Foreword

From the Co-chairs, TeL2013

Welcome to the International Symposium on Technology-enhanced Learning 2013 (TeL2013) and to our foreign delegates, a special welcome to Singapore and to NUS! This symposium hopes to bring together various stakeholders from institutions of higher education in order to closely examine key aspects of technology-enhanced learning — impacts on both learners and teachers, sustainability of such forms of learning and scalability of this approach to education. With a good number of participants registered for the symposium, we are confident that the discussions will be both stimulating and productive as we gather to discuss how technology and pedagogy must influence each other.

The digital revolution is beginning to have a transformational effect on teaching and learning in our educational institutions. The launch of MOOCs by several prestigious universities and consortia has made global access to quality education a reality. Many universities seeking to emulate these programmes are rapidly implementing technology-enhanced learning and instructional systems. This “rush”, however, raises many questions: What is the potential of these emerging technologies in the holistic development of students? Can the quality and quantity of these innovations be improved in all educational areas? Are these innovations sustainable? The theme, “Towards an engaging & meaningful digital future!” places these questions and issues on the table for discussion. We hope the symposium events which comprise workshops, oral and poster presentation and panel sessions will maximize opportunities to actively engage in and adopt new ideas and practices.

We would like to express our sincere gratitude to the following individuals, without whom TeL2013 would not have been a success:

- Our guest-of-honour Professor Tan Eng Chye, Deputy President (Academic Affairs) & Provost, NUS and his team for actively supporting multiple avenues to sustain conversations on education,
- CDTL Director Laksh Samavedham, for his unwavering faith in us and invaluable guidance,
- Alice Christudason, Anand Ramchand, Cecilia Lim, Erik Mobrand, Farooq Shamsuzzaman, Ravi Chandran, Sow Chorng Haur for playing central roles in the organising committee; and Johan Geertsema, Ben Leong, and Tan Beng Kiang for serving as session chairpersons,
- Invited speakers, workshop facilitators and session panelists – Aaron Doering, Mike Keppell, John Shank, Sue Bennet Adrian Lee, Robert Kamei, Chng Huang Hoon, Erle Lim, Roger Cook, Ashley Tan, Linda Lim, Adeline Phua, and Alvin Tan for their enthusiastic participation,
- Our sponsors – ascilite, Cengage, Knolskape, and Wiley,
- CIT team for providing audio and video support,
- And last but certainly not the least – to our wonderful CDTL colleagues – for all the help and support they have offered us.

We hope you will enjoy this symposium!

Best wishes,
Kiruthika Ragupathi
Alan Soong
Invited Lecture

**From Apps to Adventure Learning:**
**Engaging Millions of Learners Around the World**

Aaron Doering
Associate Professor,
Learning Technologies Co-Director,
Bonnie Westby-Huebner Endowed Chair of Education and Technology,
Institute on the Environment Fellow,
University of Minnesota, USA

Website [http://www.chasingseals.com](http://www.chasingseals.com)
Twitter / @chasingseals
Facebook / facebook.com/chasingseals
LT Media Lab / lt.umn.edu

**Synopsis**

Wondering how to design learning environments that engage millions of learners? Dr. Aaron Doering can show you how. Doering, professor of Learning Technologies and co-director of the Learning Technologies Media Lab (LTML) at the University of Minnesota, has taken online learning and design to a new level over the past decade through numerous of his initiatives. He will share with you the technology transformation principles behind many of the learning environments he and his team have designed, developed, and delivered around the world. Some of these projects include North of Sixty, Earthducation, WeExplore, and Geothentic.

When not at the LTML, Doering can often be found on the road collaborating with diverse cultures in remote regions of the globe while millions of learners engage virtually in these journeys online, giving talks, or writing his next book. He looks forward to exploring his design principles and educational philosophy with you in Singapore!

To virtually experience some of Doering’s current projects, go to [http://www.chasingseals.com](http://www.chasingseals.com) or follow him on Twitter @chasingseals.

**About the Speaker**

Dr. Doering is an Associate Professor in Learning Technologies at the University of Minnesota. Doering holds the Bonnie Westby-Huebner Endowed Chair in Education and Technology, is a Laureate of the prestigious humanitarian Tech Awards, and is a fellow for the UMN Institute on the Environment. Doering has delivered education on sustainability and climate change to over 10 million students by traveling the world and by dogsledding and pulking over 5,000 miles throughout the circumpolar Arctic.

Doering gives hundreds of talks a year on adventure learning and motivation. His academic writing is focused on how adventure learning impacts the classroom experience, designing and developing online learning environments, and K-12 technology integration. Doering has received millions of dollars in grants and has published over 60 journal articles, books, book chapters, and conference proceedings. He is also the coauthor of *Integrating Educational Technology into Teaching* as well as the forthcoming book *The New Landscape of Mobile Learning*. 
Workshop

Theory into Practice:
A Quick Look into The Learning Environments and Principles that have Engaged Millions of Learners

Synopsis
Now that you have taken a sneak peek at the learning environments and projects that have engaged millions of learners at the keynote address, take a closer look into the theory and practice of these environments. Learn how you can use them in your teaching and classroom!

Doering will discuss how his principles to technology transformation have played a role in the design of the learning environments and also share how you can integrate these principles into your designs and pedagogy. Through the lens of some of the most recent projects to come out of the Learning Technologies Media Lab, Doering invites you to get involved with the learning and sharing. Bring your computer and get involved!
Invited Lecture

Personalising Learning for New Generation Students

Mike Keppell
Executive Director and Professor
Australian Digital Futures Institute
University of Southern Queensland,
Australia

Website http://www.usq.edu.au/adfi/team/mike

Synopsis

This presentation will focus on how new generation tertiary education students interact in a digital age. It will discuss how they adapt and customise their learning and personalise their interactions to suit their needs. It will argue that students need to acquire a range of literacies to successfully personalise their learning and social environments. New generation tertiary education students are characterised by having a rapport or relationship with technology and they have an inherent need to express themselves through multiple avenues which utilise user-generated content. User-generated content includes artefacts created by the student that are uploaded to the internet for sharing with other people. Knowledge acquisition now focuses on networks and ecologies, and knowledge now requires literacies in networking (Siemens, 2006). In addition, our learning is increasingly mobile as we move through a wider range of spaces. We now expect to be able to work, learn, and study whenever and wherever we want (Johnson, et al, 2012).

About the Speaker

Professor Keppell commenced at the University of Southern Queensland in October 2012 as Executive Director and Professor, Australian Digital Futures Institute. Professor Keppell has a long professional history in higher education in Australia, Canada and Hong Kong. Professor Keppell was Professor of Higher Education and Director of the Flexible Learning Institute at Charles Sturt University, and prior to that was Head of the Centre for Learning, Teaching and Technology at the Hong Kong Institute of Education. Professor Keppell has also held positions at the University of Melbourne, Central Queensland University and private providers in Canada. He holds qualifications from the University of Calgary and University of Queensland. Having published widely in the field of flexible learning, and with a background in educational technology, extensive community involvement and a strength in design-based research, Professor Keppell has a range of valuable skills and experience in Higher Education.

His research focuses on learning spaces, blended learning, learning oriented assessment, authentic learning and transformative learning using design based research. He has edited two books: Instructional Design: Case Studies in Communities of Practice and Physical and Virtual Learning Spaces in Higher Education: Concepts for the Modern Learning Environment. He is a Life Member of ascilite after serving 12 years on the executive including three years as Treasurer and three years as President. He is widely published and has completed numerous keynote and invited presentations.
Owning the Place of Learning: Principles for Designing Personal Learning Spaces for Learners and Teachers

Synopsis

Personal learning spaces constitute the formal and informal spaces and technologies customised by the learner or teacher. They are spaces that are owned by the learner or teacher. However, insufficient attention has been given to providing assistance to learners and teachers to design their own personal learning spaces. This workshop provides a framework for personal learning spaces that includes: distributed learning spaces, seamless learning and principles of learning space design that assist learners and teachers to design their own personal learning spaces. Distributed learning spaces include physical, blended, virtual mobile, personal, outdoor, academic and professional practice spaces (Keppell & Riddle, 2012). Seamless learning occurs when a person experiences a continuity of learning across a combination of locations, times, technologies or social settings (Sharples, et al, 2012). Seven principles of learning space design include: comfort, aesthetics, flow, equity, blending, affordances and repurposing (Souter, Riddle & Keppell, 2010). By taking account of distributed learning spaces, seamless learning and principles of learning space design both learners and teachers will be empowered to construct their own personal learning spaces.
Invited Lecture

iOERs:
How to Actively Engage Students Online to Enhance Learning

John Shank
Director
The Center for Learning & Teaching
Associate Instructional Design Librarian
Penn State Berks,
USA
Website

Synopsis
The digital information age presents the academia with an unprecedented opportunity to shift its course resources from primarily passive resources (i.e. books, magazines, newspapers, journals, videos, etc...) to active resources such as interactive tutorials, modules, games, and simulations. These resources are quickly emerging as supplemental learning materials for blended, online, and Massive Open Online Courses (MOOCs). The academic library has the potential to become the primary hub (learning commons) for providing the public, faculty, and students access to these resources. This session will explore the emergence of interactive learning materials (ILMs) as part of the Open Educational Resources (OERs) movement and the implications it has for society as well as the possible impact on higher education. You will learn what ILMs are along with how to find, choose, and use such resources in instructional settings.

About the Speaker
John D. Shank is the Instructional Design Librarian and Director of The Center for Learning & Teaching at Penn State Berks. Prior to his appointment in July 2001, he held positions at Bryn Mawr, Haverford, and Montgomery County Community College. He was selected by Library Journal in 2005 as a Mover and Shaker.

His responsibilities include teaching, administration, research, and service. He teaches CAS 283 (Communication and Information Technology) & CAS 383 (Culture & Technology). He developed the Berks Educational Technology Grant Curriculum Program in 2002 and since that time has directed more than 90 grant projects that have been awarded to 60 faculty, initially impacting over 100 courses and more than 3500 students. These initiatives focus on enhancing the student-centered teaching and learning environment. His research interests include the role, use, and impact of instructional technologies in higher education and academic libraries.

He has given hundreds of presentations at conferences, meetings, webinars, and workshops. Additionally, he has authored and coauthored a book, book chapters, and articles that focus on library integration into learning management systems, Learning Objects (Digital/Interactive Learning Materials), and the development of instructional design librarian positions. He is the co-founder and Advisory Board Co-Chair of the Blended Librarian On-line Community (http://www.blendedlibrarian.org/), as well as a reviewer for the Journal College & Research Libraries.
Researching Educational Technology in Higher Education

Sue Bennett
Associate Professor
Faculty of Education
University of Wollongong

Synopsis

This workshop integrates presentations, discussion and practical activities that address the key stages of developing a high quality research project to investigate educational technology in higher education.

The following topics will be covered:

• identifying research problems and locating them in the field
• exploring a research problem through relevant literature
• designing and conducting a robust investigation
• presenting the findings in publications

By the end of the workshop, participants will have developed a greater awareness of the field of educational technology and how to conduct research that advances knowledge in the field and is able to be published in a high quality outlet.

About the Speaker

Sue Bennett is an Associate Professor in the University of Wollongong’s Faculty of Education. Sue’s research into the role of technology in education across school, university and workplace settings has attracted national competitive grant funding and resulted in a significant body of publications. Sue's work draws on sociological and psychological constructs to investigate how people interact with and interpret technology in their everyday lives and in educational settings. The aim of this work is to develop a more holistic understanding of people's technology practices to advance knowledge in this area, and to inform practice and policy.

Sue graduated with a PhD in Education in 2002 and has worked as a full-time teaching and research academic in the Faculty of Education since. During that time she has taught IT integration to students enrolled in Bachelor, Graduate Diploma and Master degree programs, and has supervised more than 30 research students whose studies have focused on educational technology. She has also been involved in design projects for school and university education and for industry training, including interactive multimedia and online technologies.

Sue is currently the coordinator of the Learning, Design and Technology theme in the Interdisciplinary Educational Research Institute, one of the University of Wollongong’s research strengths. She is the joint lead editor of the Australasian Journal of Educational Technology and one of two higher education representatives on the Australian Information and Communications Technology in Education Committee (AICTEC).
Interactive Dialogues on "Transforming the Classrooms"

Flipped Classrooms

About the Panelists

Adrian Lee

Adrian Lee read Natural Sciences at Downing College, University of Cambridge. For his work on small trapped-ion clusters, he received the ICI Prize in Theoretical Chemistry. After graduation, he worked briefly at the British Antarctic Survey under the supervision of Prof. Howard Roscoe. There he helped develop code to retrieve NO2 column amounts from zenith-sky spectrometers. Following this, he took up a Ph. D. scholarship at the Department of Chemistry, University of Cambridge, under Prof. John Pyle FRS. In 1997, he completed his doctorate entitled ‘Numerical Modelling of Stratospheric Ozone’. A highlight of his doctoral studies was the development of a chemical forecasting methodology. In recognition of the use of this methodology during the ASHOE/MAESA international research campaign, he was awarded the NASA Achievement Award in 1995. He subsequently won a University Merit Award in 2000. Adrian continued his research in atmospheric science in Prof. Pyle’s research group until 2002, when he was awarded the Singapore Millennium Foundation Fellowship. This fellowship brought him to the National University of Singapore. His research under the fellowship centred on developing models to understand the economic cost of air pollution and global warming. Following the fellowship, Adrian took up a faculty position at NUS as a Lecturer in 2005 and was subsequently promoted to Senior Lecturer in 2008. He is currently the Director of the Special Programme in Science (SPS) in the Faculty of Science.

Robert K Kamei, MD

Robert K Kamei, MD is the Vice Dean of Education at the Duke-NUS Graduate Medical School Singapore. Born in Los Angeles, California, he has an undergraduate degree in Human Biology from Stanford University and his medical degree from the University of California, San Francisco. He subsequently pursued internship and residency training in pediatrics at the Children’s Hospital of Philadelphia, University of Pennsylvania School of Medicine. After several years in primary care pediatric practice, he returned to the University of California, San Francisco where he served on the faculty. He was named as director of pediatric residency training in 1990 and continued in this position until accepting the position at the Duke-NUS in 2006.
While director of residency training, the UCSF program grew from 45 to 89 residents and expanded from 2 to 5 major clinical teaching sites. Under his leadership, the program developed into a highly innovative educational training program, with several publications describing many of these creative efforts. He served with Dr Abraham Rudolph as co-editor of the “Fundamentals of Pediatrics” for the 3 editions of this textbook. This textbook has become one of the most popular references on pediatrics for medical students and residents that is sold in the world today; and has been translated in several different languages.

In 2000, he was the recipient of a Fulbright Senior Scholar Award to provide faculty development for academicians teaching medicine in Indonesia. During his sabbatical year, he traveled extensively throughout Indonesia and Southeast Asia to lecture and lead discussions on contemporary medical education teaching and evaluation techniques. Dr Kamei has held many different leadership positions in the Association of Pediatric Program Directors, the American Board of Pediatrics, and holds membership in the Alpha Omega Alpha medical society.

Chng Huang Hoon is an Associate Professor in the Department of English Language & Literature, National University of Singapore (NUS). Her teaching and research interests lie in discourse, gender and ideology. She has taught several courses on these subjects in her 15-year teaching career at NUS, and has published several papers on the subject. She is the author of the book, Separate and Unequal: Judicial Rhetoric and Women’s Rights (John Benjamins, Amsterdam, 2002). Her recent papers include: “From pedagogy to activism: The AWARE saga” (Australian Feminist Studies, 2012) and “Developing social literacy: Assessment strategies in a feminism class” (MELTA ELT Series, 2012). She has also published a number of papers on education, including “Mentorship in teacher training” (Routledge, 2013), and “The NUS Students’ Global Education Experience” (forthcoming). Huang Hoon has served in various administrative appointments in the past 10 years, including Assistant Dean (External Relations) and Director, Centre for Development of Teaching and Learning. In 2012, she assumed her current position as Associate Provost (Undergraduate Education).
Interactive Dialogues on "Transforming the Classrooms"

Innovative Applications of New and Emerging Technologies

Erle Lim
Assistant Dean of Education
Yong Loo Lin School of Medicine
National University of Singapore

Roger Cook
Manager
Learning & Teaching Technologies in eLearning Services
Queensland University of Technology, Australia

Ashley Tan
Head
Centre for e-Learning
National Institute of Education
Singapore

For presentations, visit:
https://sites.google.com/site/tel2013panel/ | http://goo.gl/M6cDkE

About the Panelists

Erle Lim graduated from the National University of Singapore in 1990, and obtained his Masters in Medicine (Internal Medicine) from the same university in 1997. In 2009, he was appointed as a Fellow to the Royal College of Physicians, Glasgow. He trained in Neurology at the Singapore General Hospital, after which he completed his training in Movement Disorders at the Mount Sinai School of Medicine, New York, under Professors C Warren Olanow and Mitchell F Brin. He is currently Senior Consultant Neurologist at the National University Hospital and was Assistant Dean of Education at the Yong Loo Lin School of Medicine, NUS from 2007 to 2010.

Erle's subspecialty interest is in Movement disorders, focusing on clinical applications of Botulinum toxin, Parkinson's disease, Spasticity and Dystonia. He has been invited to give lecture on Neurology and Movement Disorders regionally and internationally, and teaches techniques of Botulinum toxin injection using electromyographic guidance to regional neurologists. He has published over 100 papers in international journals, covering topics in general neurology, movement disorders, botulinum toxin, general medicine and medical education, and is reviewer for international journals in Medicine, Neurology, Movement disorders and Medical Education. He is Deputy Editor of the Annals, Academy of Medicine, Singapore, and sits on the editorial board of the Journal of Clinical Medicine Research. He sits on the specialist training committee in Neurology. An avid educationist, he conducts weekly postgraduate clinical tutorials at the National University Hospital, and is director of the yearly Neurologic Localisation Course. In 2006 and 2007, he was awarded both the faculty teaching excellence award and the university's annual excellence teaching award. In 2007, he was awarded the university’s outstanding educator award.
Roger Cook is Manager of Learning and Teaching Technologies in eLearning Services at Queensland University of Technology in Brisbane, Australia. He is currently managing a review of the university’s virtual learning environment and provides learning design support for a number of blended learning initiatives in the Science and Engineering Faculty and for the new Science and Engineering Centre. He has has worked as an educator and educational designer for the past 24 years in Australia, Japan and Thailand. His interests include authentic and active learning, web-conferencing, mobile and cloud computing, student response systems and learning analytics. This is the first time he has had the pleasure to visit Singapore!

Ashley Tan is the Head of the Centre for e-Learning (CeL) (http://www.cel.nie.edu.sg/) at the National Institute of Education, Singapore. The Centre promotes learning that is social, open, and mobile.

As teacher educator, Ashley believes that the best learning opportunities stem from our instinct to play. He plays video games like Minecraft with his son regularly. By observing and interacting with his son during game play, he has relearted how to teach by leveraging on play even among adult learners.

Ashley has gamified a Masters course, and integrated video games and game-based learning principles into pre-service and in-service teacher courses.

When he is not gaming, he thinks out loud by reflecting daily at his blog (http://ashleytan.wordpress.com/). Occasionally he shares a thought or two about game-based learning.
CONCURRENT SESSIONS
Learning design-principles & best practices
Gamification of Pharmacy Practices: Learning How to Manage Patients the Fun Way

Kevin Y.-L. Yap, Li Lian Wong, Kai Zhen Yap, Wai Keung Chui, John Y.G. Yap and Uday S. Athreya

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Keywords: Counseling; Dispensing; Gamification; Pharmacy Practice Education; Serious Games

EXTENDED ABSTRACT

Introduction
The Generation Y students who come into the pharmacy course are not only technology-savvy, but also digitally focused. In fact, these students are also coined as “Generation Cs” due to their “connectedness” with digital technologies (Fox, 2012). A constant challenge exists for our educators to find innovative approaches to sustain their interest in the modules, as well as encourage peer learning, and improve their practice skills. Additionally, the large student numbers (150-175 per cohort) make it a challenge for academic staff to monitor and instruct students on a one-on-one basis. Students’ level of understanding of the lecture content and their competency skills cannot be evaluated satisfactorily. As our students progress through the four years of study, they face the challenge of being able to integrate and apply what they have learnt in these modules to real-life practices. For pharmacy, this is especially important since the lack of these skills can impact patient safety. Game-based learning can provide a more interactive and engaging session as students participate both as a player and work collaboratively to solve various game challenges. Furthermore, virtual patient encounters can enable them to be more self-aware of their strengths and weaknesses, as well as improve their health communication skills.

The undergraduate pharmacy curriculum at our institution will soon be redesigned into a thematic structure which will run longitudinally throughout the 4-year candidature. Besides traditional lectures and tutorials, the pharmacy practice modules have a practical component whereby students are trained to read prescriptions, identify drug-related problems, prepare extemporaneous (i.e. non-commercially available) preparations, dispense medications and counsel patients. Currently, these skills are taught by role-playing and video-taping of sessions. This study describes a novel approach of applying gamification to medication dispensing and patient counseling for pharmacy education. We want to harness the capabilities of 2 upcoming technologies—virtual environments and serious games—for the training of our students, so that they can practice their dispensing and counseling skills anytime and anywhere.

Methodology
A role-playing strategy game simulating various patient encounters will be developed for a whole module. Students will play the game as pharmacist avatars in a futuristic world environment to “save the world”. Throughout the gameplay, students will have to complete a certain number of mini-tasks and “big boss” encounters in which they have to assess patients (automated avatars) through visual and audio cues, as well as dispense medications and counsel them. The patient avatars will then react dynamically to the student pharmacists’ actions.
Gamification Pedagogies

A game simulation, commonly known as a gamesim, is a hybrid which combines the pedagogic value of simulations with the motivational attributes of games (de Freitas and Levene, 2004). Here, we utilize de Freita’s 4-dimensional (4D) framework for our gamesim as it seems to be the most comprehensive and applicable to our needs (de Freitas and Oliver, 2006) (see Table 1). Context, the first dimension, considers the macro-level and micro-level aspects so as to facilitate learner support. The second dimension focuses on the attributes of the learner and learner group, including background, styles and preferences, so that the gamesim effectively support formal and informal learning processes. Diegesis forms the core of the third dimension to enhance students’ learning during gameplay in the “story world”, as well as enable appreciation of the subject and critical reflection outside gameplay. Tasks and challenges will be designed to suit the knowledge and skills of the student players so that flow experience—the psychological state of being completely absorbed/involved in gameplay—is possible (Csikszentmihalyi, 2008; Kiili, 2006). The last dimension focuses on the pedagogic approaches to support learning practices. Construction of the case scenarios will follow a problem-based learning approach (Azer et al., 2012). The gamesim will also be developed such that students are able to integrate and apply their knowledge and experiences gained during gameplay to new situations in actual practices (Kolb, 1984). Mini-tasks, “big boss” encounters, rewards, feedback and the environments afforded through gameplay will be based on Kaptelinin’s activity theory and Bronfenbrenner’s ecological systems theory so as to maximize students’ interactions and experiences (Kaptelinin and Nardi, 2006; Paquette and Ryan, 2001).

<table>
<thead>
<tr>
<th>Context</th>
<th>Learner specification</th>
<th>Mode of representation (Tools for use)</th>
<th>Pedagogic considerations</th>
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| **Place of learning:**  
• University and home | Learner/ learner group:  
• Pharmacy undergrads  
(Years 1-2) | Level of fidelity:  
• High level of fidelity based on use of 3D avatars, virtual patients and virtual pharmacy | Pedagogic approaches:  
• Problem-based Learning  
• Experiential Learning  
• Activity Theory  
• Ecological Systems Theory |
| **Level of resources needed:**  
• Low to medium level of resources (Leap Motion at home, gamesim setup with Kinect and Leap Motion in school) | Learner background:  
• Students from pre-university and polytechnic/vocational institutes  
(little/ no pharmacy knowledge) | Level of realism:  
• Medium to high level of realism in a virtual world whereby students have to dispense and counsel patient avatars on various medications and preparations | Learning outcomes:  
• Improve peer collaboration, critical thinking skills, health communication skills and awareness of socio-global issues  
• Obtained through surveys, focus groups and gameplay capture |
| **Technical support needed:**  
• Significant supported needed (students need training on how to navigate virtual world) | Learning styles/ preferences:  
• Caters towards two learning styles (gesture-based and voice-based) | Level of immersion:  
• Medium when playing individually as the pharmacist  
• High when attempting to solve patient encounters through group collaborations | Learning activities:  
• Virtual patient encounters in which students have to counsel and/or dispense medications  
• Embedded as part of lesson plan in the form of tutorials in the module |
| **Link between context and practice:**  
• Health issues and patient encounters in the gamesim will be representative of actual practice settings | Collaboration:  
• Students work singly and in groups of 9-10 | Link between gamesim and reflection:  
• Made through briefing/ debriefing  
• Pre-game and post-game surveys  
• Focus groups  
• Reflection journals | Briefing and debriefing:  
• Pre-class preparation and post-activity reflection to reinforce learning outcomes |
Evaluation of Learning Outcomes and Student Experiences

Students’ interest levels, extent of interactivity, peer collaboration, reflections on learning and experiences with the gamesim will be assessed through pre-game and post-game surveys, focus groups, reflection journals and briefings/debriefings. The role of debriefing is critical as it is able to support the learning objectives of the lesson and module (de Freitas and Oliver, 2006). Furthermore, the use of reflection journals has shown to promote the psychosocial competencies of students, and correlate to their academic performances (Lew and Schmidt, 2011; Shek and Wu, 2012). Objective assessments captured during gameplay will be used to evaluate students’ knowledge and skills in communication, dispensing and counseling, as well as their ability to make sound therapeutic decisions.

Conclusion

We have described a novel approach of educating pharmacy students through gamification of our pharmacy practice modules in line with a new thematic curriculum that will be developed. This platform is intended to supplement our current teaching methods (i.e. lectures, tutorials and practicals) in anticipation of the increasing student cohort size in the near future. If successful, a library of case scenarios will be created so that it can be scalable towards students at the higher years of the undergraduate pharmacy course, as well as those doing postgraduate studies at our institution.

Acknowledgement

This project is supported by the Learning Innovation Fund – Technology (LIFT) awarded by the National University of Singapore.

References


Lightening Up Mathematics-intensive Classes: 
A Case study Study Using a Flipped Classroom Approach

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Keywords: flipped classroom, video lectures, students participation

EXTENDED ABSTRACT

Introduction
The application of mathematical theory to real life problems is at the core of an engineer’s skill set. As a consequence, any Engineering curriculum involves several courses where a certain set of mathematics concepts are explained to the students. Engineering students should typically share an appreciation or at least an inclination towards mathematics. Nevertheless, it is the application of mathematics—rather than the mathematical theory itself—that actually sparks an Engineering student’s interest. For this reason, some of the most theoretical classes often end up being perceived as rather dry and, taken in isolation, quite uninspiring.

The key underlying idea of this case study is to cover the most theoretical topics in pre-recorded video lectures while focusing on specific applications of the theory during the classroom session. For this purpose, I implemented a flipped classroom concept incorporating participation incentives for the students during the classroom session.

Implementation Details
This experiment was conducted in a large undergraduate class. The topic of the course was data analysis. Total number of students was 145. Following a paradigm that is similar to that of flipped classroom (Hamden et al., 2013), I pre-recorded video lectures and made them available to the students a week before the contact sessions. The video lectures were typically 20 to 30 minutes long. The content covered the most theoretical and mathematical aspects of the topics in the syllabus. The fact that the most theoretical topics were covered in the video lectures allowed for the contact session to focus more on the applications of the theory. In fact, each classroom session started with a problem taken from scientific literature in the relevant field (bioengineering) and consisted of applying the theory covered in the video lecture to the specific problem.

Students were encouraged to view the video lecture before the classroom session, which occurred on Tuesday. E-mail reminders were sent to them regularly. To promote students’ participation in the classroom session, I asked several questions to the class throughout the lecture time. At least 5 questions per contact session were asked, often more. Students who watched the video lecture beforehand should be able to answer the questions easily. After asking the question, I would visually spot the first student who raised his/her hand and listened to the answer. For every correct answer I gave a small prize: typically, a chocolate bar.

I emphasized many times that no penalty is applied for wrong answers, that one student can answer multiple times, even after getting a question wrong. Also, I emphasized that in no way the answers given in class will have any effect on grades.
Methods of Assessment and Results
The efficacy of the proposed strategy was assessed by two independent methods: a survey and a focus group discussion with the students, two of the most commonly used methods (Cousin, 2009).

Survey
A questionnaire was distributed to the students during the last lecture of the term. The questionnaire consisted of the following statements:

Statement 1: “I found the video lectures useful.”
Statement 2: “I would have preferred a traditional lecture + tutorial format without any video…lecture.”
Statement 3: “Because of the video lectures, the lectures on Tuesday were useless: that time could be better invested practising on computers.”

The reference to practising on computers in Statement 3 is related to the tutorial session that followed the Tuesday lecture the next day. Students were asked about their level of agreement in a 5-points scale, i.e., “Strongly disagree”, “Disagree”, “Neutral”, “Agree”, “Strongly agree”. An open box for comments and suggestions was included as well. 107 students (74% of the class) responded to the questionnaire.

Survey results are shown in Figure 1. When asked whether they found the video lectures useful, no students disagreed and only 5% were neutral about it, providing a strong indication that the video lectures were appreciated. Nevertheless, when asked whether they would prefer a traditional classroom concept as opposed to the presence of video lectures, a sizable proportion of students (34.9%) answered ‘neutral’ and only 50.5% agreed or strongly agreed. Only 13.5% of students thought that the contact session on Tuesday became useless because of the presence of the video lectures, suggesting that the interplay between video lecture and classroom session was well-received.

Focus Group Discussion
Five (5) students were randomly selected for a focus group discussion. The objective of the discussion was to substantiate the results of the survey and gather more feedback and ideas from the students. It was conducted about six weeks after the end of the term. The first topic of the discussion was the video lectures. Four out of five students watched the video lectures (one student missed a couple). They all agreed that the ability to rewind and “re-listen” was critical to their learning and most appreciated it because in a normal classroom, at some point “my mind goes somewhere and I miss what the lecturer says”, as one student pointed out. The length of the video was deemed appropriate by all students. Two students watched the video before the actual lecture throughout the course (as recommended). Two other students said that sometimes they would watch it afterwards or in some cases, just watched it before the exam.

The second topic of the discussion was the classroom session. All students agreed that the presence of video lectures was not a factor in their decision whether to attend the classroom session or not. They all attended the classroom sessions. They agreed that the focus on the application side of the problem during the classroom sessions—made possible by the presence of the video lectures—was useful. They all enjoyed the rewards system (chocolate bars) and explicitly encouraged me to maintain it next year. They suggested limiting the number of answers one particular student is allowed to give.
Reflections and Future Directions
Implementing the flipped classroom concept required considerable extra work. Nevertheless, I believe it was well worth the effort. Survey results were encouraging and the classroom sessions were livelier than I expected given the topic and the size of the class. The system of participation incentives worked well. I managed to obtain answers for all the questions I have asked in class throughout the course. This made the contact sessions considerably livelier. The focus group discussion essentially confirmed the survey results: the video lectures are considered valuable by the students, particularly because of the added capability of listening to certain parts of the lecture multiple times. It would be interesting to collect more data to confirm and further validate what is presented here.

References
Reading Courseware Design and Evaluation: Learners’ Perception of its Usage and Implication

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Keywords: CALL application; Courseware Design; Courseware Evaluation; Reading Comprehension; Reading Strategies; Motivation.

EXTENDED ABSTRACT

Technologies in Computer Assisted Language Learning (CALL) have been widely utilized and integrated in language classrooms to enhance learning. However, the application of CALL in the teaching of Indonesian as a foreign language is still scarce and relatively under-researched. This paper discusses the pedagogical consideration of designing an educational courseware material to aid reading comprehension for beginners. It explores learners’ perceptions of its application as a supplementary platform and how it benefits learners in their reading comprehension development. The interface design, content and structure of the reading courseware are also evaluated from learners’ perspective. There are five units of interactive reading materials in the reading courseware with different topics and reading tasks. A survey was conducted at the end of the semester to evaluate the effectiveness of the courseware. The feedback shows that the reading courseware is useful in providing additional reinforcement exercises that are motivating for learners to practice their reading comprehension skills due to its interactive nature. It is also an effective platform for self-assessment. Some limitations and obstacles in the process of integrating the courseware into the curriculum are also presented in this study.

Introduction

Technologies in Computer Assisted Language Learning (CALL) have been widely utilized and integrated in language classrooms to enhance learning. However, the application of CALL in the teaching of Indonesian as a foreign language is still considered scarce and relatively under-researched. The Indonesian Language Program at the National University of Singapore (NUS) has attempted to embrace the paradigm shift in foreign language teaching and learning by integrating multimedia courseware as a supplementary material to enhance students’ language proficiency beyond the classroom. The latest development completed in the program was the development of reading courseware for the beginners’ level. The project was funded by the Centre for Development of Teaching and Learning, National University of Singapore under the Teaching Enhancement Grant 2010/2011.

This paper discusses the pedagogical consideration of designing an educational courseware material to aid reading comprehension for beginners. It explores learners’ perceptions of its application as a supplementary platform to make reading practice more engaging and how it benefits learners in their reading comprehension development. This study involves obtaining learners’ feedback of the interface design, content and structure of the reading courseware and the effectiveness of it as a part of the curriculum.
Method

Participants
67 students participated in this study. They were enrolled in LAB1201 “Bahasa Indonesia Level 1” in the second semester of the academic year 2012/2013.

Procedures
The data was collected anonymously from the subjects through a questionnaire. The questionnaire, administered at the end of the semester, consists of two parts. In the first part, the participants were to respond—on a scale of 1 (strongly disagree) to 5 (strongly agree)—to 10 statements regarding the interface design and the content of the reading courseware. In the second part, the participants had to answer 7 open-ended questions on their perception of the integration of the reading courseware in the course. The questions pertained mainly to learners’ motivation to do independent reading practices using the courseware and the strategies they used in completing the assignments in the courseware.

Discussion

Reading Courseware Development Project and its Integration in the Curriculum.

Schitai (1998) mentioned that there are some instructional design principles that must be considered in courseware development to ensure learning. They are:

1. Define and implement learning strategies to function as information processors that would help students understand, retain and apply the newly learned material.
2. Provide individualized feedback for typical mistakes that students make while learning the new material.
3. Determine media combinations and appropriate interactivity level to fit the target audience and the selected learning strategies.

This online reading courseware was developed to supplement the authentic reading course pack used in the classroom that was developed under the same grant.

The objectives of this reading courseware are to

- provide additional interactive reading activities to supplement the core reading material.
- expand learners’ vocabulary and improve their reading skills
- enhance their cultural awareness of the target community.

In order to achieve the objectives, five interactive lessons were developed, as summarized in Table 1:

<table>
<thead>
<tr>
<th>Lesson</th>
<th>Topic</th>
<th>Tasks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Berbelanja (Shopping)</td>
<td>Finding items at the supermarket and writing the price of the items</td>
</tr>
<tr>
<td>2</td>
<td>Memasak (Cooking)</td>
<td>Reading and following instruction in the recipe.</td>
</tr>
<tr>
<td>3</td>
<td>Transportasi (Transportation)</td>
<td>Positioning the correct location in the map and choosing the correct means of transportation.</td>
</tr>
</tbody>
</table>
The results show that learners are generally satisfied with the interface design of the courseware (see Table 2). However, we note that some users found the navigation buttons to not be user-friendly. The students also commented in the second part of the questionnaire that they had difficulties gaining access to the page and finding the correct exercises assigned to them, and became less motivated to use this courseware to practice their reading.

**Table 2. Interface design of the reading courseware**

<table>
<thead>
<tr>
<th>Statements</th>
<th>Frequency</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>The welcome screen which offers an overview of what the courseware is about is informative and helpful.</td>
<td>0 4 11 47 5</td>
<td>3.79</td>
<td>0.66</td>
</tr>
<tr>
<td>The instructions are concise, clear and easy to understand.</td>
<td>0 2 9 42 14</td>
<td>4.01</td>
<td>0.68</td>
</tr>
<tr>
<td>The available navigation buttons and icons are user friendly.</td>
<td>1 9 7 37 13</td>
<td>3.78</td>
<td>0.96</td>
</tr>
<tr>
<td>The graphics and animation in the exercises are colourful and attractive.</td>
<td>0 2 5 31 29</td>
<td>4.30</td>
<td>0.73</td>
</tr>
</tbody>
</table>
The type and size of fonts of the reading text is suitable, clear and readable

<table>
<thead>
<tr>
<th>Statements</th>
<th>Frequency</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>The type and size of fonts of the reading text is suitable, clear and readable</td>
<td>0 3 5 37 22</td>
<td>4.16</td>
<td>0.75</td>
</tr>
</tbody>
</table>

1 (strongly disagree) to 5 (strongly agree)

With regard to the reading content, 86% of the population agreed that the content of the courseware is well organized and structured. We also observe that the glossary link provided needs to be improved to facilitate learning (See Table 3).

### Table 3. The content of the reading courseware

<table>
<thead>
<tr>
<th>Statements</th>
<th>Frequency</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>The general presentation of the reading content is well-organized and structured</td>
<td>0 3 6 43 15</td>
<td>4.04</td>
<td>0.71</td>
</tr>
<tr>
<td>The exercises are interactive and fun.</td>
<td>0 2 9 33 23</td>
<td>4.15</td>
<td>0.76</td>
</tr>
<tr>
<td>The selected passages are interesting.</td>
<td>0 3 11 40 13</td>
<td>3.94</td>
<td>0.73</td>
</tr>
<tr>
<td>The vocabulary used in the reading passages and exercises are appropriate to your level of proficiency</td>
<td>0 3 7 47 10</td>
<td>3.96</td>
<td>0.66</td>
</tr>
<tr>
<td>The glossary link provided is informative and helpful.</td>
<td>0 2 16 27 22</td>
<td>4.03</td>
<td>1.01</td>
</tr>
</tbody>
</table>

1 (strongly disagree) to 5 (strongly agree)

Pertaining to whether the reading courseware can motivate students to practice reading on their own, 46 respondents agreed that this platform helped them to increase their motivation. Due to its interactive nature, the courseware makes learning fun compared to typical traditional reading lessons they had in class. The other 21 respondents feel that this reading courseware did not have an impact in increasing their motivation due to technical problems, time constraint and no mark incentive was given to do the exercises in the courseware.

In terms of reading strategies, the results show that previewing, predicting and reflecting are the most common strategies used by the respondents. It is interesting to discover that 23 respondents mentioned that they were still unaware of using any reading strategies to improve their comprehension while they were completing the exercises in the courseware. Therefore, it is necessary to provide extra tasks to raise students’ consciousness of different reading strategies available in this courseware material.

### Conclusions

The findings suggest that the integration of the reading courseware as a supplementary material provide additional reinforcement exercises for learners to review what has been discussed in class at their own pace. The majority of the population agreed that due to its interactive nature, the courseware make them more motivated to practice further on their own and be in control of their learning to improve their reading comprehension. However, there are some issues that need to be considered and evaluated further to ensure the effectiveness of CALL application to facilitate learning. Design is fundamental in CALL application when theory is put into practice in the structuring of CALL tasks and programs (Levy & Stockwell, 2006). In addition, there should be sufficient support provided to prepare the students prior to the application of CALL. They should be aware of the purpose of using
CALL as a platform to enrich their learning experiences. In this context, the teachers should ensure that the learners are aware of what reading strategies are so that the online reading courseware can be used effectively to support learners’ reading skills development.

Acknowledgements
The writer would like to express her gratitude to Johanna Wulansari Istanto, the convenor of the Indonesian Program at Centre for Language Studies, NUS and Jeniati Prasetio for their collaboration in developing the courseware reading material as a part of the material development project entitled “Integrating Communicative Practical Grammar, Online Authentic Reading Materials and Podcasting in Learning Indonesian as a Foreign Language”, funded by the CDTL Teaching Enhancement Grant 2010/2011.

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Enhancing Class Learning using Computer-based Design Tools

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Keywords: Computer-based; Design tools; Core Subjects; Design Module.

Extended Abstract

Introduction
Transformation of education – including engineering education in particular – has been the recent concern in education and industry communities, with a call to integrate the “science” and the “application” through design. The engineering curricula, for instance, have traditionally been based on an engineering science model, where a solid foundation of core subjects (including mathematics and sciences) are taught in the first half of the curriculum, and then only followed by engineering and application subjects in the second half of the curriculum. Many studies have pointed out that such approach does not allow the engineering concept to sink in (Dynn et al., 2006).

The availability of computer-based design tools in the form of software and apps has provided an avenue to address this issue. Computer-based design tools, which are sometimes provided for free, offer reliable, much faster solution and thus allows many concepts to be taught and fostered with many examples of implementation. This in particular addresses the following problems:
1. That students, when learning theories, tend not to comprehend the context of their applications
2. That students, when solving problems, tend not to comprehend the underlying theories of their own solutions

Module in the Traditional Curriculum
Engineering curricula traditionally teach foundational/core modules in the first two years of four years curricula. The final two years of the curricula consist of application modules where students apply the theories that they have learned in the previous two years. In mechanical engineering, for example, the foundational modules including dynamics of motion and strength of materials are taught in year 2, while the application modules including machine design are taught in year 3. This curricular structure is presented in Figure 1.

Figure 1: Traditional engineering curriculum

Figure 1 depicts the gap between the teaching of the theoretical concept and the implementation of such concept, which can lapse for one semester or more. The rationale of such curricular structure is
to allow students to understand the concept/methodology prior to implementing it. Teaching the methodology and its application at the same time indeed require a longer time with traditional approach.

This structure, however, often creates a disjoint between the theory and the application. Students often learn important concepts without understanding the context in which such concepts are valid. Problems/tutorials somewhat can help, but they are simplified and hence do not present the complexity of real problems. Such theoretical understanding poses a big challenge for students and lecturers alike in year 3, where students are supposed to apply their knowledge to solve problems. Students often do not know where and when to apply certain concepts, and in many instances even forget about the concepts. This situation requires the lecturers and students to revisit the subjects in year 2 in details, but with much shorter time.

There are currently increasing numbers of computer-based tools for design, analysis, presentation, and other computational tasks that used to require human’s direct involvement and used to take a lot of time to perform. These tools are often available for free or at a very low price to download/use. Such tools present an opportunity to address the abovementioned issues. It allows very rapid generation of examples and analyses when there is a need to quickly revisit foundational concepts.

The integration of such tools to the design module in year 3 is discussed in the following sections.

**Class Preparation and Delivery using Computer-based Design Tools**

The intended learning outcomes of the design module are as follows:

1. Ability to translate concepts/ideas into engineering design using appropriate tools and methodology
2. Ability to build and test design solutions through appropriate validation methodology
3. Ability to analyze and interpret information

Students are given certain problems and are tasked to provide solutions using the knowledge/skills that they have acquired from their earlier years of study. This typically requires students to perform many analyses and to demonstrate many examples of application, in which they will need to recall what they have learned.

In the traditional pedagogy, the learning recollection is purely the responsibility of the students, or sometime with very minimum assistance from the teaching assistants. Using computer-based design tools, a new pedagogy is introduced where lecturers revisit the relevant foundational topics by means of examples of implementation, embedded in the current lectures; which are still retained for its efficacy (Charlton, 2006). Therefore, this does not require the change of the syllabus.

The approach allows rigorous subjects such as kinematics, dynamics, and strength of materials be taught in the context of engineering design and real projects. This approach can strengthen students’ comprehension of the subjects from typical theoretical understanding to contextual comprehension.

In the class that the author has been teaching, Autodesk® Force Effect and Autodesk® Force Effect Motion apps are used in the class, and the examples cited in this paper are based on those apps. However, other software and tools can also be used with the same philosophy.

A short example is presented here to illustrate how the objective is achieved. The force diagram in Figure 2, for example, could take 5-10 minutes to do manually, but would only take seconds using computer-based design tools. This allows students to get the correct design information and still concentrate on the bigger design problem (as opposed to only solving this particular calculation and then forgetting why they solve this problem). At the same time, this allows students to invoke their memory of the concepts they previously learned and comprehend the application of such concept.
Figure 2: Example of force diagram obtained using a computer-based design tool

Evaluation
This approach has been tried for one year to engineering students. At the end of the sessions and at the end of the module, students were requested to provide feedback; as follows:
1. It helps them in understanding the application of the concept of statics and mechanics.
2. It helps to link the theory of statics and mechanics with their application.
3. It helps to expedite their project when it reaches the design stage.

Additionally, students also share suggestion for improvement as follows:
1. They’d like to have a few rounds of interpretation familiarization to bring them up to speed to the instant results using the abovementioned apps/software.
2. They’d like this to play a role in assignments rather than in tests.

The design outcomes from the modules were more comprehensive, in that students performed deeper analyses of their design and were able to articulate and present their analyses in the reports; in comparison to the outcomes by their seniors.

Conclusions
This paper presents the rationale and the implementation of teaching and learning using computer-based design tools. It is a new initiative which has many areas of improvement, such as evaluating the effectiveness of the approach from various dimensions (e.g. achieving the learning outcomes, student experience, etc.).

Although its implementation has only been done within engineering curricula, it is implementable in other disciplines as well, as this approach only requires the availability of computer-based tools; such as the widely available statistics tools.

Acknowledgement: The author thanks Engineering Design and Innovation Centre (EDIC) and Autodesk® for their support.

References
A Hybrid Teaching Method Encompassing Didactic Lectures, Short E-modules and Case Scenarios to Facilitate Learning of Pharmaceutical Care Principles

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Keywords: Case scenarios; E-learning; E-modules; Pharmaceutical care

Introduction
Pharmaceutical care (PC) is a new academic discipline within pharmacy practice. It focuses on the paradigm shift in the role of pharmacist from product-oriented dispensing to patient-centered care, with an emphasis on solving drug-related problems for achievement of predefined clinical outcomes (Helper and Strand, 1990). In line with the practice of PC, a set of concepts including the philosophy of PC, the components of PC, principles of drug-related problems, PC cycle and PC practice requirements need to be well understood by the practitioner for successful patient care. As part of the introductory course to the pharmacy profession, PR1103 “Pharmacy Practice I”, Year 1 pharmacy students are introduced to the principles of PC in their first semester of study. This is to allow them to have an appreciation of the emerging role of pharmacist in today’s healthcare continuum.

Traditionally, principles of PC were taught as two didactic lectures in PR1103 with a heavy focus on the concepts and philosophy involved. Further concept illustration using actual case scenarios was limited due to students’ lack of the required therapeutic and pharmacology foundation in Year 1 first semester as well as the limited amount of time allocated for this topic within the module. As such, many students found this subject boring and difficult to learn.

The New Teaching Model

Method
In order to facilitate students’ interest in PC principles and improve the quality of their learning, a new hybrid teaching method encompassing didactic lectures, short E-learning modules (E-modules) and interactive case scenarios was adopted. This new model was divided into five parts:

(i) Didactic lecture 1
(ii) Three short E-modules
(iii) Case scenarios
(iv) Didactic lecture 2
(v) Survey on hybrid teaching method

The first comprised of didactic lecture 1 whereby students were introduced to the philosophy of PC, components of PC and drug-related problems. The second required the students to read three short E-modules, each focusing on one of three commonly encountered chronic disease conditions namely, high blood pressure, chest pain and diabetes. It outlined the etiology, diagnosis and management of the disease condition of interest and all contents were in simplified layman language that did not require any prior therapeutic and pharmacology knowledge. Each E-module was of approximately fifteen minutes duration.
and was presented as an Adobe Breeze presentation with accompanying audio recording. Students were provided the links to the E-modules which can be downloaded and read at their convenience. After reading the E-modules, in part three of this learning model, students were asked to attempt four short case scenarios. Each case scenario depicted drug-related problems that were frequently encountered by patients with the chronic diseases described in the E-modules. As an application of what they have learnt in lecture 1 and the three E-modules, students were required to identify the appropriate drug-related problems portrayed in each of these case scenarios. This self-directed learning of both E-modules and case scenarios were completed before the next didactic lecture. In part four, didactic lecture 2, an interactive discussion of the case scenarios was first carried out. For this class, students were randomly called upon to discuss the solution to each case scenario and any question or disagreement was promptly clarified. This was followed by instructor-led teaching of concepts on developing a PC plan and its illustration using a case study based on the information found in the E-modules. Lastly, students were surveyed on their perception of the effectiveness of this hybrid teaching method after lecture 2.

Results and Comments from Student Survey
In total, 87.2% of students responded to the survey. As a whole, this hybrid teaching method was well received by the students (Table 1).

Table 1. Student’s evaluation and feedback on hybrid teaching method

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly Agree (%)</th>
<th>Agree (%)</th>
<th>Disagree (%)</th>
<th>Strongly Disagree (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>The E-modules were interesting.</td>
<td>11.2</td>
<td>75.5</td>
<td>11.9</td>
<td>1.4</td>
</tr>
<tr>
<td>The E-modules were easy to understand.</td>
<td>17.5</td>
<td>80.4</td>
<td>0.7</td>
<td>1.4</td>
</tr>
<tr>
<td>The E-modules were of just the right length (ie not too long or short).</td>
<td>18.2</td>
<td>73.4</td>
<td>7.0</td>
<td>1.4</td>
</tr>
<tr>
<td>Incorporation of E-modules helped improved my understanding of the concept of drug therapy problem taught in PC Lecture 1.</td>
<td>12.6</td>
<td>82.5</td>
<td>4.2</td>
<td>0.7</td>
</tr>
<tr>
<td>Incorporation of E-modules helped improved my understanding of the case illustration on developing a PC plan taught in Lecture 2.</td>
<td>14.8</td>
<td>82.4</td>
<td>2.1</td>
<td>0.7</td>
</tr>
<tr>
<td>More E-modules should be designed to improve the understanding of didactic lectures.</td>
<td>15.4</td>
<td>71.3</td>
<td>11.9</td>
<td>1.4</td>
</tr>
<tr>
<td>The case scenarios presented were interesting.</td>
<td>7.0</td>
<td>83.8</td>
<td>8.5</td>
<td>0.7</td>
</tr>
<tr>
<td>The case scenarios presented were too difficult for me to understand.</td>
<td>0.7</td>
<td>5.6</td>
<td>76.9</td>
<td>16.8</td>
</tr>
<tr>
<td>The use of case scenarios improved my understanding of PC concepts.</td>
<td>25.2</td>
<td>72.7</td>
<td>1.4</td>
<td>0.7</td>
</tr>
<tr>
<td>The use of case scenarios allowed me to see the application of PC concepts.</td>
<td>25.9</td>
<td>69.2</td>
<td>4.2</td>
<td>0.7</td>
</tr>
<tr>
<td>The E-modules and case scenarios made learning PC interesting and enjoyable.</td>
<td>8.4</td>
<td>81.1</td>
<td>9.8</td>
<td>0.7</td>
</tr>
<tr>
<td>Compared with didactic lecture alone, I prefer this hybrid method of teaching (didactic lecture, E-modules and case scenarios).</td>
<td>9.9</td>
<td>81.0</td>
<td>7.7</td>
<td>1.4</td>
</tr>
</tbody>
</table>
More than 90.0% of them found the E-modules interesting and easy to understand. They also gave feedback that the E-modules and case scenarios improved their understanding of PC principles taught in the lectures and allowed them to have a glimpse of the application of PC concepts in the real world. Additionally, 86.7% of students were receptive of the use of more E-modules to improve the understanding of concepts taught in didactic lectures. Overall, majority of students (>90.0%) preferred this hybrid teaching method over conventional teaching using didactic lectures alone. The success of this new teaching model was also reflected in the qualitative feedback shown in Figure 1.

“*It was enjoyable and fun. Short and brief, worked best!*”

“*Can be downloaded so it can be heard anywhere*”

“*The E-modules were informative and provided good background before lecture 2*”

“*The case scenarios were very interesting. More of it because I can follow the lecture better. I love to learn more about it*”

“*Very useful as it helped to show possible scenarios that we as pharmacists may encounter in the future*”

“*Challenging at first but enjoyable as I started to appreciate the case scenarios and link to pharmaceutical care concepts*”

“*This teaching method showed us the relevance of what we were learning. I really enjoyed the hybrid*”

**Figure 1. Qualitative responses from students on hybrid teaching method**

**Conclusion**

In conclusion, a non-traditional, hybrid teaching method was successfully employed to facilitate teaching of difficult concepts to first year undergraduate students.

**Acknowledgements**

I would like to thank Dr Seow Teck Keong and staff of the Centre for the Development of Teaching and Learning for their support and mentorship in shaping this new teaching model.

**Reference**

Integrating Online Tools, Cloud Software and Problem-based Approach to Enhance Computational Thinking in Life Science Students

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Keywords: Computational thinking; Problem based learning; Education; Softwares.

EXTENDED ABSTRACT

Results from an international survey (Hannay et al., 2009) showed that 97% of the 2000 scientists surveyed did not have formal education and training in the use of scientific software; instead they learnt it informally through peer consultation and self-education. In the field of biomedicine and life science, it is not surprising that most biologists randomly polled hardly have any skills related to computer programming or high performance usage of bioinformatics software which should have been acquired formally during their undergraduate studies. Yet, since the Human Genome project began in the early 1990s, the volume of data generated has today reached tsunami proportions. In the past two decades, much effort has been made to introduce bioinformatics and computational biology programmes, but majority of these are in the context of an advanced program, either for a Masters (conversion) or a PhD, or in the context of a computer science department offering a special interdisciplinary undergraduate program in bioinformatics and computational biology for the purpose of creating tool developers. While many life science students may have the odd module in bioinformatics optionally available in their senior years, the effort to formalise the integration of bioinformatics into the average undergraduate life science program is still weak. Hence generally speaking, life science graduates, particularly in Asia, enter the workforce with woefully inadequate computational skills, much less having any sense of computational thinking to be able to marshal computing tools to solve biology problems framed in a computationally integrated manner.

Since 1990, the Department of Biochemistry of the Yong Loo Lin School of Medicine at NUS has been actively campaigning for the introduction of bioinformatics training as part of the formal program in the training of life science students of the Faculty of Science, NUS. In the 2000s, we introduced elements of computational thinking as well. In the context of the bioinformatics community, we have been involved in pioneering the workshop on Education in Bioinformatics in various conferences such as the Intelligent Systems in Molecular Biology series (ISMB) and training workshops in the International Conference on Bioinformatics. From 2001 to 2006, we introduced online webinars and remote teleconference with problem-based learning in a consortium of universities in Singapore, Sweden, Sydney, South African and Stanford University and UC San Diego, the S* Life Science Informatics Alliance (Lim et al., 2003; Lim et al., 2012). Thus, long before the advent of Khan Academy, Coursera, and other massively open online courses (MOOCs) of
this decade, we had already trained more than 2,000 students recruited online and issued certificates to students from India to Indonesia. Recently we participated in co-sponsoring the launch of the Global Organization for Bioinformatics Learning, Education and Training (GOBLET) launched in 2013.

In full recognition that technology plays an important role in today's teaching, we have also introduced the latest technologies from online webcasting to learning workflows to our students in NUS, such as the revolutionary Learning Activity Management System (LAMS) (www.lamsinternational.org) to our bioinformatics teaching of life science students (Lim et al., 2009). These multiple methods are employed to enhance learning and teaching these days through a blended approach that combines traditional chalk-and-talk lectures with online techniques. However the usage of these technologies requires proper planning and utilisation so that the students can learn in an easier way using user-friendly methods.

One key aim is to enhance learning of the concepts in bioinformatics in a way which can be better understood by students without much complication. Online tools such as different bioinformatics tools can be used for teaching so that students can understand the concepts and also get hands-on experience and get a grasp of the concept within a few hours. As lectures clash between different modules, more online seminars should be provided for students so that they can see these video lectures and seminars and learn more about the concepts.

A feedback system should be included as an added feature so that students can give their comments about the lecture and also ask questions if they have any. This will improve the learning and engage more students who tend to be shy in class and not ask questions or engage in the class or tutorial activities because they do not like to talk in front of their classmates. Another system which can be employed is that of problem-based learning. In this case, students are given a particular problem scenario and they learn about the concepts by trying to solve the problem and address the biological question in a practical way using scientific methods. The usage of tools and understanding of software development, together with algorithm design, are very important for bioinformatics learning. Live operating systems, such as BioSLAX (www.bioslax.com) that is distributed freely to students, enable such an endeavor through the integration of various bioinformatics tools (Kolatkar et al., 1998a; Kolatkar et al., 1998b) into one platform such that students can get first-hand experience on bioinformatics concepts, softwares and tools. We hope that the above described methods, online tools, seminars, integrated bioinformatics platforms and software/tools made in-house could be used to enhance learning experience of the students.

In this way, we hope that sufficient pressure will be brought to bear on curriculum planners that it is high time that the way life science education at the undergraduate level is done has to be rethought in the context of Big Data in Biology. The syllabus has to be restructured to incorporate skills and competence in the usage of bioinformatics tools as part and parcel of the process of research and enquiry. The minimum skill sets of every individual graduating from a life science curriculum has to include the computational aspect (Tan et al. 2009) or our life science graduates will face obsolescence sooner than later. Through these developments, bioinformatics education and research can be established and extended through Asia Pacific as already shown previously (Ranganathan et al., 2006; Ranganathan et al., 2009).
References


EXTENDED ABSTRACT

Background

The Special Programme in Science (SPS) was established in 1996 as the NUS Faculty of Science’s talent development programme to nurture aspirant scientists toward the growing research and development (R&D) demands of a 21st-century knowledge-based economy. There are 2 main aspects of the programme: (1) exposure toward research excellence at the early stage of students’ undergraduate education, and (2) exposure to multidisciplinary science. Indeed, SPS students come from various departments in the faculty. A small dedicated group of academic staff collaborate with the student mentors, which comprises of senior undergraduates (3rd-year and 4th-year/honours) and postgraduates students, to design and execute SPS’s Integrated Science Curriculum (Dewanto et al., 2012). Teaching and learning in SPS is mostly undertaken through active learning, hands-on projects, and peer mentorship; senior students, having gone through the SPS curriculum themselves, are contributing their expertise and experience to guide the junior students.

In this dynamic learning environment, the programme requires a robust system, among other things, capable of:

1. **Administering a communication channel between various stakeholders of SPS**, namely students, mentors, staff and even alumni, as many of the SPS alumni are doing their postgraduate studies or post-docs, and the programme is in need of their support as experienced mentors or their network as faculty members in various academic institutes around the world. This channel also serves as a centralized means of disseminating information to the SPS community.

2. **Supporting collaborative work between students**. SPS students are working on various research projects in groups. They have to be able to find a common time, meet for discussions, collaborate on the report, etc amidst their diverse timetables.

3. **Keeping record**. This means the system should be able to keep track of various activities that are happening in the programme and, if necessary, remind the relevant people of the upcoming event. Moreover, the system also serves to keep students’ portfolio.

While at the same time, the system should also be cost-efficient and straightforward to maintain by amateur system administrators (done by SPS students on part-time basis).

Google Apps for Education

Previously, the programme was privileged to maintain its own UNIX server and E-mail system since its establishment. Over the years, the task of maintaining and patching various security loopholes was getting more and more challenging as both the hardware and software went obsolete. For that matter,
in 2009 the programme turned to Google Apps for Education (www.google.com/enterprise/apps/education/) to replace its old system.

Avid Google users would have been familiar with various Google Apps, such as Gmail, Google Calendar, and Google Documents. Normally, to access these tools, one needs to setup a Google account, which will look something like “user_name@gmail.com”. Google Apps for Education allows its subscriber to set up an account which reflects one’s affiliation to a particular educational institute (e.g. andreas.dewanto@sps.nus.edu.sg) in order to gain access and utilize these Apps. SPS students thus use Gmail and Gchat as their means of online communication. Google Calendar serves as a organizing tool and helps in seeking and managing common timetable for tutorial, group discussions, etc (Figure 1). Google Form and Google Spreadsheet are the most widely used by the students to create surveys and tabulate the outcomes both for academic and informal activities in SPS. Finally, Google Site provides a content management site for SPS students to create webpages as part of the continual assessment for the module SP3175 “The Earth” (Figure 2).

Google Calendar is used to organize SPS events. It can be incorporated into each student's personal calendar and collaborated with other students' calendar. Students can then see one another's timetable and seek a common slot for group discussion.
Google Apps and IVLE

The authors believe that Google Apps complements the Integrated Virtual Learning Environment (IVLE), which is NUS’ learning management system in teaching and learning at SPS. Many of the students that come to the programme are already familiar with the various Google apps. In fact, they might have already had vast experience dealing with the apps (for instance, they may have been using Gmail as their personal email account all along). It does not take long for them to adapt the apps for collaborative learning. On the other hand, it takes some time for them to get used to the IVLE layout (which they would only experience when they were matriculated to NUS), let alone to fully realize and utilize various IVLE capabilities.

Furthermore, the Google account that is created for each student when they join SPS stays with the student after he or she graduates from NUS. After the initial installation, Google Apps for Education comes free and Google does the main job of maintaining the server and making sure of its security. Hence, we do not see any need to revoke the account to make hard disk space for new students. Neither will we face the problem with the technology going obsolete. At the same time, individual student is able to customize the account to their preferred setting. This encourages students to keep the account after they leave the programme. In fact, they often integrate their Gmials to their other personal email accounts (e.g. Yahoo, Hotmail, MSN, etc). This conveniently provides a way to reach out to the alumni for upcoming SPS events. And because students keep the account, they are able to carry the tools into their workplace or postgraduate study. An ex-SPS student recently shared with the author (Dewanto) how she is using Google Apps, a skill that she picked up in SPS, in her work now. On the other hand, students will no longer have access to IVLE once he or she leaves NUS.

Nonetheless, students will need to keep in mind that Google still owns and maintains the server after all. Thus it unavoidably has access to the information that students are exchanging via the apps. Although at the moment, we have yet to experience any issue with Google breaking the legal conduct and leaking information, we still strictly adhere to the university’s data management policy with regards to the classified information.
References


2. Refer to: www.google.com/enterprise/apps/education/ for further details on the product.

3. The page can be accessed at https://sites.google.com/a/sps.nus.edu.sg/the_earth/
A Tool for Leveraging Feedback in Teaching and Learning

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Keywords: Peer feedback; Peer evaluation; Learning Management Systems.

EXTENDED ABSTRACT

Introduction

Peer feedback and instructor feedback can play a vital role in students’ learning experience. TEAMMATES (Rajapakse, 2011) is an online system that we built for managing peer feedback in team project courses. After a few successful trials in our own courses, we made TEAMMATES available as a free online service for others in early 2012 (available at http://teammatesOnline.info). During its first year in the public domain, the TEAMMATES user base grew beyond 2000, spanning more than 20 universities. This reasonably high adoption rate suggests that there is a significant demand for feedback management tool support unfulfilled by current learning management systems (LMSs). On the other hand, the TEAMMATES user retention rate was comparatively low: more than half of instructors who showed interest in adopting TEAMMATES did not continue because they did not find all the features they wanted. This indicates that there is a significant demand for more features. In particular, many users were looking for the ability to manage other types of feedback beyond TEAMMATES current scope of peer feedback in team projects. In response, we are now in the process of evolving TEAMMATES towards a more general tool for managing feedback among instructors and students. We expect TEAMMATES to complement current LMSs in use, rather than try to replace them.

The purpose of this abstract is to share our vision for TEAMMATES with interested educators and seek feedback on what they want to see in the future of this product. Given next are some salient features of the target product. Some of these features are already available while others are currently under development.

Formative First, Summative Second

We believe that early, frequent, and incremental feedback provided in a non-threatening environment can play an effective formative role in students’ personal development. Such feedback can help students to recognize and rectify gaps between peer/instructor expectations and their own performance. TEAMMATES was designed with that in mind. While TEAMMATES can be used for both formative and summative purposes, it tries to emphasize the formative purpose more, in the following ways.

- It makes it easy to hold early and frequent feedback sessions. Setting up an additional session can be done in a few minutes and the feedback collected can be published to students at the click of a button.
- It tries to reduce the students’ overhead of providing feedback. For example, the default setting is optimized to collect just enough feedback for the feedback recipient to answer these important questions: 1. How does my contribution compare with team expectations? 2. What am I doing right? 3. What can I do better?
• TEAMMATES documentation and examples encourage instructors to hold early and frequent feedback sessions. For example, the sample data an instructor sees when he/she starts using TEAMMATES shows a scenario of a class having multiple feedback sessions.

Instructor-centric and Student-centric
One very useful kind of student feedback is the feedback we can get from students who have since graduated. For example, it would be quite useful to know which of the things we taught turned out to be more useful in their work life. Unfortunately, most instructors do not have an easy way to contact past students. Most LMSs operate in an institute-centric way in that the student record is purged when the student leaves the institute. In contrast, TEAMMATES services are provided directly to the instructors and students and designed in a user-centric way:

• For instructors, it provides a way to manage feedback in their courses, for both current and past students. For example, it is even possible to get feedback from past students.
• For students, it provides a way to manage feedback they received from and gave to peers and instructors. For example, we hope to allow students to use peer feedback received in the past in the form of an online ‘resume’.

Optimized Yet Configurable
Tool support for managing feedback does not necessarily generate useful feedback. The tool itself should try to enhance the quality of feedback. For example, one of the TEAMMATES features (currently under development) analyses student feedback at the point of submission and automatically prompts students to improve the quality of the feedback where necessary. For example, if a student estimated the contribution from a student as ‘low’ and yet did not provide any substantial qualitative comments, the system prompts the student to elaborate more.

Given that TEAMMATES started as a peer feedback system for team projects, it is currently well-optimized for that form of feedback. We are currently in the process of implementing other forms of feedback as illustrated in Figure 1. Here are the feedback options currently available in TEAMMATES (the item numbers in the list refer to the numbers in the diagram):

(1) Self reflections. E.g., A description of how the student contributed to a team project.
(2) Feedback to team members.
(3) Feedback from student to/about the own team. E.g. Comments on team dynamics.
Here are examples of feedback modes currently not available in TEAMMATES:
(5) Feedback between individual students e.g., audience feedback about student presentations.
(8) Feedback between teams. E.g. A team’s opinion about the work done by another team.
(9) Feedback from a team to an instructor. E.g., A team’s feedback to tutor who supervised them.

These feedback sessions will be fully configurable in that the instructor can set his/her own questions with the desired giver type, recipient type, and the visibility level for each question. Here is an example for a hypothetical feedback session scheduled after a round of team project presentations:

Question: What is the strongest aspect of the team’s presentation?
Feedback route: from each student, one response per team (the route number 6 in Figure 1).
Visibility: Shown to the receiving team anonymously.

Evolving to Match Emerging User Needs
When designing a new system, it is difficult to predict all user needs at the beginning because user needs evolve over time. Furthermore, providing all desired features from the very beginning is not practical because of the resource-constrained nature of software projects in an academic environment. Therefore, we adopted an iterative and incremental model for building TEAMMATES: we add features incrementally and refine them iteratively, based on emerging user needs and user responses to existing features. This model of product development is very similar to how Facebook and Google build their online products (they too upgrade the product frequently, sometimes several times a day, while it is being used by users). TEAMMATES releases a new version every week.

Conclusion
TEAMMATES is an online service for managing various forms of feedback among instructors and students. This abstract touched on some of its salient features and its current direction. TEAMMATES aims to evolve continuously to match changing user needs. Therefore, we hope that the readers interested in TEAMMTES services will start using it and help shape its future direction by giving their own feedback about TEAMMATES.

Acknowledgement: TEAMMATES is partially supported by a Teaching Enhancement Grant C-252-000-096-001 from the Centre for Development of Teaching & Development (CDTL) of National University of Singapore (NUS).

References
The Effect of Blogging on Field-Dependent and Field-Independent Students’ Critical Thinking

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Keywords: Blogs; critical thinking (CT); field dependency.

EXTENDED ABSTRACT

Introduction

In education, the rapid development of blogs has been considerable (Chen & Bonk, 2008). Compared to other Web 2.0 tools like wikis, Facebook, and podcasts, blogs facilitate individualized teaching and learning styles in a variety of settings and give an equal chance to all students to participate in various class activities (Duda & Garrett, 2008). One of the main reasons of making blogs attractive to EFL/ESL educators is its positive effects on learners by inducing them to think critically in a learning environment (Johnson, 2004). Research shows that blogging can facilitate users’ share of information and collaboration, and engage students in an in-depth meaningful interaction which may lead to promoting critical thinking (CT) (Wang et al., 2009, Johnson, 2004).

Despite the increasing interest in and need for blogging (Shahsavar & Tan 2013, Blackstone et al., 2007), very little research has been conducted on students’ cognitive styles particularly their field dependency and their achievement in an online learning environment. In the following sections, I initially discuss the effects of blogging on students’ CT. I further define field-dependent (FD) and field-independent (FI) students and explain the role of learners’ field dependency in an online learning environment.

Blogging and CT

Gooding and Morris (2008) believe that blogging gives students a chance to reflect on their own and others’ writing that provides the opportunity for them to create, publish, and share their thoughts. These activities force students to think more analytically and more critically (Oravec, 2002) which may promote their CT (Richardson, 2004). Other research shows that sharing information and discussing on blogs can promote students’ writing skills and their CT abilities (Lai & Wang, 2008). Along the same line, researchers have recently shown that students will become more independent, responsible, and careful when they blog. In this case, blogging gives students a chance to think more to analyze their writing (Kajder & Bull, 2003; Shefler, 2006). In spite of the need for improving students’ CT, it seems essential to consider learners’ cognitive styles such as field dependency (Rudd et al., 2000). However, the research in this area is limited.

FD and FI Students

Witkin et al. (1971) believe that FD and FI students are not two different types of people but rather individuals who prefer particular learning characteristics to perceive and memorize information. FD students have global perception which enables them to solve cognitive problems globally and perceive objects as a whole (Witkin et al., 1971). They pay more attention to social cues and they are better at getting along with other people. They tend to be more sociable, insistent, and perceptive of others’ feeling and thoughts (Brown, 2007). They can easily
recall social information like conversation and relationships (Altun & Cakan, 2006). Conversely, FI students are more superior to FD students in learning (Aristoklis & Xenia, 2011). They tend to be more autonomous, competitive, self-reliance, self-confident, and inner-directed (Witkin et al., 1971; Brown, 2007). They are more sensible in learning, relying on internal references (Chen & Macredie, 2004), and better at solving cognitive problems analytically than FD students (Witkin & Goodenough, 1981).

Recently, many studies emphasize students’ cognitive styles in an online learning environment (e.g., Bocchi et al., 2004). Some researchers believe that learners with particular cognitive styles performed better than others (Swan, 2004). The literature seems to show some apparent contradictions between matching cognitive style and teaching method in an online learning environment (Mampadi et al., 2011). For instance, Boles et al. (1999) stipulate that students constantly perform better if computer-based instruction is matched with their cognitive styles. The result is consistent with Oh and Lim’s (2005) idea that paying attention to students’ cognitive style is the key role in an online learning environment. Conversely, Summerville (1999) claims that matching or mismatching of computer-based instruction with students’ cognitive styles had no effect on students’ performance. This paper attempts to investigate if blogging made a difference on FD and FI students’ CT.

**Method**

The participants were an intact class of tertiary level students enrolled in a compulsory course. All students had home or dormitory Internet access. Most of them were familiar with blogging and had used blogs for posting assignments, keeping diaries, updating their postings, sharing thoughts and information, giving comments, and reading others’ blog posts. Students were trained in multiple aspects of CT skills namely induction, deduction, observation and credibility, and assumption (Ennis et al., 2004) and asked to apply CT skills in their blogging. The blog was set up at www.blogger.com.

The instruments consist of the Group Embedded Figure Test (GEFT) developed by Witkin et al (1971), and the Cornell CT Test Level X (CCTT-X) developed by Eniss and Millman (2005) to classify students’ field dependency and measure their CT abilities respectively. In the analysis of the data, the paired-sample t-test was conducted to compare students’ CT before and after training CT skills. Also, independent samples t-test was used to compare FD and FI students’ CT in both pretest and post-test.

**Results and Discussion**

A significant mean difference in the overall score of students’ CCTT-X before and after CT skill training (t(39) = -2.83, p <.05) shows the higher positive criticalness in students’ CT ability after they were trained in CT skills. While, looking at pretest scores in the CCTT-X test did not show a significant mean difference between FD and FI students’ CT ability before training CT skills (t(37) = -.69, p <.05). In addition, the independent samples t-test on post-test scores in the CCTT-X test and students’ field dependency reveals no significant mean differences between FD and FI students CT ability after training CT skills (t(37) = -.45, p <.05).

As Table 1 presents, blogging enhanced both FD and FI students’ CT; however, no significant mean difference was shown between FD and FI students before and after they were trained in CT skills. The result may support Summerville’s (1999) idea that both FD and FI students are able to adjust themselves to online learning. Another interesting finding is that FI students applied more CT in their blogging despite being insignificant (see Table 1). This finding may support previous research that FI students seem to set their own learning paths more than FDs in online courses (Shahsavar & Tan, 2011) and the course blog as a non-threatening learning environment can cause a positive perception change to promote all students’ CT, specially FI students who are not as sociable as FD students (Brown, 2007).
Conclusion

This study reports that blogging can enhance both FD and FI students’ CT. Although FI students applied more CT aspects in their blogging, no significant mean difference was shown between FD and FI students in using different aspects of CT. The study suggests that all students are able to promote their CT equally well on their blogging, regardless their field dependency.

References


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A Preliminary Study of the Use of Self-Recordings of Student Presentations and Online Peer Feedback in Larger Classes

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Keywords: Information and Communication Technology (ICT); student presentation recordings; online peer feedback

EXTENDED ABSTRACT

Introduction
The student presentation is an important way for students to learn how to summarize and communicate information. It complements the learning and mastery of ideas and information which is often the main focus of education. However, increasing class size makes it more difficult to incorporate student presentation in the curriculum (Sander et al., 2002). There is also concern that the information presented by students may be inaccurate (Farnsworth, 2008). These problems can be overcome with the innovative use of information and communication technology (ICT). The use of ICT, such as the video recording of student presentations, offers additional opportunities to provide feedback to the students (Barry, 2012). Cochrane (2009) created specialized software for students to use a webcam to record presentations and receive peer feedback. In this paper, I will describe the use of commercially available ICT to record student presentations of their project findings for peer feedback. The use of ICT and peer feedback removes the challenges student presentations present in the face of increasing class size.

Background
I taught a required course in the Sociology program at Nanyang Technological University on social organizations a number of times (once a year from 2006 to 2011). The main written assignment was a news archive project: students were required to write a report about an organization that had received news coverage in the past year and present their findings to the class. I had approximately 40 students the first time I taught the course and it was possible to organize presentations during the final two weeks of classes. However, student enrolments more than doubled in subsequent years and it was no longer feasible for students to do “live” presentations.

The availability of AcuStudio software, which is mainly used to record lectures, made audio-video recorded student presentations a viable alternative. In subsequent cohorts, students recorded their presentations at a computer that had a webcam and a microphone. The software had the option to sync the presentation recordings with PowerPoint slides. They were required to record a 5-minute presentation of their main findings, upload their presentation to a discussion forum in Blackboard, a learning
management system, and give peer feedback to an assigned student in the form of a comment in the discussion forum. Both the presentation recording and feedback were assessed as components of class participation. For their presentation, students were asked to identify their main findings and to explain them succinctly. Summarizing findings and communicating successfully is an important skill that students have few opportunities to practice in larger classes.

Implementation
Organizing the presentation recordings was logistically challenging for a number of reasons. First, I needed to ensure that the larger computer labs were available during the recording week to accommodate the students in a tutorial group, and that the AcuStudio software was installed on the computers. Second, the students needed to be familiarized with the AcuStudio. They were also informed of the schedule for recording, deadlines for uploading the link to Blackboard, and deadlines for giving feedback. The presentation recordings were organized by tutorial groups and so the peer feedback came from randomly assigned students from the same tutorial group. It was scheduled for the week after the project reports were due. The advice I received from NTU’s Center of Excellence in Learning and Teaching (CELT) on how to organize the recordings was invaluable.

Findings
Overall, the students were not resistant to recording their presentations. They were able to successfully record and upload their presentations, and provide online feedback. However, there were some difficulties that were inherent in the nature of the task. First, for many of the students, this was the first time they were asked to record a presentation and some of them had difficulty getting started. Some students were very self-conscious when they started recording—there was giggling and whispering but after a while most of them settled down to the task and were able to complete their recordings during the 50-minute tutorial. A few students, however, had to come back again to complete their recordings. The reasons ranged from acute stage fright to technical problems with the hardware and software. A handful of students found the task very challenging mainly because they were trying to produce a “perfect” recording. They persisted in rerecording their presentation a number of times, even though I reminded them that it was only part of class participation and was not graded.

Second, many students had trouble keeping to the 5-minute time limit. While most students exceeded it by one or two minutes, a few students ignored the time limit and recorded presentations that exceeded 10 minutes. The main problems were giving too much background information about their organization and not being able to select their most important findings. This underscored the importance of giving students the opportunity to practice summarizing findings.

Students were also asked to give peer feedback on presentation style and the clarity of the Powerpoint slides. Even though they were only required to view the presentation of the student they were supposed to give feedback to, many students viewed all the presentations in their tutorial group. Some students even left comments for students who were not assigned to them. The peer feedback was generally encouraging and any given criticism was gentle. Using a discussion board for the peer feedback allowed interaction between the presenter and the student giving feedback.

The students’ reactions to the tasks were generally neutral. While the majority of students completed the task without any complaints, a few students voiced their dissatisfaction—some thought that it was too
much work while others did not see any value in the task. One student, for example, complained about the presentation recording in the Student Feedback on Teaching exercise—the student stated that it would have been better to conduct live presentations.

Conclusions
The self-recording of student presentations made it possible to have students in a large class present their report findings to their classmates and receive peer feedback. They were able to reap the benefits from the normal presentations such as summarizing and communicating report findings, as well as receiving feedback. There were added benefits such as speaking to a camera as they would if they were teleconferencing and students were also able to review their own presentations. There was no concern that the students would be sharing inaccurate information since they are presenting information from their reports and the concepts they used were discussed in lectures and tutorials.

References
Pinning, Sharing, Learning:  
The Use of Pinterest for First Year Architecture Students

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Keywords: Pinterest, Learning, Sharing, Visual.

EXTENDED ABSTRACT

Introduction

This paper discusses the use of Pinterest as a medium for learning among first year architecture students. Pinterest is a form of social media that focuses on the sharing of visual materials. From an educational point of view, Pinterest is an example of Web 2.0 tools in which the users could participate as the creators of content rather than merely being passive consumers of content. The new paradigm of connectivism suggest that “Learning is a process of connecting specialized nodes or information sources” (Siemens, 2012). The presence of Web 2.0 has redefined the concept of learning, in terms of collaboration (increased participation), publication (opportunity to publish learning outcomes), literacy (new forms of expression, representation and creativity) and inquiry (new ways of conducting personal research) (Crook, 2007). Pinterest has been used in education in various ways, including for sharing teaching materials, encouraging student participation, and showing students’ works (Marino, 2012). Since Pinterest is primarily associated with visual content, it becomes highly relevant for the learning in visual-based disciplines such as arts, design and architecture.

Objectives and Methods

This paper focuses on examining the process of introducing and using Pinterest as a part of learning activities for first year architecture students at Universitas Indonesia. In particular, this study is aimed at understanding, from the students’ perspective, their experience of using Pinterest as a learning media, and whether its use also encourages them to pursue further actions on their learning. The study also looked into various aspects that the tutors could assess from the students’ Pinterest activities.

The study was conducted based on the analysis of students’ activities in using Pinterest in an architectural communication class. This course is compulsory for all first year architecture students. A total of 97 students participated in the course at the time of the study, with six tutors facilitating the learning process. As a part of their learning in this course, the students were required to participate by pinning visual materials on several Pinterest boards set for this purpose. The monitoring of students’ activities in the Pinterest resulted in the records on the variety of visual images pinned by the students, and various types of student activities: pinning, adding texts, liking and commenting on other students’ pins. In addition, interviews with a small group of students were conducted to obtain the students’ perspectives on their learning activities with Pinterest.

Main Findings

The followings are some findings from this study, which suggest some opportunities as well as challenges in the use of Pinterest for students’ learning.

Introducing Students to Pinterest as a Learning Tool

Although the majority of students had been active users of the internet, including some social media, Pinterest was relatively new for them. Nevertheless, their technology literacy allowed them to participate in this media immediately and easily. Managing the use of Pinterest is relatively easy;
however, the use for a large number of students might involve some issues in making sure that everyone has been invited to participate in all the boards. Some students pinned images in the wrong board, which could cause difficulties in monitoring their participation.

**Learning Activities with Pinterest**

The students’ main activity in Pinterest was pinning a variety of visual materials to four Pinterest boards. On the first board they were allowed to pin any images that they found interesting. Since re-pinning is not allowed, this activity encourages them to find any online resources that they could explore to find interesting things, thus widening their knowledge on the various resources available. Three other boards were used as media to showcase their works, both individual and group works. This activity required the students to be able to ‘curate’ their own works, selecting which one was appropriate to display, deciding the best point of view to capture the works, and creating texts to describe the images. In addition to individual pinning, the students could also ‘like’ or give comments to other students’ pins.

**Opportunity for Assessment**

The visual materials pinned by the students had made it possible for the tutors to get some ideas on the students’ abilities in various aspects. These included the quality of visual materials chosen by the students, the wide range of online resources found by the students, the student’s ability to select their own works and present them, the levels of students’ aesthetic abilities, as well as their interest on various aspects that might be of benefit to further architecture studies.

**Trigger for further learning**

The students were also encouraged to not just pin their own images, but to also look at the variety of materials pinned by other students. In this way, materials, resources and knowledge were shared naturally among the students. They could see other alternatives in exploring visual materials, and they were exposed to a wide range of online resources that they did not know before. They could also see the quality of other students’ work and get inspired to achieve better quality for themselves. Although we only monitored the students’ participation in the four boards, the students might also use Pinterest for other purposes, thus the use of Pinterest in this course might trigger further uses of Pinterest to support their learning in other courses as well.

**Conclusion**

The use of Pinterest as a learning tool allows the students to share materials, resources and interest with one another. Various skills could be exercised through the use of Pinterest, such as the skills of curating and selecting materials, locating and using a various resources, and presenting works with good quality. The use of Pinterest might also encourage students to use it for other purposes that could support their learning beyond those required by the course.

**References**

A Series of Action Research Case Studies to Examine Strategies to Build and Maintain a Community of Practice for Pre-service Teacher Trainees on Practicum

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Keywords: Building and maintaining a community of practice; asynchronous communication; collaborative learning; e-tivities.

EXTENDED ABSTRACT

Introduction
This study was an action research exploration of the online virtual learning environment as a vehicle for developing the reflective practice of pre-service ESOL teacher trainees during practicum. The research occurred at the Institute of Education in Hong Kong, where this researcher worked as a Senior Teaching Fellow and practicum supervisor. Papers from the study have been published previously (2012, a, b, c). The particular focus of this presentation is on one of the study’s aspects, which is the strategies that were employed to initiate and develop the online communities of practice. This was found to be an essential pre-requisite to developing reflective capabilities online as each case study had a duration of only eight weeks (the length of practicum). It was thus an area where participants could verbalize their experiences openly, seek critical responses and share advice with each other. Findings suggest that online communities are able to develop effectively when a systematic core set of strategies exploiting the collaborative and asynchronous nature of the online environment are implemented. These strategies will be presented, analyzed and laid open for discussion.

Literature Review

VLEs and Online Learning
As knowledge is a socially-constructed phenomenon, the online virtual environment, with its inherent social and collaborative characteristics, can be seen to be a useful tool in developing focused content-based discussions. However, two caveats should be emphasized; the first is that if participants are communicating online in this way for the first time, as in this context, they may need instruction as to the nature of the tenor of the online discourse required (see Gee, 2004; Clarke, 2009); they may also lack the ability to project online social presence (Bibeau, 2001; Garrison, 1997; Gunawardena, Lowe, & Anderson, 1997). Without these skills, as Wang and Newlin’s (2002: 21) study suggests, intrinsic motivation and learner satisfaction online could dwindle as the forums age. The second caveat is that a significant volume of postings should have been uploaded, shared and the content manipulated before an online community can mature (see Murillo, 2002, 2008). The communities for this research could be referred to as ‘task-based COPs’ as they joined for a very limited time. Thus, the need to develop reciprocity and produce constructed meanings quickly was essential. Given the two caveats raised, the role of the online moderator is of paramount importance, and a great deal of research on the role of the tutor in online moderation has been published (Jones & Peachey, 2005; Laurillard, 2007; Laurillard, 2007, Laurillard et al, 2009; Lewis & Allen, 2006; Salmon, 2000, 2004; Wenger, 1998). This research will present empirical data on two important aspects of managing an online environment: the first is how the COPs were set up; the second, how they were maintained.
The Study
A collective case study approach was adopted for the research methodology. All three case studies were self-study action research projects (for more on this see in particular Allwright & Bailey, 1991; Burns, 1999; Edge, 2001; Edge & Richards, 1993; Greenwood & Levin, 2003; Kemmis & McTaggart, 1998; Nunan, 2005). The research involved three 8-week case studies with 24 student teachers (8 participants per case study). Applying action research methodology, the research objective was to analyze what is needed (if anything) in terms of e-moderator practice in order to set up and maintain an effective online environment which promotes collaborative learning. The participants were unfamiliar with each other and unknown to this researcher at the beginning of the study. Each case study consisted of eight third-year participants of a four-year BEd (EL) degree from both Hong Kong and mainland China. There was a mix of male and female students aged between 20 and 25. Using personal journal and research observational notes, data and findings were recorded during and after each case study. These were compared and differences noted. By the third case study, the models and strategies discovered to be effective had been trialed and refined at least once. The forums were limited access. It was felt that this was preferable due to the desire to open a close-knit collective through which participants could grow mutual respect and trust in order to express themselves openly and honestly.

Results
These are divided into two elements. The first is ‘initiating an online learning community’; the second, ‘maintaining an online learning community’.

i. Part 1
As part of the first section, four activities along with participant postings and research notes will be presented. These activities have been constructed to form what has been termed the ‘developing online awareness model’ shown below as figure 1 below:

<table>
<thead>
<tr>
<th>Step 1: Ranking activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 2: Discussion on ranking</td>
</tr>
<tr>
<td>Step 3: Socialization activity</td>
</tr>
<tr>
<td>Step 4: Find a similarity</td>
</tr>
</tbody>
</table>

Figure 1: ‘developing online awareness model’.

The activities will be presented with data from the three case studies. Briefly, the first activity required participants to rank four statements:

A. I am able to learn by writing about my thoughts and experiences on the discussion forum;

B. I can learn from others’ responses to my thoughts;

C. It is beneficial to upload and share lesson plans and teaching material;

D. I am able to learn by reading about the others’ thoughts and experiences.
These were then discussed asynchronously. The third activity was the sharing of personal information. This task was left completely open for trainees to choose the content of their postings. This was then followed up with an activity entitled ‘find a similarity’. This required learners to skim through the forums constructed by this stage and to study the threads to find as many commonalities with the other participants as possible and to acknowledge these. In addition to building of the community at these initial stages, this activity was designed to train participants to navigate through the forum to find threads effectively.

ii. Part 2

The results from the second section pertain to the stage when the initial part of the cycle has been surpassed and the COP is actively constructing new meanings through dialectical processes. Due to a busy schedule during practicum, it was observed that a lull in participant motivation may occur, and discussion relating to peers’ postings became less regular; some participants ceased logging on. To deal with this, strategies were developed which could inform participants about what the forums were doing. This way, it was guaranteed that even if they were too busy to log on during the week, they would not fall behind and would therefore be able to follow the threads when they found the time to do so. Two types of collage were created, each depicting snapshots of forum events. The first is a snapshot of each participant’s week providing the postings carrying the most content of their discussions during the week. The second is a snapshot of one of the week’s main topics of discussion. These will be presented along with participant postings. The models can be seen below in figures 2 and 3:

![Figure 2: collage 1.](image)
Conclusion

The findings reflect other studies in this field (Clarke, 2009) that posit that online teacher education programmes need to engender a participant-awareness of online discourse and communication strategies. Thus, despite the number of e-enabled teacher education programmes, participants benefit from being explicitly informed about the positivity of working together in an online, asynchronous environment. In addition, actively building relationships at the outset through e-moderator strategies is essential, particularly if the site is a short-term community. This supports Skinner (2009), who argues the need for a ‘spark’ which ‘fires’ interaction, and Downing et al. (2007), Jones & Peachey (2005), whose findings suggest that more challenging tasks rather than mere socialization or ‘greet and meet’ type activities can increase the use of the discussion forums. In addition, maintaining an online learning community by summarizing the content of its postings, either by offering a snapshot of the discussion themes or of each participant’s weekly communications, and informing absent or less active participants about this content, can very much help sustain the use and even lead to the growth of the learning community.
References


Collaborative Online Learning Using Multimodal Analysis Software

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Keywords: Collaborative online learning; Multimodality; Multimodal analysis; Web-based learning; Multimodal analysis software

EXTENDED ABSTRACT

Introduction
Advancements in digital and internet technologies have facilitated an accelerated interest in the use of such technologies, customized online tools and social media to support the endeavours of online education. As a result, educators and educational institutions have gained access to a global audience beyond the physical classroom. The individuals that make up this audience, from various locations around the world, are not confined to being mere spectators and receptors of information. They are very much active participants as they leverage on various social media and online tools that facilitate interactive teaching and learning.

In this presentation, we present research conducted as part of Multimodal Analysis ONLINE project\textsuperscript{1} undertaken in the Multimodal Analysis Lab at the Interactive & Digital Media Institute at the National University of Singapore, which aimed to develop a web-based software application for annotating, analyzing and interpreting text, images and videos in collaborative project work with the view to developing evidence-based accounts of students’ acquisition of 21st century competencies, including information and communication skills, critical and inventive thinking, global awareness and cross-cultural skills. For this purpose, real-time learner data was gathered using existing desktop software, Multimodal Analysis Image\textsuperscript{2} and Multimodal Analysis Video\textsuperscript{3} and social media to investigate the following phenomena:

(a) How students understand, analyze and interpret multimodal texts (with language and image components)
(b) How students understand, analyze and interpret videos (with language, image and audio components)
(c) How teachers can automatically assess the project work and individual student’s contributions and learning style
(d) How a systematic approach to multimodal analysis contributes to students’ analytical and critical thinking about information encountered on a daily basis

As part of this presentation, we also describe the research design, data analysis and preliminary findings.

Research Design
The aim of the project was to develop integrated web-based software which students can use to analyze and interpret how language, images and other resources construct different perspectives of issues of interest and relevance to the school curriculum in collaborative project work. The online environment was simulated using Multimodal Analysis Image and Multimodal Analysis Video software and social media technologies Google Plus and Google
Hangout. In this way, students could use chat and screen-share facilities to work together remotely to undertake collaborative analysis of multimodal documents and videos.

Four Singapore schools were involved in the project: one primary school, one secondary school and two junior colleges. Prior to data collection, workshops were conducted to familiarize and train teachers in the use of Multimodal Analysis Image or Multimodal Analysis Video and Google Hangout. From this pool of teachers, one teacher was chosen by the respective school to deliver and conduct a lesson on a topic in their syllabus which they felt would be enhanced from the inclusion and use of such software and social media applications.

Based on student numbers provided by each school, Google Hangout accounts were created to allow each student to interact via the Google Hangout interface, which has both synchronous chat and screen-share facilities. Students were grouped into teams of four members or less, and each group was assigned an Annotator, who was responsible for inserting, amending or deleting annotations using facilities in Multimodal Analysis Image and Multimodal Analysis Video, based on discussions which took place in the ‘live’ group interaction. All group members could view this analysis via the screen-share facility on Google Hangout, but only the Annotator had direct access to the multimodal analysis software to undertake the analysis.

Logs of the synchronous chat were collected using a chat logger developed in-house (MMA Chat Logger) as a Google Chrome extension. In addition, screen captures of the screen-share session were recorded on video from the Annotator’s computer using the screen capture software Camtasia to capture the process of annotation and analysis in real-time for data processing and interpretation.

**Data Processing**
The various chat logs were coded according to an analytical framework for collaborative computer mediated conversation (CCMC), adapted from Eggins & Slade (1997), Martin & Rose (2007) and Sinclair & Coulthard (1975). In this framework, task-orientated generic stages were classified as sub-phases for ‘on-task’ and ‘off-task’ entries, with sub-classifications to describe the various turns, functions and moves in the interactions. The number of on-task chat entries was divided by the number of annotations to derive the average number of utterances which accompanied each annotation. The general assumption was that a lower estimate would mean fewer utterances needed to accomplish an annotation, and a higher estimate would indicate more utterances needed to accomplish an annotation. Such a relative comparison, while reflective to some degree of group efficiency, cannot be interpreted without examining other variables:

(i) the actual chat which takes place, whether the annotations made were a consequence of the collaborative chat, or the annotator’s own initiative in isolation from the group chat;
(ii) the annotator’s familiarity with the research design and software capabilities;
(iii) the annotator’s dexterity with regard to manipulating the on-screen interface incorporating both Google Hangout and either Multimodal Analysis Image or Video; and
(iv) the nature of task the students had to complete.

We examined these issues to develop a profile of the most efficient and least efficient groups in each of the three schools.

**Conclusion**
Our research findings revealed that the groups which had a specific strategy for undertaking the analysis produced the most effective results. Our research findings also demonstrated the
need for an integrated online platform for multimodal analysis that facilitates collaboration among students, particularly as issues of dexterity, familiarity with and ease of adaption to software have been shown to affect group performance. The next phase of this research will be undertaken at Curtin University in Perth, Western Australia.

Acknowledgements

1. Multimodal Analysis ONLINE: A Web-Based Software Application for Collaborative Project Work (NRF2012IDM-IDM002-009) (Principal Investigator Kay O’Halloran) was funded by the Ministry of Education’s Interactive Digital Media Programme Office under ‘Assessing 21st Century Competencies through Interactive Digital Media Challenge (Phase 1)’ Grant Call by National Research Foundation in Singapore.

2. Multimodal Analysis Image software:
   http://multimodal-analysis.com/products/multimodal-analysis-image/

3. Multimodal Analysis Video software:
   http://multimodal-analysis.com/products/multimodal-analysis-video/

4. Contact Kay O’Halloran: kay.ohalloran@curtin.edu.au

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Students Who Do Not Value Face-To-Face Interaction Can Skew Teaching Evaluations

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Keywords: Screencast Lectures; Student Feedback; Teaching Evaluation Surveys; Web-based Teaching.

EXTENDED ABSTRACT

Screencast lectures provide flexibility and enhance the learning experience of on-campus students. This multimedia learning resource enables students to catch up with classroom lectures they have missed, and review difficult concepts as often as needed, at their own time. They can be pre-recorded lectures or recordings of actual classroom lectures. Unless a course is taught using the flipped classroom approach or offered to off-campus students enrolled in a distance learning programme, screencast lectures are generally not meant to substitute traditional classroom lectures as they do not offer students the opportunity for face-to-face interaction with the teacher. Indeed, where screencast lectures are provided, teachers should ensure that there is additional activity in the classroom lecture to discourage students from deliberately skipping classes.

In this talk, I give a personal account of using pre-recorded screencast lectures in a first-year undergraduate course, EE1003 “Introduction to Signals and Communications”, as part of the Electrical Engineering (EE) curriculum at the National University of Singapore for full-time, on-campus students. I introduced this learning resource the last time I taught this course, i.e., in Semester 2, AY2012/13. Before that, I did not provide any form of recorded lectures, not even webcast lectures. My classroom lectures, which span the first five weeks of the semester, are highly interactive, as students are given problems to solve to quickly apply what they have learned. Further, I walk around providing one-to-one assistance as needed, before going through my suggested solutions with the whole class. In my screencast lectures however, I only go through my lecture notes and do not engage in any problem solving exercise other than the worked examples contained in the notes. Students are therefore discouraged from viewing the screencast lectures as a substitute for the classroom lectures, at least in principle. Two anomalies in my teaching evaluation by students at the end of Semester 2 of AY2012/13 however, suggested that in reality, this was not the case. A survey I subsequently carried out suggests that when web-based lectures are provided on top of traditional classroom lectures, students who do not value face-to-face interaction can skew teaching evaluations. Specifically, the survey showed that there was a small group of students in my class who behaved as though they were enrolled in an online course, as they deliberately skipped almost all classes and “attended” lectures by viewing the screencast recordings. Further, these students gave poorer teaching evaluations compared to those who attended my classroom lectures. These findings, though based on a relatively small sample size, deserve some attention for the following reasons.

Remarkably, they mirror what is reported in the literature. Loveland (2007) notes that some schools in the US have reported significantly lower student ratings on teaching for online courses. Similarly, Rivera, McALister and Rice (2002) report that student ratings on teaching are lower for teachers who adopt a blend of traditional and web-based teaching, and even lower for those who teach entirely web-based. This raises the question of whether teaching evaluation surveys need to be redesigned to take into account the fact that with today’s technology, face-to-face classroom teaching is now just one way to deliver a course, even in an institution that offers only on-campus courses. In fact, Loveland (2007) also suggests that existing teaching evaluation surveys do not capture all the factors that affect
student ratings on web-based teaching. If this is indeed true, the same can be said about blended teaching.

One should keep in mind the objectives of teaching evaluation surveys. First, they are meant to help teachers improve. Two, they are used by senior management in making decisions towards the award or denial of tenure and/or promotion, as well as in annual performance reviews. It is certainly in any institution’s interest to ensure that their teaching evaluation surveys indeed enable teachers to identify areas of weakness that need improvement, and favour neither of the three kinds of teachers that we have today: the classroom teacher, the web-based teacher, and the blended classroom/web-based teacher.

The findings of my survey therefore provide one more (albeit, small) piece of evidence that there is a need to develop and validate teaching evaluation surveys that are as current as the technology-enabled teaching tools that we have today.

References


Predicting Undergraduate Nursing Students’ Intention to Use the Electronic Health Records Software Application

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Keywords: Nursing Education; Electronic Health Records; EHRs; Health Information Technology

EXTENDED ABSTRACT

Introduction

Most hospitals in Singapore have adopted electronic health records (EHRs) in their practice. As a result, nurses need to use and be aware of electronic nursing documentation in providing patient care (Kelley et al., 2011). Preparing competent nurses who have the knowledge and skill to use EHRs is in high demand, especially at the undergraduate level. It is recommended that nursing students should prepare to use EHRs when they are in nursing school so that they are aware of and comfortable with the latest health information technology (Bembridge et al., 2010; Fetter, 2008; Meyer et al., 2011). Previous literature suggested that nursing students’ perceptions and intentions to use EHRs would influence their willingness to learn the system and use it in practice (Boryck et al., 2011; Fetter, 2008).

Advanced technology cannot improve organization outcomes or enhance individuals’ performance if it is not accepted or not being used by the end users (Davis et al., 1989). In an educational environment, nursing students are end users and their acceptance of EHRs is essential. Failure of system adoption would likely lead to financial loss and users’ dissatisfaction, whereas the success of system adoption can lead to improved productivity and gains in profits (Hu et al., 1999). If nursing students do not accept and do not have any intention to use the EHRs program in their instruction, the University could lose revenue and fail to produce optimal learning outcomes. The purpose of this study was to describe, identify, and predict factors that influence nursing students’ intention to use the electronic health records for nursing education in the simulation laboratory before it is implemented.

Conceptual Framework

The Health Information Technology Learning Model (HITLM) was used to guide the study. The model was derived from existing literature, and empirical observations. According to the HITLM, the constructs provided by the Technology Acceptance Model (TAM) are perceived usefulness (PU), perceived ease of use (PEOU), attitude toward using (ATU), and intention to use (ITU). The primary key factors (PU and PEOU) are influenced by external variables. Attitudes toward using are the bridge between both key factors (PU and PEOU) and intention to use. Factors suggested by Theory of Planned Behavior (TPB), Subjective norm (SN) and perceived behavioral control (PBC) would also influence the intention to use. The intention to use would influence the actual use of EHRs (Fishbein and Ajzen, 1975). Based on the literature, the following external variables were included in the conceptual framework: age, academic year, knowledge of EHRs, awareness of EHRs, support from faculty, and support from simulation lab staff (please see Figure 1).
Research Questions

The study’s research questions are:
1. What are the relationships among key variables in the proposed model (HITLM)?
2. What are the predictors of the nursing students’ intention to use the electronic health records for nursing education in the simulation laboratory?
3. What is the most influential factor in predicting nursing students’ intention to use the EHRs in the simulation laboratory?

Methods

Design

This study was a quantitative, descriptive cross-sectional study design, in which undergraduate nursing students completed a questionnaire.

Sample

The sample was a convenience sample of undergraduate nursing students recruited from a local university in Singapore. The inclusion criteria were undergraduate nursing students who were studying in year 1 to year 4, and have been involved in simulations and skills laboratory activities in the university. A total of 263 undergraduate nursing students were invited to participate in the study, and 218 completed questionnaires were returned. The overall response rate was 83% which is considered satisfactory. This sample size was adequate to achieve a moderate effect size (0.13) with $\alpha = 0.05$ and power level = 0.80.

Instrument

The Electronic Health Records Acceptance Survey (EHRAS) was used in this study. The EHRAS was modified from two surveys; the eICU Acceptance Survey (Kowitlawakul, 2008) and the Seeman and Gibson’s survey (2009). In this study, the internal consistency of the instrument constructs ranges from 0.60 to 0.89 of the subscales, and with a total coefficient $\alpha$ of 0.93, which was considered satisfactory (Polit & Beck, 2008).

Data Collection

Data collection was started in January 2012 using the EHRAS and ended in March 2012. The study has been approved by the Institutional Review Board (IRB) of a university in Singapore. The information sheets, consent forms, and questionnaires were provided to the students after the purposes of the research study were explained.

Data analysis

The IMB SPSS version 20.0 was used to analyze the data. Statistical significance for all of the analysis was defined as $p \leq 0.05$. Descriptive statistics were used to describe the nature and overview of nursing students. Bivariate analysis was conducted to investigate the relationships between demographic/external variables and the model constructs. Multiple regressions (path analysis) were performed to explain and identify the most influential predictor (Mertler & Vannatta, 2002) of the students’ intention to use EHRs.
Results

Characteristics of the Participants

The age average of the participants was 21 years old (SD = 1.50), and it ranged from 19 to 29 years old. Most of students were female (85.3%). On average, the students had 113.73 days of practicing experience in clinical sites (SD = 205.34, range = 0-1095 days), while they had average of 11.15 years of experience in using computer (SD = 3.40, range = 0.25-20 years).

Relationships Among Variables/Constructs in the Proposed Model

According to Pearson’s correlation among external variables and the two key determinant factors (perceived usefulness and perceived ease of use), age and awareness of EHRs have no statistically significant correlation with perceived usefulness. Also, age and academic years also have no statistically significant correlation with perceived ease of use. Table 1 presents the correlation among the constructs in the HITLM (perceived usefulness, perceived ease of use, attitude toward using, subjective norm, perceived behavioral control, and intention to use). Results showed that all the variables have statistically significant correlations with each other that range from 0.232 to 0.579 with \(p<.01\).

<table>
<thead>
<tr>
<th></th>
<th>PU</th>
<th>PEOU</th>
<th>SN</th>
<th>PBC</th>
<th>ATU</th>
<th>ITU</th>
</tr>
</thead>
<tbody>
<tr>
<td>PU</td>
<td>1</td>
<td></td>
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<tr>
<td>PEOU</td>
<td>0.432**</td>
<td>1</td>
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</tr>
<tr>
<td>SN</td>
<td>0.284**</td>
<td>0.405**</td>
<td>1</td>
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</tr>
<tr>
<td>PBC</td>
<td>0.346**</td>
<td>0.475**</td>
<td>0.423**</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>ATU</td>
<td>0.468**</td>
<td>0.428**</td>
<td>0.390**</td>
<td>0.367**</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>ITU</td>
<td>0.513**</td>
<td>0.424**</td>
<td>0.402**</td>
<td>0.232**</td>
<td>0.579**</td>
<td>1</td>
</tr>
</tbody>
</table>

**\(p<0.01\)

Multiple regressions/path analysis

The results of path analysis illustrated in Figure 1. According the results of regression 1 (perceived usefulness as a dependent variable), knowledge of EHRs, academic year, and perceived ease of use path coefficients were statistically significant (\(p<0.05\)). The results of regression 2 (perceived ease of use is a dependent variable), awareness of EHRs and support from faculty/tutor path coefficients were statistically significant (\(p<0.01\)). Knowledge of EHRs and support from lab staff path coefficients were not statistically significant (\(p>0.05\)). The results of regression 3 (attitude toward using as a dependent variable), perceived usefulness and perceived ease of use path coefficients were statistically significant (\(p<0.01\)). The results of regression 4 (intention to use as a dependent variable), Perceived usefulness, attitude toward using, and subjective norm path coefficients were statistically significant (\(p<0.01\)). Together, perceived usefulness, attitude toward using, subjective norm, and perceived behavioral control explained 44% of variance observed in intention to use (\(R^2=0.44\)).

Conclusion

To enhance the students’ intention to use EHRs in learning, cultivating a positive attitude toward using EHRs, as well as increasing the perceived usefulness and subjective norm is an imperative. Providing students with knowledge of EHRs should be initiated before implementing this technology. The contents of the class could focus on how this technology could enhance their performance in the nursing laboratory and clinical practice. Learning could be made simple and easy. Faculty could be trained to use the program effectively and proficiently so that they could support the students to learn. The faculty could also enhance students’ awareness of EHRs and ensure that they have the appropriate information.
This study found that students’ attitude was the main predictor of intention to use which differed from some previous studies. The results of this study provided direction for the implementation of health informatics in nursing education. The Health Information Technology Learning Model was examined, and it could be used in guiding learning health informatics and applied to nursing discipline and different healthcare professional student groups. More investigation on the HITLM in nursing and other healthcare discipline is needed. The replication of this study in another discipline is also highly recommended.

Figure 1: HITLM and path analysis results (N=218)

Acknowledgements
This study was funded by the Alice Lee Centre for Nursing Studies Start-up Grant at the National University of Singapore.
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Building an Online Repository of Teaching Resources to Facilitate Consistent and Good Quality Teaching of Postgraduates and Undergraduates in Medicine—A Preliminary Report

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Keywords: Technology Enhanced Learning; Education Research; Medical Education.

EXTENDED ABSTRACT

Introduction
One of the greatest challenges facing medical educators, in both undergraduate and postgraduate education, is ensuring consistency of clinical experience. It could also be argued that clinical expertise is based on a foundation of clinical patient (case) experience—both the variety and range of cases, and depth of case experience. The challenge for curriculum planners is ensuring the availability of a wide enough range of cases to be linked to, and embody the undergraduate medical and postgraduate training curricula. Developing an online repository of these cases is an obvious solution to this educational challenge. Efforts in this area to date over the last 10 years internationally in educational practice, highlighted in conference presentations, and in the published literature have shown that digital repository initiatives have met with varying degrees of success, with unfulfilled potential of many of these initiatives, and major obstacles encountered in both the solicitation of case contributions, curating these cases, as well as utilizing these repositories as a core feature of medical education in individual institutions. Examples of these initiatives will be described in the oral paper presentation at the symposium, and some of these are listed online (digital repository initiatives).

What is the role of radiology in these education efforts? Radiology encompasses the whole range of clinical imaging techniques, and provides in-vivo images of both normal, and disease states. Radiology images are currently used as a key clinical problem solving and educational resource in undergraduate and postgraduate medical education, to provide a strong visual demonstration not only of normal form and function (anatomy, physiology and biochemistry), but also disease states (pathology and pathophysiology). Radiology images provide a central visual focus, and important investigative technique in the evaluation of clinical cases, and are used routinely in clinical problem solving. Radiology images can therefore be used not only in the training of specialist radiologists, but have a wider role in supporting medical education across the continuum of undergraduate, postgraduate and continuing medical education. This paper, and symposium presentation, will describe our experience over the last 2 years, building up and using a repository of over 2000 online radiology cases, focused initially on neuroradiology and chest radiology; and will show how this has now led to the genesis of a new institution-wide initiative.
Goals
The key objective of medical education is to develop increasing and progressively higher levels of expertise in clinical problem solving. Training in clinical problem solving traditionally centres around the review and evaluation of clinical scenarios, or clinical patient cases. In undergraduate medical education, the use of typical examples, or exemplar cases is emphasized. Moving along the continuum of medical education, in postgraduate and continuing medical education, there is increasing emphasis and focus on training for competency and proficiency, with the ultimate goal that of high levels of expertise and mastery. The challenge of providing consistency of clinical case experience can be met by systematically building up a digital repository of clinical cases, which reflect the breadth and depth of actual clinical experience. This idea would address one of the major weaknesses of previous efforts in building online case repositories to support medical education.

Our initial goal was to build an online case repository to support undergraduate medical education, facilitate postgraduate training in radiology, the evaluation of education theory, and investigate its potential to shorten duration of postgraduate training, and aid mastery training.

Background Information
The focus in undergraduate education is to build a foundation of basic knowledge, anchored by exemplar cases, which are easily provided via an online repository. Postgraduate education builds on this foundation, with a focus on developing clinical competency and proficiency, and the ultimate aim of developing expertise and mastery. One of the key methods of training for mastery is the use of deliberate practice (Anders Ericsson, Krampe, & Tesch-Romer, 1993). The educational literature also supports the use of compare and contrast case reviews to facilitate mastery training and potentially shorten the duration of learning or training; with the idea of using paired and mixed practice involving the use of a series of similar and contrasting examples of imaging abnormalities, with an attempt to describe and reflect on the similarities, and differences between the similar and contrasting examples (Anders-Ericsson, 2004; Hatala, Brooks & Norman, 2003; Norman, 2008; Norman, Young & Brooks, 2007).

Brief Description of Methodology
Digital case repositories have a role in facilitating training by providing an accessible, reusable, hyperlinked collection of clinical cases that mirror the full spectrum of clinical experience—from typical to atypical presentations, with confounding features, and multiple pathologies. Our initial focus was on Chest Radiology and Neuroradiology, exemplified by clinical cases illustrated with Chest Radiographs, and CT scans of the head; as the Chest Radiograph is the most common (over 20% of a typical radiology department workload) requested radiology investigation, and CT scans of the head one of the most common radiology examinations with high immediate impact in clinical practice; with the use and interpretation of these images forming part of the core clinical skills required of a competent, safe medical practitioner. For postgraduate education, we have organized our neuroradiology residency curriculum into thematic experiences, which are reflected in a defined collection of illustrative cases systematically collected and made available online over the last 2 years. These cases have multiple uses, including being presented via an online blog thematically, as unknown cases for quiz and drill exercises, and as a hyperlinked index (with links to additional recommended online resources) for self-study (Figure 2).

Main Findings
Our online neuroradiology case repository (presented via a neuroradiology and companion head and neck radiology blog) currently contains over 2000 cases for review (neuroradiology blog), which reflects the breadth and depth of clinical experience for the most common, and less common but important conditions. This has been viewed over 36000 times in the last 2 years, with positive qualitative feedback using focused group medical student and postgraduate resident questionnaires.
and interviews. Quantitative testing using compare and contrast drills and practice sessions has shown
the potential of using this online case repository to reduce residency duration (master thesis abstract).
Evaluation of educational theory, and its application to improve the efficiency and effectiveness of
training; and mastery training is facilitated by the availability of this online case repository. Our
experience in the use of technology enhanced learning has been systematically presented for peer
review and feedback both locally and internationally over the last 10 years (technology enhanced
learning conference papers), and has formed the basis for the design and presentation of eLearning
symposia and workshops over the last 3 years (technology enhanced learning workshops and
symposia). One of the local eLearning workshops, presented in November 2012, at the request of the
Chairman of our Medical Board for departmental postgraduate training directors at NUH, has led
directly to a new initiative to create an institution-wide online case repository over the next three
years.

Conclusions
An online case repository of teaching resources supports undergraduate and postgraduate teaching and
learning in radiology. A new initiative to build an institution wide case repository has the potential to
have a wider significant impact in medical education.

Acknowledgements: The CDTL at NUS for stimulating my interest in eLearning (now more
popularly described as technology-enhanced learning) during a workshop 10 years ago, and for
providing the resources together with the CIT at NUS for helping us develop a comprehensive range
of eLearning modules in radiology for undergraduate medical education. My former departmental
chair Professor Wang Shih Chang, Professor Vincent Chong, and Associate Professor Quek Swee
Tian from the Department of Radiology at NUS for giving me unequivocal support, guidance and
advice, in these TEL initiatives; and for facilitating my further professional development as a medical
educator while completing a Master in Health Professions Education study program at Maastricht
University. Professor Matthew Gwee, Dr Dujeepa Samarasekara and my colleagues at the Medical
Education Unit, NUS for their encouragement and feedback. Professor Lawrence Wong for co-
ordinating the multidisciplinary taskforce involved in developing the proposal for the Interactive and
Digital Media Institute at NUS; the Provost, NUS for supporting the initial developmental projects
coupled with the launch of the IDMI institute. My former fellow students and the teachers at the
Maastricht University School of Health Professions Education for deepening my understanding of
educational pedagogy and educational scholarship. My fellow committee members of the Association
of Medical Education Europe (AMEE) eLearning Committee for sharing their experience in TEL; and
Professor Ronald Harden, General Secretary of AMEE, for his visionary leadership in international
medical education, and promotion of the use of technology enhanced learning.
Figures

Figure 1 (two part image): Hyperlinked text index from our neuradiology case repository (by both unknown case number, and diagnosis), with visual index also shown alongside.

Figure 2 (two part image): Use of case images from the digital repository in multiple formats, from hyperlinked index, through sequential case review, to side by side compare and contrast exercises, and online thematic “textbook-like” collections.

References

INSIGNIA:
Crowdsourcing an Open Badge System for Research Training and Supervision

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Keywords: Research Training, Open Badges, Technology Enhanced Learning; Education Research.

EXTENDED ABSTRACT

The Australian government recognises the critical need for research skills and quality research training in order to meet workforce needs and drive growth and innovation for the future. A number of recent commissioned reports inform the rationale and design of this proposal including, The Australian Government’s Research Workforce Strategy (RWS), Research Skills for an Innovative Future (2011).

What is clear from increased level of scrutiny on research training is that supervision of higher degree research (HDR) students and the quality of that training must be a priority across Australian higher education. To meet this need, The Australian National University (ANU) has leveraged expertise in research and innovative technologies to deploy a tracking and development platform for HDR students and supervisors: INSIGNIA. HDR student completion is not only central to the mission of ANU as Australia’s top research institution, but also a compelling interest to the University’s financial viability and the preparation of graduates.

INSIGNIA brings together evidence-based practices in research supervision in a University-wide virtual learning environment (VLE) to facilitate: connected knowledge network, multimedia supervisor training, educational research resources for students, a community of practice for peer review, and the opportunity for analytics of research training and supervision. In doing so, this project addresses the following priority areas of the Office of Teaching and Learning:

- Assessment and promotion of student learning: innovative models of assessment and reporting student achievement;
- Curriculum design: use of information and communication technologies;
- Improving tertiary pathways: pathways to professional qualifications, to doctoral qualifications, or to other postgraduate study, or research pathways;
- Innovative use of technology in teaching and learning: creative use of existing innovations in learning and teaching in higher education.

Digital “open badges” were developed by the Mozilla Foundation (creators of one of the major web browsers, Firefox) in association with the MacArthur Foundation and can serve to motivate student learning (Glover, 2013). Specifically, digital open badges allow for a way to quantify, assess and acknowledge a student’s research training progress; a critical need given concerns about research degree retention, completion, and student satisfaction (Maxwell & Smith, 2011). They are derived from traditional “scout” badges and serve as an acknowledgement of accomplishing or displaying a certain skill or set of skills to a threshold of qualification.
INSIGNIA was created by using ANU’s learning management system (LMS), Wattle, as the credentialing and educational platform. Because Wattle is built on the open source LMS, Moodle, we are now able to integrate Mozilla Open Badges to recognise student progression in their HDR milestones. This means that at-a-glance supervisor’s will be able to assess a student’s progress while students will be able to see a visual representation of their own progress, access resources in their areas of need, and work with peers who can offer support in addition to their supervisor (Goligoski, 2013).

This paper will explore the design, implementation and evaluation of an open badging system to support research candidates in the development of the following essential transferable skills identified by the Department of Industry, Innovation, Science, Research and Tertiary Education (DIISRTE): digital literacy, critical thinking, decision-making, data literacy, disciplined inquiry, constructing an argument and evaluation all explicated as important areas of need by the Research Workforce Strategy (Research Skills for an Innovative Future, 2011). Developing an open badging system such as INSIGNIA will afford the opportunity to explore the issues of using open badge schemes and e-Portfolios to explore an effective means of research training and supervision. Indeed, such a solution was promoted by the DDOGS (2012): “Completion of skills course and workshops should be registered on a central database and made available in portfolio format or as certificates to research students and graduates” (p. 8).

![Figure 1. Prototype INSIGNIA Badges (for HDR students)](image)

**Conclusion**

The explicit research training curriculum of INSIGNIA (see Table 1) is meant to allow students to acquire transferable and core research competencies so that their individual meetings with supervisors can focus more acutely on discipline-specific needs and the student’s own area of research (Leder, 1995).
Table 1. INSIGNIA Learning Outcomes, Training Content, and ePortfolio outcomes

<table>
<thead>
<tr>
<th>INSIGNIA</th>
<th>Supervisor Skill Training</th>
<th>Student Skill Training</th>
<th>ePortfolio outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>For assessing following learning outcomes:</td>
<td>In addition to INSIGNIA system training, supervisor skill training will include:</td>
<td>The content of the skills program may include:</td>
<td>The challenges involved in creating and maintaining an eportfolio may also help the student to develop transferable skills. These include:</td>
</tr>
<tr>
<td>1. the degree to which the student engages with learning;</td>
<td>• Excellence in supervision</td>
<td>• Oral and written communication skills</td>
<td>• Autonomy and responsibility</td>
</tr>
<tr>
<td>2. capability to display specified actions in the context in which learning takes place (the combination of students, teachers, content);</td>
<td>• Clear and consistent communication and feedback</td>
<td>• Critical thinking</td>
<td>• Selectivity and prioritisation</td>
</tr>
<tr>
<td>3. ability to apply their capabilities in a context outside of that in which they learn;</td>
<td>• Ethics in HDR supervision</td>
<td>• Research ethics and responsible research conduct</td>
<td>• Writing reflectively</td>
</tr>
<tr>
<td>4. meta-capability for developing their capabilities further;</td>
<td>• Providing support by establishing trust, respect and communication</td>
<td>• Research tools: IT skills, database, data analysis (statistics + qualitative, data storage and presentation, document management), citation optimization, eResearch</td>
<td>• Writing for specific audiences</td>
</tr>
<tr>
<td></td>
<td>• Clear understanding of fair and appropriate examination processes</td>
<td>• Research methodologies</td>
<td>• Peer assessment</td>
</tr>
<tr>
<td></td>
<td>• Mentoring and equity</td>
<td>• Time management, project management, and peer review</td>
<td>• Decision-making and digital literacy</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Understanding access</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Manipulating the eportfolio technology</td>
</tr>
</tbody>
</table>

With an intensified focus this should allow not only for more meaningful use of time for both student and supervisor but greater autonomy on the part of the student. As a system, INSIGNIA requires a high level of feedback from the educational community and with the development of appropriate transferable materials, could be scalable across different universities working toward improvement of HDR training and supervision.

References

Can Computer-Generated Linguistic Features Predict Second Language Students’ Writing Scores across Time?

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**Keywords:** Assessing writing; automated rating; automatic linear modeling; latent growth curve model; many-facet Rasch model

**EXTENDED ABSTRACT**

One of the most significant discussions in writing assessment literature is understanding the relationship between the quality of second language (L2) students’ texts as assessed by human raters and computer-generated linguistic features (Crossley, Weston, McLain Sullivan, & McNamara, 2011). Using human raters to judge the quality of L2 students’ essays is perceived to be a useful and relatively reliable rating method in writing assessments. Researchers have used a variety of holistic and analytic writing scales to assess students’ writing skill(s) and use the test scores for different purposes.

Despite its benefits, human rating has multiple limitations such as logistical constraints, cost inefficiency, and the need for double-marking to improve scores’ precision. To address these limitations, researchers have recently adapted automated rating engines. Computer-generated scoring or automated rating is time- and cost-efficient and recent developments in computer science have helped improve its precision significantly (Enright & Quinlan, 2010).

Although automatic and human rating have achieved relative success in writing assessment, there has been little discussion about the development of linguistic features and their links with writing quality over time. If evidence for developing linguistic features and their power to predict the growth of students’ writing quality is found, there will be much pedagogical and assessment use for them in academic writing. L2 writing development is not a well-defined science and it remains unexplored whether linguistic features could help researchers tease out and address the developmental features of texts.

The present study examines the link between the linguistic features as measured by Coh-Metrix and writing scores assigned by human raters over an academic semester.

**Methodology and Results**

**Participants**
This study uses the data from 116 first-year tertiary students enrolled in a paragraph writing module and aged between 18 and 20. They are enrolled in various disciplines including Business, Computer and Electrical Engineering, Geography, Real Estates, and Social Sciences. They performed six paragraph writing tasks at three time points (i.e., Pre-, Mid-, and Post-Course; two tasks per testing session) and their paragraphs were both marked by human raters and subjected to Coh-Metrix analysis.

**Generating Data**
The texts collected in the pre-, mid-, and post-course time points were marked by multiple raters on Content (i.e., the fulfillment of the task’s requirements), Organization (i.e., unity and cohesion in the paragraph), and Language (i.e., the richness and flexibility of vocabulary, grammar, and accuracy of mechanics). At each time point, 232 texts were collected (i.e., 116 students X 2 tasks), making 696 texts (i.e., 232 texts X 3 time points). Each text included one paragraph comprising between 180 to
230 words with the average of 210 words. Four contracted raters (CR)—who had taught the module for several semesters and used the analytical scale for rating before—marked 464 pre- and post-course texts and the four module tutors (MR) who taught the module marked 232 mid-course texts.

The pre- and post-course data were marked by the CR and the mid-course data were marked by the tutors teaching the module. I performed a number of many-facet Rasch model (MFRM) on the FACETS computer package to examine the quality and reliability of the generated data (Engelhard, 2012). In all, MFRM identified 28 misfits, which were re-marked by the researcher and coordinator.

**Development in Rater-Assigned Marks**
A Factor-of-Curves latent growth model (LGM) was used to examine students’ development in Content, Language, and Organization over time. The slope coefficients of Content, Language, and Organization indicated that these scores grow rather rapidly from point one to point two in all writing skills (Duncan, Duncan, & Strychker, 2006). The growth gradually deceased from point two to point three although it had a positive trend.

**Coh-Metrix Data**
The pre-, mid-, and post-course scripts were subjected to the Coh-Metrix analysis, Version 3, and specific information for each script at word, sentential, and discourse level was recorded.

**Automatic Linear Modelling (ALM)**
ALM is a data-mining approach to identify the relationships underlying the raw data. The goal of ALM is to use independent or predictive variables to predict the dependent variable. In this study, the dependent variable was set to be students’ writing scores—which were validated by the MFRM. The independent variables were the vocabulary sophistication, lexical diversity, syntactic sophistication, and cohesion statistics yielded in the Coh-Metrix analysis.

The forward stepwise ALM analysis on the pre-, mid-, and post-course data showed that the predictive power of computer-generated Coh-Metrix coefficients reduced over time. Ten (10) Coh-Metrix indices such as paragraph length, connectives, text readability, and hypernymy for verbs were able to explain 29.3% of the variance observed in the pre-Course data (Adjusted $R^2 = .293$).

However, none of these variables except text readability emerged in the Mid-Course data analysis. The ALM analysis on the Mid-Course data showed that 10 Coh-Metrix indices such as additive connectives and text readability explained 13.3% of variance (Adjusted $R^2 = .133$), leaving a big amount of the variance unexplained. Finally, the ALM analysis on the post-course data showed that 9.6% of the variance observed in the post-course data was explained by four Coh-Metrix indices such as hypernymy and syntactic simplicity (Adjusted $R^2 = .096$).

**Conclusion**
This study set out to investigate the predictive power of computer-generated Coh-Metrix indices over time. It was found that the power of these linguistic features dropped throughout the educational program, although they were still capable of predicting students’ paragraph writing proficiency by the end of the course. The findings are likely due to the nature of the Coh-Metrix indices. They have been developed on the basis of patterns in corpora in academic and informational texts. These corpora, however, do not reflect growth patterns of writers, specifically L2 writers. Therefore, although previous research has found the Coh-Metrix indices useful in predicting the observed variance in data, they may not be used for tracking L2 students’ growth.

To our knowledge, this is the first study which examines the predictive power of the Coh-Metrix indices, and therefore the findings should be further studied in future. The present study used lengthy paragraphs as units of investigation. Future research can use lengthier units of discourse such as essay to examine the predictive power of these indices over time.
References


3D Lighting Courseware: Igniting Student’s Creativity Through Virtual Lighting Worlds

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Keywords: Learner-centered-learning, Virtual Worlds, Interactivity, Technology Enhanced Learning, Online

EXTENDED ABSTRACT

Background: How Lighting Used to be Taught in Production Modules in Film and Media Studies, Ngee Ann Polytechnic

As lighting is an essential part of film, TV and video production, students were taught lighting in classes with bulky big lights and cramp studio spaces. In addition to this, there are never enough resources as lights are expensive and limited. Therefore, not all students got a chance to physically manipulate the lights and gain a good understanding of this foundation craft. Furthermore, when the students got on set, they would waste time setting up the lights because of their lack of understanding and preparation. The student’s learning was further limited by time constraints and they could only understand basic three-point lighting or lighting for illumination. They did not understand further complex forms of lighting such as lighting for mood and genre. For the above reasons, the use of virtual learning spaces was an ideal solution because it would provide students with the opportunity to learn to set up the lights even if they are by themselves; it would give them the opportunity to experiment with different types of lights and create the mood, which they were not able to learn in the studio.

Literature Review

During the past few years, higher education has ventured into 3D immersive virtual worlds in order to simulate scenarios for more interactive and engaging learning. The most well known virtual world is probably Second Life, where the user can create their own avatars and interact in a variety of environments.

The aim of this paper is to demonstrate that developing the appropriate a 3D immersive virtual learning environment and online simulated scenarios in learning can be extremely beneficial for the students’ learning. According to a paper called “A taxonomy of virtual worlds usage in education”, the authors state that “by developing scenarios which involve group work activities, educators can help learners benefit from the strengths or interests of other team members and ultimately develop their own skills and confidence levels. Computer games can encourage learners to be interactive and allow for discussion based on game planning and strategy, as well as increasing student confidence.” (Duncan, Miller & Jiang, 2012).
Furthermore. Savin-Baden (2011, p7) highlights that virtual worlds are useful in higher education because the experimentation can occur in ways that are not possible in real life. In addition to this, it can create trust and increase the engagement in learning. Finally, it offers a possibility of role-play and the activities tend not to have real life consequences.

Another concept useful for this paper is called the “Online simulated scenarios in learning”. As stated by the Saskatoon public schools, “A simulation is a form of experiential learning. Simulations are instructional scenarios where the learner is placed in a "world" defined by the teacher. They represent a reality within which students interact. The teacher controls the parameters of this "world" and uses it to achieve the desired instructional results. Simulations are in way, a lab experiment where the students themselves are the test subjects. They experience the reality of the scenario and gather meaning from it.” (n.d., 2013)

Authentic activities in online learning environments have shown to have many benefits. In the paper “Patterns of engagement in authentic online learning environments”, the authors state that instead of academic, decontextualised exercise, online simulated scenarios have shown that “students become immersed in problem solving within realistic situations resembling the contexts where the knowledge they are learning can be realistically applied.” (Herrington, Oliver & Reeves, 2003).

Based on the writings on 3D immersive virtual worlds and the online simulated scenarios in learning, it is evident that students would benefit from these new learning tools as long as it is well conceived for their learning needs.

**What is the 3D Lighting Courseware? Scope and Key Strengths**

This “3D lighting courseware: lighting for different genres” is a unique tool conceptualized, developed and designed by lecturers from the Ngee Ann Polytechnic’s School of Film & Media Studies, that simulates a virtual lighting world that enable the student to create a variety of lighting scenarios in relation to a particular genre.

This 3D lighting courseware is used in 3 different diplomas (Film, Sound & Video, Mass Communications and in Digital Visual Effects) and by 270 students. The courseware allows the student to select different locations, place avatars in the virtual world, select and manipulate the height and angle of the lights. Students can access the camera and lighting control panel to manipulate different lighting effects, shot size and angles.

The key strengths of this courseware are that it allows the students to experiment the concept of lighting without physically borrowing real lights in a real setting. The courseware also helps to solve the limitation of resources of physical lights where not every student can borrow and experiment with lights; it allows all students to experiment with lights in the virtual world. In terms of learning experience, the students have a deeper understanding in lighting concepts, not only in terms of illumination but also in terms of mood for genres. Besides, they can experiment with different virtual sets, which the students may not have the ability to experiment in real life.
Technologies and Strategies for Mobile and Ubiquitous Learning

The 3D lighting courseware involves the development of immersive and innovative virtual learning materials: the courseware is easy to use, unique (as it does not exist anywhere else.) and it encourages learner-centered learning by the use of online simulated environment and scenarios. In addition to this, the courseware is portable and the learning can take place at any time and any place.

It adopts technology together with effective teaching and learning strategies to enhance students’ learning as the courseware assists in the understanding of lighting which is beneficial not only for the modules but for the courses.

The 3D lighting courseware promotes thinking, self-directed learning, use of formative feedback and developmental feedback by allowing the students to work together in peers, discussing their outcomes and approach, and receiving feedback from lecturer.

Feedback

Comments by Students

According to the student survey, 100% of the student polled agreed that this courseware is unique and innovative.

Many students also commented that the simulated scenarios helped them understand concepts of lighting and it allows them to anticipate set-up and lighting on set. As explained by Herrington et al., (2003), the authentic activities kept them engaged, as they were able to visualize what would happen on set. More importantly, our research shows that they were able to creatively design lighting for their films better than if they were only taught in class.

Beyond basic illumination, students were able to learn beyond what was taught in class. A student commented: “I have learnt about the various angles that the light shines through and how it can help to create specific moods. Thus, it enables us to have a clear direction when creating lighting for my project”.

Another student shared that he has: “learnt how to play with lighting setups that let me create shadows and frame my characters in new ways, something that would have taken a lot of manual labor and time if I experimented with actual equipment in real life. On top of that, I can change the time of the day, environment and characters through the software so that's really efficient and helpful.”

Comments by Staff

As part of our research and feedback mechanism, we also surveyed the lecturers from the School of Film & Media Studies on their views about the 3D lighting courseware. One lecturer observed that: “For the student, the courseware allows them the freedom to do what they want on their own time to discover what they can do right but more importantly, what they can do wrong, without too a real impact to other students, resources or equipment. As such, it makes them think more about their actions and learn through their own mistakes or successes.” Another lecturer added that: “One of the challenges involved in Location Video Production is the need to cover a lot of technical subject matter in a short time. This software will help in acclimating students to the demands and processes of lighting”.

Conclusion

The 3D lighting courseware is an innovative 3D immersive virtual learning environment which provides online simulated scenarios specially designed for Film & Media students. It allows the students to learn at their own pace in a virtual world; control their learning experience at their own time and in their preferred space; it allows them to experiment with lighting, camera, angles and more importantly learn lighting at a deeper level: they can design lighting set-ups instead of just illuminating a set. It is a technological tool that helps to enhance the students’ knowledge and heightens their overall learning experience.

Acknowledgements: Ngee Ann Polytechnic, Teaching and Learning Centre and Film & Media Studies staff Adrian Lim, Lecturer, School of Film & Media Studies, Ngee Ann Polytechnic Leonard Yip, Senior Lecturer, School of Film & Media Studies, Ngee Ann Polytechnic Shirley Asodra Williams, Director, Teaching and Learning Centre Tan Hui Leng, Teaching and Learning Center

References:

Effects of Computer Role-playing Games Usage toward Thai Language Attitudes of Thai Muslim Students in Three Southern Border Provinces of Thailand

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Keywords: Computer Role-Playing Games; Attitudes; Thai Language.

EXTENDED ABSTRACT

This report is a part of research that aims to reinforce the positive attitude toward Thai language of students in three southern border provinces of Thailand. Most Muslim people in three provinces of Thailand always communicate with Malayu–Patani (dialect) in daily life. Most of them do not want to communicate using the Thai language because they do not want to lose their identity. Furthermore, from attitude test with Thai Muslim students we found that they have a negative attitude towards the Thai language. However, they have to study the Thai language and other courses in Thai. These are their obstacles to using the Thai language because they are illiterate in Thai and their achievements are at very low level. The ways to solve these problems are document synthesis and experts in-depth interview. The findings are ARRS Principle Framework and the Computer Role-Playing Game model which is the tool of research. All details of these findings are proposed below.

ARRS Principle (Attention, Relevance, Re-behavior and Satisfaction)

This principle is synthesized from the ARCS model; social learning theory and attitude change process as shown in Figure 1. It was considered by game experts that it is appropriate and useful to reinforce positive attitude towards the Thai language at high level. Four components of the principle are defined as these meaning; A=Attention is a step to encourage students to pay attention at the attitude object with interesting media; R=Relevance is the activity that students were engaged in. The activity was set up for giving the facts and all detail of attitude object. Moreover, it should relate to their way of life, their social and their age; R=Re-behavior means students’ expression by urging them to behave the positive side towards the attitude object and putting them perpetually on situation that is related to the attitude object or using the role model for their imitation; and S=Satisfaction was defined as students’ emotion such as amusement, challenge, pleasure and accomplishment. These things satisfy to students and reinforce them to the positive attitude constantly. It is started with Attention or the others, depending on the situations and participants. Moreover, it is useful for both classroom learning and E-learning and useful for any attitude object because it emphasizes the theory and process of attitude change that can motivate the positive attitude of students well.

Computer Role - Playing Game model (CRPG model)

The finding of an appropriate model to reinforce positive attitude toward Thai language is the computer role–playing game model. The computer role–playing game consists of 7 elements such as content and story, character, activity, interface, environment, resource, rule and regulation. These
elements are synthesized from the document and evaluated by game experts that are appropriate at high level. The CRPG model is blended from 7 elements of the computer role–playing game and 4 components of ARRS principle as shown in Figure 2. Game experts considered that it is appropriate to reinforce positive attitude towards the Thai language at high level. This model will be developed as a tool of research that will study the effects of computer role–playing game usage towards the Thai language on Thai Muslim students’ in three southern border provinces of Thailand after utilizing in the next part.

![Figure 1: ARRS Principle Framework](image1)

![Figure 2: Computer Role-Playing Game model](image2)
The CRPG model is also useful for any attitude objects by changing the details in each element of the computer role-playing game to appropriate attitude goals or objective. The computer role-playing game is a good media which allows students to take a part of imaginary experience that they gain better understanding of situation from another perspective. It persuades and engages students to the attitude object insensibly. When the computer role–playing game is blended in ARRS principle, it becomes a stronger tool to encourage students to behave positively towards the attitude object. However, all 7 elements should be designed properly for the participants.

Acknowledgement

The researcher thanks the financial support from the National Research Council of Thailand (NRCT).

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Reflections of an Instructor on the Use of Turnitin to Manage Plagiarism in Large Classes

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Keywords: Plagiarism; Academic Integrity; Turnitin; Large Classes.

EXTENDED ABSTRACT

Introduction
Detection of plagiarism in classes with enrolments of 400 to 800 students is a challenge. It is extremely difficult to spot submitted answers that were directly copied from other sources, especially internet websites, but it is almost impossible to manually detect answers that were copied from each other. As such, the plagiarism detection software Turnitin was used to manage plagiarism in large classes of two different courses that were offered at the National University of Singapore (NUS). One of the courses typically had about 700 to 800 enrolled students in a particular semester; while the other course had an enrolment of about 400 to 500 students per semester. In this abstract, the author, who is the primary instructor of both courses with large enrolments, presents his thoughts and reflections on the use of Turnitin to manage plagiarism in large classes.

Courses Involved
The two courses involved were LSM1301 “General Biology” and LSM1401 “Fundamentals of Biochemistry”. The LSM1301 course has about 700 to 800 students in Semesters 1 of the NUS academic year. The course is a non-major Biology course that is offered to anyone who does not have a pass in Biology at the GCE A-Level. The course is also read as a bridging course by students intending to major in the Life Sciences but do not have the prerequisite pass in Biology at the A-Level.

The LSM1401 course is offered to students who are majoring in Bioengineering, Chemical Engineering, Chemistry, Engineering Science, Environmental Engineering, and Pharmacy. The course has about 400 to 500 students in Semesters 2 of the academic year. More than 90% of those who are reading the course in Semester 2 are Engineering Science, Chemistry, and Pharmacy students. Every student taking the course must have fulfilled the prerequisite of a pass in Chemistry at the A-Level or its equivalent.

Reminders and Repercussions
All submissions by the students for the assignments of both the LSM1301 and LSM1401 courses were in soft copy format and had to be uploaded to the university’s custom-built learning management system called the Integrated Virtual Learning Environment (IVLE). The students were informed that the scripts that they would be submitting for the assignments would subsequently be uploaded to the Turnitin website for a plagiarism check. As such, they were warned against plagiarising and the severe penalties for committing plagiarism were also made known to the students. These were communicated during the first lectures of every semester. Furthermore, reminders were also included in every assignment.

Additionally, the students were directed to the university’s online course on Academic Culture (URL: http://emodule.nus.edu.sg/ac/) and the section on plagiarism was highlighted to them. The
online course explains what constitutes plagiarism and what does not. Using role play exercises, various scenarios would be presented to those accessing the online course. Furthermore, actual case studies would also be put forth and participants of the online course would be invited to make judgement calls on whether each of the cases was an example of plagiarism or not before an explanation was given.

Despite all the efforts expended to explain what plagiarism is, and to remind and warn against it, plagiarism persisted. In one particular instance, there were as many as 70 cases of plagiarism per assignment for the LSM1401 class, which had an enrolment of 440 students that semester.

**Real Examples**

Instead of merely directing students to the Academic Culture online course, brief explanations on what constitutes plagiarism were added to the discussion on plagiarism during the first lectures of both courses. Guidelines were provided on very practical steps that each student should take to prevent plagiarism. An example is provided in Figure 1:

![Figure 1: Example of Guidelines Communicated to Students on Plagiarism](image)

Samples of plagiarised work by former students of both the LSM1301 and LSM1401 courses were also furnished to the students during the first lectures. To protect the privacy of former students, information that could lead to the identification of owners of the plagiarised samples were removed.

With the addition of practical tips and real examples of plagiarised work by students who had read the courses in the previous semesters, there was a reduction in the number of plagiarism cases. Hence, when these additional information were presented, there were about 10 to 15 cases per assignment for the LSM1301 class, which had an enrolment of 680 students that semester.

**Revised Reporting Regulation**

Prior to 2008, all plagiarism cases were dealt with by the respective instructors of the courses. Most cases were not reported to the university’s central administration as the majority of students caught plagiarising in one assignment would not resort to plagiarism again in subsequent assignments of the same course. However, it was possible for a student to plagiarise again in another course taught by a different instructor and still not be reported to the university’s central administration on the basis of being a ‘first-time offender’.
Therefore, in 2008, a new regulation was introduced which required all plagiarism cases to be reported to the Dean’s Offices of the respective faculties or schools. This was also announced to students of both the LSM1301 and LSM1401 courses, and seemed to be an effective deterrent as the number of cases has since been reduced to only a handful per course per semester.

**Redesigned IVLE Interface for Plagiarism Detection**

From 2011, the university’s IVLE portal was redesigned to allow for a direct uploading of submitted scripts by students for plagiarism detection by Turnitin. This integration of Turnitin with the IVLE had facilitated a seamless manner for the students to submit their own scripts for plagiarism checks first before the submission deadlines of the assignments. If a student finds that his/her answers returned a high similarity index, he/she could make the necessary changes and resubmit a revised script, which could also be uploaded for detection by Turnitin again. The process could be repeated for as many times as the student wishes until he/she is satisfied with the answers, as long as it is within the deadline of the assignment.

Although the option of allowing students to self-check their answers for plagiarism with Turnitin is not novel, it was a bothersome process that involved multiple steps. These included the need to register the whole class with Turnitin that required the students’ e-mail addresses. Since it is not unusual for individuals to have more than one e-mail address, there were many students who could not recall which e-mail address they had used to register with Turnitin. To complicate matters further, there were also cases when the e-mails from Turnitin ended up in the junk mail folders of the e-mail accounts.

Therefore, the integration of Turnitin with the IVLE was a welcome change which ‘returned’ the responsibility of checking for plagiarism to the students, instead of the instructor having to ‘police’ for the occurrence of plagiarism. To compel students to take charge of ensuring that their answers were not plagiarised, they were informed that scripts that were not submitted for plagiarism checks would not be marked. When this rather draconian regulation was implemented, the number of plagiarism cases was reduced to zero.

**Final Reflections**

Superficially, it appears that the menace of plagiarism had been eliminated. However, upon more careful consideration, the limitations of Turnitin must be taken into account. While the database that Turnitin has is extensive, it is nevertheless incomplete (Buckley and Cowap, 2013). Furthermore, one must be cognizant of the fact that Turnitin does not detect the occurrence of plagiarism *per se*. What the software does is to detect similarities of a piece of work against the database. The instructor will then have to make a judgement call on whether the highlighted similarities constitute plagiarism or not. In the case of a large class, at what percentage of the similarity score should the instructor decide to examine and decide if the highlighted texts have been plagiarised or not, as it would neither be possible nor practical to examine every script that was highlighted.

More importantly, one has to ask whether the use of Turnitin has resulted in better writing by the students. Studies have shown that this is not necessary the case (Biggam and McCann, 2010) as students were able to ‘get around’ Turnitin. Finally, although it is still not an issue in Singapore at this point in time, in the long term, the question of whether it is ethical to impose the use of Turnitin upon the students cannot be avoided (Vanacker, 2011).

**Acknowledgement:** The author would like to thank the different fellow lecturers of both the LSM1301 and LSM1401 courses for their input and contributions on managing plagiarism when they were co-teaching with him.
References


Examining Digital Storytelling In Terms of the 21st Century Skills Development

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Keywords: Digital Storytelling; 21\textsuperscript{st} Century Skills; Information, Media and Technology Skills; Life and Career Skills; Learning and Innovation Skills.

Introduction
Systematic application of technology into educational environments requires the integration of technology into curricula. This is especially in today’s, world, where it is important to integrate technology effectively into educational environments rather than using it in instructional processes. Technology integration is defined as a curriculum which actively helps students form their own meaningful knowledge and which use activities involving more interdisciplinary project-based learning (Jonassen, Peck and Wilson, 1999). Integration of technology into a curriculum requires the use of technology as a tool in interdisciplinary environments or in teaching the content of that curriculum effectively (Harris, 2005).

In order to help students structure their knowledge, they should be encouraged to participate actively in learning via information and communications technology (ICT) tools (Jonassen and Carr, 2000). According to Strommen and Lincoln (1992), what is important is not the type of technology to be used in classroom, allowing students’ active participation in the learning environment, but the way to use that technology. Especially in learning environments, appropriate use of ICT tools contributes to students’ development of 21\textsuperscript{st} century skills (Robin, 2007; Sadik, 2008). There are a number of technology integration approaches which help integrate technology into educational environments and which allow students to acquire the 21\textsuperscript{st}-century skills. One of these approaches is the digital storytelling approach.

Digital storytelling refers to the combination of certain texts, graphics, audios, videos and music in the digital environment. Digital storytelling is basically a process in which students can use technology as designers. In this process, students can interpret their ideas in line with their experiences and create their own narrative language thanks to technological facilities (Barret, 2006; Tendero, 2006). The digital storytelling system, in which students take part as designers, establishes an entertaining learning environment and provides students with an opportunity to create a visual narrative language using the technology (Kindborg, 2001).

Purpose
The purpose of this study was to determine elementary school sixth-grade students’ views about whether digital storytelling activities develop their 21\textsuperscript{st} century skills or not.

Method
In the study, the single survey model was used as the research method.

Participants
The participants of the study were 45 sixth-grade students attending a private elementary school.
**Data Collection Tool**
In the study, in order to determine whether digital storytelling activities developed students’ 21st century skills or not, the 11-item “Digital Storytelling Questionnaire for 21st Century skills” developed by the researcher in line with the indicators suggested by the Partnership for 21st Century Skills was used. The questionnaire was made up of three sub-dimensions: learning and innovation skills, information, media and technology skills, and life and career skills. In the addition, it was a five-point Likert-type questionnaire including a rating scale of “I totally disagree”, “I disagree”, “I am neutral”, “I agree” and “I totally agree”.

**Research Process**
The present study covers the evaluation phase of an application carried out based on case study. Prior to the application, the related literature was reviewed, and a curriculum was prepared for eight student teachers from the department of Computer Education and Instructional Technologies (CEIT) regarding digital storytelling.

In the Fall Term of the academic year of 2012-2013, a training of four course hours on storytelling was given to eight CEIT student teachers and they watched sample digital storytelling videos. Following the training session, the student teachers created their own digital stories and uploaded them onto Youtube ([www.youtube.com](http://www.youtube.com)).

The CEIT student teachers taking training on digital storytelling carried out digital storytelling activities with 45 sixth-grade students from three different classes of a private elementary school in the Spring Term of the academic year of 2012-2013.

In order for the students to carry out the digital storytelling activities, a web page with the domain name of [www.dijitaloykuleme.com](http://www.dijitaloykuleme.com) was designed by the researcher. In addition, in order for the students to organize their digital stories, the web page of [www.wevideo.com](http://www.wevideo.com), an online video editing program was used.

The students were given training on digital storytelling by the CEIT student teachers. Following this, they carried out digital storytelling activities with the help of the CEIT student teachers.

The digital storytelling activities carried out in the class environment started with a scenario created by the students regarding a certain subject they determined. The students sharing their scenarios on the web-page of [www.dijitaloykuleme.com](http://www.dijitaloykuleme.com) received feedback from other students regarding their scenarios and finalized these scenarios. Following this, the students searched the Internet and other online environments for multimedia elements as photos, videos, audios and graphics they would use in their digital stories or created them on their own. Finally, the students organized these multimedia elements via the web page of [www.wevideo.com](http://www.wevideo.com), an online video editing program, created their short films of 2 to 3 minutes each and shared them on Youtube ([www.youtube.com](http://www.youtube.com)) and the website [www.dijitaloykuleme.com](http://www.dijitaloykuleme.com).

In order to find out whether the digital storytelling activities developed the participating students’ 21st-century skills or not, the questionnaire developed by the research was applied to 45 students who completed the digital storytelling activities.

**Findings**
The data collected via the questionnaire were analyzed using descriptive statistical methods, and the means and standard deviations obtained regarding the sub-dimensions of the questionnaire are presented in Table 1.
Table 1. Means and Standard Deviations

<table>
<thead>
<tr>
<th>21st Skills</th>
<th>N</th>
<th>( \bar{X} )</th>
<th>Sd</th>
</tr>
</thead>
<tbody>
<tr>
<td>Learning and Innovation Skills</td>
<td>45</td>
<td>3.55</td>
<td>.830</td>
</tr>
<tr>
<td>Information, media and technology skills</td>
<td>45</td>
<td>3.84</td>
<td>.791</td>
</tr>
<tr>
<td>Life and career skills</td>
<td>45</td>
<td>3.57</td>
<td>.881</td>
</tr>
<tr>
<td>Overall mean</td>
<td>45</td>
<td>3.61</td>
<td>.791</td>
</tr>
</tbody>
</table>

As can be seen in Table 1, the students believed the digital storytelling activities developed their skills in “learning and innovation”, “information, media and technology” and “life and career”. The view that the students agreed most was that the digital storytelling activities developed their skills in “information, media and technology” (\( \bar{X} = 3.84 \)).

When the overall mean given in Table 1 was examined, it was seen that the elementary school sixth grade students believed the digital storytelling activities developed their 21st century skills (\( \bar{X} = 3.61 \)).

Conclusion

The elementary school sixth grade students held the belief that the digital storytelling activities contributed to the development of their 21st century skills. In their study, Renda and Sprouse (2010) reported that digital storytelling activities developed students’ technology use skills as well as their 21st-century skills. In one study carried out with teachers, Robin (2007) found out that digital storytelling developed the teachers’ technology skills. In another study conducted with teachers and students from two private schools, Sadik (2008) investigated the influence of digital storytelling activities on students’ learning. According to the findings obtained, students’ use of creative and motivating technological tools in digital storytelling activities increased their learning experiences and developed their 21st-century skills.

References


ICT-Based Instruction In A Constructivist Classroom

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EXTENDED ABSTRACT

The study determined the Information and Communication Technology (ICT) based instructional materials produced and utilized by the public high school teachers. It is noted that new technologies increase teachers’ training needs in order to improve instruction; it is the aim of this study to determine specific needs to promote constructivism in teaching. This study identified the factors for successful or non-successful implementations of ICT integration in high school curriculum. Researcher-made evaluation instruments were developed to analyze the degree to which the learning designs have potential to foster high quality learning in secondary public schools. Extensive reading on related researches was done for validating and establishing the reliability of the instruments. Stratified random sampling was adopted in this quail-quantitative study. ICT can provide more flexible and effective ways for professional development for teachers and administrators and connect them to the global community. Sample ICT-based evaluation in selected learning areas were packaged for the improvement of the performance of the learners. The study concluded that ICT integration may lead to techno-enthusiast learners. Techno-constructivist teaching can be adopted by the secondary school teachers for the development of student learning.
Student Attitudes towards Mobile Learning – a preliminary survey

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Keywords: Technology Enhanced Learning; Education Research; Education; mobile learning; student surveys

This project builds on recent developments in ‘mobile learning’, and aims to develop a software application (which we label ‘an App’ in this paper) operating on ‘Smartphones’ (and their equivalents), to assist both staff and students in the learning process. We will design the App to integrate with the existing University’s existing LMS. The App will not replace the Learning Management System (LMS) but rather complement and enhance its useability.

This paper reports on the preliminary results from Phase One of the larger project. Phase One involves ascertaining student responses to mobile learning through an online survey. The survey was administered to Australian undergraduate students at a regional and an outer urban campus of Monash University in Victoria and secured 70 responses. The survey included opportunities for extended written feedback as well as a series of questions about student preference for, and possible use of, mobile learning. In keeping with the student-centred approach to design, Phase Two of the project will involve a deeper engagement with students through the formation of a student users’ group. Phase Three will involve the design and trial of the App, while Phase Four will involve implementation and fielding testing in a series of courses across diverse disciplines.

Higher education and mobile learning

While the survey focuses on the Gippsland and Berwick campuses of Monash University in Australia, many of the course offerings and student demographics at these campuses make the research relevant to the Higher Education (HE) sector more broadly. For example, the Gippsland campus includes 8 of the 10 Monash Faculties and has a broad educational profile. It also offers courses in both on and off campus mode.

Furthermore, the challenge to recruit and retain low Socio Economic Status (SES) students also has sector-wide relevance, particularly at the Gippsland campus where 27% of all students are from low SES backgrounds, which is above the sector average of 15% (See Monash University, OPQ, 2012). If the HE sector is to meet targets to increase enrolments and participation, new and innovative modes of engaging students, including low SES and geographically dispersed cohorts, need to be assessed and adopted where they are found to be successful. Yet the benefits of the digital age are spread unevenly across the potential student demographic (see Graham, 2011). This project will develop a working App, and explore ways to overcome the possible barriers of access and implementation.

In terms of the literature on mobile learning, the project is based on E-learning and Mobile learning theory which focuses on the power of the ‘anytime, anywhere’ concept. As Motiwalla (2007) among others, notes, mobile learning can free the learner from the physical constraints of the class room, enabling personalised, student-centred, and flexible learning. We also follow Alonso et al (2005) in seeing mobile learning features as integrating with and enhancing existing forms of learning; what Alonso and many others have termed ‘blended learning’. The collaborative design of the proposed App using input from prospective student users is also central to a student-centred approach.

E-learning or Mobile learning presents a range of opportunities, but there are also potential challenges. The demographics of Monash University’s Gippsland campus indicates that students are from diverse backgrounds with varying levels of access and familiarity with Smartphones. They are also culturally
diverse and some research (cited by Gasparini (2012) for example) has highlighted the cultural bias inherent in instructional design and in online learning environments. Other work has explored the effects of gender, income and ethnicity on mobile phone ownership and usage (Junco et al, 2010). There are also issues in the cost of Smartphone plans and the inherent limitations of the device such as the small screen size and limited battery life (Molnar and Muntean, 2012). To that end we emphasize that we do not envisage using multimedia rich content but prefer personalised text-based information and interaction. Previous studies have shown that cost pressures are a significant barrier to participation in mobile learning, though Molnar and Muntean offer possible technical fixes which may reduce overall cost which can be investigated.

**Method**
An online survey was designed to ascertain the initial response of students to the possibility of mobile learning. We focused on student demographic information, their past experience (if any) with this form of learning, and their perceptions of the value of particular features of mobile learning. We draw upon Hetherington’s summary (Hetherington, 2009) to identify four areas of student interaction and engagement. The questions were designed to capture the possibilities and potential of each of these areas:

1. **Orientation and Engagement** (reminder texts, pushed and/or pulled information, etc).
2. **On track assignment and event reminders/campus room tracking**: (reminder texts for assignment deadlines, posting of new learning material, personalising nature of interaction, integration with timetable, etc)
3. **Smartphone quizzes/interactive learning/student networking**: (higher levels of interactivity including online quizzes, opportunities to network, in-class interaction, etc)
4. **Student feedback and evaluation**: (facility to send feedback student use of, and reaction to, the app, etc)

**Results**
The final presentation will provide more detailed analysis but for the purposes of this abstract we can offer an overview. Of the 70 responses received for the online survey there was a roughly even spread of students across 1st, 2nd and 3rd year levels. Some 76% of the sample was female which may come from the dominance of students from arts and social sciences (who made up 59% of the sample) and from nursing (16% of the sample). There was also a roughly even spread of students who were studying mostly on campus (54%) and mostly off campus (43%), while 70% were full time and 30% part time. 97% of those surveyed (i.e. all but 2) owned or had ‘regular access’ to a mobile device, which we defined as ‘a phone, ipad or mini-computer that is connected to the internet’). 73% of the sample had prior experience with mobile learning. Of those, 80% recorded that experience at University, 24% at School and 13% at TAFE (the Technical and Further Education sector in Australia).

The general response of students to the possibility of mobile learning was very positive. When asked to consider ‘how important do you think a mobile device could be in your University studies’ 47% said it was ‘crucial’ or ‘very important’, while 47% said it was ‘moderately important’ or ‘somewhat important’. There were also clear preferences in terms of the general areas of focus for a possible App. Using the App to help identify rooms and navigate campus was marked as ‘crucial’ or ‘very useful’ by 65%. 69% of students thought it was ‘crucial’ or ‘very useful’ to receive regular quizzes on their mobile device. Students preferred the possibility of using the App to access lecture notes and lecture recordings (70% ‘crucial’ or ‘very important’).

As expected some areas did not receive such enthusiastic support from students, perhaps because they may be more difficult to imagine compared to more straightforward forms of engagement. Using the App to assist in making connections with other students (in study groups) for example was marked as ‘crucial’ or ‘very important’ by only 39%. Employing the App to encourage in-class interaction was assessed by only 31% of students as ‘crucial’ or ‘very important’.
In terms of the nature of the interaction, and the possible barriers, students also had some interesting observations. The idea of ‘personalised’ interaction i.e. tailoring the App was assessed as ‘crucial’ or ‘very important’ by 73%. The cost of downloads and phone plans was seen by 29% of the sample as a ‘crucial’ or ‘very important’ issue ‘in reducing their participation in mobile learning’. This finding relates to the equity issues inherent in the design and implementation of mobile learning but given the low SES profile of the campus cohorts this figure was not as high as we might have expected. Perhaps the best overall summary of the results is captured by the final question which asked students to think ‘about the possible benefits of mobile learning’, and specifically asked ‘how would you feel about the introduction of this form of learning to complement your University studies’. A very high 69% of the sample thought this was ‘absolutely crucial’ or would ‘strongly support’ this introduction, while 21% would ‘moderately support’, 5% were ‘slightly against’, and 5% were ‘strongly against’.

Conclusion
This survey provided useful base line data for the further development of the project. We were able to ascertain the general disposition of the student group (based on this sample). The results suggested a strongly favourable disposition towards the possible benefits of mobile learning. There were also clear preferences for certain forms of functionality such as easier access to content and tailoring communication to suit their needs. This work remains provisional at this point with more detailed assessment to follow. We also need to conduct a closer analysis of the some of the open-ended responses which could be and were made by respondents at key points. The base line data, together with some of this qualitative feedback, indicates that the general approach of ‘anytime, anywhere’ learning is appealing to students and that their views have a vital role to play in assisting the design phase of an effective learning App.

References


Poster Presentations

Technology Enhanced Learning in Medical School with Special Reference to Anatomy
by P Gopalakrishnakone
National University of Singapore

Touching Lives – Tokens, Tools and Transformation Technology and Teaching in the School of Health Sciences
by Chiew Hun Phang, Woan Ching Lam, Tina Soo, Michelle Geok Mui Koh, Kylie Lee Sung Tang and Ching Liang Chong
Ngee Ann Polytechnic

Understanding Teachers Problem Spaces for Idea-centered Classrooms in a Technology-infused Environment
by Teo Chew Lee
Ministry of Education

Examining the Psychometric Features of the Persian Computer-Assisted Language Learning Attitude Questionnaire
by Vahid Aryadoust, Parisa Mehran, and Mehrasa Alizadeh
National University of Singapore & Alzahra University

CoWs, Google and online possibilities: Creating Digital Posters to Enhance Student Engagement
by Roger Cook
Queensland University of Technology

Examining Technology Use Competencies of Administrators of Preschool Educational Institutions
by Mehmet Fatih Karacabey
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Facebook Addiction on Graduate and Undergraduate Students
by Huey-Wen Chou
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Visualization in Design and Technology Using a Software: From 2D to 3D
by Goh Bee Hua
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