



Association for Educational  
Communications and Technology

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## Investigating Relationships Between Features of Learning Designs and Student Learning Outcomes

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and Kin Fai Cheng*

(Editor's note: See full article for complete reference citations.)

The literature on the use of the web in teaching and learning contains many reports of cases where the use of technology may or may not have been effective in supporting student learning. Mostly, these are reports of individual studies, and insufficient work has occurred towards the development of clear models of relationships between the design of the use of the web and a range of student outcome measures. As long ago as 1996, Hannafin et al. (1996), in an extensive review of research in computer-based instruction with respect to cost-effectiveness, learning effectiveness and design, recommended that future research include "clarifications of relationships among teaching, learning and technology" (p. 397). Fifteen years later, these words are still relevant.

Reeves (1999) in the US proposed a model of web-based learning which includes factors organized into three categories, inputs, processes and outcomes; we will use this terminology (which is, incidentally, similar to the presage-process-product (3P) concept of Biggs (1987) that has informed decades of work in Australia, Hong Kong and the UK). Inputs include characteristics which indicate variation in both students and teachers, such as individual differences between students in background, ability and motivation, and variation in pedagogical beliefs held by teachers and students. Processes include opportunities to construct knowledge, task ownership, quality and structure of web resources, collaborative support, teacher support, and meta-cognitive support. Outcomes include knowledge and skills, mental models, and higher-order thinking skills.

Our interest in this study was in the process/output interface and so the complexity at the input end is not considered in this study. In Hong Kong there is a gradual, but clearly directed, increase in government intervention towards ensuring that Hong Kong universities develop demonstrable evidence of student learning outcomes. This outcomes-oriented shift in focus influenced our rationale for selecting this 'end' of the learning spectrum for this study. Further, this study involved university courses with a blended design of face-to-face classes combined with online learning, and so examples of blended learning will be chosen in this discussion. Many studies compare student learning outcomes (perceptions or performance) between some combination of totally online, totally face-to-face and blended courses; however, few obtain conclusive results about student learning outcomes (e.g. Johnson et al. 2000; Lim et al. 2007). Such comparisons are a bit like comparing apples and oranges because, certainly with reference to the context in Hong Kong, the reality for almost all students attending a Hong Kong university is a blend of classroom experience with some components of web-based or web-supported learning. In this paper 'blended learning' designs is used to designate a purposeful design for student work where learning technologies are used for separate aspects of students' designed activities to those designed for face-to-face activities which do not involve technology. In other words, the technology component is not a duplication of what occurs in conventional classes; it is an integral part of the students' learning experience, and engagement in the technology-supported activities are needed in order for students to gain most from the course (McNaught 2011).



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### **AECT Mission**

The mission of the Association for Educational Communications and Technology is to provide international leadership by promoting scholarship and best practices in the creation, use, and management of technologies for effective teaching and learning in a wide range of settings.

### **Goals:**

- Define the disciplines and professional activities that comprise the field of educational communications and technology.
- Serve and represent professionals in the field and support professional growth.
- Advance scholarship and practice that contribute to and enlarge the knowledge base of the field.
- Promote policies that ensure the humane and ethical use of educational communications and technology at all levels, from the personal through the international.

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## **Investigating Relationships Between Features of Learning Designs and Student Learning Outcomes**

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In this study, therefore, there is a range of measures for student learning outcomes, based on performance in the discipline, as well as on perceptions of capability development and approaches to learning. The combination of perception and performance data was intended to increase the validity of the measures.

### **Methodology**

The study had a focus on the process/output interface of eLearning in the higher-education context of Hong Kong. The main focus of the study was to examine possible relationships between features of online learning designs and student learning outcomes. We also paid attention to the influence of the quality of the eLearning strategies used in these learning designs in terms of the intention behind the learning design, the nature of the interactivity and an assessment of how well implemented each particular strategy was.

### *Selection of cases*

The case unit was a whole course at university undergraduate level.... Over the period of 2 years, the project solicited collaboration with teachers in 21 courses. The cases were chosen because of the design of the course; the research team has access to university log data and also most teachers who are actively interested in learning technologies are known to the researchers. In all courses blended design was used with significant use of the web, but with face-to-face teaching as the pre-dominant teaching mode.



### **Discussion and concluding comments**

#### *Diversity of learning designs*

The study illustrates a variety of learning designs that teachers in Hong Kong use to assist teaching and learning. It is clear from the web matrix results that our teachers had different intentions in mind when choosing eLearning strategies. While improving course management is important to all our teachers, technology is also viewed as a set of tools to support learning. In our set of 21 cases, there are technology-supported explanations of concepts and rules, training materials for discipline-related problems, ill-defined authentic cases, and professional simulations.

#### *Reliance on simple learning designs*

We chose the 21 cases carefully, seeking teachers who were enthusiastic about eLearning and interested in interacting with the research team. However, there is a preponderance of simple resources in the designs we examined. Only a few of the cases had exercises and activities that provided students with opportunities to apply and discuss what they had learnt as an integral part of the learning design. So, if these are our most committed eTeachers, we should expect that these strategies take an even less prominent role among the rest of the university teacher population. Indeed, this is the case, as a recent universitywide study of web logs indicates (Lam et al. 2010).

#### *Developing web designs to support student learning*

We have evidence of mild correlational relationships between the design of the web environment used as a course website and the learning outcomes students perceive they have attained. Also, the influence of the web environment on learning seems to be more prominent in the 'high use' cases. These findings indicate that the effort paid in designing a complete and rich web environment may pay off in terms of learning benefits, at least in terms of students' perceptions.

Both the provision of rich learning resources and the engagement of students in online communication appear to relate to learning (acquisition of knowledge and skills, and enhancement of learning motivation). However, we also found that, in general, the amount of time students spend on these resources and activities is less important than the quality of the learning activities themselves.... However, a relationship was not found between the richness of the web environment and the actual student performance in assessments. There are many factors that affect performance (e.g., teaching styles, subject content, students' differential abilities in parts of the discipline domain, etc.).

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## Calls for Papers, Proposals, and Participants

**Call for Papers.** Got a Hot Topic? A burning issue? A philosophical musing? Air your thoughts in a white paper for AECT directed at our field or our world. For more information please go to:

<http://aect.org/publications/whitepapers/>.

**Call for Proposals.** The submission deadline for proposals for the fourth biennial Research Symposium is January 31. The symposium will be held in Louisville, Kentucky, July 18-20. For more information go to Events on the AECT homepage at:

<http://www.aect.org/>.

### Take a Look

## New Articles in the Journals

Following are selected article citations from recent issues of journals available online to AECT members. Go to Publications on the homepage at <http://www.aect.org/> and log in for instant access to full texts.

Bennerstedt, Ulrika; Jonas Ivarsson, and Jonas Linderoth. (2011). How gamers manage aggression: Situating skills in collaborative computer games. *International Journal of Computer-Supported Collaborative Learning*. Online First, DOI 10.1007/s11412-011-9136-6. November 29, 2011.

What do players learn from digital games? This article explores behavioral effects, in particular aggression and collaboration. The authors are at the University of Gothenburg in Sweden.

Dawidowicz, Paula. (2011, November). With scholarship and practice in mind: The case study as research method. *Journal of Applied Instructional Design* 1 (2): 5-12.

If you liked  
Jacksonville,  
You will **love**  
**Louisville**

Stay up to date on the **2012 convention** proposal and registration dates and other details on the AECT website:  
<http://www.aect.org/>

**Call for Proposals.** Need funding to develop a research proposal? Consider applying for a Collaborative Research Grant. The purpose of the grant is to provide monetary support to enable association members to develop research project proposals that include active collaboration among researchers, research institutions, and AECT. Information soon will be available on the association homepage at:

<http://www.aect.org/>.



This article briefly discusses the nature and purpose of various types of research and focuses specifically on the nature and utility of case study methods. The author is at Walden University in the United States.

Luo, Heng, and Tiffany A. Koszalka. (2011). Making design decisions visible: Applying the case-based method in designing online instruction. *International Journal of Designs for Learning* 2 (1). Electronic journal.

The target design case is a self-directed online tutorial that applies the case-based method to teach educators how to design and conduct entrepreneurship programs for elementary school students. The authors describe decisions made in each phase of the design and development process, explicate the rationale behind them, and demonstrate their effect on the production of the tutorial.

Schwartz, Catherine Stein. (2012, January). Counting to 20: Online implementation of a face-to-face, elementary mathematics methods problem-solving activity. *TechTrends* 56 (1): 34-39.

This study describes how the same problem-solving activity was implemented online and face to face. Each context privileges different ideas about teaching and learning. The author is at East Carolina University in the United States.

Take time to explore all of the journals available online through the AECT website.

### New!

*International Journal of Computer-Supported Collaborative Learning* is now available to members through the Publications link on the AECT homepage:  
<http://www.aect.org/>

Look for the button!



Check out the new **Open Content Portal** through the link on the AECT homepage at <http://www.aect.org/>

The goal is to provide an Open Educational Resource (OER) portal, through which educational technology scholars and researchers can share how they teach and what they teach in their courses.

# Research Roundup

## Member Access Publications

### **Educational Technology Research and Development**

Bimonthly  
ISSN: 1042-1629  
(print)  
ISSN: 1556-6501  
(electronic)  
Journal no. 11423  
Springer US

### **TechTrends**

Bimonthly  
ISSN: 8756-3894  
(print)  
ISSN: 1559-7075  
(electronic)  
Journal no. 11528  
Springer US

### **Instructional Science**

An International Journal of the Learning Sciences  
Bimonthly  
ISSN: 0020-4277  
(print)  
ISSN: 1573-1952  
(electronic)  
Journal no. 11251  
Springer Netherlands

### **International Journal of Designs for Learning**

Quarterly  
ISSN: 2159-449X  
(electronic)  
AECT

### **Journal of Applied Instructional Design**

Quarterly  
ISSN: 2160-5289  
(electronic)  
AECT

...and More!

## IECT Conference and Proceedings Offer Valuable International Resources

The 11th International Educational Technology Conference was held this past spring at Istanbul University in Turkey. The conference, now entering its second decade, aims "to create and disseminate knowledge about the use of instructional technology for learning and teaching in education," according to the conference proceedings publication.

A glimpse of the conference history can provide perspective:

"The first of 'The International Educational Technology Symposium (IETS)' and the second of 'The International Educational Technology Symposium (IETS)' were held at Sakarya University in Turkey in 2001 and 2002. The third one was at Eastern Mediterranean University in the Turkish Republic of Northern Cyprus in 2003, and the fourth one at Sakarya University in Turkey in 2004. The fifth International Educational Technology Conference (IETC) was organized at Sakarya University in Turkey in 2005. The Sixth International Educational Technology conference was held in Turkish Republic of Northern Cyprus. In 2007, the seventh conference was organized at Near East University in the Turkish Republic of Northern Cyprus. After then The 8th International Educational Technology Conference was held at Anadolu University in Turkey in 2008. The 9th International Educational Technology Conference was organized at Hacettepe University in Turkey in 2009. IETC-2010 was organized at Bogazici University in 2010. IETC-2011 conference organized at Istanbul University in 2011."

The most recent conference drew some 500 applicant papers, of which 350 were accepted. Participants in the three-day conference represented nearly thirty nations.

The 2012 conference will take place in Taiwan from July 11 to 13.

The proceedings publication is a wide-ranging and valuable international resource. Following is a sample of the article titles included in the 2011 proceedings, which will give some sense of the scope of the conference:

"A Comparative Study of Problematic

Internet Use and Loneliness Among Turkish and Korean Prospective Teachers"

"A Cross-Cultural Study of ICT Competency, Attitude and Satisfaction of Turkish, Polish and Czech University Students"

"Analysis of Internet Access Among Youth in Klang Valley Malaysia"

"Call for Teaching English Children's Literature: Hot Potatoes Framework in Taiwanese EFL Classrooms"

"Can Assistive Technology Help Improve Early Literacy Skills of Young Children with Disabilities?"

"Cheating and the Use of Technology by High School Age Students"

"Distance Education Technologies and Transformative Learning Across Borders: Results from Three Sino-American Online Courses"

"Ecological Education Through Birds for the Public in Iași Botanical Garden (Romania)"

"Effect of Self-Worth and Parenting Style on the Planned Behavior in an Online Moral Game"

"Exploring Reciprocity of Information Exchange in Online Discourse of Student Groups"

"Factors Affecting E-Learning in the Middle East: Jordan School Case Study"

"Fostering the European Dimension in the E-Learning Programme Consortia: Catalysts for the Emergence of a European E-Learning Area"

"Gender Factor in the Use of Interactive Internet Application for Process Writing"

"Human Anatomy in Non-Medical Faculties from Romania and Republic of Moldova, Past and European Integration"

"Library Automation Design for Visually Impaired People"

"Press the Big Blue Button to Teach Computer Science"

...and many more!

The proceedings publication and information about the 2012 conference can be found at the International Educational Technology Conference website at <http://www.iet-c.net/>. The site also includes a call for papers, which can be submitted in either of the two official languages of the conference: English or Turkish.