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# INSTRUCTIONAL DEVELOPMENT NEEDS FOR WEB-BASED EDUCATION IN HIGHER EDUCATION

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**Abstract**

Over the past decade, web-based education programs have developed at an extraordinary rate. Web-based education has emerged in higher education as a means for providing a variety of educational opportunities to a diverse community of individuals. As the number of participants continues to increase, so too does the importance of providing effective instruction that focuses on the needs of learners. The purpose of this study was to identify directions for addressing the instructional development needs that instructor-practitioners teach when using web-based communication tools in higher education. This single case study aimed to examine the factor structure of a 16-item survey. The data in the areas of instructional development and net-based learning. The findings indicated a four-factor model for instructional development concerned with web-based courses: (1) technical (internet/Web resources); (2) social (interpersonal); (3) moderating (cognitive/pedagogical); and (4) management (teaching). The identified constructs were associated with the unique characteristics of teaching courses using web-based communication tools. Support for instructors should be offered in the areas of basic and essential skill development (e.g., technical matters related to web-based communication tools) and delivered in ways that are embedded in effective pedagogical practices.

**Keywords:** instructional development, web-based education, higher education

## INTRODUCTION

In many instances, web-based education involves unique instructional development requirements that go beyond the everyday concerns of on-campus teaching and learning. Much of what instructors in higher education can be applied to both the theory and the practice of teaching at a distance using internet and web- based communication tools. However, if the degree of separation between and among instructors and learners is too great, this divide can transform traditional expository teaching so significantly that alternative ways of teaching are necessary (Moore, 2001; Lee & Tsai, 2010). If not dealt with properly, web-based education can result in poorly developed and delivered courses. This causes not only poor attitudes and opinions for both students and instructors, but can also cause low course completion rates for students (Kanuka & Rourke, 2006). Given the ongoing problem of low completions rates in traditional, delivered courses and programs (Kanuka & Jugdev, 2006), the purpose of this study was to better identify directions for addressing the instructional development needs of instructor-practitioners in institutions of higher education who teach using web-based communication tools.

## THEORETICAL FRAMEWORK

A number of notable theoretical frameworks have been developed with the aim of explaining essential constructs required for successful web-based education. These theoretical frameworks are premised on two assumptions: (1) dialogue is essential to the facilitation of successful learning in higher education, and (2) successful web-based education requires the cognitive dimensions to be addressed. The cognitive dimension has been expressed as higher intellectual levels of learning (e.g., critical, creative, and complex thinking skills), and the dialogue dimension has most often been expressed in association with social and teaching constructs (Vygotsky, 1962). One of the first web-based models designed for education was developed by Henri (1992). Her framework identified both social and cognitive constructs as essential aspects of web-based education within the following four dimensions: social, interactive, cognitive, and metacognitive. About the same time, Berge (1995) developed a similar theoretical framework on the essential roles of instructors facilitating web-based learning. Berge's model identified four roles: technical, managerial, social, and pedagogical.

Building on Henri's (1992) model but also incorporating the pedagogical (intellectual/cognitive) construct of Berge's (1995) model, Garrison, Anderson and Archer (2000; 2001) identified the essential properties of asynchronous learning networks: teaching presence, social presence, and cognitive presence. This model, called the community of inquiry (CoI), is more complex than the prior models cited and provides wider explanatory power within each of the theoretical constructs. Social presence in this model involves the ability of students to project and establish personal and purposeful relationships and includes affective communication, open communication and group cohesion. Teaching presence involves interaction and discourse, as well as structure (design) and leadership (facilitation and leadership) falling within the categories of design, facilitation, and direct instruction. Cognitive presence is the most complex of constructs in the CoI model and has a model within the model, which the authors have referred to as the practical inquiry model. It is defined as the exploration, construction, resolution, and confirmation of understanding through collaboration and reflection in a community of inquiry.

The CoI model has received considerable attention in the instructional technology research arena with over 200 studies using this model as a theoretical framework. Moreover, it has proven to be a useful and validated methodology for researchers (Garrison, Cleveland-Innes, & Fung, 2008). As such, this model was deemed to be an appropriate choice to frame the survey development. However, the CoI model assumes that the technology used to facilitate the learning will be text-based, asynchronous computer conferencing. At the time the model was developed, this was an appropriate assumption. With the more recent emergence of social software (e.g., blogs, wikis) and increasingly pervasive use of ephemeral communication tools (e.g., web-based audio/video conferencing tools, virtual worlds), a technological factor was incorporated as well.

## METHODOLOGY

This single-case study aimed to examine the factor structure of a 16-item survey. The data were drawn from a larger survey that examined the wider structures and practices that could improve technologically-mediated instruction and were based on extensive literature reviews conducted in the areas of instructional development (Harrison, 2006) and net-based learning (Rourke,

2007). What marks this investigation as a single-case study is that the data were drawn from a specific unit of analysis (one institution), and the data were bounded by place and time (Creswell, 2008; Yin, 2004). This section of the survey was framed around the four constructs as grounded in Garrison et al.'s (2008) and Berge's (1995) models. The survey was developed using a five-point Likert-type scale, with the anchors Strongly Disagree (1) and Strongly Agree (5).

## RESULTS

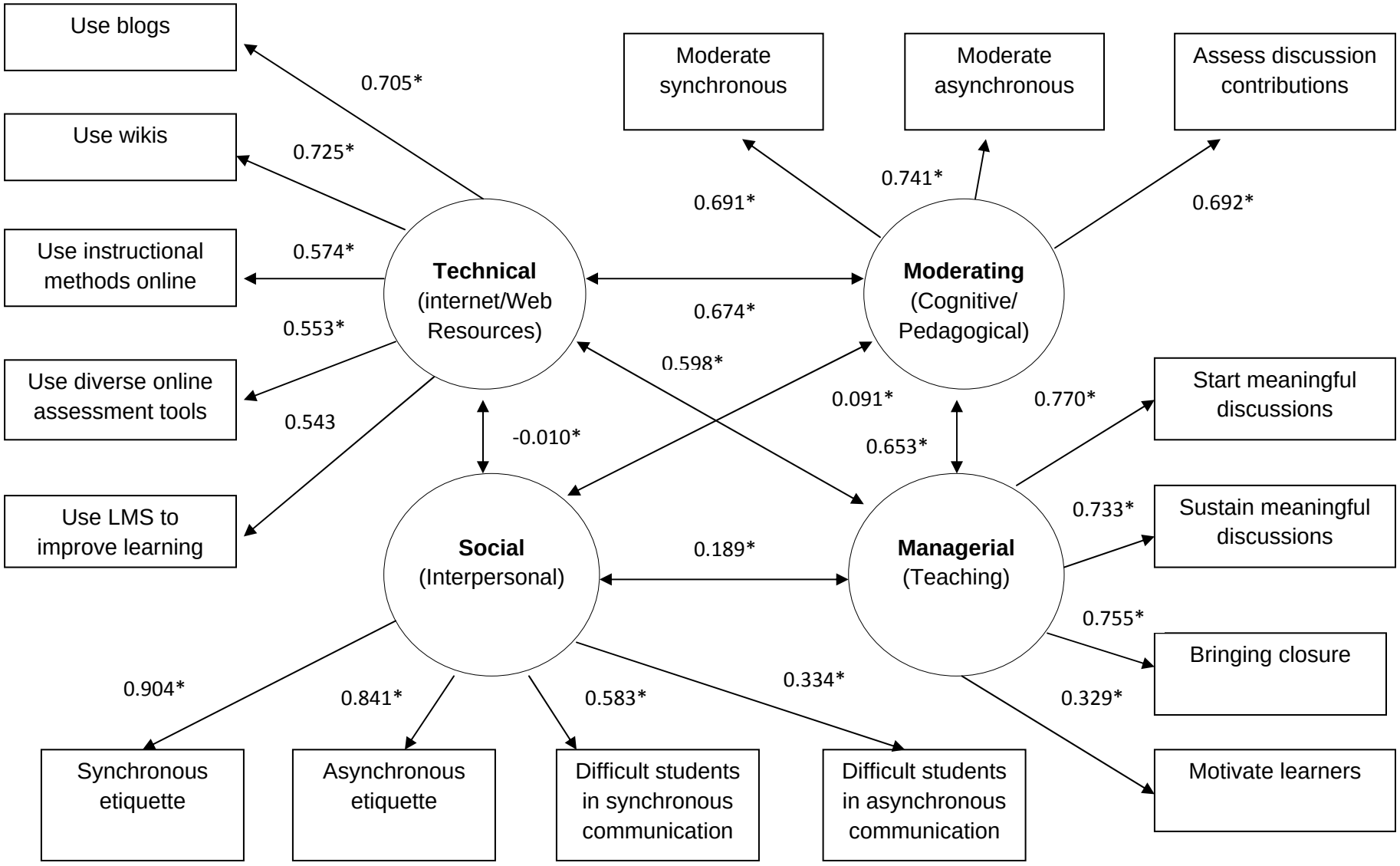
The survey was sent to all staff members (n=309) involved in the design and delivery of course materials (tutors, academic staff, and professionals) at a university in northern California. There were 187 responses to the survey for a response rate of 61%. The majority of respondents were between the ages of 50-59 (n=80), followed by 40-49 (n=48), under the age of 40 (n=42), and 60 or older (n=17). The majority of respondents were female (male: n=70; female: n=117). Most respondents were relatively new hires with five or less years of experience from the date of hire (n=104;pre2003 :n=20; 2003-2008: n=63).

Statistical analysis was first performed using the SPSS Version 16.0. Confirmatory factor analysis (CFA) (Brown, 2006) was then conducted to examine whether the factor structure identified through exploration factor analysis would achieve a goodness-of-fit with the survey responses and significance of individual factor loadings. The approach used for the CFA was through a Linear Structural Equation Modeling package (LISREL).

Using the whole sample, Principal Component Analysis was performed. The questionnaire items associated with each factor were averaged to create an estimate of the four underlying constructs: technical (internet/Web resources), social (interpersonal skills), moderating (pedagogical/cognitive), and managerial (teaching). A one-way repeated measure ANOVA of the four levels was performed and indicated that there was a statistically significant resource effect ($F(3,558)=5.803$, $p=0.001$). Pairwise comparisons with Bonferroni corrections indicated that technical (internet/Web resources) (M=.456) was significantly different from social (interpersonal skills) (M=.350) and moderating (pedagogical/cognitive) (M=.358). Managerial (teaching) (M=.350), moderating (pedagogical/cognitive) (M=.358) and managerial (teaching) (M=.431) were not statistically significant from each other. Technical resources (internet/Web) were not statistically different from managerial (teaching). Managerial (teaching) was shared between these two clusters.

Table 1 Rotated component matrix for teaching resources (n=187)
Extraction Method: Principal Component Analysis Rotation Method; Varimax with Kaiser Normalisation

| | Leader: I would like to learn how to: | Factor 1: Technical | Factor 2: Social | Factor 3: Moderating | Factor 4: Managerial |
|---|---|---|---|---|---|
| Q13: | effectively use Web logs (Blogs) with my students | .790 | | | |
| Q14: | effectively use wikis with my students | .755 | | | |
| Q9: | conduct different instructional methods in an online classroom (e.g., debates, Webquests, case studies, problem-based learning, invited guest, nominal group technique) | .633 | | | |
| Q16: | effectively use online student assessment tools (e.g., quizzes or exams) | .607 | .307 | | |
| Q15: | using Learning Management System (LMS) (e.g., Blackboard) to improve learning | .582 | | | |
| Q10: | ensure I am using proper e-mail etiquette with my students | | .859 | | |
| Q8: | deal with difficult students on the phone (e.g., Skype, iVocalise) | | .833 | | |
| Q7: | deal with difficult students online | | .780 | | |
| Q4: | start effective online discussions | | .536 | .799 | |
| Q6: | maintain meaningful online discussions | | | .736 | |
| Q5: | bring closure to online discussions | | | .715 | |
| Q12: | engage self-paced learners through motivation strategies | | | .532 | |
| Q1: | effectively moderate text-based synchronous discussion | | | | .836 |
| Q2: | moderate text-based asynchronous discussions | | | | .771 |
| Q3: | assess student contributions in online discussions | .409 | | | .562 |




*significant at 0.05 level

Figure 1 : Result of Corfirmotory Factor Analysis for teaching development needs

Using LISREL 8.8, maximum-likelihood confirmatory factor analysis was conducted to assess the generalisability of the four-factor model that emerged in the Principal Component Analysis. Three practical measures of fit, the goodness-of-fit (GFI, values greater than .90), the adjusted goodness-of-fit (AGFI, values greater than .80), were used as the evaluation criteria for adequacy of the model (Cole, 2007). The GFI=.88, the AGFI=.83 and the RMR=.08 values for the four-factor model in this study indicated a good fit to the observed data. The loadings of the item to each of the factors are presented in Figure 1.

## DISCUSSIONS AND CONCLUSION

The ability to develop and deliver quality web-based education is critical to the success of the students' learning experiences. In turn, instructor development is a critical component of quality web-based learning (Kim & Bonk, 2006; Salmon, 2003). The purpose of this study was to better identify directions for instructor development needs for those who teach web-based education. The findings continued a four-factor model for instructional development concerned with web-based delivered courses:

(1) Technical (internet/Web resources);
(2) Social (interpersonal);
(3) Moderating (cognitive/pedagogical); and,
(4) Management (teaching). The constructs identified were associated with the unique characteristics of teaching delivered courses using web-based communications tool.

### Implications for Instructor Development Needs

In the *technical* area, the learning activities should include "how to" subject matter with course management systems and their associated assessment tools, as well as social software. These activities must be guided by pedagogical underpinnings. Such pedagogical underpinnings include how to use diverse instructional methods (e.g., debates, webquests, case studies, problem-based learning, nominal group techniques, etc.) with web-based communication tools.

In the *social* area, the learning activities should include interpersonal skills that support the creation of a welcoming community necessary to establish a respectful environment. This is important since both instructors and students may not be familiar about how to interact using web-based communication tools and often experience considerable anxiety (Kanuka & Jugdev, 2006; Oh & Park, 2009; Yeh, 2010). Specifically, this would include information about what is acceptable and appropriate communication in both synchronous and asynchronous environments, sometimes referred to as 'netiquette' in the literature. Another topic that was perceived to be important revolves around how to deal with inappropriate communication in both synchronous and asynchronous environments.

In the *moderating* area, the learning activities should include how to effectively facilitate the pedagogical tasks necessary to support students' intellectual development. While the CoI model has a complex sub-model for cognitive presence, the findings indicate that instructors' needs are somewhat simpler. Their needs revolved around two areas: (1) how to guide or moderate activities when using synchronous and asynchronous web-based technologies and (2) how to assess these web-based activities (e.g., assessment rubrics).

In the *managerial* area, the learning activities should include basic and essential teaching tasks related to web-based technologies. Such tasks include starting and sustaining meaningful technologically-mediated discussions, as well as bringing meaningful closure to mediated discussions. Most importantly, however, is a desire to gain the knowledge and skills to motivate learners when working at a distance. Motivating students is a particularly important element for instructors to understand, as there is a connection with motivation and certain aspects of a successful web-based learning experiences (i.e., completion rates).

Finally, an important theme connecting each of these four factors is the need for pedagogically sound learning in ways that lead to successful learning experiences. Specifically, support for instructors should be offered in the areas of basic and essential skill development (e.g., technical matters related to web-based communication tools) but offered in ways that are embedded in effective pedagogical practices.

## REFERENCES


Beige, Z. L. 1995. Facilitating computer conferencing: Recommendations from the field. *Educational Technology* 15(1): 22-30.

Brown, T. A. 2006. *Confirmatory Factor Analysis For Applied Research*. New York: Guilford.

Cole, D. A. 2007. Utility of confirmatory factor analysis in test validation research. *Journal of Consulting and Clinical Psychology* 55: 584-594.

Creswell, J. 2008. *Qualitative Inquiry and Research Design: Choosing Among Five Traditions*. London: Sage Publications.

Garrison, D. R., Anderson, T., & Archer, W. 2001. Critical thinking and computer conferencing: A model and tool to assess cognitive presence. *American Journal of Distance Education* 15(1): 7-23.

Garrison, D. R., Anderson, T. & Archer, W. 2000. Critical inquiry in a text-based environment: Computer conferencing in higher education. *The Internet and Higher Education* 2(2-3): 87-105.

Garrison, D. R., Cleveland-Innes, M., & Fung, T. 2008. Student role adjustment in online communities of inquiry: Model and instrument validation. *Journal of Asynchronous Learning Networks* 8(2): 61-74.

Harrison, J. E. 2006. The quality of university teaching: Faculty performance and accountability. *Canadian Society for the Study of Higher Education* 21: 1-18.

Henri, F. 1992. Computer conferencing and content analysis. In A. R. Kaye (Ed.), *Collaborative Learning Through Computer Conferencing: The Najaden Papers*, (pp. 117-136). Berlin: Springer-Verlag.

Kanuka, H. & Jugdev, K. 2006. Distance education MBA students: An investigation into the use of an orientation course to address academic and social integration issues. *Open Learning* 21(2): 153-166.

Kanuna, H. & Rourke, L. 2006. Changes occurring in higher education through e-learning. Paper presentation at the Canadian Association for Distance Education (CADE). May, 2006, Montreal, Canada.

Kim, K. J., & Bonk, C. J. 2006. The future of online teaching and learning in higher education: *The survey says…Educause Quarterly* 29(4). http://www.educause.edu [12February 2009]

Lee, M., & Tsai, C. 2010. Exploring teachers' perceived self efficacy and technological pedagogical content knowledge with respect to educational use of the World Wide Web. *Instructional* Science 38(1): 1-21.

Moore, M. G. 2001. Theory of distance education. Paper presented at The Second American Symposium on Research in Distance Education, May 22-24, The Pennsylvania State University, University Park, PA.

Oh, E., & Park, S. 2009. How are universities involved in blended instruction. *Journal of Educational Technology & Society* 12(3): 327-342.

Rourke, L. 2007. *Learning through online discussion*. Published doctoral dissertation, University of Alberta, Edmonton, Alberta, Canada.

Salmon, G. 2003. *E-Moderating: The Key To Teaching And Learning Online*. Sterling, VA: Stylus Publishing.

Vygotsky, L. 1962. *Thought And Language*. Trans. E. Hanfman & G. Backer. Cambridge, MA.: M.I.T. Press (Originally published in 1934).

Yeh, Y. 2010. Analyzing online behaviors, roles, and learning communities via online discussions. *Journal of Educational Technology & Society* 13(1): 140-151.

Yin, R. 2004. *Case Study Research: Design And Methods* (4th ed.). Beverly Hills, CA: Sage Publishing.

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