**

Alexandre César Rodrigues da Silva, Ian Andrews Grout

This paper presents a tool developed to read files describing a SIMULINK® model and translates it into a structural VHDL-AMS description. In translation process, all files and directory structures to simulate the translated model on SystemVision™ environment is generate. The tool named "MS<sup>2</sup>SV" was tested by three models of commercially available digital-to-analogue converters. All models use the R-2R ladder network to conversion, but the functionalities of these three components different. The methodology of conversion of the model is presented together with sort theory about R-2R ladder network. In the evaluation of the translated models, we used a sine waveform input signal, and the waveform generated by D/A conversion process was compared by FFT analysis. The results show the viability of this approach. This work considers some of the challenges set by the electronics industry for further development of simulation methodologies and tools in field of mixed-signal technology.

## **MODELOS DE SISTEMAS DE CONTROLE EM FPGA**

Alexandre César Rodrigues da Silva, Norian Marranghello

Due to studies that seek to evaluate the possibility to describe models of control of industrial plants through programmable logical devices using VHDL language an environment named LOGO2VHDL was developed. The environment contains basic and special functions available in CLP LOGO!SOFT CONFORT of Siemens. The environment is composed by several window forms that present the symbols of the available functions, the necessary parameters for each one of the special functions and the code VHDL for the correspondent description in Logo!Soft language. Each symbol is related to a model (behavioral or functional) describing the symbol in VHDL language. Several cases were studied proving the viability of this new approach in control systems of industrial plants. For show the developed tool, it is presented in this work some special functions what were implemented and the VHDL code generated for the automated irrigation control system.

## **UMA INTERFACE VISUAL PARA O ENSINO DE ESTATÍSTICA ATRAVÉS DA CALCULADORA ESTATÍSTICA**

Herbet Ferreira Rodrigues, Gedvan Pereira Dias, Renata Grigório Silva Gomes, Ronei Marcos de Moraes, Liliane dos Santos Machado

The system Calculadora Estatística is a Web-based tool to support learning of statistics technique. Due to its learning approach, special attention was dedicated to the user interface in order to make it intuitive and allow better learning results. This work presents a visual programming environment as a new interface for the Calculadora Estatística system. This interface implements a graphical environment where visual components represent operations that can be manipulated to construct the sequence of steps of an statistical analysis. Thus, the user can visualize all operations demanded and the sequence of execution. The advantages implemented in the new interface are the better intuitivity, memorization augmentation and impulse to new discoveries. As consequence, the interface can offer a new way to experiment and learn statistical operations.

## **GEOPLANO: UM JOGO EDUCACIONAL INTELIGENTE PARA O ENSINO DE GEOMETRIA PLANA**

Marcela Balbino Santos de Moraes, Danilo Lima Dutra, Ulisses Umbelino dos Anjos, Rogéria Gaudêncio do Rego, Ronei Marcos de Moraes, Liliane dos Santos Machado

Since their emergence until the present time, games instigate their users with challenges and scenarios to provide entertainment and stimulate imagination. Nowadays, educational computer games have presented important advances and their development is being stimulated through government investments in research and public initiatives as the PC-Conectado initiative. In this context, the development of new educational games has as goal to stimulate students to the learning process. This paper presents the game Geoplano Educacional to the learning of plane geometry. An intelligence module based on bayesian networks, to make the game more challenging, integrates this game.

## **UTILIZAÇÃO DE UM SOFTWARE LIVRE NO ENSINO E EM PROBLEMAS DE MODELAGEM ESTATÍSTICA EM ENGENHARIA**

Angelo Bernardo Brasil de Souza, Fernando Araújo Garcia

Statistical models have become overwhelmingly complex and for that matter the use of computers is a necessity. Statistical modeling software like Minitab and SPSS provide flexibility and a user-friendly interface. However, those are expensive and may be unaffordable for large-scale purchase by some institutions. This work proposes the use of a free, efficient and easy to handle software available online: the R statistical package. This software is an environment that allows script programming, and is highly expansible by package download. The main functions used in statistical modeling, and an example of its application will be shown in this work.

## **QUESTÕES E DESAFIOS NO ENSINO DE ALGORITMOS E PROGRAMAÇÃO: IDENTIFICANDO ASPECTOS IMPORTANTES NO PROCESSO DE APRENDIZAGEM APOIADO POR COMPUTADOR**

Rodrigo Santos, Adriana Vivacqua, Jano Souza, Heitor Costa

Despite the existence of much research in the area, teaching algorithms and programming is still a challenge to computer

science educators. However, an analysis of the problems found in this process would enable the identification of important requirements for a productive learning environment. Thus, this paper looks into issues and challenges found during the process of teaching algorithms and programming, especially when supported by computers. Contributions from cooperation and collaboration are discussed, with the goal of producing a set of requirements for the process.

## **Session PT3D**

### **APRENDIZAGEM BASEADA NA COMPUTAÇÃO E NA REDE**

Célia Maria Gomes Correia, Tânia Regina Dias Silva Pereira, Telma Dias Silva dos Anjos

This work is thinking about the educational process, in the face of changes in paradigms, setting a new posture for teaching-learning. Using the resources provided by the new digital technologies, the deepening of pedagogical considerations arising from their practices, the cooperative work is promoter of changes in their own thinking and practice. Studies show possibilities in this field of application of new technologies, both for education and for education presence in the distance. There are thousands of schools connected in some way with the Internet, the number of new connections is growing constantly. Thus, learning based computing and network and presents itself as a viable alternative, which tends to a lesser space of time great opportunities as a means to disseminate and expand knowledge are facing new forms of e-learning environments that are open to us.

### **COMO REDUZIR GASTOS E AUMENTAR GANHOS, GERENCIANDO ESTOQUES**

Edmilton Romão da Silva, Tânia Regina Dias Silva Pereira, Tatiana Dias Silva, Helidalva Silva Meneses

The supply chain is one of the most important processes of an organization. It's need to be managed with ability and knowledge, then, it needs tools to facilitate this management. The operational continuity must be guaranteed through the availability of materials, as the spare parts for the maintenance and also the production inputs. To manage efficiently this supply, satisfying the necessities of the users and the shareholders, who are not satisfied with its fixed capital inside of a warehouse is the great challenge. Questions as, how much to have in the supply? How much to buy? When to buy? They appear automatically. The objective of this study is to show that mathematical methods of forecasts can supply these answers, and also indicate ideal models to assist the management of the supply in agreement its characteristics.

### **AMBIENTES VIRTUAIS DE ENSINO APRENDIZAGEM: CAPACITAÇÃO PROFISSIONAL E FORMAÇÃO CONTINUADA**

Tânia Regina Dias Silva Pereira, Célia Maria Gomes Correia, Telma Dias Silva dos Anjos, Helenita Dias Silva

With the market of work each more demanding and competitive time, and with the quarrels and changes of educational paradigms, the demand for the professional qualification and continued formation became highly necessary and has been reason of many studies. In this context, we intend with this work, to make an analysis of the use of the New Technologies of Information and Communication, as resource that makes possible the dynamics and the diversification of the methodologies in the process ensino/aprendizagem, as form to minimize the distances and to dinamizar the strategies for way of these technologies for the formation and the professional improvement.

### **O PROFESSOR DE ENGENHARIA E AS TECNOLOGIAS DE INFORMAÇÃO E COMUNICAÇÃO: SUA PRÁTICA EDUCATIVA**

Tânia Regina Dias Silva Pereira, Helidalva Silva Meneses, Tatiana Dias Silva, Edmilton Romão da Silva

The Technological advances and the dissemination of the use of the Technologies of Information and Comunicação (TIC) in the distance disclose new perspectives for the education with support in digital environments of learning had access way InterNet. In this work we have as proposal, to make one analyzes on the performance of the professor in the construction of the educative process in the conduction of the ensino/aprendizagem. We will make a referring study to the professor of engineering, inserted in the educative process, in the context of the use of the Technologies of Information and Comunicação (TIC) and to the relation it enters the professor of engineering and the technologies.

## **O PERFIL DE UTILIZAÇÃO DA INTERNET PELOS ESTUDANTES DE DUAS FACULDADES PARTICULARES: DO CURSO DE DIREITO E DO CURSO DE ADMINISTRAÇÃO**

Tânia Regina Dias Silva Pereira, Helidalva Silva Meneses, Tatiana Dias Silva, Edmilton Romão da Silva,  
Laís Dias Silva Pereira

The job of the use of the InterNet comes increasing of accented form and new applications are being suggested, amongst these new applications include it use of the InterNet in the construction of the ensino/aprendizagem process. In this context, the proposal of the work was the result of a research, having as objective to analyze the profile of use of the InterNet of the students of two courses of particular facultiesses: the course of Right and the course of Administration.

## **DESENVOLVIMENTO DE CURRÍCULOS E OS DESAFIOS DO SÉCULO 21**

Tânia Regina Dias Silva Pereira, Carlos Nei Pires Franca, Débora Alcina Rego Chaves, Helidalva Silva Meneses,  
Laís Dias Silva Pereira

This study it aims at to present some Considerations on the challenges of century XXI in the education area. We will analyze the education through its relationship with the economic theory, as these aspects are integrated in the context macroeconomic micron and of all the economies, or either, since the study of the demand and it offers of the ways of education, correlating them with the aspect of the perfect competition, the paper them economic agents, analyzes of the existence of equal, buying and selling products without being able of interference in the market, the phenomenon of the perfect competition, the education-quality in the absorption and use of the production factors, its macroeconomic aspects, where we go to dedicate to a part of this study in the comment and challenges of social interest, of the sector public, as responsible for it offers of the courses that the modern society on the basis of demands the absorption of the new technologies of knowledge, as regulator of the process and responsibility of the requirement of a minimum standard of quality.

## **DESIGN: GESTÃO E NOVAS TECNOLOGIAS**

Telma Dias Silva dos Anjos, Tânia Regina Dias Silva Pereira, Célia Maria Gomes Correia, Helenita Dias Silva

To the long one of history, design evolved together with the nature human being, searching to adapt it the moment and interacting with diverse areas of the knowledge in the intention to satisfy to the necessities of the man. With the current changes new challenges for the ability of design appear, either for the globalization that provokes the social changes, economic and technological, that demand of the new companies strategies, to become more competitive, or for the speed where the information arrive until the customer, as much in the Internet how much in other medias. In the first decades of century XX designer it exerted an essentially projetual activity and in series, passing in the last decades to occupy a position of prominence in the organizations, for being responsible for the creation of the visual identity of the company. The intention of this work is to make one analyzes on as these changes intervene with the performance of designer.

## **Session PT3E**

### **O USO DOS LABORATÓRIOS ALIADO A CRIATIVIDADE NO ENSINO DE ENGENHARIA MECÂNICA**

Antonio Gonçalves de Mello Junior, Helio Pekelma

This article approach how the laboratories in an engineer study, in special mechanical engineer can bring benefit for professor, student and institution, about learning, investment, up-to-date and maintenance. It analyzes the question that the most of the laboratories have changed to didactic instead of research. The work starts defining engineer and show the relations between engineer, science, technology and human being, stand out the role of engineer as who apply the science attending the human being, show the laboratory as a model (reality simplification) gathering simulations (operations imitation), allowing the engineer student to practice the transformation science/technology; at this point, a case study show the benefits of laboratory usage. At the end of work, discuss the question of use the laboratory not only for didactic purpose, but also for research. A relationship between laboratory and creativity is placed as a motive factor and easiness in understanding the several studies.

### **ORGANIZANDO CURSOS SUPERIORES DE TECNOLOGIA NA ÁREA DE INDUSTRIAL COM MÓDULOS ESTRUTURADOS MATRICIALMENTE**

Wilton Ney do Amaral Pereira, Giuliani Paulineli Garbi, Marcelo Pinheiro Werneck

Brazil lives the growth of the Technology Graduation Courses in the most several areas of the human activity. In the industrial area, superior level professionals have appeared with a more specific formation and more focused in the productive system immediate needs, a different approach from the traditional graduation in engineering, administration and computer sciences. At the begin, they have presented wide spectrum of qualifications, organized in independent courses and isolated among themselves. Progressively, but still separate, they were placed in module structure, allowing until some flexibility in the sequence of the modules according to the student's interest. This article presents a new evolution: matrix curriculum organization, with common modules or shared thematic axes. As illustration, are introduced the combination of typical courses of the industrial area: Industrial Automation, Technology of the Information in Processes of Production and Industrial Production Management.

### **ESPECIALIZAÇÃO EM AUTOMAÇÃO INDUSTRIAL: UMA ORGANIZAÇÃO CURRICULAR INTEGRADA EM TRÊS MÓDULOS**

Wilton Ney do Amaral Pereira, Giuliani Paulineli Garbi, Marcelo Pinheiro Werneck, Carlos Rivera Ferreira

Considerations are presented about the specialization in industrial automation: a lato sensu postgraduate course appropriate to two demands of the current market of the work: to specialize engineers, technologists and managers to act in the automated production of goods or services and to form instructors and teachers for the technical and superior teaching. The organization curricular and the programmatic content presented in the article are current of the experience developed by the authors in the assembly of specialization courses in industrial automation in higher education institutions and of training "in-company" in industrial companies placed in São Paulo. Looking for to combine guidelines of the Education Ministry, profile wanted by the students, limits of the workload and the traditional material and financial restrictions of the institutions, he/she settled down a modular structure in three levels: basic, middleman and advanced.

### **O PROCESSO DE ENSINO-APRENDIZAGEM DO CURSO TECNÓLOGICO EM SISTEMA DE ENERGIA, NA DISCIPLINA DE CIRCUITOS ELÉTRICOS I, ATRAVÉS DA INTERNET COMO FERRAMENTA DE APOIO**

Geraldo de Magela C. de Oliveira, Evaldo Inácio Delgado

The Internet is a tool very used in the support of the teach-learning process, through its resources; this work was carried through with pupils of the CEULJI/ULBRA, in it disciplines of Electric Circuits I of the course of Technologist in System of Energy, and as the institution works with the semiactual module, better tries, the lessons had been given normally; e some materials had been disponibilizados in the Internet, so that them it could later be consulted. You doubt them that they were appearing during this process, had been cured in the classroom, beyond research, tests, the performance of the pupils was satisfactory, therefore all interacted through e-mails, chats resources among others used.

### **A INTRODUÇÃO DE TECNOLOGIAS DE INFORMAÇÃO E COMUNICAÇÃO NOS PROCESSOS EDUCACIONAIS: ACESSO E PREDISPOSIÇÃO DOS DOCENTES**

Maria José Viana Marinho de Mattos, Iran Calixto Abrão

In this study, a set of political and educational skills are covered, starting on 1990th and supported by some common cores on the literature, such as: management, equity, academic training of teachers, evaluation of performance of the educational system and improvement of the teaching-learning process. From the understanding of teaching-learning strategies provided by these poticals, the introduction of the both information and communication technology in the teaching-learning process(specially in terms of higher education) has gained main focus. In following, the study was focused on analysis of the empirical using a group of teachers as subject, focusing the access and feeling for applying technological tools on their tasks. In this context, the results have indicated that the technological tools are incorporated on the teaching practices. Furthermore, there is no technical difficulty related to technological environment itself, and the student-teacher interaction has been improved in this scenario.

### **A UTILIZAÇÃO DE TRABALHOS PRÁTICOS DE CAMPO E DE LABORATÓRIO NO ENSINO DA TECNOLOGIA DO CONCRETO**

Antonio Domingues de Figueiredo, Osvaldo Shigueru Nakao

O estudante de engenharia civil poderá vir a ser o profissional responsável pelo proporcionamento do concreto de modo a atender os requisitos de projeto ou, por outro lado, o responsável por seu dimensionamento ou recebimento

e controle, configurando necessidades diferenciadas de capacitação. No desenvolvimento da disciplina de materiais de construção, algumas experiências têm sido bem sucedidas no sentido de se atingir estes objetivos. A primeira é o ensino do material partindo do comportamento do material como um todo para posteriormente abordar os materiais constituintes. A segunda é a utilização de trabalhos práticos de dois tipos: um concurso de concreto de alta resistência e o acompanhamento do controle de produção e de recebimento de concreto em uma obra. O enfoque prático dos trabalhos que são desenvolvidos em paralelo com a teoria que é ministrada nas aulas aumentou significativamente o interesse dos alunos com a matéria e o nível de aproveitamento.

## **OPERACIONALIZAÇÃO E CRIATIVIDADE NAS METODOLOGIAS DE ENSINO EM ENGENHARIA E ARQUITETURA**

Marco Antônio Rossi, Roberta Barban Franceschi

This work was proposed by the author, who are responsible for the basic drawing disciplines and graphic language of the courses of civil engineering and architecture UNESP - campus of Bauru, state São Paulo, aiming at investigating the teaching and learning methodology the relations of curricular activities, which programmatic content of the techniques of the parallel perspective and conic are focused. The results were analyzed and rebound, about student's difficulties in the matters of the ideas expression, with the sketch technique and of proportion.

## **Session EW1A**

### **PARTICIPATORY SYSTEMS ENGINEERING**

Dulce Magalhães de Sá, Luis Joyanes Aguilar

We are currently witnessing a boost in participatory activities involving citizens in various spheres of human life. Numerous sectors are encouraging public participation and there is a growing interest in tools and mechanisms to facilitate this participation. In this paper, we propose a formal conceptualization of aspects of participatory systems engineering, which is presented as a new paradigm in computer science. To that end, we define and characterize participatory systems. The applicability of these systems interests different areas, namely e-government, lifelong learning and knowledge management. In e-government, they are tools to support decision-making and governance. In lifelong learning, they help enrich learning environments. And in knowledge management, they facilitate the enhancement of knowledge bases.

### **A UNIT OF MATERIAL FOR INDEPENDENT LEARNING OF A TEXT TYPE IN ENGLISH FOR ENGINEERING**

Elia Carrizo

This article presents an interactive Unit of material for independent learning of English. Based on the Systemic Functional Grammar and its approximation to text, theories of learning styles and strategies and material developed in institutions abroad, the unit is part of a larger project in which instructional modules are designed to suit the academic reality of our institution, our students' idiosyncrasy and previous knowledge. The unit aims at helping students learn strategies for reading and comprehending one factual text type, the information report. Activities are included that help students gain consciousness of these strategies and also, to reflect on and evaluate the activities. The module will be loaded in Word format onto a CD. Hyperlinks and animations are inserted in the module. Also, hyperlinks connect to grammar information pages built by the author. Software is loaded to generate self-assessment by the students. Self-Evaluation exercises are included, with corresponding solution options.

### **A B-LEARNING APPROACH IN AN ELECTRICAL CIRCUIT THEORY COURSE USING A WEB-BASED EDUCATION TOOL**

Manuel M. Travassos Valdez, Cristina I. Faustino Agreira, Carlos M. Machado Ferreira, Fernando P. Maciel Barbosa

Education in engineering is inconceivable without a lab component. Electrical Circuits Theory is the basic unit in electric engineering curricula. The objective is to provide knowledge of mathematical modulation and solutions for electric circuits while developing proficiency for practical applications. The learning is accomplished in the Laboratory of Instrumentation and Measures/Electric Circuits and develops the students' experimental competences, team work,

how they learn to communicate effectively and be responsible for their own results. The use of Moodle learning system as an education tool increases and facilitates their preparation and instruction. The teacher will have the chance to analyze the requirements of students and to envisage what to do to assist them better. This study compares different methods of developing lab experiences and evaluates their impact in the students' performance.

### **REMOTE PATIENT MONITORING SYSTEM USING WAP**

Jyothi Nookula, Nikhil Chaudhary

The proposal discloses a patient monitoring system for use in a hospital, in which a central station linked to the internet is networked to a plurality of portable patient monitors by a wireless network for viewing patient data by clinicians at another location. Vital signs are transmitted to the central station from the monitors via the network by a suitable interface. The central station is arranged to display sensed vital signs from all the plurality of monitors. Thus the user of the central station can monitor a plurality of patients. The system is for use in a hospital to view data from the patient monitors and, if desired, to control the patient monitors. The emergency vehicle may be equipped with all the necessary first aid supportive instruments, and in the meanwhile before reaching the hospital, the status of the patient can be transferred to the hospital using GPRS technologies.

### **A TOOL FOR LEARNING AND TEACHING BASIC PROGRAMMING**

Carlos Alberto Ynoguti, Gabriel Duarte do Lago, Guilherme Fernando de Jesus Reis

The project's aim is to develop a tool to help computing engineering students to understand some basic concepts involved in basic programming, such as variable declaration and value assignment, parameter passing, and others. It was noticed that with visual animations students usually understand programming topics easily. The software's user interface is divided in two areas: the left side, where the user types the source code to be evaluated; and the right side, where visual animations are generated according to the typed code. The software is being developed using Java language. Some development tools in use are: JavaCC, JJTree, JavaScript and ActionScript3. Currently the software implements animations for "variable declarations" and "assignments" topics. The next step is to implement such animations for "linked lists" and "parameters passing".

### **WEBLAB FOR THE STUDY OF NON-LINEAR EFFECTS IN OPTICAL FIBERS**

Sérgio Szpigel, Joaquim Pessoa Filho, Erik Aceiro Antonio, Eunézio Antonio de Souza

The association of Web technology with instrument automation by computer has made possible the development of the so called Remote Laboratories or WebLabs – distributed environments that allow to access and control real experiments through a network or the Internet. In this work we describe the main characteristics of a WebLab developed for the study of non-linear effects in optical fibers, aimed to support activities in face-to-face and distance courses in Optical Communications. We developed applications and graphical user interfaces for the remote measurement of an optical fiber non-linear coefficient and for the numerical simulations of the experiment. The WebLab is integrated to a virtual learning environment implemented with the course management system MOODLE. In order to implement such integration, we developed a new activity module based on PHP scripts and original components from MOODLE, which includes functionalities for user management, registration of remote experiments and configuration of learning activities.

### **DETERMINATION OF ATTITUDES OF STUDENT TEACHERS TOWARDS THE UTILIZATION OF TECHNOLOGY: CREATING A TECHNOLOGY TREE**

Öztürk Funda, Yücel A. Seda, Seçken Nilgün

This study involves an alternative statistical evaluation process of an assessment tool, which had previously been evaluated through factor analysis regarding determination of the attitudes of student teachers, who receive education in Turkey, towards the utilization of technology. The previously prepared 50 items were evaluated in this study according the Classification Tree method, which is one of the multi-variable statistical analysis methods. A classification of 31 leaves was created. All 31 items of the obtained Technology Tree reflected the positive and negative attitudes of student teachers of chemistry towards the utilization of technology as well as their technological consciousness. Additionally, the researchers emphasize that such a scale would serve as a guiding tool that could be applied to other groups with other social status and classes.

## **Session EW1B**

### **USING EMBEDDED SYSTEMS TO IMPROVE PERFORMANCE OF ASSESSMENT IN VIRTUAL REALITY TRAINING ENVIRONMENTS**

Ronei Marcos de Moraes, Liliane dos Santos Machado

Several techniques for training assessment in virtual reality environments have computational complexity incompatible with commodity computers performance. Even advanced computers could be unable to process, simultaneously and in real-time, 3D stereo graphics, haptical tasks, users interactions and assessment system. Advanced programming techniques, using specific hardware, can decrease costs of processing, allowing the utilization of low end computers. However, such strategies can be insufficient to guarantee the main features of virtual reality systems. In this paper it is proposed the use of embedded systems to compute specific tasks, to prevent those problems and allowing the use of low end computers. Consequently, embedded systems could contribute to minimize the lose of information and improve performance of assessment in virtual reality training environments.

### **ONLINE TRAINING ASSESSMENT IN VIRTUAL REALITY SIMULATORS BASED ON FUZZY NAIVE BAYES**

Ronei Marcos de Moraes, Liliane dos Santos Machado

Training systems based on virtual reality are used in several areas. In these systems the user is immersed into a virtual world to have realistic training through realistic interactions. In such training is important to know the quality of user's training. An online assessment system allows the user to improve his learning because it can identify, immediately after the training, where he committed mistakes or presented low efficiency. Several approaches to perform online or offline evaluation in training simulators based on virtual reality have been proposed. In this paper, we present a new approach to online training assessment based on Fuzzy Naive Bayes for modeling and classification of simulation in N pre-defined classes. Fuzzy Naive Bayes is a generalization of Naive Bayes Networks, which are a special case of probabilistic networks that allows to treat continuous variables using fuzzy linguistic values.

### **AN INTERFACE BASED ON HYPER REALITY FOR VIRTUAL MOCKUPS**

Liliane S. Machado, Ronei M. Moraes

Hyper Reality can be defined as the technological capability of join intelligence, virtual reality and physical reality. The main concept consists on provide to users a world better of the real world and added by information only available in a computer generated environment. In this context, the interfaces must be intuitive and natural to allow interaction among people and with objects present in the world. This paper presents an interface based on hyper reality to support several services from a virtual mockup, as access to laboratories, collaborative work, supervision, remote control and distance learning. The interface must integrate users to virtual representation of the real world and provide intuitive interactions with virtual components and real devices for remote manipulation.

### **HYDRODYNAMIC NUMERICAL MODELING AS A BASIS TO COASTAL ENGINEERING SOLUTIONS (SANTOS, SP, BRAZIL)**

Silene Cristina Baptistelli, Joseph Harari, Paolo Alfredini

This research aims at integrating and comparing results obtained from a numerical hydrodynamic model and from field data, in order to evaluate the hydrodynamic behavior of the Baixada Santista Region. The hydrodynamic model is a version of the Princeton Ocean Model (POM), a numerical system for simulations of sea levels and fluxes in estuaries, bays and coastal waters. The model results were compared to several measurements in Santos coastal area, as done for ADCP data and the model output at 24° 5.2'S 46° 17.8'W, in July / August 2002, in a water column of 20 m depth, which surface values presented a correlation coefficient of 0.52 for velocity intensity, 0.44 for direction, 0.67 for component EW and 0.35 for component NS. The research reveals that the results of the numerical model agree with measurements, demonstrating that this approach has general applicability as a basis to several coastal engineering solutions.

### **DESIGN OF AN AUTOMATIC SPEECH RECOGNITION SYSTEM USING A TEXAS INSTRUMENTS DIGITAL SIGNAL PROCESSING BOARD**

Jamel Price, Ali Eydgahi

In this paper, implementation of an automatic speaker recognition system using Texas Instruments DSP TMS320VC5510 board and Matlab® codes is presented. In recognition mode, the system analyses the speaker commands in order to execute minutiae cockpit voice controlled and other voice controlled commands. This work was part of a collaborative research project for the NASA Langley Research center and the Chesapeake Information Based Aeronautics Consortium. The issues considered for completing this research were determining which speech recognition algorithm, Dynamic Time Warping or Hidden Markov Modeling, produces the most representative speaker recognition system and then designing a Matlab® based speaker recognition system that can be ported to a real world environment such as airplane cockpit for recording and performing complex voice commands.

## **Session PW1A**

### **ANÁLISE DAS ÊNFASES DE EDUCAÇÃO E TREINAMENTO EM AMBIENTES VIRTUAIS 3D**

Marcelo da Silva Hounsell, Edgar Luís da Silva, Isabela Gasparini

Although 3D Virtual Environments (VE) are widespread and valued as learning helping tools, there is a lack of consensus on how much and which of the existing features contribute to the educational and/or training function. These emphases are clearly understood as different approaches. This paper surveys 37 (thirty seven) VE's using a conceptual model of differentiating characteristics. By analyzing the frequency of those features of the conceptual model on existing VE's it was possible to infer the importance of each characteristic regarding that emphasis on VE's. The features were then classified as "necessary", "desirable", "usual" and "optional" for each emphasis. Now it is possible to know based on a theoretical (concept of each emphasis) as well as practical (dissemination on existing systems) points of views, which characteristic contribute the most for a given VE to be considered as having an Educational and/or Training emphasis.

### **DETALHANDO ASPECTOS DE EDUCAÇÃO E TREINAMENTO EM AMBIENTES VIRTUAIS 3D**

Marcelo da Silva Hounsell, Edgar Luís da Silva, Jeferson José de Miranda

Three-dimensional Virtual Environments (VEs) have been valued as an aid for the Teaching-Learning Process (TLP) and a great variety of such systems can already be found in the literature. The TLP can be realized through an Educational and/or Training emphasis. These emphases however are not properly and precisely identified regarding the VEs scope. Most of the developers do not care to explicitly identify their systems and there are some difficulties on finding appropriate criteria to pinpoint their specifics. This paper proposes a conceptual model of characteristics that is able to differentiate these two approaches. The characteristics are divided into feature categories that will be detailed in this paper and which help identify their presence in the VE system. They not only help developers to better explain their systems potential's but also help them on the task of designing new systems that stick on to a particular approach.

### **MEDINDO AS ÊNFASES EM EDUCAÇÃO E TREINAMENTO DE AMBIENTES VIRTUAIS 3D**

Marcelo da Silva Hounsell, Edgar Luís da Silva, Avaniilde Kenczinski

The educational and/or training function are clearly understood as different approaches regarding the 3D Virtual Environments (VE) scope. Using a conceptual model of differentiating characteristics, a measuring scheme is proposed. This measuring scheme is capable of quantifying how much a given VE have of the educational and/or training emphases. The evaluation results on two indexes (one for each emphasis) that are calculated based on the weighted sum of the alleged presence of that particular feature and their importance. It is also taken into account the fact that some of the features are hard to identify and so, a "certainty rate" is proposed and shown how to be calculated. According to the indexes it is now possible to classify a VE into one of four different groups of applications with a given level of confidence. The VE can be classified as: Training And Educational; Educational Only; Training Only, and; Informational Only.

### **EDITOR COGNITIVO PARA APRENDIZADO DA LINGUAGEM ASSEMBLY**

Marilza A. Lemos

Despite of the C language have been spread in automation and control applications, such as microcontrollers programming, the importance of the Assembly language arises when questions as performance, code size, memory use are relevant subjects. However, the difficulties in the learning of Assembly language are amplified comparing with the

language C. One of the reasons is far away between natural plans and programming plans, since Assembly is a low level language. The computational aspects are strongly implemented in the syntax and semantics of the language. This work proposes a tool called Cognitive Edit that allows modeling, store and using programming plans. They can be seen as construction blocks that, combined, form the solution for a programming problem, in other words, a program. So, the apprentice can select and instance the plan that considers helpful for compose his program, learning in the automatic form.

## **LABORATÓRIO GNSS: UMA FERRAMENTA PARA ENSINO EM TELECOMUNICAÇÕES**

Fernando Walter

This paper reports recent development programs and activities in the GNSS Laboratory at the Instituto Tecnológico de Aeronáutica (ITA). Since early 1990's, personnel at the ITA have been working in the integration and evaluation of GPS sensors and related technology. Following directives from ICAO, ITA developed a systematic training program that uses GNSS as a curricular option for Telecommunications engineering courses. The objective is to generate human resources capable of overcoming the technological challenges and changes imposed to the aeronautical fields in the imminent presence of three main GNSS systems. Experimental project results and trends of this methodology are presented.

## **DESENVOLVIMENTO DE UMA FERRAMENTA COMPUTACIONAL DE APOIO AO ENSINO DE SISTEMAS ELETRÔNICOS DIGITAIS**

Marcelo Luis Murari, Norian Marranghello, Alexandre C. R. da Silva

In this work it is described the development of a computer-based tool for the support to digital systems learning. It has been named CALDIS, and achieves a more dynamic learning-teaching process through information exchange among students, and professor. Through CALDIS it is possible to discuss the subjects approached in classroom; students have access to support texts, as well as they can simulate several situations, and view the corresponding results. It has been assessed that the environment developed into an efficient didactic-pedagogical resource to support the understanding of the intended theory.

## **A AQUISIÇÃO DE IDIOMAS ESTRANGEIROS ATRAVÉS DAS TIC: O CASO DA LÍNGUA INGLESA**

Artur André Martinez Campos, Henrique Nou Schneider

This work focuses on studying the knowledge acquisition of a foreign language through the use of ICT. We aim this research to the learning of the English language since students develop both listening and reading skills when surfing websites in English. The acquisition of reading skills is promoted with the use of grammar taxonomies and magazines/newspapers from English speaking countries. Podcasts and AM/FM online radios from the UK, Canada, United States, South Africa and Australia are selected to the listening skills. A case study and a qualitative research check this hypothesis using S.I.L.L. inventory and evaluating the language acquired by the learners on the reading and listening activities. This paper suggests new approaches to the English language acquisition using the Internet due to its massive use on the web and the ubiquity of computers nowadays.

## **Session PW1B**

### **O PROCESSO DE INCLUSÃO DIGITAL ATRAVÉS DE AULAS DE INFORMÁTICA BÁSICA**

Thiago Cristiano Cunha, Joyce Danielle Reis, Célia Regina da Silva Rocha, Juliano Schimiguel, Ismar Frango Silveira, Carlos Fernando de Araújo Jr

The digital inclusion is a subject very argued and that it comes nowadays gaining space. However, one of the factors that intervene negative with this direction are the question of the accessibility, as well as the lack of chance to the involved ones. Thinking about this, as part of program PROESP (developed project inside of the Southern Cross University), that it has as objective to promote independence, autonomy and social interaction of young with physical and intellectual deficiency; we are promoting lessons of basic computer science aiming at to also prezar for the digital inclusion and the

preparation of these young for the use of the new technologies and medias. The lessons are prepared with intention to work with the motor coordination of the pupils at the same time where computer science concepts are given.

## **O PODER DO TRABALHO COLABORATIVO PARA O DESENVOLVIMENTO DE HABILIDADES E ATITUDES EM ESTUDANTES DE CURSOS NA ÁREA TECNOLÓGICA**

Dilermando Piva Jr., Ricardo L. Freitas, Geraldo Gonçalves Jr.

This article presents the results of the techniques and technologies applications of collaborative work in the pedagogical practices in the Technological Graduation Course in Computer Science of the Faculdade de Tecnologia de Indaiatuba - FATEC-ID and of the complementary aspects gotten in the development of abilities and attitudes necessary to the professional of success but beside the point complex to be treated for the traditional processes of teach-learning. The works carried through in diverse institutions since 2001 had demonstrated clearly that the practical adequacy of the pedagogical one with the available technologies allowed the creation of a rich environment of learning in content and existential experiences.

## **OS DESAFIOS DA CIÊNCIA DA COMPUTAÇÃO NO BRASIL NA CONTEMPORANEIDADE**

Henrique Nou Schneider

This article presents a reflection about the challenges of Computer Science in Brazil as they are defined in the special report of the "Sociedade Brasileira de Computação" according to the social and economical claims of the information and knowledge society, which is organized in webs and is supported by the Information and Communication Technologies to determine the new social and business relationships, presenting a movement of a rigid production and mass markets for a flexible-lean production and niche markets

## **O COMPUTADOR E O SEU PODER DE INTERAÇÃO NO AMBIENTE ESCOLAR**

Sheilla Silva da Conceição, Henrique Nou Schneider

In the world of computer mediated communication is living in another time and in another space, which provides a challenge for educational practice. Education has to adapt to the new needs of society. The Computers have produced changes in ways of learning and consequently in education. In that sense, the power of interaction is not fundamentally in technologies, but especially in our minds. When two or more persons cooperate in an activity, happen the mediation process, as well as a redrafting of knowledge. The use of some tools such as bulletin board, chat, among others, may trigger new conflicts cognitive. These happen not by tools themselves, but by the interaction of the subject with them and through the interference of other individuals who may to act as promoters of cognitive growth. Thus, the computer is only a means, innovation is to use the technology to cause significant learning.

## **A ESTRATÉGIA ECOLÓGICA DAS EMPRESAS QUE GERAM PRODUTOS A PARTIR DE RESÍDUOS**

Bertholdo Werner Salles, Eduardo J. Soriano-Sierra, Mauro B. Meirelles

The residues generated by the man, through their domestic and industrial activities, they grow in amount and volume, mainly due to the increase of the demographic density, of the technological development and of the elevation of the standard of living. No strategy has sense if it be not adapted to the field. When defining the borders of the action of the company besides the social and economical field, the ecological strategy forces who administers company to establish a map of the field where the action will grow.

## **TV DIGITAL INTERATIVA: INSTRUMENTO PARA INCLUSÃO SOCIAL E INTEGRAÇÃO NACIONAL?**

Alexandre C. dos Reis Lima, Joni Fusinato, Alejandro Martins Rodriguez

The implementation of Digital TV in Brazil is no longer far-fetched. This new media brings unique communication and interactivity tools, unlike Analog TV, which is unidirectional media. In this context, the Brazilian government has viewed Digital TV as a key tool for battling social inequality across different regions of the country. Due to its large territory, Brazil may use this broadcasting technology to strengthen national integration, bringing forth transparency to events

across the country and enabling unique services such as e-government and TV messaging among others. However, from an information perspective, several interests arise once a new promising field unfolds to different social actors with likely diverging interests. This bias may lead to heterogeneous and unequal access to Digital TV.

### **AS TECNOLOGIAS DA INFORMAÇÃO E COMUNICAÇÃO (TIC) COMO VETOR DE TRANSMISSÃO DE INFORMAÇÃO OU PRODUÇÃO DE CONHECIMENTO? UM ESTUDO DE CASO.**

Ucineide Rodrigues Rocha Moreira, Henrique Nou Schneider

The reality in which we live is characteristically marked by fast changes. The world is no longer the same and daily life implies exceedingly high access to information. Amidst all of this, globalization as well as information and communication technologies (ICT) tend to make increasingly shorter the distance which puts men apart. Social sectors are influenced by such changes and play their role in a typically modern scene. Education, just like all other segments of society, has also a part to perform in this process. This academic work thus aims to investigate how education has dealt with these changes and innovations and more precisely the manner ICT are being used in schools. It is a case study carried out in an Aracaju-SE private school about the contributions to the teaching/learning process offered by ICT to teachers, students and pedagogical staff.

## **Session PW1C**

### **FÊNIX: A MODEL ARCHITECTURE OF A WEB APPLICATION GENERATOR FOR FOMENTATION AGENCIES IN BRAZIL**

Eberson Omar Weschter, Marcelo Augusto Santos Turine

The increasing number of used Web applications in the organizations motivates the research and the development of tools that reuse devices already produced, generating them automatically. The use of standards of software, components and frameworks assists the agile development of applications, increasing the reusability of the models and the produced code. Considering that some institutions of fomentation in Brazil do not use digital ways to manage, to follow, to monitor and to evaluate projects of research and/or extension for the Internet, and few possess dynamic Web systems for interaction with its community, the present work uses technology to implement a generator of application for the present domain. In this context, to take care of to the enterprising business in Brazil the use of tools and techniques of automatic generation to applications is one of the solutions, as present the proposal of an automatic generator for fomentation agencies intitled Fênix.

### **TREMOR HUMANO: REGISTRO, DETECÇÃO, QUANTIFICAÇÃO E ANÁLISE**

Lilian Ribeiro Mendes Paiva, Adriano Oliveira Andrade, Adriano Alves Pereira

The central aim of this paper is to present a review regarding the state of the art on strategies for detection, quantification and analysis of human tremor. For this, a number of papers taking into account the study of tremor in natural (i.e., resulting from a physiological process, for instance, the ageing process) and pathological conditions were investigated. From the discussion and ideas presented in this review it is expected that the reader will obtain a first introduction to distinct aspects concerning the origins and methods to investigate tremor.

### **EXPERIMENTS ON ENVIRONMENTAL COMFORT TRANSFORMED INTO REMOTE ACCESS LABORATORIES**

Regina Coeli Ruschel, Fernanda M. P. Freire, Núbia Bernard, Eleri Cardozo, Eliane Gomes Guimarães, João Vilhete Viegas D'Abre, Marcos Túlio Chella

This article partially presents the learning action proposed as concept proof of the distance-learning environment under development in FAPESP's TIDIA-Ae project . Introduction to Environmental Comfort was the topic selected as the main theme of the action proposed for undergraduate students of Architecture. The learning action was implemented as a distance learning in introducing students to elementary notions on the topic through observation and experimentations associated to practice. In this context, two infrastructures of Remote Access Laboratories (RAL) were used: the RAL-SIROS for an experiment on built environment evaluation on accessibility and the RAL-REAL for

an experiment on ventilation evaluation on scaled model. This article discusses the necessary interdisciplinary effort for the mapping of present laboratory experiments to RALs. It is also presented the validation process of the proposed experiments and the corresponding implementation in RAL format.

### **COMPARATIVE ANALYSIS BETWEEN OVERLAPPING AND NONOVERLAPPING OPERATION MODE FOR THE BUCK PWM CONVERTER USING THE THREE-STATE SWITCHING CELL**

Falcondes J. M. Seixas, Juan P. R. Balestero, Thiago N. Santelo, Grover V. T. Bascope

This paper presents a comparative analysis between overlapping and nonoverlapping operation mode for the buck PWM converter using the three-state switching cell (TSSC). In this converter only part of the load energy is processed by the active switches, enabling this topology to operate at higher power levels. The volume of reactive power elements (inductors and capacitors) is also decreased since the ripple frequency of the output voltage is twice the switching frequency. For lower operating frequency, switching losses are decreased. Another advantage of this converter is the smaller region to operate in discontinuous conduction mode when compared with the conventional buck converter or, in other words, the operation range in continuous conduction mode is enlarged. The main experimental results with the comparative analysis of 1kW prototype, implemented and tested in laboratory, are discussed in this paper.

### **ASSOCIAÇÃO PARALELA DOS SUBCONDUTORES DE CONDUTORES MÚLTIPLOS**

Sérgio Kurokawa, Carolina G. de Carvalho, Rodrigo S. Daltin, Afonso J. Prado, José Pissolato

The objective of this paper is to show a exact procedure to obtain the equivalent conductor for a bundled conductor. The proposed methodology takes into account the distributed nature of the longitudinal parameters of each conductor of the bundled conductor and also takes into account the mutual coupling among conductors of the bundled conductor. The developed procedure will be used to obtain the equivalent conductor of a hypothetical bundled conductor constituted by two conductors. The equivalent conductor will be find by using the geometric mean radius of the conductors that constitute the bundled conductor and also will be find by using the proposed methodology. The results will show that there are differences among parameters of the equivalent conductor obtained by using geometric mean radius and parameters obtained by using the proposed methodology. The differences are manly in the resistance, capacitance and conductance of the equivalent conductor.

### **MÉTRICAS PARA AVALIAÇÃO DE DESEMPENHO EM REDES WiMAX APLICADAS A PREFEITURA MUNICIPAL DE HORTOLÂNDIA**

João Carlos Lot, Ranieri Marinho de Souza, Eduardo Pinto de Oliveira, Omar Carvalho Branquinho

This article proposes a method for evaluating the performance of the network WiMAX, technology that operates at 5.8Ghz, operating in the city of Hortolândia-SP, we propose a metric that indicates the efficiency of the network considering the number of frames per level of modulation, this metric to assess the degree of efficiency and the need to change the topology of the network or even the amplification of the same, it is a proposal that this tool meets the requirements of the people who manage the network, but do not have Strong knowledge in the area of networks wireless. This tool can be provided for many public entities assisting in the network management and optimizing the application, thus contributing to the digital inclusion.

### **IMPLEMENTAÇÃO DE NCAP (IEEE-1451) EM DISPOSITIVO EMBARCADO (NIOS)**

Alexandre César Rodrigues da Silva, Tércio Alberto dos Santos Filho, Silvano Renato Rossi, Thiago Alexandre Prado

The stress level in the swine and poultries is related directly with the temperature of the environment. Producers invest on technology with objective of minimize the related problems, usually, with high costs. The technology without human supervision can generate mistakes causing damages and death of the several animals. For the supervision and control of these environments, we developed an embedded server NCAP using the kit Nios II that is controlled through the Ethernet network. The server was developed in agreement with the norms of the pattern IEEE 1451. The communication between the server and the microcomputer is accomplished by the UDP/IP protocols. When the NCAP server receives the package, it sends the control signal to STIM module that does the control or read one sensor and the sensor values come back to the microcomputer. This system was submitted to Olympics of the PI Componentes, obtaining the second place.

## **Session SW1A**

### **LA FORMACIÓN DE INGENIEROS EN ARGENTINA: REQUERIMIENTOS DE LOS NUEVOS TRABAJOS PARA LOS GRADUADOS EN ELECTRÓNICA, MECÁNICA Y SISTEMAS DE INFORMACIÓN**

Estela Gamondés, María Luisa Jover, Diego Villalba, Fernando Napoli, María del Pilar Verde Rey, Inés Casanovas

With the transformations that took place in Argentina since 1990, and considering the conditions of work in the world today, we are looking to identify the identity and selection features of the new jobs of Electronics, Mechanics and Information Systems Engineers that have appeared in our country because of the influence of Information Technology. We will take into account the different sociological approaches that introduce knowledge as critical factor to the productive paradigm and the main role of Education as essential condition for insertion in the working environment. So, we hope to create knowledge about competencies required to these engineers by the new job, add elements useful to future planning of engineers training that include the competencies that allow them this insertion and contribute to debate and update of curriculum in the careers offered in our university

### **EXPERIENCIAS EN UN CURSO DE ELECTRÓNICA DE POTENCIA PARA PROFESIONALES QUE SE ESPECIALIZAN EN AUTOMATIZACIÓN INDUSTRIAL**

Fernando Bertolotti, Fabiana Ferreira

This paper presents some experiences obtained in a electronic power postgraduate course which is a subject inside of an automation specialist post degree course. This course is oriented to graduates and it has some characteristics that we will comment later which we have considered for determination of its structure and contents. The methodology followed in class was based on the intensive use of simulation programs which became a fundamental educational tool to stimulate learning, improve understanding and it can be an excellent form to achieve the integration of new concepts with other subjects. We relate about the experiences developments in class, also we show the results that we had obtained of this and conclusions what are made in reference to the methodology used.

### **BERLIN: SENCILLEZ Y CALIDAD EN LAS BÚSQUEDAS WEB**

Jose Jesus García Rueda, Francisco Javier Ruiz Guijarro, Raúl V. Ramírez Velarde

In this paper we present BerLin, a web searcher that filters the found web pages before indexing them, in order to keep only those with high quality and potential interest "a priori" for the users. BerLin does not use very complex technologies: the basic idea is to extract, out of the email interchange in the forums, those pages that experts recommend each other. The tool is also groups-oriented, facilitating, by means of the customization it allows for, the reinforcement of a community sense, the quick integration of new members in the community and the semi-automatic development of a shared repository of quality information. These features make it especially appealing for teaching and learning, both in engineering and in other fields, as it very positively contributes to the creation of a shared knowledge space for the learning community.

### **EL ENFOQUE CONCEPTUAL EN LA ENSEÑANZA DE LA INGENIERÍA**

Omar A. Iglesias, Carmen N. Paniagua

The incorporation of computer utilities to the professional Engineering working environment requires an adaptation of the students's curriculum of this speciality. This paper presents the formation of the so-called Cybernetic Engineer, together with examples of some thematic axis for the special case of Chemical Engineers. This paper also remarks the importance of the conceptual approach as basis of the control and conduction of computing tasks, which are derived towards application programs. In this context, really basic matters, such as freedom degree analysis or long-standing professional practices [such as the use of rules of thumb and shortcut methods), are reassessed. Several examples, taken from the use of simulators in the formulation and analysis of process basic engineering alternatives, are also included in the present paper.

### **ACTIVIDADES DE ARTICULACIÓN EN FÍSICA PARA EL INGRESANTE A INGENIERÍA**

Susana Julia Meza, Irma Irene Lucero, María Silvia Aguirre

Previous studies have shown that novel engineering students of the Exacts and Naturals Sciences (UNNE- Argentina) have deficiencies in basic competences required for Physics learning. This fact causes academic failures and a dropping effect within the first year of studies. A pre-university Workshop in Physics is currently being executed in order to ameliorate the mentioned insufficiency. Its implementation required the construction of a descriptive hallmark of these students and the design of learning-teaching activities focused on the systemic analysis of physical situations. This presentation describes the sequence of the implemented teaching activities according to a previously drawn map of detected difficulties. Main competences in Physics for the novel engineering students were achieved through the support of laboratory materials and PC simulators. We present as examples, the activities designed for students whom initiate the first university course of basic Physics, to solve the frequent confusion between "paths" and "position/time graphics".

## **A LOW COST EDUCATIONAL TOOL USING LABVIEW FOR ELECTROMEDICINE TEACHING**

Pedro P. Escobar, Silvano R. Rossi, Raúl E. Romero

Electromedicine teaching integrates electronic and physiological knowledge applied to understand how a device works to improve critical analysis of real life working situations. The necessity of a simple and powerful educational tool motivated us to develop a patient simulator using Labview in order to provide a better training for our student, teaching how to test and calibrate various medical devices with only connecting them to the computer through different interfaces. The virtual instrument showed to be a powerful tool for modeling physical systems, testing devices and an excellent resource for education helping to visualize real world dynamic processes and to enhance student's knowledge. Testing capabilities were of great practical relevance. Further versions of the patient simulator will include new VI's for mechanical ventilators and EEG devices. The designed patient simulator is a low cost, very useful, training and educational tool and it was developed entirely as an original work.

## **PROFESSORS' DRIVING AND LIMITING FACTORS FOR THE ADOPTION OF E-LEARNING IN HIGHER EDUCATION WITHIN ARGENTINE CONTEXT**

Inés Casanovas, Gladys Fernandez, Carlos Tomassino

Implementing e-learning needs an accurate understanding of the users requirements to be met but we also felt that higher education professors have driving and limiting factors that encourages or prevent themselves in facing the first step in e-learning. This scenario was explored by designing and distributing a questionnaire among professors from engineer careers at National Technology University in Buenos Aires, Argentina. We selected them taking into account different formation backgrounds in order to avoid biases in answers. We then performed a comparative analysis and it was shown that 95% of them were very or rather positive towards e-learning; their main purposes to use it were related with improving interaction and not technical facilities. Driving factors were mainly the search of pedagogical improvements. Barriers were both individual concerns (lack of technical knowledge and time) and institutional (lack of incentives and technical support).

## **Session EW2A**

### **APPLYING SOFTWARE METRICS TO JUNIOR STUDENTS OOP PROJECTS**

Oswaldo Clúa, María Feldgen

We applied a set of metrics to the CS3 final project of our junior students. They were asked to develop a medium sized java application such as a game with visual components. We used a set of industry based metrics, some unique to Object Oriented Programming and others more general such as reuse oriented metrics. The used metrics are aimed to measure quality of the software and intrinsic aspects of the design. Inspecting the outcomes we were able to draw some similarities between the way our students use Object Oriented Programming and some findings on students perception of object oriented programming.

### **IMPROVING DISTRIBUTED SYSTEMS DESIGN THROUGH WRITING**

María Feldgen, Oswaldo Clua

An important challenge in teaching a distributed systems course at an advanced undergraduate level is to design

appropriate assignments that can provide students an insight into the complexities of distributed computing, as well as a hands-on experience. Our course is student-focused, and learning-oriented, with an emphasis on providing assignments designed to ensure active learning. We included a writing activity and small group collaboration to increase reasoning ability. We ask student teams to write a conference paper introducing them in the use of the principles of writing research papers and argumentative essays. Student teams can rewrite their papers as many times as necessary as the reviews are very exhaustive. In this paper, we will show how the students' paper works as an assessment tool and how intellectual development progression and approaches to learning showed up during the paper reviews and as a retention tool for students with low attendance rate.

## **DESIGN AND DEVELOPMENT OF AN INNOVATIVE ECCENTRIC LOCATER PIN FOR AN INSPECTION FIXTURE**

K. Gokul Kumar, S. Hemakumar

In manufacturing industry, evolution of multi-axis tool movements and multitasking capabilities of CNC machines has reduced the number of setups and machining fixtures needed to machine a part. Every part made needs to be inspected to insure part quality and conformity to dimension. However, inspection tooling systems have not changed radically. And the time taken to manufacture an inspection fixture for a new product takes more time, which results in increased lead time of the product. This paper discusses the work done on design and development of an innovative eccentric locater pin for an inspection fixture which reduces the lead time of a new product. The paper also highlights the details of how the eccentric locater pin can handle the variations in part dimensions.

## **METAPHOR ENTAILMENTS IN DIGITAL ANNOTATION DESIGN**

Christian Adriano, Matthias R. Brust, Ivan L. M. Ricarte, Steffen Rothkugel

In this paper, we investigated educational technology design by means of porting metaphors among usage scenarios. Even though such approach is common in usability engineering, it is novel to domain-driven design. In this context, the metaphor adopted is the annotation on documents. The method was to survey metaphors in current digital annotation systems and to analyze their metaphorical implications. These implications are defined as entailments. As result, it was possible to extract essential and accidental features. As proof of concept, we probed the rationale by porting metaphors to an educational software engineering scenario prototyped in the Eclipse IDE. We concluded that entailments should play a role in domain-driven design. Questions for further research are offered.

## **PHYSICS ASSESSMENT TOOL.**

James F. Sullivan

The Physics for Technology courses at my college are primarily service courses for engineering technology majors. These academic programs are accredited by the Accreditation Board for Engineering and Technology (ABET) and therefore the Physics courses must participate in the accreditation processes. ABET has recently changed its processes to emphasize assessment and the author has developed a short pre-/post-course test to aid in the assessment process. The test for the first term (of our three-term sequence) will be shared along with results of testing that have been done during the past two academic years in preparation for the recent accreditation visit as well as future accreditation visits.

## **TEACHING RADAR CROSS SECTION CONCEPTS TO UNDERGRADUATES WITH A SIMULATION SOFTWARE**

Mauro A. Alves, Mirabel C. Rezende

The commercially available CADRCS software, sold as a simulation tool for military and industrial applications, was used to teach the main concepts of Radar Cross Section (RCS) to undergraduate students. Models of objects and targets are created in CAD; their surfaces are discretized with the Rhinoceros software and imported to CADRCS for the simulations. In this way, the RCS of objects with both simple and complex geometries can be simulated with relative ease and versatility with CADRCS. The visualization and analysis of these simulations serve as valuable teaching aids, helping students to obtain a better understanding of key issues related to the calculation and interpretation of the RCS signature of actual objects and targets.

## **ANALYSIS OF MAN-MACHINE LEARNING PHENOMENA BASED ON PROGRESS ELASTICITY AND RELATIVE RELIABILITY RISK INDEX (R<sup>3</sup>I)**

Rajiv B, B. B. Ahuja, S. K. Basu

The paper deals with the man-machine learning phenomenon where two cases have been considered, one on Man-Learning and other on Machine-Learning phenomena. In a case study on man-learning a component (job) is considered with increasing complexity and time required to make a moulds in sand casting is measured. In this case study progress elasticity is determined. In another case study involving the machine-learning, classification of machine learning has been done. A case of machine learning of a CNC lathe machine has been considered; the alternative criteria have been chosen based on the Relative Reliability Risk Index.

## **Session PW2A**

### **PESQUISA EDUCACIONAL NO BRASIL: INTERDISCIPLINARIDADE COMO FORMA DE AGREGAR VALOR CIENTÍFICO E EXPERIMENTAL**

Ana Clara Bonini-Rocha, Maria Isabel Timm, Marilda Chiaramonte, Milton Zaro,  
Ricardo Demétrio de Souza Petersen

Based on bibliographic sources, the paper summarizes historical context of brazilian educational research culture. It points to the lack of experimental and scientific basis, as well as to the importance to open a real dialogue with contemporary multidisciplinary knowledge and instruments of Neurosciences, in order to add value to educational researches. It suggests that this scientific approach can contribute to improve research methodologies to support real knowledge acquisition in terms of teaching and learning, both biologically and culturally. As an example, it reports an experiment to observe cognitive and motor learning, using EEG.

### **RESPONSABILIDADE SOCIAL COM ESTRATÉGIA DE SUSTENTAÇÃO ORGANIZACIONAL EM UM MERCADO COMPETITIVO**

Frederico Teixeira da Silva

Social Corporative responsibility is a subject that comes attracting the attention of society. In this movement, the organizations if consider to assume socially responsible position in relation to social injustices and degradation of nature. With increase of the competitiveness in worldwide market, from the globalization process that causes an enterprise change in the worldwide scene, companies that adopt politics of Social Corporative Responsibility, thus taking care social demands, start to increase reputacional capital, starting gain the allegiance of consumers, being thus obtained to remain itself in the market. Therefore when the organizations start adopt one responsible politics starts to add value the mark and if to differentiate in the market. This work presents study on the Social Corporative Responsibility, showing to the importance of this new philosophy for the empowerment of institucional image of the companies, using the knowledge of social actions for attainment of positive results for their public.

### **UM MODELO DE PROCESSO DE CONSTRUÇÃO DE PROGRAMAS PARA APRENDIZES**

Marilza A. Lemos

This work presents a Process Model of Program Construction for Apprentices proposed as a cognitive tool, defined in the literature as one that assists people to execute mental activities that can not be observed directly or they can little be observed, such as to help think, to know or to learn. To represent the Model, is specified a language based in Hierarchical Planning of Artificial Intelligence, the Language of Cognitive Program (LPC). The LPC describes planning components and strategies for programming to be used by apprentices and thus, to contribute for construction of programming cognitive knowledge. The model elements-key are programming plans that arranged, can represent solutions for programming problems. Programming plans are modeled from elementary programming patterns of the Pedagogical Patterns research area and books.

### **UM SOFTWARE DE EXERCÍCIO-E-PRÁTICA PARA ALFABETIZAÇÃO INFANTIL**

Rogério Carneiro Machado, Aleandra da Silva Figueira-Sampaio, Eliane Elias Ferreira dos Santos, Gilberto Arantes Carrijo

The objective was the development of software, which would aid the educator during the literacy process of students through the use of practical exercises, allowing the individual student to interact with his/her own reflections, thus adding their participation to the learning process. The authors decided upon the use of the Flash 8, as it combined optimization to the file size as well as speed to the loading of the animation. The software presented exercises with different difficulty levels and vibrant colors are a predominant part of the environment, guarantying that students are motivated and become involved in the proposed exercises. Resources such as sound and text also make up the exercises. The architecture is made up of two main modules: Graphic Interface and Activities, where the last is divided into: Modeling/Animation and Execution. The aspects analyzed showed themselves satisfactory for the objective for which the software was developed.

### **MODO DELIZANTE DISCRETO APLICADO AO SISTEMA BOLA E VIGA COM ATRASO NA COMPUTAÇÃO DO SINAL DE CONTROLE E ACESSO À SAÍDA DO SISTEMA**

José Paulo F. Garcia, Lizete Maria C. F. Garcia, Graciliano A. Damazo

In this work a new discrete sliding mode controller is proposed for delay time systems. This discrete-time control design proposes a smooth sliding law, which takes in consideration the converters, the sampling period and the delay time. It is considered only output access. Thus, it is also presented a sliding mode robust observer design that takes into account the time-delay. The efficiency of the discrete controller and the continuous-time robust observer will be shown by results of simulation in the System Ball and Beam.

### **JOGOS COMPUTACIONAIS PARA AUTISTAS**

Vera R. N. Schuhmacher, Tatiana S. Rodrigues, Maria I. Castineira, Elcio Schuhmacher

A criança autista enxerga o mundo de uma forma diferente, o autismo é uma inadequacidade no desenvolvimento que se manifesta de maneira grave por toda a vida. Diferentes estudos comprovam a interação harmoniosa entre o computador e o indivíduo autista, que dependendo do grau de incidência faz uso de ferramentas profissionalmente, para seu entretenimento e estudos. No processo de alfabetização onde são vistos os primeiros conceitos de matemática e a introdução a arte de ler e escrever é fundamental para o autista o uso de instrumentos que reforcem seu aprendizado, neste contexto o uso do computador pode ser um forte aliado. O jogo no computador é uma das maneiras que se pode utilizar para apoiar este desenvolvimento. Este artigo relata a concepção e desenvolvimento de jogos que permitam o apoio ao desenvolvimento da criança autista com idade de 6 a 8 anos por meio do computador.

### **DO GIZ À TV DIGITAL: UM PROGRAMA DE CAPACITAÇÃO PEDAGÓGICA CONTINUADA ENQUANTO FATOR ESTRATÉGICO NO GERENCIAMENTO DA MUDANÇA**

Joni de Almeida Amorim, Irani Marchiori, Eduardo J. P. Coelho, Silvia H. Z. Coelho

The transmission of dynamic or sometimes static images, generally with accompanying sound, via electric or electromagnetic signals, was considered a revolution. The television, an electronic apparatus that receives such signals, revolutionized the way people accessed information allowing them not only to watch news and films, but also to watch educational programs. With the Internet, the use of multimedia turned teacher training on computer based education fundamental as a way to better prepare them to work in this new context. Now, with the advent of the interactive digital TV, teachers experience a new change that once more demands quality training. This paper discusses the importance of training for a more appropriate management of change in institutions. The tendency of massive use of videos in education as a way to enrich learning brings the need for training on satellite videoconferencing, for example, a need fulfilled by the initiative described in this paper.

## **Session PW2B**

### **USO DE UM AMBIENTE VIRTUAL DE APRENDIZAGEM PARA ACOMPANHAMENTO DO PERFIL DE EGRESSOS**

Douglas Almendro, Juliano Schimiguel, Ismar Frango Silveira, Luis Naito Mendes Bezerra, Vagner Silva

The management of Supervised Professional start-up activities for Computer Sciences and Information Technology

undergraduate courses is a task that entails huge amounts of time and discipline, since it requires not only the quantitative supervision of course-related activities executed by students, but also obliges to a qualitative analysis of the impact of such activities in learning process as well as in students' future professional lives. This paper aims to present an experience taken at Cruzeiro do Sul University – São Paulo, Brazil – when a virtual learning environment – Blackbord, in this case – was used as an effective tool for such surveillance task.

### **PROPOSTA DE UTILIZAÇÃO DE PROCESSO INFORMATIZADO PARA APOIAR ATIVIDADES DE MITIGAÇÃO DE EVASÃO ESTUDANTIL EM INSTITUIÇÕES DE ENSINO SUPERIOR**

Renata de Souza França, Thiago Marotta Couto, Nesley Jésus Daher de Oliveira

The objective of this paper consist of a study on the evasion of students (or pupils) at Undergraduate and Graduate Institutions (Univesities) on the basis for use of datamining tchniques through a tool named WEKA. For that, different ways of analysis of preces of information on the evasion at universities will be demonstrated, presenting a parallel between at the moment they decide to drop a major. The methodology was applied to group justifications of students for evasion a course at a specific institution, at the moment they formalize it, in order to build up data. Consequently, a mining technique was studied to help determine a real reason for evasion. From there a tree of decision wich estimated a solution to minimize the problem of evasion at universities it is proposed.

### **PROJETO E DESENVOLVIMENTO DE UM MÓDULO DIDÁTICO PARA TRANSFORMADOR SCOTT**

Falcondes José Mendes de Seixas, Rodolfo C. Fernandes, Priscila S. Oliveira

Formed by two specially connected transformers, Scott connection provides two single-phase sources out of a three-phase one, it means that can be proposed to interface different electrical supply systems such as in high-speed railways substations. An important property of this connection is its reversibility, in other words, Scott transformer operates converting three-phase to two-phase sources and also the way back, which increases the number of possible applications. Knowing the main characteristics of this special connection, we propose mathematical and phasorial analysis and digital simulations. The results will be the base for a didactic prototype, giving full windings access. Moreover, important tests will be carried out, including the operation of a two-phase motor.

### **DESENVOLVIMENTO DE UM OBJETO DE APRENDIZAGEM PARA ESTUDO DE ANÁLISE DE SISTEMAS DE ENERGIA ELÉTRICA**

Márcia Beatriz Carvalho Pereira, Laurence Duarte Colvara

This paper presents a contribution to the development of Engineering Education techniques, by means of a Teaching/Learning support tool for Electrical Power System studies resulting in a friendly low cost interface software. It was developed in C++ language and follows the pattern of object oriented programming, offering to the user the resolution of load flow and digital simulations of transient stability with the possibility of interactivity, showing the results in a graphic environment. It was developed for use in applications of Static and Transient Power Systems Stability and it has enclosed classic sample-systems of IEEE and others and also allows the user to customize input data files. Then the tool is flexible and enables easy access to cases formerly inserted in the system. The machines rotors movement can be seen in a graphic animation, allowing easy visualization of events, phenomena comprehension and analysis of influences about the performance.

### **DISPOSITIVOS MÓVEIS APLICADOS NA AMPLIAÇÃO DA CARGA HORÁRIA DOS CURSOS EDUCACIONAIS POR MEIO DA PLATAFORMA JAVA**

Marcelo Silva, Rodrigo Vieira Nunes, Raphael T. C. Matos, Robson da Cunha Silva

In today's world, the search for knowledge has become fundamental due to the technological demand. Therefore, the course schedule of educational courses has become short in relation to the learning period. A video-exercise system, through a mobile device, aims at narrowing the frontier among education, knowledge and technology, optimizing the time for theory and pratice in most of the courses, filling an existing gap. The possibility of the search for an exercise whose resolution is shown in a video in the internet, helps the student equalize the course schedule with the learning period. The development of system of such relevance requires a tool which fits the proposed functions, and the Java plataform constitutes a proper example. The project facilitates the knowledge enrichment in educational courses.

## **MAPAS DE DEPENDÊNCIAS: UMA METODOLOGIA PARA O PLANEJAMENTO E A AVALIAÇÃO DA APRENDIZAGEM**

Rommel Wladimir de Lima, Sergio Vianna Fialho

The assessment is one of the main problems for the teaching-learning process, mainly for scientific and technological areas. This paper has the objective of presenting the Dependency Map, which enables the teacher to plan the evaluation of disciplines based on education goals and not just in the contents. Besides, this work presents a methodology that makes possible the use of modern educational theories in the planning of disciplines where the Dependency Map is inserted.

## **GESTÃO DE EAD – PLANEJAMENTO DE AÇÕES DE UM CEAD PARA ATENDER AS DEMANDAS DA EQUIPE DE PRODUÇÃO DE MATERIAL PARA EDUCAÇÃO TECNOLÓGICA E ENSINO DE ENGENHARIA**

Luis Otoni Meireles Ribeiro, Maria Isabel Timm, Milton Antonio Zaro

To respond to technological and professional education needs, with huge demands in terms of complexes and structured contents, institutions have to develop planning strategies, to handle different human, technological and pedagogical issues. They also need to use management tools, to follow the activities and monitor quality information about the process. This work presents a use case of a management tool, the QFD (Quality Function Deployment), to guide decision about settling a Distance Education Center (CEAD, according to the terms in Portuguese). It presents partial results of the research, found after the use of the tool with the multidisciplinary team that produces educational resources, in a technological and professional university, in Brazil. It contains the activity of elicitation of what is perceived by this team, as being necessary to the effective work of the group.

## **Session PW2C**

### **COMPARAÇÃO DA EFICIÊNCIA DAS CARTAS DE CONTROLE DE SHEWHART, SHEWHART COM MODIFICAÇÕES, CUSUM E EWMA EM PROCESSOS COM MEDIDAS INDIVIDUAIS**

Raquel Cymrot, Rodrigo Rodenburg Magalhães

The best way to detect changes in the mean of some variable of interest in a production process is by using the statistic control charts. Whenever it is desirable to detect small changes in the mean, the traditional Shewhart chart can be of little efficiency, once it is not used to detect changes lower than 1.5 times the standard deviation of the process. To make the performance of these charts better, others criteria can be added, although others false alarms can happen frequently. CUSUM and EWMA control charts have showed their selves fast in the detection of these small changes. Simulations of four hundred samples were made and was verified the efficiency and the advantages of one method over the other. In the sequence, the speed of the detection of the changes in the process was compared and the incidence of fewer false alarms too.

### **ANÁLISE DE EMISSÃO DE GASES DE VEÍCULOS COM INJEÇÃO ELETRÔNICA UTILIZANDO PLANEJAMENTO DE EXPERIMENTOS**

Raquel Cymrot, Luis Antonio Vidotti

The environmental pollution and specifically polluting gas emissions are utterly relevant issues nowadays, in view of a new worldwide conscience on ecology and environment. This work aims to seek some answers to vehicle gas emissions, using experiment planning. The factors regarded are fuels as pollution raw material, technology applied to vehicles and motor use conditions. The objective of this work is to find the best combinations of the mentioned factors to minimize gas emission into the atmosphere. The outcome of such analyses shall cooperate both with the environmental issue and the technological development in the processes of sources of energy, searching to be self-sustainable so as to preserve life, health and also the comfort that technology brings.

### **ERP COMO TÉCNICA DE INVESTIGAÇÃO SOBRE PADRÕES COGNITIVOS EVOCADOS COM ESTÍMULOS VISUAIS 2D E 3D**

Marilda Chiaramonte, Alexandre Balbinot, Giovani Carra, Milton Zaro

Event Related Potential is a basic and non-invasive method of electrophysiological investigation. It can be used to assess aspects of human cognitive processing such as visual pathway. This paper focused on ERP technique to discover signal cerebral pathway related to an external visual stimulus. In that experiment we used 2D and 3D visual stimulus in the same picture. The signals were captured using 4 channel EEG system developed for this project and interfaced in a ADC board with LabVIEW system - National Instruments. The signals were math treatment and statistical techniques showing the relationship between cognitive pathway by groups and intergroups.

### **IDENTIFICAÇÃO DE SIMILARIDADE ENTRE ARQUIVOS ELETRÔNICOS ATRAVÉS DA DIVISÃO SENSÍVEL AO CONTEÚDO**

Thiago Marotta Couto, Renata de Souza França, Nesley Jésus Daher de Oliveira

This paper proposes the development of a content-based file splitter technique that divides any kind of electronic documents into changeable segment sizes, ensuring that the every identical information is always subdivided in same way: inside identical blocks. Studies indicate that split electronic files into small segments can facilitate identify equivalent fraction's of information between different documents, allowing wastage reduction of transfer and storage of duplicated information. However, the definition of these segments is critical and must be accurate, since the same information present in separate files, if divided into unequal sizes blocks, can originate different results, compromising the similarity detection efficiency. This paper concludes with an algorithm model that detects similarity level between non-identical electronic files.

### **DESENVOLVIMENTO DE UM SISTEMA DE IMPORTAÇÃO E EXPORTAÇÃO DE DADOS PARA UM AMBIENTE VIRTUAL DE ENSINO E APRENDIZAGEM USANDO XML**

Fabrcio Viero de Araujo, Felipe Martins Muller, André Zanck Condenonsi, Tatiani Oliveira

This article has as objective, to show to the development of an exportation system and importation of data, developed from free software, for a virtual environment of education and learning. The environment for which the system was developed, was the environment AMEM, that it is a total free environment, used in the Federal University of Santa Maria.

### **SISTEMA DE AQUISIÇÃO DE DADOS CONFORME IEEE1451.4**

José Carlos dos Santos, Silvia Maria Farani Costa

This work was the development of an acquisition, processing and storage system of a signal from an arrangement of sensors based on IEEE 1451.4. The acquisition signal system proposed will permit to monitoring several kinds of sensors for a variety application in the fields of biomedical, industrial automation, environment and many others. The system proposed is formed by a module, called STIM (Smart Transducer Interface Module) that the main element is a general purpose microcontroller. The STIM module is connected with a PC computer by serial interface to transmit the data from sensors and to receive the control commands. The sensors was adapted to the system utilizing a technique called MMI (Mixed Mode Interface) attending the IEEE 1451.4, transforming the sensors in a plug&play system. The STIM module is assisted by a PC via resident software that will permit the acquired data viewing and recording in file for further study.

### **XRTPS – EXTENSIBLE REAL-TIME PUBLISH-SUBSCRIBE: UM MIDDLEWARE MULTICAST PARA TROCA DE DADOS BASEADO EM XML PARA REDES INDUSTRIAIS DE TEMPO REAL**

Jalerson R. F. de Lima, Ricardo A. de M. Valentim, Simonne Callegario

The standard Ethernet is the man technology for interconnection of local area networks, but has not yet been established as a standard for industrial networks, as its mechanism of access to means (CSMA / CD), does not meet the time requirements required by this type of network. This paper developed a middleware on Java for data exchange in industrial networks(Extensible Real-Time Publish-Subscribe XRTPS). The implementation done in Java portability objectives of the platform provided by this technology. The messages exchanged between our network based on the XML standard of the W3C, because it is a worldwide standard, can be manipulated by different development platforms and operating system, making the middleware quite flexible in their environment for implementation. In order to validate the performance of the middleware tests were conducted using different operating systems among us, which evaluated the behavior and performance.

## Session PW2D

### **ADMINISTRAÇÃO DE COMPONENTES: UM PROCESSO PRÁTICO PARA APOIAR O REUSO DE SOFTWARE**

Rosangela Kronig, Ivanir Costa

The main concern in software engineering area is to find an integrated and shared software environment. However, organizations have been invested significant amounts on development and maintenance system processes should support actual and further business demands. The software reuse has been identified as one of the solution and a challenge to reduce the time and cost with increasing productivity and quality. To implement a reuse approach, this paper, after bibliography's research, proposes a practical process, named Components Administration, to manage a set of structured information on software components designed and implemented to be shared and become available for future projects. The proposed process is based on relevant references for reuse, the IEEE Std 1517-1999 (R2004), which provides a common framework for the practice of systematic reuse in the software life cycle processes.

### **GERENCIAMENTO DE ATIVIDADES COMPLEMENTARES EM UM AMBIENTE VIRTUAL DE APRENDIZAGEM**

Douglas Almendro, Cristiane Camilo, Ismar Frango Silveira, Luis Naito Mendes Bezerra

The major problems that are pointed out by professors that are responsible for Complimentary Activities in Information technology-related undergraduate courses at Cruzeiro do Sul Univeristy (Unicsul) lie over managing an overwhelming amount of students' documents, which are supposed to be analyzed and corrected, in order to generate a proper feedback to students. In order to deal with such problem, this paper shows a methodology that uses virtual learning environments' native tools – in this case, Blackboard was used – to help activities' management, thus making quicker the evaluative process for such courses.

### **TECNOLOGIA E GESTÃO ESTRATÉGICA DAS INICIATIVAS MUNICIPAIS EM EDUCAÇÃO A DISTÂNCIA EM IMPLANTAÇÃO NO CONTEXTO DA UAB-MEC**

Joni de Almeida Amorim, Rosana G. S. Miskulin, Mauro S. Miskulin

The pace of change nowadays has put a premium on an organization's ability to learn. In order to increase the speed of change while having minimal dysfunctional behavior, poor habits that hinder resilience must be reviewed and altered. People must recognize and learn the many mechanisms involved. But if the intent is learning, training may be a solution. The literature advocates that staff development should be embedded in a broad range of strategies related to the context of the workers. In this perspective, this work presents a course focused on managers dealing with distance education projects. The subjects of the course would be Strategic Management, Management of Change, Project Management and Distance Education Management in general, which includes pedagogical and technological aspects. Different methodologies are presented and used.

### **GESTÃO DAS TECNOLOGIAS DE INFORMAÇÃO E COMUNICAÇÃO: METODOLOGIA DE ALINHAMENTO E PRIORIZAÇÃO DAS ESTRATÉGIAS**

Oswaldo Luiz Agostinho, Eni Aparecida Sivera Bertolini, Letícia Ferreira de Souza Netto, Uéber Fernandes Rosário, Rosemary Lumena Berol da Costa

This work discuss the difficulties that are faced by the companies to manage the Information Technology resources , taking into consideration the current conditions of competitiveness in the globalized environment . The corporate information systems, including communication should be considered , in current times , as tools to strategically support the businesses ,mainly with the e-commerce available , through web resources , in addition to transactional and decision support systems .This work presents a methodology , that , based on focusing of priorities , and the application of tacit and structured knowledge , ponderates the relationship between the internal competitiveness attributes of the organizations and the respective strategies of the Information Systems.

### **O PROJETO ERGONÔMICO DO PRODUTO E O ENSINO EM ENGENHARIA: UMA CONTRIBUIÇÃO PARA A INCLUSÃO SOCIAL DE PESSOAS COM DEFICIÊNCIA**

Luciano Franceschini, Jose L. G. Hermosilla, Ethel C. C. Silva

This article presents a exploratory-descriptive research, carried out by students of the last year of the graduation course of production engineering. The main objective of the research was the development of a lifting platform for persons with impaired mobility. The initial goal of the project is to point out the importance of the ergonomic aspects in the conception phase "process" of the development of the platform, as well as its participation in the social responsibility, focusing on accessibility and paradigm of the Social Inclusion. However, it is noticed in the elapsing of the research work, other profound and important unfoldings to the learning and teaching team, was the fast consistent profit of knowledge, based on the methodology of thematic projects, showing itself be a expressive element to the consistent and responsible learning.

## **GESTÃO DE RECURSOS HÍDRICOS NA ENGENHARIA COM SUSTENTABILIDADE AMBIENTAL**

Carlos Roberto Jóia Hozumi, Francisco de A. Corrêa, Haroldo Pereira Gomes, Rosana Dischinger Miranda

Water resources are one of greatest ambient concerns of our days, and may be an exhaustible source if no cares be provided. It is necessary to preserve and to protect nature, promoting management of these resources. For this, it is necessary to manage these resources in an adequate way in order to use them for all population. Management of water resources is the focus of this reflection in engineering courses, that wants to integrate ambient vision of water resources with an environmental education that promotes, together with pupils, conscience that environment does not only have to be preserved, but that it must be ecologically protected.

## **A CONTRIBUIÇÃO DO FÓRUM DE DISCUSSÃO COMO COMUNIDADE DE APRENDIZAGEM EM ENGENHARIA DE PRODUÇÃO**

Elaine Maria dos Santos, Elenise Maria de Araújo, Selma Regina Martins Oliveira, Edson Walmir Cazarini, José Dutra de Oliveira Filho

Resumo: As comunidades virtuais de aprendizagem constituem um ambiente intelectual, social e cultural que estimula e facilita a aprendizagem, pois o compartilhamento e o uso da informação resultam em novos aportes para a construção de novos conhecimentos, competências e habilidades. O objetivo deste estudo é avaliar a contribuição do fórum de discussão, utilizado como uma comunidade de aprendizagem em uma disciplina da graduação em Engenharia de Produção. Trata-se de uma pesquisa de natureza aplicada, quali-quantitativa, descrito-exploratória. É um levantamento seguido por estudo de caso. Utilizou-se a técnica de análise de conteúdo para a categorização nos fóruns. Os resultados obtidos comprovam a importância do fórum, como espaço propício à trocas, socialização e agrupamento de interesses, que pode ser utilizado como ferramenta complementar às aulas presenciais, pois o mesmo possibilita ao aluno um tempo maior para a pesquisa, reflexão e análise sobre os assuntos tratados, de forma a construir seu conhecimento.

## **Session SW2A**

### **DISEÑO DE UNA ACTIVIDAD PARA FAVORECER EL DESARROLLO DE COMPETENCIAS**

María Teresa Garibay, Silvia Angelone

Reflecting on the technologic innovations that we had available in the institution where we develop our teaching activities (multimedia projectors, digital platforms, web page designer assistants, computer room for students) and observing that our students were digital natives, internet enthusiasts and computer experts, we highlighted the necessity of introducing changes in our way of teaching. Firstly, we reformulated the way classes were developed. Then, we designed our own web page (<http://www.fceia.unr.edu.ar/geologiygeotecnia>) and as a consequence, communications between teachers and students started outside timetable times via e-mails. Furthermore, we stimulated activities to make students adopt an active role in their formation, trying to promote their participation in classes, debates with classmates and finally to improve their language; all of them abilities that have to be developed for the intellectual and personal growth of a person.

### **EL FRACASO DE LOS ESTUDIANTES EN LOS PRIMEROS AÑOS DE ESTUDIO EN INGENIERÍA: ACCIONES EMPRENDIDAS Y SUPUESTOS QUE LAS JUSTIFICAN**

Rita Lilian Amieva, Jorge Eduardo Vicario

The methods to reduce the academic failures in the first year of engineering are shown here. They are based upon

assumptions such as: learning failures, problems in high school and university teaching methods. The income system was redesigned, new materials for the teaching of Physics in high schools were made, (high school teachers made it possible) and new techniques for the teaching process at university were designed. The aim is to establish the limits of the assumptions that guided us even if they have been based on teaching and research in the teaching of physics.

### **ANÁLISIS DE SITUACIONES REALES PARA MOTIVAR EL APRENDIZAJE FACILITADO POR LA UTILIZACIÓN DE TICs**

Ana María J. Meroi

As trigger to motivate learning, by using ICTs, situations of actual cases, daily, or models of them are presented at the subject, they are similar to what students will face in the future performance of the profession. So, the basic concepts of mathematics, physics, etc. and the contents of the course give conceptual foundations to those real, everyday events, making the integration between the real thing, the theoretical contents of the course and practice, finding then, the student, justification to solve the problems. The students bring the supporting material for classes printed prior to the development of each topic, which is used to supplement the schemes, development, graphics, and the student becomes part of its author study material instead of the reader or listener liabilities, promoting school attendance, attention and participation during the development of the class.

### **COMPLEMENTACIÓN ENTRE LA EDUCACIÓN TRADICIONAL Y LA EDUCACIÓN A DISTANCIA EN LA ENSEÑANZA – APRENDIZAJE DE LA DERIVADA**

Inés Calvo, Lucía G. Gil, Yolanda B.Gil, Stella M. Loiacono

The educational labor is a task that needs a continuous update so much of knowledge as methodologies. It's frequent that students of careers for not mathematicians argue, why so much mathematics, if I'm not going to be a mathematician? How change this situation? The NTIC's allows to motivate the student and stimulate to an active participation in their learning. The Distance Education makes possible the use of skills that they lead to explore, to infer, to do conjectures, to justify, and so that, construct their own knowledge. It is not enough to elaborate a web page and put the same notes of the magisterial class, they need a systematical process. The experience was developed in the topic Derived, the material was elaborated and was put in practice. This methodology needs to incorporate other techniques besides the traditional one by the teachers and the students to achieve satisfactory results.

### **UNA ESTRATEGIA PARA EL DESARROLLO DE COMPETENCIAS EMPRENDEDORAS EN LA FORMACIÓN DE GRADO EN CARRERAS DE INGENIERÍA**

Néstor Bruno Braidot, Ruben Angel Cesar, Victoria González

The actual exigencies of the labor market obliged engineers to complement their technical formation with a considerable set of personal competences. There is a vast consensus stating that students' formation needs to go beyond their working necessities which involves the promotion of the process of firms' creation from their undergraduate studies. This requires the implementation of different strategies throughout the career oriented towards the development of these enterprising competencies especially in the classical courses that addressed issues of technical formation. The present paper explores the application of different strategies and methodological tools used to develop these enterprising competencies in the engineer career of the Instituto de Industria of the Universidad Nacional de General Sarmiento.

### **MEDICIÓN DEL ACOPLAMIENTO ENTRE OBJETOS DE APRENDIZAJE A PARTIR DEL ANÁLISIS LINGÜÍSTICO DE SU CONTENIDO**

Emilio Ormeño, Sergio Ochoa, Myriam Herrera, Susana Ruiz

The main idea after the use of Learning Objects consists in that a professor can build courseware reusing pre-designed digital pieces that respond to one instructional objective; should possess, also, some standard semantic envelope to guarantee their interoperability. In order to improve their reusability, these pieces should be independent of the context where they were conceived, in other words, they should have a low coupling regarding other Learning Objects. On the other hand, the software engineering area possesses for some time, diverse metrics already mature that serve to measure the coupling between software modules. Since the Learning Objects are software components,

the concept can be induced. In this paper an adaptation of a metric is presented to measure the coupling of Learning Objects from the perspective of the linguistic analysis of its content in Spanish.

## **DISEÑO DE ESTRATEGIAS COLABORATIVAS: DESCRIPCIÓN DE UNA EXPERIENCIA DE APRENDIZAJE COLABORATIVO CON ESTUDIANTES DE CARRERAS DE INFORMÁTICA**

Ferrarini Oliver Cintia, González Mónica Gilda

Education is now in a transitional process in which traditional learning model coexists with a number of educational models that consider pedagogical use of ICT, the principle of collaborative learning being one of them. While in the traditional model, the professor is the sole responsible of his students' learning, in collaborative learning, responsibilities are shared. In collaborative learning, spaces are considered for the students to construct, share and broaden their knowledge in a given field of learning. The aim of this paper is to show results of research in process, obtained through a collaborative learning experience with students of Computer Sciences careers. Collaborative strategies have been designed within the framework of the Blended Learning. As a support for the interaction, use was made both of the internal e-mail of educational platform <http://unsj.e-ducativa.com> and, of services offered by Yahoo\_Groups, [programacionprocedural07@yahoo.com.ar](mailto:programacionprocedural07@yahoo.com.ar).

## **Session EW3A**

### **A TECHNOLOGICAL FRAMEWORK APPLIED TO ENGINEERING ACADEMIC AND RESEARCH NETWORKS**

Edmundo Tovar, Nelson Piedra, Janneth Chicaiza , José Carrillo

The current state of the web technologies allow the development successful of academic collaborative networks focused on the research. This paper proposes a framework that satisfies the work requirements of engineering academic and researchers teams located in different geographical areas. A web site integrates all the technologies selected. Specific tasks as the communication, contents management, or links management can be solved in collaborative way with the application of the web technologies selected. This framework can be applied in master or doctoral studies that follow blended or elearning models.

### **EVALUATING EIFFEL AS A FOUNDATION LANGUAGE FOR AN OO-CENTRIC CURRICULUM**

Mathias Fonkam, Muhammadou Kah

The principles of object technology are today central to computer science, software engineering and related curricula in academia. Research in pedagogy increasingly emphasizes the teaching of principles, as applied to problem solving in the general, rather than the specifics of any particular programming language implementing the ideas. However, the importance of a language in teaching principles cannot be underestimated. The appropriateness of a chosen language, in comparison with other competing choices is perhaps a critical consideration, but one that must be made against an explicit statement of the goals and objectives of curricula centered on OO principles. With the goals, objectives and principles outlined, we review the limitations of the current dominant language choices; namely Java and C++. We then evaluate Eiffel, The language against the same principles and outline the benefits of its adoption as the foundation language in curricula centered on OO technology.

### **UNDERGRADUATE STUDENT RESEARCH: INVESTIGATION ON THE MEASUREMENT ERRORS OF A TIPPING-BUCKET RAIN GAUGE**

André Luiz de Lima Reda, Daniel Massashi Uehara, Alexandre Gurfinkel Reda

The paper reports research results by two undergraduate students. Different rain gauges are used in Brazil, mainly in real time monitoring for population and infrastructure protection. Many adopt a tipping-bucket design – broadly accepted for automatic and telemetric monitoring. Literature emphasises the importance of reliability on gauge precision, particularly when measuring intense rain – what may be verified in a controlled, laboratory environment. Problems related to device design; regular checking; cleaning; fluid dynamical effects during the bucket filling and emptying phases, and duration of each phase, made authors recommend the correct interpretation of intense rain measurements based on calibration or,

eventually, simple design improvements. A clear-cut calibration routine resulted from volumetric laboratory experiments on a rain-gauge prototype at Mauá Institute of Technology School of Engineering (São Caetano do Sul, SP State, Brazil), so increasing data reliability. This emphasises the need for similar procedures for all types of similar gauges.

### **TECHNOLOGY USED IN AN ONLINE CLASS**

Patrick Charles Kumpf

Technology Used in an Online Class. Business Computer Applications is a service course offered by my department and college to approximately 1,200 students at the University of Cincinnati each academic year. Students enrolled in this class are non IT majors and come from almost every college at the University. For several years I have been offering several sections of this course in an online, pseudo distance learning format. Some of the tools used in teaching this class as well as the success of the class will be shared with members of INTERTECH.

### **PET - A SUCCESSFUL TUTORIAL EXPERIENCE**

João José Hiluy Filho, Sônia Maria Araújo Castelo Branco

The Brazilian Educational Tutorial Program was created in 1979, originally Special Training Program, It aims to support special groups of twelve selected undergraduate students from public universities and faculties. PET searches to provide to their members to work in some special extracurricular activities, complementing and enlarging their formation, always under a supervision of a professor, named tutor. These activities, related with teaching, studying, research and social interaction, have for purpose allow some students to live some opportunities not present on conventional curricula. PET has serious pedagogic, ethic and social compromises. By this initiative MEC hope to be stimulating the formation of high level professionals and citizens in multiple knowledge areas, with skills oriented to transform the national reality. This paper describes some results of the program and the new stage that it has reached, by the experience observed in the engineering courses, where the program exists during fifteen years.

### **CHANGE, KIDS AND COMPUTERS: PREPARING THE COLLEGE STUDENTS OF TOMORROW**

Joni de Almeida Amorim, John Maynard, Suzy Prudencio

The twenty-first century has already exhibited rapid changes in society due to population growth, environmental degradation, shortage of resources and the emergence of new technologies. In Brazil, digital exclusion continues to be a problem in public and private schools. However, access to computers in schools is increasing through non-profit organizations such as One Laptop per Child (OLPC), an institution dedicated to providing inexpensive laptop computers to children in developing nations. Initiatives like OLPC may revolutionize how children learn. In this perspective, new methodologies for engineering education are being discussed and accepted by the profession, which includes continuing education of teachers in K-12 instruction. This paper discusses the preparation of the college students of tomorrow by presenting computer activities implemented in a fifth grade classroom in the state of São Paulo, Brazil. This work also discusses how to apply the concepts of resilience and change to continuing education of teachers.

### **PAVING THE WAY FOR A DYNAMIC AND MATURE ICT INFRASTRUCTURE IN EDUCATION: A CASE FOR SCHOOLS IN EMERGING MARKETS**

Eduardo Morgado, Daniel Igarashi, Erika Twani

According to the Gartner Group, more than 70% of the Information Technology budget in today's enterprises is destined to maintenance. The IT (Information Technology) infrastructure in schools is not different. Deployment, management and performance are the main problems. We address the ICT (Information and Communication Technology) with a model proposition to support the evolution of the IT infrastructure for education based on Gartner's Infrastructure Maturity Model. It defines four evolution stages: Basic, Standardized, Rationalized and Dynamic. We introduce an extending level to address a common scenario in education, which can be defined as the Chaos Level. In this level, there is no network or management policies, and limited access to the Internet. We propose a guideline for schools' IT infrastructure in emerging markets with focus on Chaos and Basic scenarios. By following these steps, schools should be able to provide an effective learning experience using technology.

## **Session PW3A**

### **DESENVOLVIMENTO E IMPLEMENTAÇÃO DE UM OBJETO DE APRENDIZAGEM SOBRE AMPLIFICADORES DE FIBRA DOPADA COM ÉRBITO**

Marcelo Leme Mamud, Sandra Maria Dotto Stump, Pollyana Notargiacomo Mustaro

Recent works and researches related to teaching-learning technologies have culminated in development and availability in Internet of the Learning Objects, Learning Objects Repositories and also Learning Management Systems. Those educational resources allow the implementation of interactive and hypermedia projects for education, that can provide to students' the management of study according their own learning rhythm. The aim of this research is to provide at the Moodle (Modular Object-Oriented Dynamic Learning Environment) open platform a Learning Object to support optic communication study. The motivation for this work is the gap of didactic materials to explore important subjects about Telecommunication Engineering, specially lack of tools related to Erbium Doped Fiber Amplifier (EDFA) learning. This didactical resource was based in Adobe Flash, eXe eLearning XHTML and VPI Application tools.

### **A OUVIDORIA COMO INSTRUMENTO DIAGNÓSTICO DE AVALIAÇÃO NA ESCOLA DE ENGENHARIA.**

Osny Rodrigues, Ana Maria Porto Castanheira, Abílio Ribeiro Coelho

The implementation of the Complaint Department as an evaluation tool was a very important initiative of the Universidade Presbiteriana Mackenzie, because among the foreseen objectives for its Institutional Development Plan we highlight getting to know the existent problems in order to better understand its own reality. The Complaint Department opened an adequate space so that the students of the Engineering School had a direct communication channel with the institution, considering that the identification of problems is essential for the process improvement. The objective of this work is to show which are the main anxieties and difficulties the students find in their course and allow a discussion of daily subjects, looking for ways of providing support that will facilitate facing their difficulties and fomenting a more effective and responsible participation in their academic life and in the classroom.

### **THE USE OF GENETIC ALGORITHMS AS OPTIMIZATION TOOLS IN A STUDENT LABORATORY SETTING**

Luiza C. Folgueras, Mauro A. Alves, Mirabel C. Rezende

The process of designing and developing new materials usually involves the correct choice of several parameters. As a complicating factor, the parameters that characterize these materials usually interact with each other. Their simultaneous determination can be a challenging task that is best approached by optimization tools. As a part of their course work, students in our laboratory have to develop optimization tools based on genetic algorithms (GAs) to solve this type of problem. As an example, a GA is implemented to find the optimal thickness of microwave absorbing materials. This activity helps the students gain a better understanding of some of the problems commonly found in research laboratories and the techniques used to solve them.

### **THE INFLUENCE OF THE PERIOD OF TRAINING IN THE FORMATION OF THE ENGINEER**

Carlos Oscar Corrêa de Almeida Filho, Carlos Alberto Monezi de Oliveira

This work analyzed the influence of the training period on the engineer's basic formation, evaluating the update resulting from the contact of the student with the diverse relative areas to his qualification. Items referring to current graduation demands by companies and institutions were verified as well as the place of computer science as a source for spreading of knowledge through the means of the long-distance learning. The Company-University partnership was mentioned, emphasizing the society's influence and its place in the development of qualified individuals. The training/job condition was revised under the view of current legislation and ongoing propositions that refer to readjustment of training programs. The engineer schools training programs were evaluated. A current position was proposed aiming to perfect the engineer's graduation program and to satisfy the requirements of the work market.

### **DESENVOLVIMENTO DE SOFTWARE EM AMBIENTE GRÁFICO PARA VISUALIZAÇÃO 3D E TRATAMENTO DE IMAGENS ADQUIRIDAS ATRAVÉS DE MICROSCOPIA POR SONDA DE PROVA**

Renato Guimarães Aquino de Oliveira, José Roberto Ribeiro Bortoleto, Mônica Alonso Cota

In this work a graphical environment has been developed for the visualization, treatment and analysis of images obtained through the technique of scanning probe microscopy (SPM). This program presents tools for the visualization 3D and the

specific treatment of images acquired for SPM, that they are not found in commercial softwares dedicated to this microscopy technique and integrate some resources that are found only separately, facilitating the life of the researcher. Moreover, it will provide the importation and exportation of the data in the specific binary format used by some models of microscope of atomic force. For the development of this software in environment of the Windows, has been used the program Borland C++ Builder 6.0, and the programming language has been used was C++. Finally, this software will have to be capable to take care of to the necessities of the researcher in clear way and easy manuscript.

### **PROPOSTA DE MENSURAÇÃO DE RECURSOS E INVESTIMENTOS PARA A ELABORAÇÃO E DISPONIBILIZAÇÃO DE OBJETOS DE APRENDIZAGEM**

Mariana Andrade Machado, Luiz Augusto Mourão Marcelino, Pollyana Notargiacomo Mustaro

This search aims to analyze digital learning objects and build metrics that will result in a prevision of the necessary investment to develop and turn available the objects in a digital format, analyzing the financial, administrative and software engineering aspects. The definition of a methodology to the development of the learning objects, activities, professionals involved in the process and the execution time of each stage, make possible the development of a Web application in Java that provide a prevision of the initial investment for the development of digital learning object.

### **ANÁLISE DE UTILIZAÇÃO DE SOFTWARE LIVRE PARA MINERAÇÃO DE DADOS**

João Paulo Lopes Muniz, Viviane Cristina Dias

This article deals with the analysis of the use of free software for data mining to discover standards in database contends information about regions and services/activity (commerce, industry) in the same. From this database, a company it can get standards that assist it in the decision taking, for example, in relation to the implantation of a strategical service. For such, the tools of mining of data WEKA (Waikato Environment will be Knowledge Analysis), and KNIME (Konstanz Information Miner) are used. Addressing also the process of Knowledge Discovery in Databases.

## **Session PW3B**

### **A BUSCA DE UMA METODOLOGIA DE ENSINO DE LÍNGUA ESTRANGEIRA POR MEIO DA ILUSTRAÇÃO**

Silza Maria Librelon Raia, Ana Júlia Ferreira Rocha

This work has the aim to search the influence of the image in the process of teaching learning. The survey, whose contents have theoretical foundations on the image in the communication, is to approach the use of illustration to bring learners to develop skills in foreign language. On learning it is needed a selection of illustrations appropriate to the cultural, contextual levels and age of the learners. It is also studied the influence of the images, and their importance as the use of creativity and entertainment as a way to find a methodology for the teaching of foreign language.

### **PESQUISA DE INICIAÇÃO CIENTÍFICA: IDENTIFICAÇÃO DE PADRÕES DIÁRIOS NA VAZÃO E NO TRANSPORTE DE SÓLIDOS EM RIO URBANO – O RIBEIRÃO DOS MENINOS EM SÃO CAETANO DO SUL, SP, BRAZIL**

André Luiz de Lima Reda, Daniel Massashi Uehara

In this undergraduate research, a diurnal-variation pattern was recognized in the Meninos creek sediment-transport time series – subject to the daily seasonality of sanitary and industry effluents, containing considerable settleable solid load. River level and solids concentrations were measured at two bridges 720m apart throughout a day, and the local rating curve determined. A hydrograph was then derived showing a diurnal oscillation pattern typical of dry periods — reflecting effluent-production fluctuations, though delayed by about 3h (due to propagation along sewers, culverts and tributaries). Based on the hydrograph and settleable solid concentrations throughout time, a series for the volumetric settleable solid load along the day was derived. This showed an oscillatory pattern under strong influence of fluvial dynamics (i.e., turbulence), as well as the balance of the solids settling-and-ressuspension mechanism – which seems to find some equilibrium within a typical, dry day. These original conclusions were part of the student trainee report.

### **MULTIDISCIPLINARIEDADE EM ESTUDOS EPIDEMIOLÓGICOS PARA A ANÁLISE DE APLICAÇÕES DE ONDAS ELETROMAGNÉTICAS**

Raquel Cymrot, Rodrigo Carlos Rodrigues Duarte

Modern world makes use of several technology applications that emit electromagnetic waves. In the last decades, many studies have been performed to test scientifically if the electromagnetic waves emission brings benefits or risk to health in view of some biological effects caused by the same. Until now, these effects have not been scientifically evidenced on human beings and the limits established have not actually been proved to be safe. Due to this lack of scientific evidence, more studies are necessary to seek confirmation for the outcome of the researches already done. The electromagnetic waves effects on the health of electric area's workers and possible consumers have been the focus of several studies. For better understanding these studies it is necessary to gather the Electric Engineering, Epidemiology and Statistics background.

## **EXPECTATIVAS DOS ALUNOS DE UM CURSO DE ENGENHARIA ELÉTRICA EM RELAÇÃO ÀS POSSÍVEIS ATIVIDADES COMPLEMENTARES**

Ivanilda Matile, Raquel Cymrot, Yara Maria Botti Mendes de Oliveira, Sandra Maria Dotto Stump

It was possible to initialize an administration process with the participation of the students through the Complementary Activities defined in the National Curriculum Guidelines, because the structure of the Electrical Engineering course and its contents are pre defined and oriented by the Education and Cultural Ministry and the Federal Engineers and Architects Council. According to this paradigm, the student can opine about the practical/professional contents actualizations that will be managed in a non conventional way. This paper presents the results of a research realized with the students, to know their expectative related to Complementary Activities. The research had the participation of 54,8 % of the students. Statistical analysis compared the expectative of the students in the beginning and at the last stages of the course. The most interest was for technical visits and a small percentage of the students contributed with suggestions of subjects for presentations and short-courses, scientific initiation and work for conclusion of the course, indicating that actions are needed to motivate the students to be more participative.

## **CRIPTOGRAFIA: UMA APLICAÇÃO DE ÁLGEBRA LINEAR**

Solange dos Santos Nieto, Célia Mendes Carvalho Lopes, Alcides Ferreira da Silva

The area of cryptography is as old as the writing. It deals with concepts and techniques to encode information so that the sender and the receiver are the only ones that can have access to it. In our work we are going to give an introductory approach to cryptography in a context of Linear Algebra and, specifically, in subjects that can be applied to the students who attend this discipline in the engineering courses, showing them one amongst many applications of Linear Algebra.

## **INOVAÇÃO: UM OLHAR MULTIDISCIPLINAR PARA O DESENVOLVIMENTO**

Fabiana R. Leta, Maria Helena T. da S. Gomes, Leandro Pestana

According to Oslo Manual, technology and innovation are fundamental to output and productivity increase. Although universities in Brazil are not the main responsible to introduce innovation to the society, they are responsible to generate new investigations and to prepare human resources to deal with innovation in scientific, technological, management, financial and commercial activities. In this context, this paper analyses the importance of informing and practicing innovation in engineering courses. In our methodology, besides learning these concepts, the students are motivated to develop an innovative project, using the theory they have learned in previous course and researching new hypothesis. The students are advising in: thinking about the problem to solve or innovate, studying the theories involved, investigating similar inventions in Intellectual Property Database, exploring the costs involved in developing the creation and developing the project. This methodology is applied in the first stage of the Mechanical Engineering course.

## **ROBÓTICA PEDAGÓGICA: UMA APLICAÇÃO EM SALA**

Paulo Henrique Cruz Pereira

Pedagogic robotics is a particular methodology of technological education and it is associated to the skill of combine theoretical and practical knowledge. The complexity of the modern world, however, demands a professional forming with a profile more included. The technical skills have to be associated to the capacity to suppose, to communicate ideas, to work in group and to negotiate collectively. The methodology of project has to perform in this process a central function. This work describes a teaching experience, wherein the concepts above exposed were put in practical in the course of study of Automation and Control, in the Mechanical Engineering course and Industrial Robotics After-Degree. The experience had been developed in a game atmosphere, wherein the students in groups, were stimulated to develop solutions for problems-situations. The real experimentation created a suitable context to the apprenticeship of methodology of project and to the understanding of technical abstract concepts.

## Session PW3C

### **PAGU- HISTÓRIA EM QUADRINHOS NO MOVIMENTO ANTROPOFÁGICO (APÓS A SEMANA DE 22)**

Flávio Mario de Alcântara Calazans

Patrícia Rehdem Galvão (PAGU), intellectual, writer and poet of the modernist movement (after the “Week of 22”) was one to the rare women to draw comics in Brazil, this historical research registers her work in the comics.

### **PROPOSTA DE SERIOUS GAME PARA CURSOS DE METODOLOGIA CIENTÍFICA EM ÁREAS TECNOLÓGICAS**

Pollyana Notargiacomo Mustaro, Lia Carrari Rodrigues

The students that are currently on undergraduate courses (technological areas or not) belong to the digital generation, characterized by the technological fluency and interest in digital games. These characteristics can be explored by means of a type of entertainment denominated serious game, which considers the ludic aspect as a motivational factor. This article presents the proposal and documentation (Serious Game Development Document – SGDD) that contemplates the aspects of a multiplayer interpretation game (Role Playing Game – RPG) and relates them to a curricular proposal to construct knowledge and development of abilities and attitudes pertaining to scientific research. This involved theoretic elements from the areas of instructional design, game design and game-based learning. With this, an implementation of didactic strategies is intended in courses of scientific methodology, in order to incentive the collaboration and investigative posture of students that are fundamental to the exercise of professional activities at this contemporaneity.

### **O ENSINO DA MATEMÁTICA A EDUCANDOS CEGOS UTILIZANDO MATERIAIS DIDÁTICOS ADAPTADOS (MDAs)**

Vilmar Jose Zermiani, Elcio Schuhmacher

This paper reports the question of the inclusion of blind people into regular education. In formal education the greatest difficulty that blind students face is in the learning of mathematics because of the lack of adapted pedagogical material (MDAs) to their special needs. FURB Mathematics Laboratory (LMF) works with blind students and is developing and validating MDAs about angles measuring, flat geometric figures, construction of natural numbers and concepts of algebra in order to assist students in the learning of Mathematics and by consequence the Exact Sciences. It should be noted that this type of materials are no companies that are interested in the production of the same. The goal of this research was to evaluate the use of MDAs checking whether they contribute to a satisfactory outcome, Wich meets the need of “view” of the concepts and mathematical calculation.

### **MELHORANDO A INTERAÇÃO, O CONHECIMENTO E VISITAÇÃO EM MUSEUS E EXPOSIÇÕES COM REALIDADE AUMENTADA EM DISPOSITIVOS MÓVEIS**

Sérgio Clayton Viana Pinheiro, Bianchi Serique Meiguins, Ricardo Melo Casseb do Carmo, Aruanda Simões Gonçalves

When visiting a museum, regardless the nature of its cultural and/or artistic content, the visitor tends to absorb more than what is being exposed, because of specific purposes like a school work, or mere personal interest. There are some reasons because of which, the search for information can be limited: poor description of exposed objects, information written in language different from the visitor’s, lack of relation between pieces of art or issues, etc. Pre-scheduled tour guides in museums minimize these problems, but the number of visitors is higher than the number of guides. The Augmented Reality in mobile devices, such as cell phones and personal digital assistants, has great potential as to provide new information on works and their authors online, without losing context. The use of mobile devices is justified by its simplified use and easy acquisition by visitors.

### **DICIONÁRIO AUMENTADO-BRINCANDO E CONHECENDO AS PALAVRAS ATRAVÉS DE SEUS SIGNIFICADOS, SOM E IMAGEM**

Leandro Hernandez Almeida, Bianchi Serique Meiguins, Marcelo de Brito Garcia, Paulo Igor Alves Godinho

A good vocabulary is very important for a smooth process of communication, especially when vocabulary is in formation, when in childhood and adolescence. One of the ways to promote the knowledge of new words is associate other information to this new word, such as textual meaning, image and sound. The Augmented Reality through intuitive interfaces can facilitate the understanding of new words incorporating text, sound and image. Therefore, this article presents a prototype for Electronic Dictionary on Augmented Reality Environment, implemented using JARToolKit and Java3D. We can highlights in this application the use of synthesized voice using FreeTTS for words in English. The prototype uses a database to retrieve words registered and loads 3D objects in the VRML format through the library Xj3D. The user interaction with augmented interface is characterized by occlusion of markers in scene.

## **ROBÔ AMBIENTALISTA**

Marilza A. Lemos, Maria L. P. Antunes, Júlio B. Laranjeira, Eduardo V. Liberado, Frederico Belfort

This work aims the integration between students of two graduation courses at UNESP Sorocaba: Control and Automation Engineering and Environmental Engineering. The project involves the dissemination of environmental themes, like the environment preservation, in a funny and interactive form, aided by the robotics. It consists of a game that contains a database of questions and answers about several environmental themes. An algorithm selects the group of questions to be answered by the player, analyses the answers and sends the result to the robot through serial communication. According with the player performance, the industrial robot interacts in the game, achieving congratulation movements and giving a gift to the winner player. Otherwise, the robot achieves negative movements, disapproving the player performance. In the robot, there is a program developed in Cosimir Industrial software that receives data from computer and selects the movements which must be done by the robot.

## **UM ESTUDO EXPLORATÓRIO SOBRE A IMPORTÂNCIA DA COMUNICAÇÃO E CULTURA EM PROJETOS VIRTUAIS**

Ivaldir Honório de Farias Junior, Itala Celly Bezerra de Farias, José Gilson de Almeida T. Filho

It is not today that the lack of communication undermines the success of projects. The context of global search for labour-qualified increases the amount of subsidized projects distributed in the network www (world wide web) where communication and culture become the determining factor and critical to the success of the projects. The objective of this article is to show the importance of good communication in Virtual Projects, in accordance of the culture of each contributor who composes the team or stakeholders in the project. To this end, this paper presents the importance of communication and some cultural dimensions that may interfere with or affect the success of the project.

## **Session PW3D**

### **COMBINADORES/DIVISORES DE SINAIS DE RF EM MICROSTRIP**

Anderson Fagiani, Antonio Alves Ferreira Júnior

This paper presents a preliminary and elaborate study about passive dividers/combiners devices of radiofrequency signals employing the microstrip technology. The work proposes approaches of the constructive and performance techniques of these devices. In this work, the 6dB resistive divider and combiner, the 3dB Wilkinson divider and combiner, Lange coupler and Branch coupler were analyzed. The classical theories of these devices and some care about its construction are presented. The characteristics, design techniques and applications of each device are commented. By the implementation of these devices, the microstrip technology was used and a brief introduction of its theory is presented. The applications are in radiofrequency and microwave circuits because of the technology and the frequency band they are used.

### **CRITÉRIOS PARA ANÁLISE DE CONTINGÊNCIA DE LINHAS DE TRANSMISSÃO**

Francisco C. V. Malange, Jaine H. Canossa, Alfredo B. Neto, Dilson A. Alves

The control actions made during the real-time operation of an electric power system should intend not only a better use of generation resources and transmission capacity, but to avoid that the system is led to operate close to a critical condition where a contingency can cause a voltage collapse. Therefore, the voltage stability margins and control actions must be determined in the planning and in the real-time operation not only for normal operating conditions, but also for different operating points and contingency conditions, intending to a better use of generation resources and transmission capacity. In this work is presented the voltage stability assessment based on static analysis methods, which is accomplished through P-V and Q-V curve tracing for each contingency and several operating conditions.

### **NOSSOS FUTUROS GESTORES ESTÃO PREPARADOS PARA ENFRENTAR A CRISE DAS MUDANÇAS CLIMÁTICAS?**

Roosevelt da Silva Fernandes, Valdir José de Souza, Brunela de Alcântara Merigueti, Jessica Vicente Guanandy, Elaine Gomes de Andrade, Fernanda Pereira Coelho, Caroline Zanetti Monjardim

To evaluate the level of environment's knowledge that the graduated college's students come to the marketplace, adopting the evaluation's methodology of the environmental perception developed by NEPA-UNIVIX, makes the creation's proposal, not compulsory, of the ENADE- Environmental.

## **TÉCNICA DE PARAMETRIZAÇÃO GEOMÉTRICA PARA O FLUXO DE CARGA CONTINUADO BASEADO NAS VARIÁVEIS ÂNGULO DAS TENSÕES NODAIS E O FATOR DE CARREGAMENTO UTILIZANDO O PREDITOR TANGENTE**

Alfredo Bonini Neto, Jaine Henrique Canossa, Dilson Amâncio Alves

This paper presents a new parameterization scheme to the continuation power flow that allows the complete tracing of P-V curves and the computation of the maximum loading point of a power system. The objective is to present, in a clear and didactic way, the steps involved in the development of a geometrical parameterization technique from the observation of the geometrical behavior of power flow solutions. The proposed technique combines robustness with simplicity, and still it is of easy interpretation and physical meaning. Was implemented the tangent predictor, so, to solve an ill-conditioned power flow problem a line equation is added which passes through a point in the plane determined by variables loading factor and the angle bus voltage. The results obtained with the new methodology for the IEEE 57, show that the characteristics of the conventional method are enhanced and the region of convergence around the singular solution is enlarged.

## **COMPARAÇÃO DOS MÉTODOS NEWTON-RAPHSON E NEWTON-RAPHSON DESACOPLADOS**

Francisco C. V. Malange, Jaine H. Canossa, Dilson A. Alves

The main expected characteristics for power flow methods are the robustness and the computational efficiency. In this sense, a procedure commonly used is do not updating the Jacobian matrix for each iteration, but only when the system suffers some significant change (for example, in its topology) or after the number of iterations to exceed a predefined value. This procedure, known as Very Dishonest Newton Method, makes possible to obtain a considerable reduction in the time of processing. The objective of this work is to present a performance comparison amongst the conventional Newton-Raphson algorithm and the simultaneous and alternate decoupled algorithms. The performances of these methods, considering the constant matrices, are also compared.

## **RANKING DO JOGO MERCADO VIRTUAL COMPARADO COM OS INDICADORES DE DESEMPENHO FINANCEIROS TRADICIONAIS**

Ariane Scarelli, Vagner Cavenaghi, José de Souza Rodrigues

This paper intends to compare the ranking of the enterprise game Mercado Virtual with some financial performance measures. The purpose is to verify if the game results – an enterprise environment computer simulation – in fact approach of a real situation in business in case it uses financial measures as evaluation patterns. Therefore first it was made a short review about the importance of companies performance measures showing the reasons that take his adoption as costs, competitiveness and so on. Afterwards it was presented the performance measures and its calculation formulas and selected some according to a methodology described in this paper. After it was made the calculation and then appraised the results making a comparison with the game ranking. Last it was made some important considerations about the software.

## **FORMAÇÃO CONTINUADA DE PROFESSORES: DESAFIOS E OPORTUNIDADES DA EDUCAÇÃO A DISTÂNCIA**

Rita Maria Lino Tarcia, Anderson Luiz Barbosa

In the 2006-2007 biennium, the Distance Education Nucleus of the Salesian University Centre of Sao Paulo (Nucleo de Educacao a Distancia do Centro Universitario Salesiano de Sao Paulo – NEAD/UNISAL) developed fifteen courses in the professors' formation area, enabling around 1500 professionals through all the national territory. Considering the NEAD/UNISAL experience in respect to the continuous professors' formation, two important moments are defined in the process implantation. Initially the docents demonstrate resistance to the methodology and difficulty in using the technological resource and the virtual learning environment (LMS); as this phase is overcome, the richness with the experiences exchange as well as the group construction of knowledge and its net sharing are identified as extremely positive aspects, that start to influence the conception of education in which they believed in the beginning of the process.

## **IMPORTÂNCIA DA INSERÇÃO DE COMPONENTES CURRICULARES DE CARÁTER HUMANISTA NOS CURRÍCULOS EM ENGENHARIA E TECNOLOGIA**

Rita Maria Lino Tarcia, Anderson Luiz Barbosa

Nowadays, technology is present in different knowledge areas and influences not only the economical and merchant relations, but also the interpersonal and community relations and people's perception of the world. This way, the professionals who act on engineering and technology areas must comprehend how the instrument with which they work impacts in enterprises and people in their every day. For this reason, it becomes essential the insertion of humanistic character curricular components in the professionals' formation, so that they can mediate the relations between man and technology in way to contribute in a more efficient way to the production of solutions that are more aligned with the client and community necessities, to direct the users in a more adequate way for using technology and to identify necessities in order to search for efficient solutions.

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