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Message from the Conference Chair, Programme Chair/Co-Chairs and Local Chair

It gives us great pleasure to extend our warmest welcome to all participants of the 21st International Conference on Computers in Education (ICCE) 2013. This year, the 21st ICCE is conducted in Denpasar, Bali, Indonesia. Bali is the most famous Indonesian tourist island, and it is popular among international visitors as well. Balinese people are friendly and welcome to other multi-ethnics. The province of Bali has two state universities, Udayana University and "Ganesha" University of Education, and many private universities. Bali has two prominent points, tourism and education, thus, it is worth to accommodate international educational events, such as ICCE 2013. Building on the success of the previous conferences, the program aims to foster lively exchanges and global collaborations on understanding, critiquing, advancing and applying the theories and practices in the field of technology enhanced learning.

The main conference schedule includes the all-important keynote speakers: (1) Professor Marcia Linn from the UC Berkeley, USA on *Designing Visualizations and Automated Guidance to Create 21st Century Learners*, (2) Professor Imam Robandi from the Institut Teknologi Sepuluh Nopember, Indonesia on *Intelligent Control Solutions using MATLAB: Laboratory Based Education Experiences for Academic Atmosphere Improvement*, (3) Professor Marcus Specht from the Open University of the Netherlands on *We Need Mindful and Seamless Learning Technologies*, and (4) Professor Glenn Stockwell from Waseda University, Japan on *Motivating to Learn or Learning to Motivate? Examining the Relationship between Technology and Motivation in Language Learning*.

Furthermore, we are featuring three theme-based invited speakers: (1) Professor Tore Hoel from Oslo and Akershus University College of Applied Sciences, Norway on *Standards as Enabler for Innovation in Education – a Reality Check*, (2) Professor Ming-Puu Chen from National Taiwan Normal University, Taiwan on *Designing Digital Game-based Learning for Enhancing Critical Thinking*, and (3) Professor Jianwei Zhang from the University at Albany, State University of New York, USA on *Cultivate Creative Knowledge Practices through Principle-Based Design*. In addition, we have a special invite speaker: Professor Herman Dwi Surjono from the Yogyakarta State University, Indonesia on *The Implementation of ICT to Enhance Student Learning Activities*.

We would like to thank everyone who has been involved directly or indirectly in making these proceedings come to fruition, and we hope a resounding success. We have to start with all of the paper authors and registered participants; we acknowledge their exciting academic contributions and are delighted that they chose ICCE 2013 as the conference at which to present their work and/or to be engaged in fruitful intellectual exchange. In conjunction we have to thank all the members of the Local Organizing Committee and the International Program Committee who work the hardest under the time pressure.

We hope all participants will have further opportunities to create new friendships and professional collaborations, and to leave fond memories for their stays in Bali. With its breathtaking sceneries, interesting culture, as well as Bali's renowned, highly developed arts, it will definitely be an unforgettable experience for everyone.

Thank you!

"Terima kasih!"

TSUKASA HIRASHIMA (Japan)
Conference chair

PUDJO SUMEDI (Indonesia)
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PREFACE

The International Conference on Computers in Education (ICCE) is a series of annual conferences encompassing a broad range of issues related to using information technology for education. The ICCE conference series is organized under the auspices of the Asia-Pacific Society for Computers in Education (APSCE). This year, ICCE 2013, being held from 18 November to 22 November 2012 at Denpasar, Bali, Indonesia, has 340 early registrants from 31 different countries or economies. Like previous conferences in this series, ICCE 2013 is structured as a meta-conference to allow researchers in the Asia-Pacific region to connect with international research communities and with each other for the worldwide dissemination and sharing of research, development, and deployment ideas that span the field of Computers in Education. Seven interrelated sub-conferences on specialized themes, each organized by a program committee appointed by the respective special interest group (SIG – see http://www.apsce.net/SIGs.aspx), constitute the five-day Conference schedule. They are:

C1: ICCE Conference on Artificial Intelligence in Education/Intelligent Tutoring System (AIED/ITS) and Adaptive Learning

C2: ICCE Conference on Computer-supported Collaborative Learning (CSCL) and Learning Sciences

C3: ICCE Conference on Advanced Learning Technologies, Open Contents, and Standards

C4: ICCE Conference on Classroom, Ubiquitous, and Mobile Technologies Enhanced Learning (CUMTEL)

C5: ICCE Conference on Digital Game and Digital Toy Enhanced Learning and Society (GTEL&S)

C6: ICCE Conference on Technology Enhanced Language Learning (TELL)

C7: ICCE Conference on Technology, Pedagogy and Education (TPE)

The Program Committee is comprised of a strong team that includes the Conference chair, the Program Coordination Chair and co-Chair, seven executive sub Conference Chairs and 284 experts in the field of Computers in Education from 41 different countries or economies. Three former ICCE local organizing chairs have played the role of consultants in overseeing the conference organization process.

In total, the conference received a total of 248 papers (155 full, 54 short, and 39 posters) from 36 different countries or economies. Table 1 provides the submissions by country of the first author of individual paper.

All papers were subjected to a rigorous review process by 2-4 reviewers from the respective sub conference program committees. After a discussion period within the individual program committees led by the sub conference Executive Co-Chairs and Co-Chairs, recommendations were made to the Coordination Committee Chair and co-Chair. They made sure that the review process for all sub conferences maintained the highest standards. This resulted in 38 full, 97 short, and 61 poster acceptances across all of the sub conferences. The overall acceptance rate for full papers is 24.5%, and the complete statistics of paper acceptances is shown in Table 2.

The acceptance rate for the full papers in the individual sub conferences closely mirrored the overall acceptance rate. This is a testimony to the continued maintenance of the quality of presentations in our conference. The number of submissions and the acceptance rate for each sub conference is summarized in Table 3.

Table 1: Distribution of Paper Submissions for ICCE 2013

Country	Submissions	Country	Submissions
Australia	12	Malaysia	5
Austria	1	The Netherlands	1
Belgium	1	New Zealand	2
Brazil	1	Norway	2
Canada	4	The Philippines	1
China	9	Puerto Rico	1
Colombia	1	Qatar	1
Germany	4	Saudi Arabia	5
Denmark	1	Singapore	8
Egypt	1	South Africa	1
Greece	1	South Korea	2
Hong Kong	4	Spain	1
India	8	Sweden	5
Indonesia	15	Taiwan	64
Japan	75	Thailand	4
Moldova	1	Tunisia	2
Mexico	1	UK	2
Mauritius	1	USA	4

Table 2: Results of the Overall Reviewing process for ICCE 2013

Submissions / Results			Full papers	Short papers	Posters
			155	54	39
Accepted	Full Papers	38	38 (24.5%)		
	Short Papers	97	74	23 (42.6%)	
	Posters	61	21	13	27 (69.2%)

Table 3: Breakdown of Submission and Acceptance Rates by Sub conference

Sub Conference	C1	C2	C3	C4	C5	C6	C7
Papers	accepted (submitted)						
Full	8(33)	3(16)	7(28)	5(19)	3(9)	4(17)	8(33)
Short	6(7)	14(8)	15(5)	9(5)	5(7)	23(18)	15(4)
Poster	9(2)	10(10)	8(5)	4(1)	9(6)	13(13)	8(2)

The poster session also includes 11 presentations for the Work in Progress Poster (WIPP) program.

Last, the main conference schedule includes the all-important keynote speakers: (1) Professor Marcia Linn from the UC Berkeley, USA ("Designing Visualizations and Automated Guidance to Create 21st Century Learners," representing sub-conference C2), (2) Professor Imam Robandi from the Institut Technologi Sepulu Nopember, Indonesia ("Intelligent Control Solutions using MATLAB: Laboratory

based education experiences for academic atmosphere improvement," representing sub conference C1), (3) Professor Marcus Specht from the Open University of the Netherlands ("We need Mindful and Seamless Learning Technologies," representing sub conference C4), and (4) Professor Glenn Stockwell from Waseda University, Japan ("Motivating to learn or learning to motivate? Examining the relationship between technology and motivation in language learning," representing sub conference C6); the theme-based invited speakers: (1) Professor Tore Hoel from Oslo and Akershus University College of Applied Sciences, Norway ("Standards as enabler for innovation in education – a reality check," representing sub conference C3), (2) Professor Ming-Puu Chen from National Taiwan Normal University, Taiwan ("Designing Digital Game-based Learning for Enhancing Critical Thinking," representing sub conference C5), and (3) Professor Jianwei Zhang from the University at Albany, State University of New York, USA ("Cultivate Creative Knowledge Practices through Principle-Based Design," representing sub conference C7); and the special invited speaker: Professor Herman Dwi Surjono from the Yogyakarta State University, Indonesia ("The Implementation of ICT to Enhance Student Learning Activities").

In addition, there will be four panel sessions: (1) "Ideating cross-pollination: A marriage in the making between technology-enhanced learning and the learning sciences" (moderator: Professor Lung-Hsiang Wong from Nanyang Technological University, Singapore), (2) "Technology and Vocabulary Learning" (moderator: Professor Glenn Stockwell from Waseda University, Japan), (3) "Designing for Student-Generated Designs (SGDs)" (moderator: Professor Manu Kapur from Nanyang Technological University, Singapore), and (4) "E-learning in School Education in the Coming 10 Years: Critical Research Issues and Policy Implications" (moderator: Professor Siu Cheung Kong from the Hong Kong Institute of Education).

The first two days of the conference are devoted to pre-conference events. This year they include 13 workshops, two interactive events, one tutorial, and the Doctoral Student Consortia, which will include 12 pre-doctoral student presentations followed by mentoring activities conducted by top-notch researchers. The Workshop papers are published in separate proceedings with its own ISBN number.

We would like to thank everyone who has been involved directly or indirectly in making these proceedings come to fruition, and we hope a resounding success. We have to start with all of the paper authors; we acknowledge their exciting research contributions and are delighted that they chose ICCE 2013 as the conference at which to present their work. In conjunction we have to thank the IPC and the Executive Chairs for all of the sub conferences. We gave them a lot of autonomy in making decisions, and selecting papers, and, as you will see from the proceedings they were thorough in their reviewing and selection process. In addition, they took on the difficult work of making sure all of the papers were submitted on time, and were properly formatted for inclusion in the proceedings. We have to thank our keynote and invited speakers for graciously accepting our invitations and for their willingness to participate in all activities of the conference. Many thanks also to the panel organizers – the panels give the conference a unique flavor. Of course, the biggest thanks go to the people who have to sweat it out, and work the hardest under the time pressure – the Local Organization Committee.

Thank you all for your commitment and hard work toward making ICCE 2013 a success. We hope that you will find the conference presentations to be insightful, interesting, and inspiring. Please partake in the rich academic atmosphere of the conference, acquire the deep insights you can gain by interacting with colleagues, and most of all enjoy the vibrant and colorful ethnic experiences around you in Bali Island.

Conference Chair:

Tsukasa HIRASHIMA, Hiroshima University, Japan

Program Coordination Chairs:

Lung Hsiang WONG, Nanyang Technological University, Singapore (Chair)

Chen-Chung LIU, National Central University, Taiwan (Co-Chair)

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Pudjo SUMEDI, Universitas Muhammadiyah Prof. DR. HAMKA, Indonesia

Secretary to Local Organizing Committee:

Muhammad LUKMAN, Universitas Muhammadiyah Prof. DR. HAMKA, Indonesia

KEYNOTE SPEAKERS

KEYNOTE SPEAKER: C2

Designing Visualizations and Automated Guidance to Create 21st Century Learners

Professor Dr. Marcia C. Linn

Graduate School of Education, University of California, Berkeley, USA

Abstract

Open source, online learning environments can transform education and support worldwide efforts to promote the capabilities students need for the 21st Century. Recent research suggests promising ways to take advantage of online, dynamic visualizations of complex phenomena such as global climate change. New technologies offer ways to diagnose student progress and provide automated guidance. These environments can use this information to create tools that enable instructors to efficiently monitor student progress and plan coherent lessons. Examples from the Web-based Inquiry Science Environment (WISE), an open source, customizable learning environment featuring a library of curriculum materials, will illustrate designs for instruction, assessment, and teaching tools that develop integrated understanding and provide a firm foundation for future learning. These recent trends have valuable implications for the design of learning environments that provide continuous assessment and guidance for students.

KEYNOTE SPEAKER: C1

Intelligent Control Solutions using MATLAB: Laboratory Based Education Experiences for Academic Atmosphere Improvement

Professor Dr. Imam Robandi

Department of Electrical Engineering, Faculty of Industrial Technology, Institut Technologi Sepuluh Nopember (ITS), Indonesia

Abstract

Intelligent control application now is rapidly growing in industry. Control System Toolbox of MATLAB provides industry-standard algorithms for systematically searching, analyzing, designing, tracking, observing and tuning linear and nonlinear control systems. MATLAB presents the system as a transfer function, polynomial, conventional algebraic, plotting, state-space, pole-zero-gain, or frequency-response model. The Intelligent controls consist of Fuzzy Logic, Optimal Control (LQR, *Linear Quadratic Regulator*), Genetic Algorithm (GA), Neural Network (NN), Artificial Immune System (AIS), Bee Colony Algorithm (BCA), Ant Colony Optimization (ACO), Simulated Annealing (SA), Particle Swarm Optimization (PSO), and Bacterial Foreging. The problems in power engineering consists of design, optimization, parameter tuning, and modeling. Step response plot of the power system can be visualized as behavior in time domain and frequency domain. Stability analysis (dynamic and transient) of control can be demonstrated through interactive and automated techniques through MATLAB. Power System as a MIMO (Multi Input Multi Ouput) system can be easily modeled in a Linear and Non-Linear System as a state space. The *controlability*, *observability*, and *stability* are mandatory requirements of intelligent control which can be performed by using MATLAB easily.

KEYNOTE SPEAKER: C4

We need Mindful and Seamless Learning Technologies

Professor Dr. Marcus Specht

Centre for Learning Sciences and Technologies, Open University of the Netherlands, Netherlands

Abstract

Seamless technologies are with us everyday. We use personal technologies that link our physical reality and environment with digital friends, media, discussion groups. Public display technologies become more and more present in our everyday environments and woven into everyday activities from riding a train to a visit in the zoo or a museum. Digital and real worlds are more and more merging and our perception and focus sometimes is blurred and we are distracted by the one or the other. This has an important societal impact that the generation of mobile natives is becoming aware of.

Some key components of learning are curiosity, focus, flow, endurance, or the framing of new knowledge in relation to earlier experiences and knowledge. New technologies enable some of these but they also hinder some of these. The keynote will give some ideas on how to design seamless learning technologies in a mindful way to enable focus, avoid distraction, foster endurance and curiosity, or enable framing of experiences. The affordances of new technologies will therefore be mapped on how they can facilitate best conditions for learning, ranging from linking of real world activities and curricular structures to the usage of mobile notifications for reflection or awareness in acting and learning.

KEYNOTE SPEAKER: C6

Motivating to Learn or Learning to Motivate? Examining the Relationship Between Technology and Motivation in Language Learning

Professor Dr. Glenn Stockwell

Graduate School of International Culture and Communication Studies, Waseda University, Tokyo, Japan

Abstract

From the early days of computer-assisted language learning (CALL), there has been discussion of how technologies can play a role in motivating learners in learning a language (e.g., Warschauer 1996), and as technologies have become more sophisticated, the growing range of uses of technology in and out of the classroom increases the potential for enhanced motivation. As Dörnyei (1999, p. 525) very rightly argues, "motivation is one of the most elusive concepts in applied linguistics and indeed in educational psychology in general." While motivation in language learning has been a consistently recurring theme over the past half a century or more, the last few years has seen a renewed interest in motivation in the field, and a number of books have appeared recently laying testimony to its importance (e.g., Dörnyei & Ushioda, 2011; Murray, Gao, & Lamb, 2011). Increased motivation has often been given as the justification for the introduction and use of technology in language learning environments, but what is the nature of the relationship between motivation and technology, and what are the characteristics of the motivation for using technology for learning a second language?

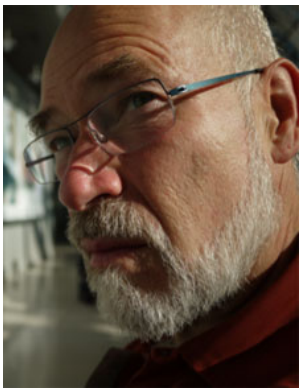
This presentation looks at how technology can be used in language learning contexts, and the relationship between technology and motivation in language teaching and learning. It begins with looking at general issues associated with technology and motivation, including a brief discussion of the so-called inherent motivational benefits of using technology, including the related concept of learner autonomy. It then considers the issue of motivation for using technology from both the teacher's and learner's perspective, followed by an overview of communication technologies that have come into the mainstream in English language teaching and learning, and how these can impact motivation. These include writing for a real audience through blogs and social networking tools (e.g., Lee, 2009) and the potential benefits

of anonymity that may be seen in different types of communication tools such as virtual worlds (e.g., Deutschmann, Panichi, & Molka-Danielsen, 2009). The presentation continues with an examination of mobile technologies for language learning, and explores the concept of private and studying spaces (cf., Stockwell, 2010). The presentation concludes by examining the local and global issues associated with using technology for language learning, and how motivation may be affected by the technologies that are available in both more and less technologically advanced regions.

THEME-BASED INVITED SPEAKERS

INVITED SPEAKER: C3

Standards as Enabler for Innovation in Education – a Reality Check



Tore Hoel

Learning Centre and Library, Oslo and Akershus University College of Applied Sciences, Norway

Abstract

Standardization is seen as static, while innovation is dynamic. Still standards could play a positive role for innovation though providing information, compatibility, variety reduction and quality assurance. In education, standardization meets a strong need for openness, which has become a key driver for innovation in Learning, Education and Training (LET). Open data, open access, open educational resources, open education, and lately, MOOCs are significant global trends. Formal standardization, based on a closed business model, could be seen as the direct opposite to openness and therefore fail to support innovation in education. This presentation will explore contradictions and paradoxes of standardization in LET. What organizations are active in our domain, and how innovative are they? What are the potential of formal vs. consortia standardization? What are the roles of different stakeholders? Could all development be left to the market?

The presentation draws on personal experience as an expert in European and international standardization bodies (CEN and ISO), and as an observer of consortia standardization (e.g., IMS Global, W3C, IDPF, Daisy). The success of these bodies within the LET domain varies a lot. What are the success factors and how do we assess the quality of a standard? Recently European pre-standardization experienced a major setback due to lack of understanding by formal standardization of the needs of the educational community. The presentation will conclude with a proposal for a revitalized process, bringing stakeholder needs, LET technology trends and the need for harmonized understanding of the basic concepts and models closer together.

INVITED SPEAKER: C5

Designing Digital Game-based Learning for Enhancing Critical Thinking

Dr. Ming-Puu Chen

Graduate Institute of Information and Computer Education, National Taiwan Normal University, Taiwan

Abstract

Recently, game-based learning has become an effective cognitive tool to enable learners to actively construct knowledge by playing, maintain higher motivation and apply acquired knowledge to solve real-life problems. The game-based learning process can be employed to provide a rich learning context to help learners construct higher level knowledge and skills through ambiguous and challenging trial and error practice. During game-playing, learners engaged in higher order cognitive activities that promote attention, selection, activation and retention. Through a pedagogically meaningful process of game-play, content, skills and attitudes can be integrated in the gaming context to engage learners and enhance learning by playing. However, what an effective game-play is consisted of, what critical phases are involved and what sequences of game-play are pedagogically meaningful to the learners still need to be further studied. In this presentation, a game-play cycle based on the perspective of knowledge transformation is introduced to facilitate novices' critical thinking by game-playing. Implications and related issues of the proposed game-play cycle are discussed. The assertion that effective game-based learning can be achieved by means of deliberate design of the processes of game-play is contended and supported. It is concluded that a pedagogically meaningful game-playing process can be employed as a prospective means to facilitate the development of higher order thinking skills.

INVITED SPEAKER: C7

Cultivate Creative Knowledge Practices through Principle-Based Design

Dr. Jianwei Zhang

School of Education at the University at Albany, State University of New York, USA

Abstract

Classroom innovations to cultivate creative knowledge work currently rely on prescriptive designs that specify a set of procedures to achieve preset goals, with limited creative engagement of teachers and students in the design process. In this talk, I will present a more adaptive, principle-based approach to learning design: teachers work with their students to co-regulate and co-improvise knowledge-building practices in light of a set of principles. They come up with productive configurations and strategies to address their knowledge goals that continually deepen as progress is made, with computerized tools providing feedback on their collaboration and progress. I will discuss the feasibility and advantages of this approach based on my analyses of a set of knowledge-building communities equipped with Knowledge Forum and highlight implications to teacher development. This principle-based approach sheds light on new designs of technology to leverage idea interaction and development, feedback on progress, and inform deeper opportunities for sustained knowledge building.

SPECIAL INVITED SPEAKER

The Implementation of ICT to Enhance Student Learning Activities

Dr. Herman Dwi Surjono

College of Engineering and the Graduate School of the Yogyakarta State University, Indonesia

Abstract

As the use of Information and Communication Technology (ICT) for delivering instruction materials increases, the term of e-learning has become widespread. Many educational institutes and universities in Indonesia have tried to adopt the e-learning system as parts of their efforts to foster teaching and learning processes. The quality of student activities can be enhanced through the effective use of e-learning. The Yogyakarta State University (YSU) Indonesia has been implementing the e-learning system called BESMART since 2006. It was developed using the Learning Management Systems of Moodle. The implementation of the e-learning system in some schools and universities in Indonesia has several obstacles such as low bandwidth of internet connection, lacks of teacher's computer skills, limited numbers of accessing terminals, no supporting policy for implementing e-learning methods and other administrative stuff. The problems could be solved by the implementation of a blended learning.

In my speech, I will discuss about the integration of ICT into teaching and learning process by the implementation of blended learning in order to increase the quality of student learning activities at the YSU Indonesia. The blended learning is a combination of e-learning and traditional classrooms. It can be the accommodation of the best elements of e-learning contents consisting of items like simulations, virtual laboratory, and online discussions into a face-to-face learning. The student activities that can be enhanced by the effective use of blended learning include online collaboration and discussion, online quizzes and assignments, online inquiry and explorations, as well as any individual activities such as e-reflections, e-journal, blogs, e-portfolios. Other conventional face-to-face activities can still be incorporated in the blended learning such as tutorials, practicum, project work and laboratory work.

The Implementation of ICT to Enhance Student Learning Activities

Herman Dwi Surjono, Ph.D.
hermansurjono@uny.ac.id
College of Engineering, Yogyakarta State University, INDONESIA

Abstract

As the use of Information and Communication Technology (ICT) for delivering instruction materials increases, the term of e-learning has become widespread. Many educational institutes and universities in Indonesia have tried to adopt the e-learning system as parts of their efforts to foster teaching and learning processes. The quality of student activities can be enhanced through the effective use of e-learning. The Yogyakarta State University (YSU) Indonesia has been implementing the e-learning system called BESMART since 2006. It was developed using the Learning Management Systems of Moodle. The implementation of the e-learning system in some schools and universities in Indonesia has several obstacles such as low bandwidth of internet connection, lacks of teacher's computer skills, limited numbers of accessing terminals, no supporting policy for implementing e-learning methods and other administrative stuff. The problems could be solved by the implementation of a blended learning.

This paper will discuss about the integration of ICT into teaching and learning process by the implementation of blended learning in order to increase the quality of student learning activities at the YSU Indonesia. The blended learning is a combination of e-learning and traditional classrooms. It can be the accommodation of the best elements of e-learning contents consisting of items like simulations, virtual laboratory, and online discussions into a face-to-face learning. The student activities that can be enhanced by the effective use of blended learning include online collaboration and discussion, online quizzes and assignments, online inquiry and explorations, as well as any individual activities such as e-reflections, e-journal, blogs, e-portfolios. Other conventional face-to-face activities can still be incorporated in the blended learning such as tutorials, practicum, project work and laboratory work.

Keywords: blended learning, e-learning, learning activities

A. Introduction

The use of information and Communication Technology (ICT) that increaces very rapidly in the last decade has impacted every aspects of everyday life including education. Challenges faced by teachers is certainly not the easy, because the students are expected to compete globally characterized by the ICT. Today teachers are no longer become learning

resources and main transmitters of information, but they have to be more than those which are capable of acting as facilitators, companions, mentors, and also as partners in developing the skill and knowledge. Teachers are required to optimally implement ICT to facilitate learning activities that encourage the development of students' skills and knowledge.

According to Wagner (2008), students are now not enough to just knowing the information and remembering facts, but they must be able to think critically, and solve problems, as well as the skills to communicate and work together. In addition, students should be able to adapt, have initiative, be able to access and analyze information as well as have high curiosity. Equip themselves with the ability to use and integrate ICT in their teaching activities, teachers are expected to lead the students to meet the competencies.

In doing some teaching activities teachers can optimize the use of ICT including administration, communication, learning resources, material delivery, evaluation, activities in and outside the classroom, self-study, and professional development. However, it is not easy for teachers and students to be able to optimally utilize ICT in learning. There are at least three conditions that must be met, namely: (1) teachers and students should have easy access to technological devices, including Internet connection, (2) the availability of digital contents (teaching materials) that is easy to understand, (3) teacher must have the knowledge and skills to use the technology and resources to help students to achieve academic standards.

The implementation of an e-learning today is very varied ranging from simple to integrated. This is caused partly because there are no standard pattern in the implementation of e-learning, human resource constraints both developers as well as lecturers in e-learning, the limitations of the hardware and software, the limitations of cost and development time. As for the actual teaching-learning process, especially in countries where Internet connection is very slow, the use of e-learning systems can be

combined with conventional learning system known as blended learning or hybrid system of learning.

This paper will discuss about the integration of ICT into teaching and learning process by the implementation of blended learning in order to increase the quality of student learning activities at the YSU Indonesia.

B. Online Environment

A social network application is an online service, platform, or site that focuses on building and reflecting of social networks or social relations among people, e.g., who share interests and/or activities. A social network service essentially consists of a representation of each user (often a profile), his/her social links, and a variety of additional services. Social networking sites allow users to share ideas, activities, events, and interests within their individual networks.

The social network application has offered some opportunities for learning. It empowers students with ICT tools to construct, present, reflect, and collaborate with other students. Many applications have a familiar user interface that can engage students in learning and interaction. Some of them may certainly offer facilitating a network between students within the course and with outside field.

Many educational institutes and universities In Indonesia have tried to adopt the e-learning system as parts of their efforts to foster teaching and learning processes. On the other hand, most of the time spent by users of school age is to access social networks such as Facebook and Twitter. Trend of increased use of the social networks over the years needs to be directed to support learning activities. The implementation of the e-learning system in some schools and universities in Indonesia has several hinders such as low bandwidth of internet connection, lacks of teacher's computer skills, limited numbers of accessing terminals, no supporting policy for implementing e-

learning methods. The problems may be solved by the implementation of a blended learning.

The blended learning is a combination of web-based instruction and traditional classrooms. It combines different learning environments such as the use of e-learning, social networks and face-to-face teaching. Thus, the blended learning can be the accommodation of the best elements of e-learning content consisting of items like simulations, virtual laboratory, online collaborations and discussions via social networks into face-to-face teaching and learning processes. This seems the most possible alternative to be implemented at schools where the Internet connection is still expensive.

C. Student Activities in E-learning BESMART

In order to optimize the utilization of information technology to support learning activities, the computer center of the Yogyakarta State University has built YSU E-learning system called BESMART since 2006. The YSU e-learning system was implemented with a paradigm of integrated on-line learning using the LMS (Learning Management System) of Moodle. The e-learning system has been functioning as it should and can be accessed through the URL: **http://besmart.uny.ac.id**

Through this e-learning system, lectures can manage their course materials, namely: prepare the syllabus, upload the lecture materials, assign tasks to the students, create a test / quiz, provide grades, monitor student activities, interact with lecturers and fellow students through discussion forums and chat, etc. On the other hand, students can access information and learning materials, interact with fellow students and lecturers, perform tasks form lectures, take a test / quiz, see the achievement of learning outcomes, etc. (Surjono: 2008).

It is important to make the e-learning portal of BESMART become engaged. An engaging e-learning will attract student to always come and learn from the resources provided. The key indicators of engaging e-learning

include an intensive interaction and a good quality of interaction (Conrad and Donaldson, 2011). There are a lot of activities that can be accomodated in the e-learning portal of YSU.

The YSU e-learning was implemented using an LMS of Moodle. The home page of the YSU e-learning portal is shown at figure 1. LMS is a software to create lecture materials on-line (web based), manage the learning activities and outcomes, facilitate interaction, communication, cooperation among faculty and students. LMS also supports a variety of activities, including: administration, delivery of learning materials, assessment (assignments, quizzes), tracking & monitoring, collaboration, and communication/interaction. Moodle is one of the open source LMS that can be obtained freely through http://moodle.org. Moodle can easily be used to develop e-learning systems. With Moodle an e-learning portal can be modified as needed.

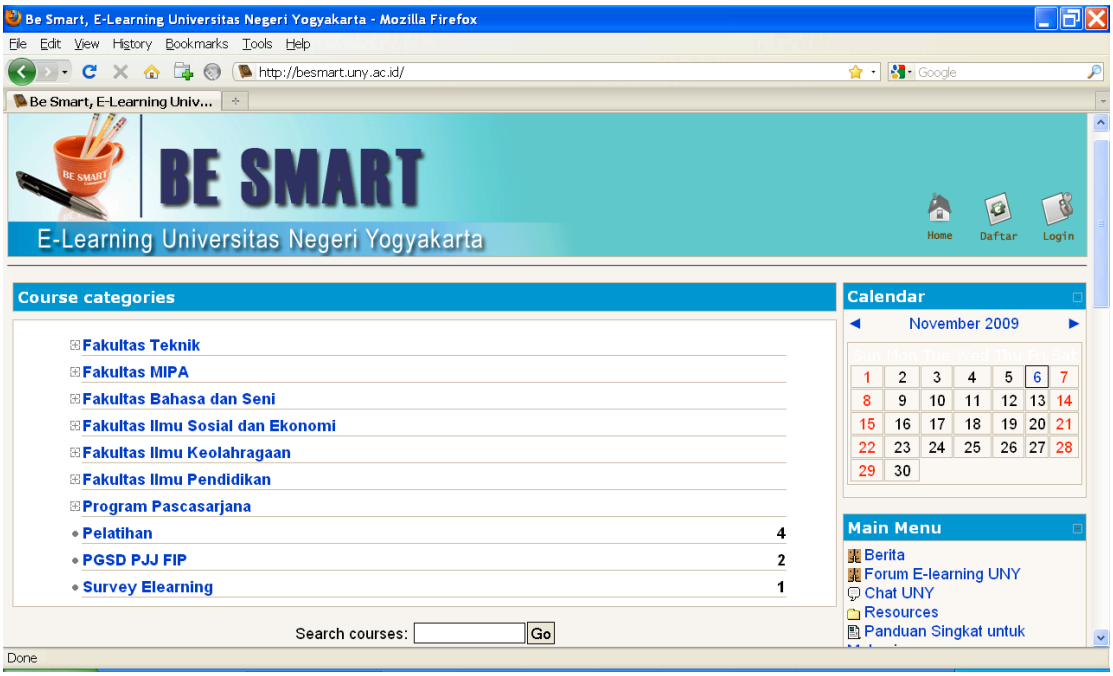


Figure 1. The homepage of the YSU e-learning portal

One of the advantages for lectures who create LMS-based online courses is its convenience. This is because they do not need to know anything about web programming, so that time can be utilized more to think about the content materials to be delivered. Besides, by using the LMS Moodle, we tend

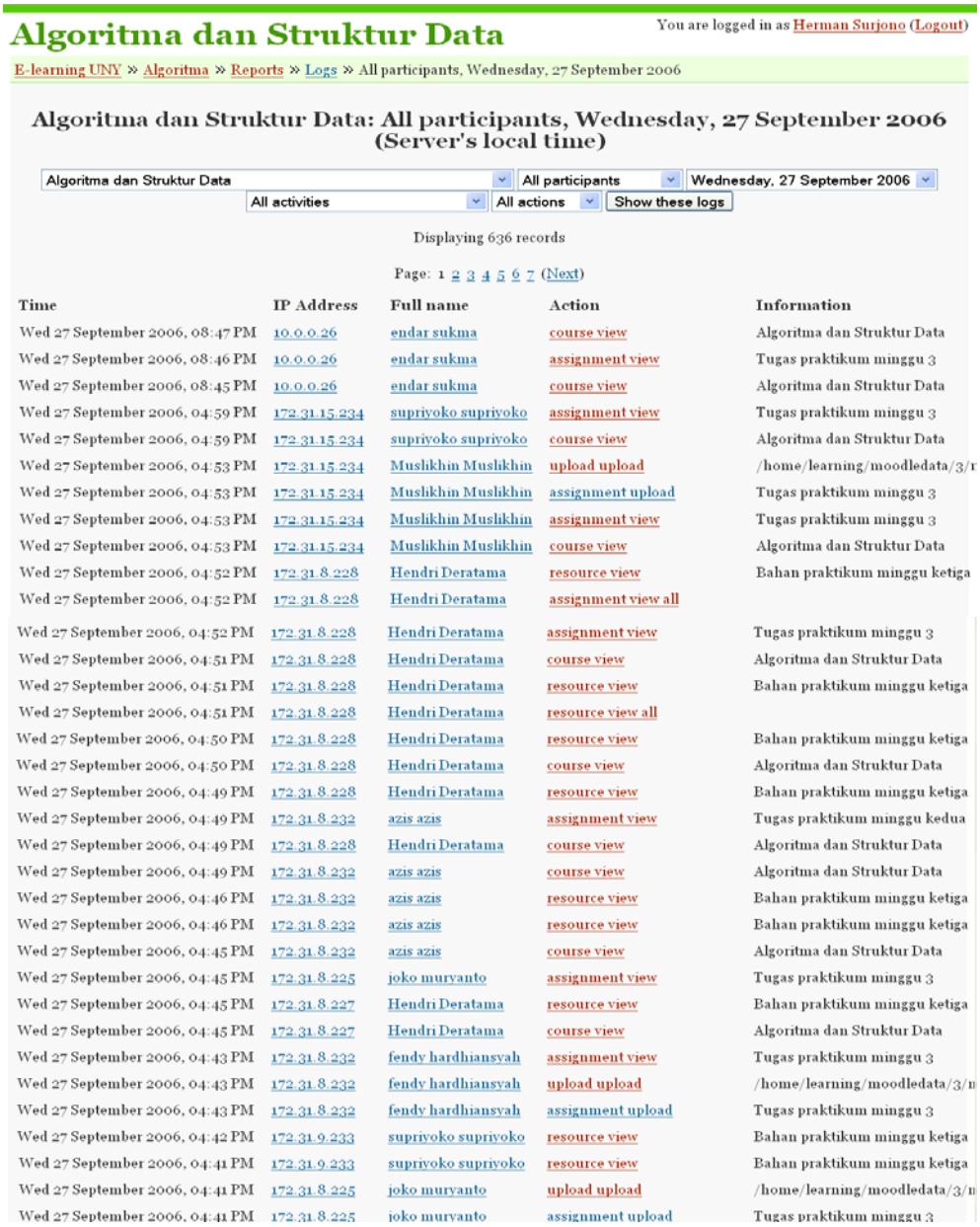
to follow an integrated e-learning paradigm that allows to establish cooperation in the knowledge sharing among the major universities in Indonesia.

In BESMART, lecturers can do the following things: create a new course, set the course, upload a variety of learning materials, make assignments, create quizzes, create discussion forums and chat. At the time of learning activities, teachers grade student's assignment and provide feedback, and respond to discussion forums as well. Learning materials can be in any format such as text documents, slide presentations, images, animations, audio and video clips. Teachers can also do some administration works such as backup, restore, reset and import. An example of a course page is shown at figure 2.

Figure 2. An example of a course page

Student activities can be monitored by a lecturer through their log histories. The e-learning system will record every activity of students who access the system. The log histories include "Time" when students access, "IP address" from where they connect the Internet, "Full name" of the student, "Action" that they do, and "Information" of the page they access. Figure 3 shows an example of log histories. In addition to these logs, a lecture can also

see other student activities include Live logs from the past hour, Activity report, Participation report, and Statistics.



Algoritma dan Struktur Data

You are logged in as Herman Surjono (Logout)

E-learning UNY » Algoritma » Reports » Logs » All participants, Wednesday, 27 September 2006

Algoritma dan Struktur Data: All participants, Wednesday, 27 September 2006 (Server's local time)

Algoritma dan Struktur Data | All participants | Wednesday, 27 September 2006 | All activities | All actions | Show these logs

Displaying 636 records

Page: 1 2 3 4 5 6 7 (Next)

Time	IP Address	Full name	Action	Information
Wed 27 September 2006, 08:47 PM	10.0.0.26	endar sukma	course view	Algoritma dan Struktur Data
Wed 27 September 2006, 08:46 PM	10.0.0.26	endar sukma	assignment view	Tugas praktikum minggu 3
Wed 27 September 2006, 08:45 PM	10.0.0.26	endar sukma	course view	Algoritma dan Struktur Data
Wed 27 September 2006, 04:59 PM	172.31.15.234	suprivoko suprivoko	assignment view	Tugas praktikum minggu 3
Wed 27 September 2006, 04:59 PM	172.31.15.234	suprivoko suprivoko	course view	Algoritma dan Struktur Data
Wed 27 September 2006, 04:53 PM	172.31.15.234	Muslikhin Muslikhin	upload upload	/home/learning/moodledata/3/r
Wed 27 September 2006, 04:53 PM	172.31.15.234	Muslikhin Muslikhin	assignment upload	Tugas praktikum minggu 3
Wed 27 September 2006, 04:53 PM	172.31.15.234	Muslikhin Muslikhin	assignment view	Tugas praktikum minggu 3
Wed 27 September 2006, 04:53 PM	172.31.15.234	Muslikhin Muslikhin	course view	Algoritma dan Struktur Data
Wed 27 September 2006, 04:52 PM	172.31.8.228	Hendri Deratama	resource view	Bahan praktikum minggu ketiga
Wed 27 September 2006, 04:52 PM	172.31.8.228	Hendri Deratama	assignment view all	
Wed 27 September 2006, 04:52 PM	172.31.8.228	Hendri Deratama	assignment view	Tugas praktikum minggu 3
Wed 27 September 2006, 04:51 PM	172.31.8.228	Hendri Deratama	course view	Algoritma dan Struktur Data
Wed 27 September 2006, 04:51 PM	172.31.8.228	Hendri Deratama	resource view	Bahan praktikum minggu ketiga
Wed 27 September 2006, 04:51 PM	172.31.8.228	Hendri Deratama	resource view all	
Wed 27 September 2006, 04:50 PM	172.31.8.228	Hendri Deratama	resource view	Bahan praktikum minggu ketiga
Wed 27 September 2006, 04:50 PM	172.31.8.228	Hendri Deratama	course view	Algoritma dan Struktur Data
Wed 27 September 2006, 04:49 PM	172.31.8.228	Hendri Deratama	resource view	Bahan praktikum minggu ketiga
Wed 27 September 2006, 04:49 PM	172.31.8.232	azis azis	assignment view	Tugas praktikum minggu kedua
Wed 27 September 2006, 04:49 PM	172.31.8.228	Hendri Deratama	course view	Algoritma dan Struktur Data
Wed 27 September 2006, 04:49 PM	172.31.8.232	azis azis	course view	Algoritma dan Struktur Data
Wed 27 September 2006, 04:46 PM	172.31.8.232	azis azis	resource view	Bahan praktikum minggu ketiga
Wed 27 September 2006, 04:46 PM	172.31.8.232	azis azis	resource view	Bahan praktikum minggu ketiga
Wed 27 September 2006, 04:45 PM	172.31.8.232	azis azis	course view	Algoritma dan Struktur Data
Wed 27 September 2006, 04:45 PM	172.31.8.225	joko muryanto	assignment view	Tugas praktikum minggu 3
Wed 27 September 2006, 04:45 PM	172.31.8.227	Hendri Deratama	resource view	Bahan praktikum minggu ketiga
Wed 27 September 2006, 04:45 PM	172.31.8.227	Hendri Deratama	course view	Algoritma dan Struktur Data
Wed 27 September 2006, 04:43 PM	172.31.8.232	fendy hardhiansyah	assignment view	Tugas praktikum minggu 3
Wed 27 September 2006, 04:43 PM	172.31.8.232	fendy hardhiansyah	upload upload	/home/learning/moodledata/3/n
Wed 27 September 2006, 04:43 PM	172.31.8.232	fendy hardhiansyah	assignment upload	Tugas praktikum minggu 3
Wed 27 September 2006, 04:42 PM	172.31.9.233	suprivoko suprivoko	resource view	Bahan praktikum minggu ketiga
Wed 27 September 2006, 04:41 PM	172.31.9.233	suprivoko suprivoko	resource view	Bahan praktikum minggu ketiga
Wed 27 September 2006, 04:41 PM	172.31.8.225	joko muryanto	upload upload	/home/learning/moodledata/3/n
Wed 27 September 2006, 04:41 PM	172.31.8.225	joko muryanto	assignment upload	Tugas praktikum minggu 3

Figure 3. An example of student's log histories

D. Implementation of Blended E-learning

The YSU e-learning system has been used university wide since 2006. Students take advance of its benefits. The advantages of using the e-learning system among others: (1) students can learn anytime, anyplace and any pace,

(2) all materials are always available, (3) materials can be reusable in other courses, (4) links to online resources are easy to create, (5) collaboration is easy to set up, (6) some quizzes are easier online, (7) students can submit tasks in various digital formats.

Results of research on YSU elearning (Sukardi, etc.: 2007) showed that the YSU e-learning has been developed using the Moodle LMS and has been functioning well; implementation of e-learning in a lecture at YSU still is not optimal as seen from the low activity in most subjects; lecturers and students consider that e-learning compliance aspects of the learning activity so it needs to be applied in the lecture; the constraints that exist in the implementation of e-learning is the lack of socialization, it needs further training for lecturers; lecturers need to increase motivation in developing e-learning; and constraints for students more focus on the lack of computer terminals. Some efforts have been done to promote the system to staffs and students, but there are much fewer numbers of teachers who use the system than as expected.

The blended learning is combination of e-learning and traditional classrooms. It is a combination of technology-based materials and face-to-face sessions used together to deliver instruction. The YSU adopts this kind of blended learning to conduct the process of learning and teaching. Some lectures have courses at the BESMART. They upload learning materials, assignments and quizzes so that students can access the materials and do the assignments and quizzes online.

Unfortunately, until now YSU does not have a policy governing the use of elearning as an alternative to classical learning activities. This makes the lectures feel reluctant to use e-learning because there are no definite rules. Although, in fact there are many lectures who have been trained to use e-learning.

The blended learning can be the accommodation of the best elements of e-learning content consisting of items like simulations, virtual laboratory, and online discussions into face-to-face learning. Most lecturers at YSU have

already conducted their teaching using this model of blended learning. In this model, the lectures conduct their teaching in a classroom and utilize information technology based media intensively. They use PowerPoint for presentation, animation, simulation, and other multimedia for enhancing teaching and learning process. The implementation of this blended learning model does not necessarily need an Internet connection, as lecturers can find online resources at other spare times. This seems the most possible alternative to be implemented at campus where the Internet connection is still expensive.

E. Summary

The implementation of the e-learning system at Yogyakarta State University has several hinders such as low bandwidth of internet connection, lacks of teacher's computer skills, limited numbers of accessing terminals, no supporting policy for implementing e-learning methods. The problems may be solved by the implementation of a blended learning. The blended learning can be the accommodation of the best elements of e-learning content consisting of items like simulations, virtual laboratory, and online discussions into face-to-face learning.

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