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**MESSAGE FROM THE ORGANIZING CHAIR OF ICCE 2009**

The 17th International Conference on Computers in Education, ICCE 2009, will be held between November 30 (Mon) and December 4 (Fri), 2009 at the Hong Kong Institute of Education, Hong Kong. The five-day conference will consist of six theme-based sub-conferences for international research communities to disseminate and share ideas for research in the field of Computers in Education. Prior to the main conference activity – the theme-based conference paper presentations – in the last three days, the Conference will dedicate the first two days to the theme-based workshops, tutorials and doctoral student consortium sessions so as to provide participants with a setting to exchange research ideas, discuss technical issues, and share practical experiences related to specific topics or emerging trends in various sub-areas about computers in education.

We received a total of 297 papers comprising full papers (8 pages), 5-page short papers (5 pages) and 2-page poster papers (2 pages) for the six theme-based sub-conferences. The selection of accepted papers will be completed by July 2009. Please visit our official website to check the list of accepted papers from July 31, 2009 (Fri) onward and submit the final version by August 31, 2009

(Mon). For colleagues who are interested in the informal exchange of scholarly ideas and practical experiences prior to the main conference activity, it is now your golden chance to share your research with us through the theme-based workshops, tutorials and doctoral student consortium sessions. Please refer to the sub-page “Call for Papers” in our official website (<http://www.icce2009.ied.edu.hk/index.html>) for the submission details

The Conference is one of the 15th Anniversary Celebration Events in the Hong Kong Institute of Education in late 2009. It is our honor to share the vision and joy of educational research with you through a large-scale and recognized academic conference. Your participation in the Conference will bring you a twofold enjoyment in the 2009 winter. On the one hand, the campus-wide delightful scene and WiFi connection in our Institute allow you to share your research insights in a pleasant place without disconnection with people in your homeland. On the other hand, the harbor-side dazzling lightings and Christmas-themed decorations along the Victoria Harbor in early December will enable you to experience an early festive joy. Come and join us at ICCE 2009 for a meaningful and jovial experience in community building of research frontiers in computers in education!

Thank you.



With best wishes  
Kong Siu Cheung

Note: The column, Message from the President will resume with the next issue of the newsletter

All society-related information can be found on APSCE's official website at <http://www.apsce.net/>

APSCE HQs has set up a public mailing list (<http://mail.apsce.net/mailman/listinfo/bulletin/>) Members who have news that are of high interests to members of the Society can take advantage of this added feature on APSCE's website.

## LETTER TO THE EDITOR

We received five e-mails from the winners of the APSCE Merit Scholarship Award. They share with us their experiences gained from ICCE2008. They were awarded USD500 each. We are pleased to highlight the third e-mail from Morris Jong. The last two e-mails will be included in the next issue.

### *Dear Editor,*

I was granted a great opportunity to engage in the 16th International Conference on Computers in Education (ICCE 2008), as well as to explore an energetic city, Taipei, thanks to the APSCE Merit Scholarship Programme. My participation in the quality international conference enabled me to gain real insights into the latest development and research on information and communication technology in education.

ICCE is a significant yearly event for researchers in the domain of educational technology, especially those from the Asia-Pacific region. I was given a chance to present my paper, "Teachers' Concerns about the Implementation of the VISOLE Pedagogy," which was co-authored with my academic supervisors, Prof. Fong-Lok Lee and Prof. Jimmy H. M. Lee, as well as my fellow colleague, Prof. Junjie Shang. Through the presentation, not only was I able to introduce our innovative game-based learning pedagogy—VISOLE (Virtual Interactive Student-Oriented Learning Environment) to the research communities, but I could also convey to them that it was important to address teachers' concerns when implementing new technological education innovations at schools. Furthermore, I benefited from the constructive feedback given by other participants during my presentation. It inspired me to explore new possibilities to conduct further research on the topic.

The conference enabled me to interact with researchers worldwide, especially the senior PhD students from National Central University of Taiwan.



Morris presenting his paper on Teachers' Concerns about the Implementation of the VISOLE Pedagogy

In spite of the difference in our research foci, we exchanged views and shared new ideas on research methodology and pedagogy designs. Although the paper I presented was in the theme of DIGITEL, I also gained new knowledge and experience beyond DIGITEL. Listening to keynote speeches which discussed the various aspects related to the use of information and communication technology in teaching and learning was undoubtedly a rewarding experience. It enabled me to be exposed to the bright ideas as well as the wisdom of worldwide scholars working in different research foci, such as Prof. Mike Sharples from the University of Nottingham, Prof. Elliot Soloway from the University of Michigan, and Prof. Cathleen Norris from the University of North Texas.

The APSCE Merit Scholarship Programme enabled me to make a fruitful journey to Taipei, in which I gained considerably from presenting my paper and interacting with researchers from different parts of the world. I hope more young researchers can benefit from the rich exposure in ICCE with the support of APSCE.

Yours sincerely,

Morris S. Y. Jong  
Centre for the Advancement of Information  
Technology in Education  
The Chinese University of Hong Kong

## FEATURE ARTICLE

In this issue, we have Dr. Dietrich Albert, Cognitive Psychologist, and Cord Hockemeyer, Computer Scientist, as our guest columnists. Dietrich has been an active participant of ICCEs for the past 10 years. In the academic year 2001/02 he was visiting professor at Hiroshima University, Graduate School of Education, Department of Learning Science. In this column, they share some details of their interdisciplinary research and development in technology enhanced learning.

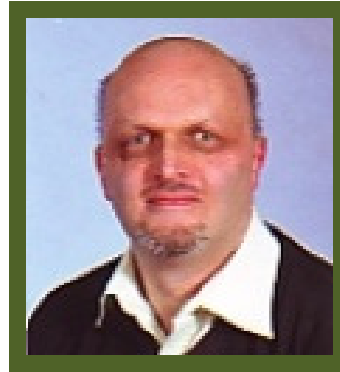
Under the leadership of Dietrich Albert, the Cognitive Science Section (CSS; <http://css.uni-graz.at>) at Graz, Austria, has developed into a very successful inter-disciplinary and cross-university research group on Technology Enhanced Learning (TEL). Since 1995, more than ten co-operative research projects have been supported by the European Commission, as well as several research networks and nationally funded research projects (see <http://css.uni-graz.at/projects.html>). Core applications of CSS are adaptive TEL-systems, game- and simulation-based learning, and evaluation of TEL. A central theoretical basis is Competence-based Knowledge Space Theory (CbKST) which is permanently extended and refined in order to meet upcoming requirements and trends from e-Learning.

A good indicator of CSS's success is the team size. What started as a group of two researchers at the Department of Psychology at the University of Graz some fifteen years ago has meanwhile grown into a group of more than 15 post-graduate and post-doctoral researchers originating from psychology, mathematics, and computer science, and reaching beyond the Department of Psychology at University of Graz into the Knowledge Management Institute at Graz University of Technology.



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### Introduction: CbKST

During the last decade, adaptivity and personalization have grown from an advanced to a mainstream research topic in e-Learning. A very successful theoretical approach in this area is the application of Competence-based Knowledge Space Theory (CbKST), a mathematical-psychological framework.

The basis of CbKST was laid by Doignon and Falmagne (1985, 1999) in their development of the (rather behavioristic) Knowledge Space Theory (KST) as an underlying model for adaptive assessment of knowledge (see also [www.aleks.com](http://www.aleks.com)). Simply spoken, Doignon and Falmagne represent a domain of knowledge by a set of test problems, and they structure this domain by eliciting prerequisite relations between these test problems. Defining a person's knowledge state as the subset of test problems this person is able to solve, they obtain a restriction of the possible knowledge states by the prerequisite relation. The set of all possible knowledge states within a domain is then called a knowledge space.

This approach, of course, neglects the underlying cognitive structures. Unearthing such underlying structures was an early interest of Dietrich Albert. Together with his earlier research group in Heidelberg, Germany, he developed several approaches to investigate cognitive processes, skills, and competences underlying the observed problem solving behavior (Albert, 1994; Albert & Lukas, 1999).

Based on this work as well as on similar work of other groups, CbKST in its current form was developed (e.g. Heller, Steiner, Hockemeyer, & Albert, 2006). One basic idea is to look at the set of abstract, unobservable competences on the one side and concrete, observable performance on

testing or learning objects on the other side. Defining a mapping that specifies, for each testing or learning object, the competences that are needed for solving or understanding, respectively, the object and the competences that are taught or actually tested by the object, competence and performance spaces can be easily derived. In addition to such analysis of tasks and cognitive processes, prerequisite relations between the competences may be derived, e.g., from experts' judgments or curricula analysis. Such additional prerequisite relations would result in a finer structure and smaller, i.e. more easily manageable, competence and performance spaces. In the subsequent sections, we will give some examples how CbKST is used in various areas and types of technology enhanced learning.

### **CbKST and Adaptive TEL**

The competence and performance spaces introduced above have proven to be a good means for implementing adaptivity and personalization in TEL (for an overview, see Conlan, O'Keeffe, Hampson, & Heller, 2006). A first implementation was the APeLS prototype system developed in the EC-funded EASEL research project (Conlan, Hockemeyer, Wade, & Albert, 2002; Hockemeyer, 2003). The APeLS system adapts to the individual learners' current knowledge by showing them only those learning objects for which they have all prerequisite competences. From a more general TEL-oriented point of view, APeLS included another novelty, educational metadata were not only used to describe learning objects but adaptivity metadata were the core information for realizing the personalization. For this purpose, a generic adaptivity element as an extension to the IMS Learning Object Metadata specification was developed and suggested (Albert, Hockemeyer, Conlan, & Wade, 2001).

More recently, the concepts implemented in APeLS were refined and better formalized (e.g. Heller et al., 2006) in the iClass project. This project, however, introduced also other innovations going beyond the further development of CbKST. On the one side this is the connection of CbKST to ontological structures, on the other side it is the inclusion of the more recent pedagogical concepts of self-regulated learning and meta-cognition in e-Learning. The structuring of knowledge domains is a tedious and, thus, costly task. Given the recent development and elicitation of ontological structures for many areas, the question of re-using them for obtaining competence structures became eminent. The relationship between conceptual ontologies and prerequisite structures has been investigated by Albert and Steiner (2005a, b; Steiner & Albert, 2008). This topic was also tackled in the iClass project, and solved by defining competences as a

combination of concepts and actions (in the sense of action taxonomies developed, e.g., by Bloom and by Anderson & Kratwohl). Competences related to a certain concept could then be, e.g., to know that concept or to be able to apply it (Albert, Hockemeyer, Mayer, & Steiner, 2007). Given the taxonomy on the action verbs and prerequisite-related information within the domain ontology, a prerequisite relation on the competences can be derived according to the component approach developed by Albert and Held (see, e.g. Albert & Lukas, 1999).

Another important innovation during the iClass project was the integration of the psychological-pedagogical e-Learning concepts meta-cognition and self-regulated learning (SRL). While personalization by navigation guidance and self-regulation may look contradictory at first sight it became soon eminent that CbKST is a good basis for both. In personalization through navigation guidance, the CbKST-based user model had already proven very successful before (see also Conlan et al., 2006). Self-regulation, on the other side, aims at being free from any navigation restrictions. In order to have a successful learning nonetheless, we need however an informed learner. The CbKST-based user model information are an important help for the learner to decide whether or not to start a certain learning object. On the other side, this gives a feedback to the learner about his/her current learning progress and, thus, builds a founding stone to their meta-cognitive knowledge and skills. A side result of this work was the development and implementation of visualization methods to give the learners information about their current state within the competence space (Albert, Nussbaumer, & Steiner, 2008).

### **Game and Simulation-based Learning**

A good example of extending CbKST due to application requirements lies in the area of game-based learning. Here, the nature of the learning material requires a new approach to adaptivity: while classical approaches focus on adaptively selecting and/or tailoring learning objects before presenting them, this does not work well within game-based learning where learning is characterized by a rather small number of large and time-consuming learning objects (in this context called game or learning situations). Instead, the learner's behavior during a game situation should be taken into account for adaptivity immediately, i.e. in real-time. We call this adaptivity within (or during) a learning object microadaptivity to distinguish it from the traditional (macro-) adaptivity.

In the ELEKTRA research project, microadaptivity was realized using an ontologically formulated model connecting CbKST and problem spaces

(Kickmeier-Rust & Albert, 2008; Kickmeier-Rust, Hockemeyer, Albert, & Augustin, 2008). Following the model of problem spaces, possible actions of the learner within the learning game situation are identified. Subsequently, competence interpretations of these actions (competences assumably available and missing, respectively, with a learner performing the action just observed) are specified. When a learner is playing within a situation, his/her competence state model is updated after each observed action according to the skills assigned to this action. Based on these updates and on the currently observed action, the learning game system can intervene immediately, e.g., by giving hints to missing competences or by giving motivational feedback and encouragements. Early-stage empirical evaluations show already very promising results (Kickmeier-Rust, Marte, Linek, Lalonde, & Albert, 2008).

There are other R&D topics related to this. On the one side, the TRAILS approach investigated the derivation of information on the learners' cognitive state from their navigation and browsing behavior (Heller, Levene, Keenoy, Hockemeyer, & Albert, 2007). On the other side, we are currently investigating medical applications of CbKST within the MedCAP project on simulation-based learning with haptic devices. This promises to be a good (re-) application of CbKST and the microadaptivity ideas (Albert, Hockemeyer, Kulcsar, & Shorten, 2007; Zhang et al., 2008).

## Concluding Remarks

Besides the areas listed above also other applications of CbKST in TEL and surrounding areas have been investigated especially in the industrial context. This includes knowledge and competence management (e.g. Ley & Albert, 2003), modeling organizational action (e.g. Stefanutti & Albert, 2002), work-integrated learning (e.g. Ley, Ulbrich, Scheir, Lindstaedt, Kump, & Albert, 2008; Höver & Steiner, 2009), and collaborative learning and working (Heller, Hockemeyer, & Albert, 2004). The successful work in TEL is continued in several projects. In GRAPPLE (2008-2011) we focus on the evaluation of adaptive TEL-systems (see e.g. Höver & Steiner, in press) and on ontology authoring tools; the 80Days project (2008 - 2010) aims at reusing existing material for Game Based Learning (GBL) and the integration of learning, story telling, and motivation (see e.g. Kickmeier-Rust, Göbel, & Albert, 2008); in the TARGET project (2009 - 2011) we investigate the application of serious games in industry; the ROLE project (2009 - 2013) contributes to the meshing of learning tools for creating individual learning environments on a sound pedagogical-psychological basis.

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## BRIEF REPORT: MULE 2009 WORKSHOP

May 2009

Moushir M. El-Bishouty, Hiroaki Ogata, Chen-Chung Liu, Gwo-Jen Hwang

### Introduction

The 5th Mobile and Ubiquitous Learning Environment workshop (MULE 2009) was successfully held from March 26 to 27 at the University of Tokushima, Japan.

Sponsored by:

- Asia-Pacific Society for Computers in Education, SIG CUMTEL;
- Taiwan E-Learning and Digital Archives Program;
- The Institute of Electronics, Information, and Communication Engineers;
- Information Processing Society of Japan (IPSJ), Shikoku Section;
- The Institute of Electronics, Information and Communication Engineers, (IEICE), Shikoku Section;
- The Institute of Electrical and Electronics Engineers (IEEE), Shikoku Section.



One for the album: Participants of MULE 2009

## Hosted by:

- The University of Tokushima, Japan
- National University of Tainan, Taiwan
- National Central University, Taiwan

This workshop was initiated by the steering committee consisting of Prof. Hiroaki Ogata, Prof. Chen-Chung Liu and Prof. Gwo-Jen Hwang, and co-organized by Dr. Moushir M. El-Bishouty. A total of 16 professors and 21 graduate students participated and interacted in a friendly and informal environment. The aim of MULE was to provide a forum where international participants could share their knowledge with one another on the latest developments in MULEs and map out directions for future developments and research collaborations.

## Topics of the workshop

- Theoretical foundations for mobile and ubiquitous learning.
- Emerging tools and technologies for mobile and ubiquitous learning.
- Development of digital content for mobile and ubiquitous learning.
- Applications of mobile and ubiquitous learning.

## Major events

1. Doctoral students presented and discussed their ongoing projects. Each student was given 20 minutes (10 min presentation and 10 min discussion).
2. Professors presented their recent research and discussed the possibilities of collaboration between the Japanese and Taiwanese researchers. Each professor was given 30 minutes (20 min presentation and 10 min discussion)
3. A panel, which focused on the international collaboration on mobile and ubiquitous learning.
4. Group discussion entitled "Big Issues on Mobile and Ubiquitous Learning". The participants were divided into 6 groups; each group consisting of a number of students and a professor as a leader. The groups were allowed to conduct their discussions outdoor in different places in Tokushima city where they experienced the nice weather during the cherry blossom season (Sakura).
5. Small group discussions during lunches, tea-breaks and dinners.
6. On March 28, a tour was arranged to visit the famous places in Tokushima city.

## Major outcomes

1. The students presented interesting research and received valuable comments from professors and colleagues.
2. The professors provided rich information,

valuable advice and hot research topics during their presentations, the panel and other workshop events. For example:

- Prof. Nian-Shing Chen led the discussion to establish the cooperation between Taiwanese and Japanese researchers.
- Prof. Gwo-Jen Hwang welcomed any participant to cooperate in the area of context awareness.
- Prof. Chen-Chung Liu invited all participants to submit their papers to ICCE 2009 on CUMTEL, where selected papers will be published in ETS journal.
- Prof. Hiroaki Ogata introduced DSC on CUMTEL in conjunction with ICCE 2009 and invited all doctoral students to submit their papers.



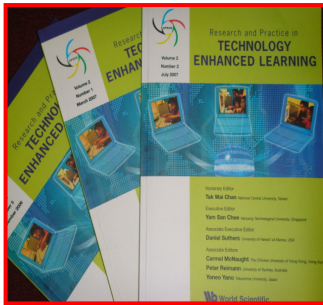
**Participants enjoying themselves in an informal environment**

3- After group discussion, a representative of each group gave a short presentation in an open session. Concrete ideas were exchanged.

- Group1: discussed the various issues in relation to mobile & ubiquitous learning. These included issues related to students, teachers, environments, resources, activities and tools.
- Group2: demonstrated interesting scenarios for ubiquitous and non-ubiquitous learning in a humorous manner.
- Group3: proposed a novel system for spoken and non-written languages using MULE.
- Group4: discussed issues on adaptive response feedback.
- Group5: discussed why and how to use the technology in the education.
- Group6: demonstrated wonderful scenarios between mobile learning and the Japanese culture.

We look forward to seeing everyone in MULE 2010.

## RESEARCH AND PRACTICE IN TECHNOLOGY ENHANCED LEARNING (RPTEL)



RPTEL is the official journal of APSCE.

<http://www.worldscinet.com/rptel/rptel.shtml>

RPTEL is a multidisciplinary refereed journal devoted to disseminating rigorous research on all aspects of the use of technology to enhance learning. The journal seeks to be a catalyst for multidisciplinary dialogue amongst researchers and practitioners worldwide in the fields of learning and cognition, education, and technology, with a view towards improving practice and achieving real-world impact in technology enhanced learning.

Contributions to *Research and Practice in Technology Enhanced Learning* are to be submitted (MS Word and PDF format) via email to the Executive Editor, Daniel Suthers ([suthers@hawaii.edu](mailto:suthers@hawaii.edu))

## FORTHCOMING ICT-RELATED CONFERENCES



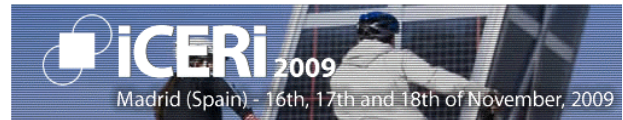
**IADIS CELDA 2009**

**Rome, Italy**

**20 to 22 November 2009**

**<http://www.celda-conf.org/>**

**Submission Deadline: 24 July 2009**



**International Conference of Education, Research and Innovation (ICERI 2009)**

**Madrid, Spain**

**16-18 November 2009**

**<http://www.iated.org/iceri2009/>**

**Submission Deadline: 15 July 2009**



**INTERNATIONAL EDUCATIONAL TECHNOLOGY CONFERENCE**

**Istanbul, Turkey**

**26-28 April 2010**

**<http://www.iet-c.net/>**

**Submission Deadline: 14 Feb 2010**

**INTERNATIONAL CONFERENCE OF ICT EDUCATION IN MODERN MULTICULTURAL SOCIETY (ICT-EMMS)**

**Enschede, The Netherlands**

**4-6 October 2010**

**<http://www.fonsr.org/>**

**Paper Submission: 30 Oct 2009**

Dissemination of news and knowledge sharing has been one of the goals of APSCE's newsletter. Personal news about community members (such as job changes, promotions, etc), research developments (e.g., new centers, books, software), recent academic activities and articles on the latest edtech buzzwords; successful classroom applications of theories, techniques, and tools...etc are more than welcome to be emailed directly to Su Luan Wong, [wsuluan@gmail.com](mailto:wsuluan@gmail.com). For your piece to be included in the next issue, an electronic copy of the file must be emailed 10 days prior to the scheduled publication date of the next issue.