Deakin Report
23 October – November 1, 2006
Associate Professor Mike Keppell

1. Introduction

Purpose of visit
This report summarises a visit by Associate Professor Mike Keppell from the Centre for Learning, Teaching and Technology (LTTC), Hong Kong Institute of Education to the Institute of Teaching and Learning at Deakin University from October 23 to November 1, 2006. The purpose of the first week of the visit was to evaluate the e-simulations developed by the Institute of Teaching and Learning and provide a report that outlined future strategies for enhancing the design, evaluation and research of the e-simulations. Mike attended the Institute of Teaching and Learning Advisory Board meeting and the Teaching and Learning Conference on the 30 and 31 October.

Discussions
During the visit, discussions were held with staff involved in the conceptualization, design, development and evaluation of the e-simulations. This report documents these discussions in the context of the evaluation. Discussions were undertaken with Dale Holt, Stephen Seagrave, Julian Pearce (Problem-based learning in Nursing), Ian Smissen (Deakin Studies Online (DSO)), Jacob Cybulski, David O'Brien, Glen McNolty, Ian Fox and Peter Lane. In addition, presentations by each of the academics who utilized the e-simulations in their academic teaching were observed at the Teaching and Learning Conference on the 30 and 31 October.

Goals of the report
This report will focus on the following areas:

- Evaluation of the existing five e-simulations
- Future directions and strategies for e-simulations at Deakin
- Research agenda
- Publication opportunities
- Summary

2. Evaluation of the existing five e-simulations

The evaluation involved an examination of each e-simulation, discussions with staff involved with the e-simulations and presentations by each of the academics who utilized the e-simulations in their academic teaching. The evaluation focussed on the use of the simulation within the teaching and learning context at Deakin.

The successful implementation of the Journalism (HOTcopy) simulation provided the impetus to develop five other simulations with a similar learning design (see

http://www.learningdesigns.uow.edu.au/. These comprised Information Systems (First Australian Bank ATM); Public Relations (Pressure Point); Law (Client View); Psychology (Mods & Rockers) and Criminology (Unreal Interviewing). These five projects were considered to be pilot implementations of simulations across different departments and disciplines. The following represents a brief evaluation of the educational design of each simulation.

First Australian Bank

This simulation provides an authentic environment for immersing students in an interaction with two bank employees about ATMs. A particular strength of the approach is the use of two staff members (Mary and Paul) who have very different perspectives in relation to ATMs. Mary examines the business side and has a macro-level perspective whereas Paul answers questions using information systems concepts familiar to the students. This is an excellent simulation for students who may often be focused on the detail of an information systems project without considering the interpersonal communication aspects. The scenario contains highly relevant questions which should provoke meaningful thought and discussion for the students.

The second version of the e-simulation should consider the use of a final transcript which lists the questions and answers asked by the students. In addition, from a visual design perspective the video-character needs enlarging whereas the document, questions and alert sections can be reduced.

The enthusiastic academic involved in the project has carefully integrated the simulation into his subject. This approach represents an excellent example which should be encouraged with other academic colleagues.

Pressure Point! Virtual Practice

This is an excellent time-based scenario that focuses on writing media releases that frame a situation. The use of a video spokesperson to introduce the simulation and to provide an overview to the task engages the user from the beginning of the e-simulation. The use of both audio/video and a written script is to be commended as it caters to a diverse range of learners. The ability to copy selected text to the student writing area provides an excellent means to assist the student in summarising the case. The alerts also prompt the student to consider important issues throughout the writing of their media release. This simulation devotes more screen real estate to the video-character and the workspace areas show an enhanced visual design. The automatic saving of the student notes also allows students to revisit their media release. Overall, this is an outstanding immersive simulation that will be highly engaging for students.

Client View.

The major purpose of this simulation is to encourage students to identify relevant and irrelevant information presented by clients to their accountant or solicitor. The major strength of the simulation is the progressive development of the interview through the first, second and third interview. Interview one sets the scene and interview two allows the user to select relevant questions, with interview three bringing closure to the

interview process. This progression provides a basis for encouraging students to listen and take notes throughout the interview.

The visual design could be modified in a future version to enlarge the video-character. The video of the client should be larger to allow the student to more easily identify their body language and facial expressions. It is also worth investigating the positioning of the transcript on the right hand side of the screen as the text can be distracting while viewing the scenario.

Mods and Rockers

The major purpose of this simulation is to encourage students to interview a practicing psychologist using a number of pre-selected questions. A major strength of this simulation is that it allows the student to choose 30 questions from 75 questions and then ask the same questions of three different psychologists. This allows the students to understand differences in professional practice of practicing psychologists. The overview questions provide a means to reinforce the task components and assures student understanding of the task that they need to complete.

As with some of the other simulations, the video-character needs to be enlarged for maximum benefit to the student. Enlarging the video will allow the student to perceive the body language and the facial expressions of the psychologist, which is an important aspect of the simulation.

Unreal Interviewing

This simulation examines the forensic interviewing of a five-year child. It is a sophisticated and engaging simulation that addresses a sensitive interviewing situation. The educational design and visual design of the simulation provide an engaging and immersive experience for the user. The ability to obtain evaluation of the question choice provides feedback to the student about how they should ask questions in forensic interviewing. A final transcript with question evaluation provides a further means of providing excellent feedback to students about the topic.

This is a brilliant simulation which represents a perfect application for e-simulations. This simulation could make a major difference to students studying in this area. The user has an emotional reaction to the forensic interviewing of the child which enhances the educational engagement and learning outcomes. The designers and developers should be applauded for this exceptional simulation. This simulation should be submitted to the ascilite awards in 2007.

Development issues

The video production and programming of the simulations is highly sophisticated. The graphic design of each component is excellent, although it may be useful to focus on the proportion of screen devoted to each component i.e. video-character and context, transcript or document area, alert area and questions area. Each simulation needs to devote more screen real estate to the video-character. The simulations focus on communication, body language, facial expressions and it is important to enlarge the

video-character to accentuate these aspects of the high quality video. In addition it would be useful to standardize the placement of the transcript on the right side of the screen to avoid distracting the viewing of the video for western learners who read from left to right. Long-term development of the simulations may consider different versions (with different sizes of video-characters) to account for low and high bandwidth networks. The allocated spaces on the graphic for the TV, monitor and telephone are too large and should be deemphasized.

The quality of the actors and video work is to be commended. The video production team have developed a successful means of obtaining the best results from the actors while at the same time capturing high-quality video for the simulations. The programming has undergone extensive research and development which has solved many issues in the programming of the simulations to allow rapid development and online delivery of the e-simulations. The use of the e-simulations in the online environment represents a unique niche for the Institute and the developments are at the leading edge. This work will benefit future developments of the e-simulations.

The rapid development of the simulations using a consistent learning design provides a foundation for the development of a number of further e-simulations across the University. The project team should continue to document the process for the e-simulations by utilizing a Wiki as a central collaborative environment for each project. This will enable the project team to update the project development on a regular basis.

3. Future directions and strategies for e-simulations at Deakin

Design

The design of the First Australian Bank, Client View, Mods and Rockers simulations should be modified as mentioned above by changing the proportion of screen real estate for each area, enlarging the video-character area to allow students to observe the subtle body language and facial expressions of the characters. PressurePoint and Unreal Interviewing represent exemplary simulations and should not require any modifications. This strategy will provide the Institute with a suite of five exemplary simulations that can be further showcased throughout the University and at international conferences.

Delivery

The delivery of online simulations should be fully explored as this will have major implications for your distance education students. The work being undertaken in this area is leading edge and online delivery represents an important area to focus attention on within the next 12 months. Once a system has been developed to update questions and deliver the simulation to areas where bandwidth is an issue, the simulations will represent a remarkable resource for enhancing student learning. The ability to deliver online simulations that enable the detection of bandwidth should provide an excellent means of delivering simulations to DE students. The concept of universal design considerations is also an excellent initiative in order to be inclusive and address diversity and individual differences. The Institute should be commended for this excellent initiative.

Strategic incorporation

After developing a successful learning design for the existing e-simulations, the next appropriate step is to develop the e-simulations as part of a broader University strategy. This strategic approach could begin with either the generic graduate attributes or discipline-specific attributes to develop several learning designs (see http://www.learningdesigns.uow.edu.au/). For example, one generic attribute of Deakin focuses on *appreciation of international perspectives in a global environment.* This may also allow the development of discipline-specific simulations which would provide the approach taken by the Institute of Teaching and Learning with an agenda that is constructively aligned with the strategic plan of the University. It would also further embed the creative talents of the Institute within the University context. This approach will also develop a sustainable approach for the development of e-simulations.

Another approach for expanding the use of e-simulations would be to focus on developing simulations for high priority areas where academics have identified learning issues. This would involve either a needs analysis with department heads or a focus group involving a number of academics from each department. In addition it may be worthwhile to identify learning issues where large numbers of students will benefit. An inter-disciplinary approach (e.g. problem-based learning with medical doctors and nurses) to the e-simulations will assist the uptake of the resources and benefits for students. This may also be linked to the graduate attributes.

It is important that targets be developed for development of additional e-simulations in the next 2-3 years. For instance, the Institute may consider the development of one simulation per department by the end of 2008 as well as university-wide simulations related to each of the graduate attributes.

Blended learning

Currently, the simulations appear to be self-instructional modules that students interact with on an individual basis. It would be beneficial to emphasise both the constructivist and social-constructivist approaches to student use of e-simulations. The Institute should be proactive in encouraging academics to use a blended learning approach where the simulation could be a trigger for face-to-face discussion or online discussion (Keppell, Au, Ma, & Chan, 2006). A useful way to categorize blended learning activities is to describe the level of learner engagement and learner control within the module. Oliver and Herrington (2001) suggest four categories which comprise: *information access, interactive learning, networked learning and materials development. Information access* conveys information to the individual learner. These types of resources provide easy access by students to the information or resources and the ability to review the content at anytime. *Interactive learning* increases the level of student engagement with the resources. In this instance the technology itself provides the feedback to the learner. Examples include: online tutorials, e-simulations and multimedia resources. *Networked learning* provides communication between students and teachers. Within a Learning Management System this may include: discussion forums, group tasks, reflective journals, online debates, online presentations and real-time chats. Communicative, collaborative

and cooperative activities are emphasized in this approach. *Materials development* emphasizes the development and presentation of products and artefacts. These can include: reports, concept maps, teaching practice journals, reflective journals, digital stories, presentations, e-portfolios, projects as well as photographs, video and audio projects. The artefacts and products can be further discussed in small-group and whole-class online discussions.

Assessment

It is important that the Institute explore how the simulations can be embedded by the academics into the *assessment* for each subject. This strategy will increase the value of the simulation within subjects at Deakin. Learning-oriented assessment may be a useful approach. Learning-oriented assessment explicitly highlights the aspects of assessment which impact on student learning (Keppell & Carless, 2006; Keppell, Au, & Ma, 2005).

Student development of e-simulations

It could also be worthwhile to encourage student development of e-simulations working in groups or individually. This student involvement in the development of the e-simulations would reinforce the learning outcomes by involving students in project-based learning through the design of their own e-simulations. These e-simulations could be reused by the academics for future classes. As an example, the Educational Technology Department at San Diego State University have developed an Encyclopedia of Educational Technology that relies on graduate students to update the website (See http://coe.sdsu.edu/eet/).

Dissemination of information

A website should be developed in order to showcase the simulations to the broader academic community. See the following website on authentic cases as an example: http://www.authentictasks.uow.edu.au/index.html

ascilite awards

The e-simulations should be submitted to the 2007 ascilite awards. In particular, the PressurePoint and Unreal Interviewing will provide good exposure for the Institute.

Evaluation

In parallel with the development of the e-simulations, the Institute needs to develop a comprehensive evaluation strategy for assuring quality of output, and obtaining data for research and publication. The following model by Reeves and Hedberg, 2003, p. 55 illustrates an appropriate approach for the Institute in relation to the e-simulations. In particular the Institute should focus on *effectiveness* and *impact evaluation* to foster a research agenda related to the e-simulations.

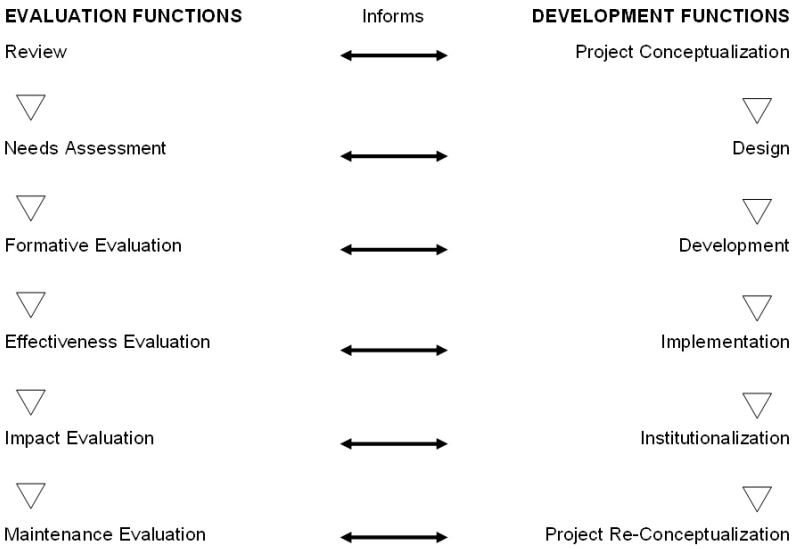

Figure 1: Evaluation Model of Reeves and Hedberg, 2003, p. 55

The review process is most important during the initial conceptualisation of the project and involves two major review activities: review of related literature in relation to the project and review of existing learning resources related to the proposed project. The purpose is to enable the team to be well-informed about all aspects of the proposed project.

The needs assessment is "one of the most widely underutilized evaluation functions in the process of developing interactive learning systems" (Reeves & Hedberg, 2003, p. 59). It examines: Learner analysis (e.g. target audience, characteristics, experience, attitude, etc); Job analysis (e.g. resources, constraints, culture of organization, development environment, delivery environment, application environment); Task analysis (e.g. cognitive, skill, psychomotor, attitudinal). It attempts to determine why the project is needed. Analysis and planning represent the major decision-making point of the project. See Figure 2 below.

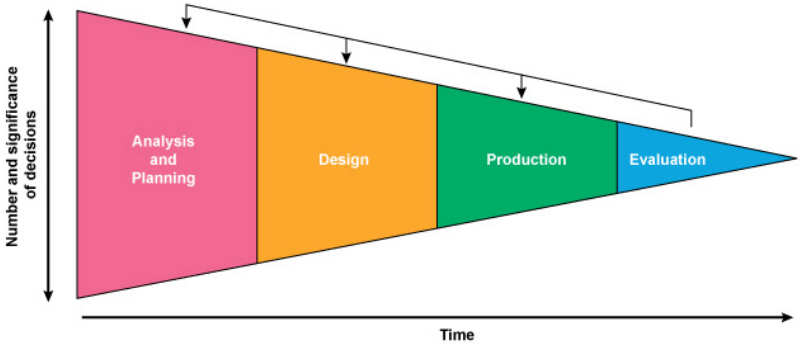

Figure 2: Decision-making funnel that illustrates the number and significance of the decisions in projects. Adapted from Strauss (1997), p. 5.

"The function of formative evaluation is perhaps the most important one in the entire process of developing interactive learning systems" (Reeves & Hedberg, 2003, p. 60). Formative evaluation often provides substantial information about the learning resource, and guides decisions about creating, debugging and enhancing a learning resource. Examples include: expert reviews, user observations, usability tests.

Effectiveness evaluation determines whether the learning resource achieves its objectives when implemented. Methods may include: Field tests, observations, interviews, performance assessment.

Impact evaluation "determines whether the knowledge, skills and attitudes learned in the context of instruction transfer to the intended context" (p. 62). This is perhaps the most challenging area of evaluation. It is also the area where the Institute needs to focus its attention in the evaluation of the e-simulations.

Maintenance evaluation examines the viability of the learning resource over time and includes document analysis, interviews, observations and automated data collection.

4. Research agenda

It is an appropriate time for the Institute to develop a comprehensive research agenda in relation to the e-simulations. This research agenda will provide a means to evaluate the effectiveness and impact of the e-simulations. It will also demonstrate the research work of the Institute and communicate your work to the international community. One approach would involve developing 1-3 publications for each simulation that you have designed in conjunction with the academics involved in the projects. The e-simulation research agenda needs to be a broader agenda to focus on transfer of knowledge and skills from the university setting to the professional setting.

Design-based research

Design-based research represents a potential approach for effectiveness and impact evaluation. Reeves (2000) suggested that many problems exist within the field of instructional technology/educational technology in relation to the quality and potential usefulness of research undertaken within the field. Educators have struggled with basic research which is seen to be theoretical and impractical and applied research which is practical but often fails to provide any impetus to the theoretical foundations of the area. Stokes (1997) in his seminal book examined the concepts of basic and applied research and suggested that they may provide an inadequate framework for research. He suggested that basic research "seeks to widen the understanding of a phenomena of a scientific field" (p. 7) and applied research is "directed toward some individual or group or societal need or use" (p. 8). A major difficulty with categorizing research as either basic or applied means that researchers need to make a choice between the two forms of research resulting in different camps of researchers and different funding agencies perpetuating the

concept of either a basic or practical research dichotomy. Stokes (1997) addressed this dichotomy by developing a heuristic illustrated as four quadrants. This heuristic represents not only a significant insight into the nature of research and what should be valued within society but also a model useful for the field of educational technology research and the research agenda for the e-simulations.

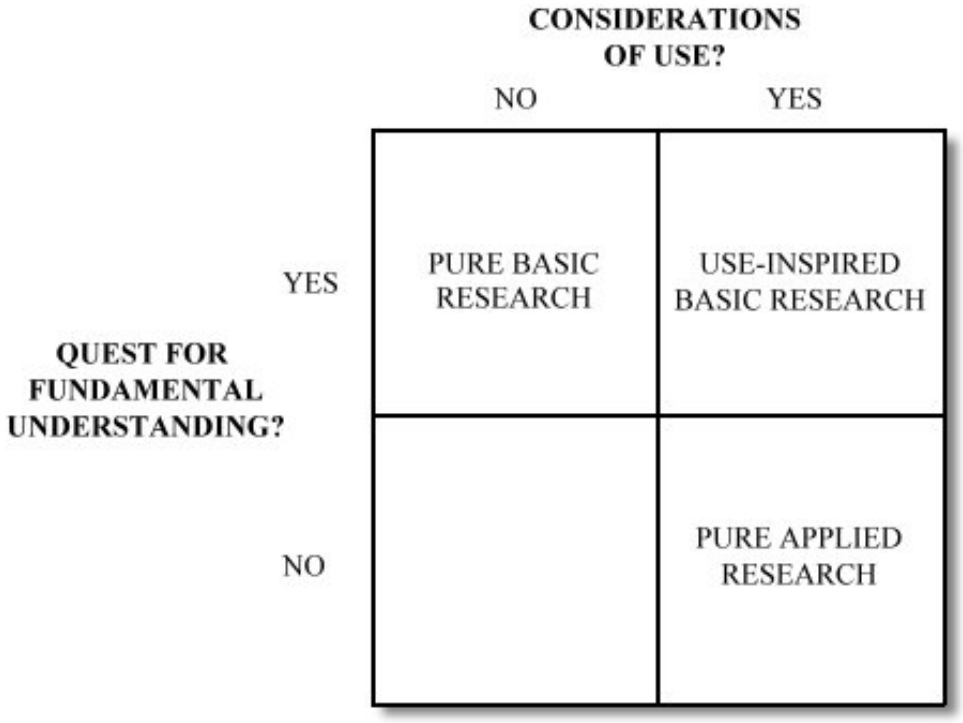

Figure 3: Quadrant Model of Scientific Research (Adapted from Stokes, 1997, p.73)

The top left quadrant is basic research "guided solely by the quest for understanding without thought of practical use" (Stokes, 1997, p. 73). The lower right quadrant includes research guided solely by applied goals without seeking a general understanding of the phenomena. The top-right quadrant "includes basic research that seeks to extend the frontiers of understanding but is also inspired by considerations of use" (p. 74). The quadrant labeled use-inspired basic research is also called Pasteur's quadrant, as he developed practical outcomes while at the same time developing our understanding of microbiology. This quadrant represents a means of addressing the basic research/applied research dichotomy. The bottom-left quadrant, although empty, could be considered to be research neither motivated by understanding or use. Reeves (2000) actually suggested that much of educational technology research is located in this quadrant. This quadrant is indicative of curiosity on the part of the investigator.

The above discussion has implications for the field of educational technology and offers promise for future research projects in relation to e-simulations. Reeves suggested that 'development research' (van den Akker, 1999), 'design experiments' (Brown, 1992; Collins, 1992), 'formative research' (Newman, 1990) all align with the concept of 'use-inspired research' and offer promise for the field of educational technology.

Development-based research is defined as research "focused on the dual objectives of developing creative approaches to solving human teaching, learning, and performance problems while at the same time constructing a body of design principles that can guide future development efforts" (Reeves, 2000, p. 7 see Figure 2). Educational technologists need to consider how our developments benefit the user, group or society. A significant benefit of emphasizing development-based research is that it also fosters more basic research and more applied research (Keppell, Au, Ma, & Chan, 2005).

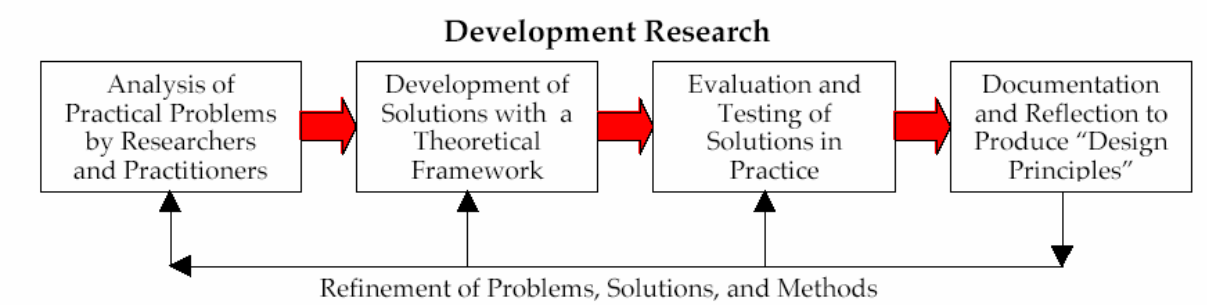

Figure 4: Development-based research process as outlined by Reeves (2000), p. 9.

A research project could be launched to investigate effectiveness evaluation and impact evaluation for each of the current simulations. Transfer appears to be a key objective for the simulations. Marton (2006) examines some key issues in this area and suggests that "transfer is about how what is learned in one situation affects or influences what the learner is capable of doing in another situation" (p. 499). The e-simulations are intended to assist the student to **transfer** their knowledge and skills to the professional work setting. A key issue is whether the aim of the simulations is actually transferred to a similar situation or to a different situation. A focus on transfer also provides a means of embedding these initiatives into the strategic direction of the University.

5. Publication opportunities

A book proposal on e-simulations could be developed. Chapters would include an introductory chapter on educational underpinnings of e-simulations, the educational design of the e-simulations, development of online delivery of the e-simulations, programming solutions for the e-simulations, integration of e-simulations into the university teaching and learning environment and individual cases from each of the academics. Three to four academics would be the editors of the book.

One publication could be developed on the e-simulations using aspects of the existing interview transcripts. There has already been extensive work completed on these areas and this would provide a seminal paper to publicise the e-simulation agenda at the Institute.

The possibility exists of working with each academic to develop an individual paper or book chapter for each of the current e-simulations, and for all future developments. This

approach ensures that academics are rewarded for their involvement through publications as well as an enhancement of their teaching through the use of the e-simulations.

6. Future collaboration

The author is interested in future collaboration with the Institute in the following areas:

- Assisting the development of a range of learning designs for future e-simulations. Some of these may also include different languages. Staff from the author's centre could provide assistance in the translation of some aspects of the e-simulations into Chinese.
- Involvement in the development of a book proposal. The author could provide editorial assistance and mentoring on the project.
- Editorial assistance on any of the papers that plan to be submitted. This could be emailed to the author and comments embedded within the paper. This would provide an external perspective of the publication.
- Participation in the development of a design-based research project for the e-simulations This would be a 2-3 year project focussed on effectiveness evaluation and impact evaluation of the e-simulations. An initial workshop could set the stage for the conceptualization of this research project.

The author is happy to participate in a teleconference to clarify or elaborate aspects of this report.

7. Summary

The existing e-simulations represent a leading edge development in educational technology. They also represent an initiative that should be championed in the international educational technology community through conference presentations and publications. The development of a robust learning design that can be reused in a time-effective manner and online represents an important development to progress the e-simulation agenda at Deakin University. The focus of the e-simulations should be on transfer of knowledge and skills from the university setting to the professional setting and all aspects of development, research and publications should focus on this important area.

Associate Professor Mike Keppell
Head, Centre for Learning, Teaching and Technology
Hong Kong Institute of Education

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