Team Learning Performance and Collaboration between Online and Blended Learning Delivery Groups

Seung Won Yoon
Western Illinois University

Doo Hun Lim
University of Tennessee

This study examined the impact of instructional variables on team learning outcomes and collaboration between online- and blended groups. Differences in team learning collaboration and instructional factors were found between the groups and significant relationships existed between them. From the findings, implications and discussions to improve existing practices of online or blended instruction were made.

Keywords: Team Learning Performance/Collaboration, Online Learning, Blended Learning

Online instruction and blended instruction are two widely used instructional delivery methods in academic and corporate settings. Online instruction is viewed as the most promising technology-based solution for providing up-to-date knowledge to distributed individuals while onsite instruction is recognized as superior in networking and learning complex contents (Yoon & Lim, 2007). With online technologies capable of coordinating remote resources and individuals in a cost-effective manner, changes and mixes of instructional sequences and methods are possible for enhancing learners' educational experiences, especially regarding learners' interactions with contents and peers. However, management challenges such as how to facilitate the process of social learning or how collaboration affects learning outcomes between different delivery modes are less well-known. How learning should take the form of collective knowledge and is iterative through the process of exchanging practices are well-documented in the literature (Lave & Wenger, 1991; Nonaka & Konno, 1998). Improvements in learning, satisfaction, collaboration, application to work, and administrative efficiency are all very important indicators to be measured. Equally important are variables related to designing and implementing teams whose members share the same goal and collaborate to enhance learning, group outcomes, and work processes. As both forms of groups are growing in numbers and interests, comparative empirical studies that are based on sound theoretical and methodological frameworks are in greater demand.

Theoretical Framework

Online Instruction

Online instruction is a form of virtual learning and instructional environment which facilitates participants' cognitive, constructive, and communicative learning needs. It commonly takes place in computer-networked environments (Kearsley, 1997) and can deliver what educators recognize as essential components of learning environments to offer proper contexts, tools, resources, and learning-facilitating scaffolds which initiate and guide authentic problem-solving processes (Hannafin, Land, & Oliver, 1999). The term also is used to reflect the historical expansion of major distance learning technologies which started from correspondence and evolved through transmittal broadcasting systems, multimedia-rich Internet, and web-based audio and video conferencing systems (Morabito, Sack, & Bhate, 1999). Benefits of online education include expanding educational opportunities, promoting self-directed, active, and reflective individuals (Berge, 2002), saving cost for training, and shifting the focus of training from learning to performance (Rosenberg, 2006). The fifth annual report on the state of U.S. online learning, supported by the Albert P. Sloan foundation, indicates that almost three and a half million students were taking an online course during the fall 2006 semester (Allen & Seaman, 2007). However, online instruction has been challenged by limitations in the capability to engage learners in learning events and deep-level learning and high expectation of self-disciplined and motivated learners.

Blended Instruction

Blended instruction is most commonly defined as the mix of traditional onsite instruction with any innovative learning technologies (Thorne, 2003). Variations of definitions exist that are noteworthy. Rossette (2003) claims

blending as a mix of instructional methods with delivery media, which includes onsite instruction. A lot of academics support the definition of blending as the substantial integration of technologies into onsite instruction Picciano (2006). Recently, Yoon and Lim (2007) maintained that blending is most easy to understand by recognizing the widespread use and strengths of onsite instruction and simultaneously leveraging simplified categories of major technologies (i.e., Web/Computer-Based Training, Web/Knowledge Management (KM)/Electronic Performance Support System (EPSS), Web/Asynchronous, and Web/Synchronous) to support core business performance and learning targets. This view is similar to Rosenberg's (2006) proposal of conceptualizing blending as leveraging technological and social networks (e.g., EPSS, KM, communities of practices, and learning solutions) aimed at aligning organizational and individual learning. Researchers strongly suggest to adopt this approach claming that blending improves learner satisfaction and educational experiences from easier access to knowledge, increased social presence, ease of updating contents, and technology-enhanced learning experiences (Osguthorpe & Graham, 2003; Reece & Lockee, 2005).

As the term blended implies, different patterns exist to mix various delivery media and instructional methods or learning theories. Singh and Reed (2001) suggested that six combinations of blended types of instruction are possible: (a) offline and online learning, (b) self-paced, live, and collaborative learning, (c) structured and unstructured learning, (d) custom content with off-the-shelf content, (e) work and learning, and (f) ingredients of the blend synchronous physical formats, synchronous online formats, and self-paced, asynchronous formats. Carmen (2002) noted that in technology-utilizing blended environments, instructors should be competent in aligning live events, self-paced learning, collaboration, assessment, and learning support materials. We prefer to use Driscoll's (2002) simpler technology classification of online instruction consisting of Web/CBT, Web/KM-EPSS, Web/Virtual Asynchronous Classrooms, and Web/Virtual Synchronous Classrooms and support the importance of instructors' competence in course designing and interaction facilitating skills (Aragon & Johnson, 2002).

Instructional Factors

Reviewing the literature of online and blended instruction has led to the identification of major instructional variables to consider. These include (a) the quality of the instructor represented as instructor presence (Anderson, Rourke, Garrison, & Archer, 2001), competencies (Aragon & Johnson, 2002), facilitation skills (Palloff & Pratt, 1999) and design (Clark & Taylor, 1992; Hirumi, 2002; Lee, Owens, & Benson, 2002), (b) the quality and variety of contents, problems, and activities for relevance and interests (Garavaglia, 1993), (c) learner characteristics, such as technology skills, readiness, self-directedness (Yang & Cornelious, 2005), action planning (Foxon, 1997) and commitment (Lim, Yoon, & Morris, 2006; Oh & Lim, 2005), and (d) learner support systems, such as tutors, counselors, registration, financial aid, and libraries (Huett, Moller, & Young, 2004; LaPadula, 2001; Muilenburg & Berge, 2002). This picture shows that numerous conditions and strategies are available and can be manipulated by instructors for directly or indirectly affecting course outcomes. It also shows the challenge of selecting and working with informed practices that critically matter to the particular contexts and targeted learners.

Evaluating Team Learning Performance

Collaborative learning groups that share the same goal and work protocols have been recognized as important for leveraging collective knowledge and distributed resources (Johnson & Johnson, 2006). In evaluating learning outcomes at a group or team level (we use these terms interchangeably, although distinctions are often made on teams as imposing greater trust, accountability, and shared work protocols), a scheme that is commonly used for evaluating individual learning should be applied with caution. Low-level assessments on individuals measure the level of satisfaction and mastery of contents, while higher-level forms attempt to capture the level of behavioral changes, work application and business impacts (Sullivan, 2002). Similarly, team or group level learning can be assessed at the low level through the acquisition of knowledge and member satisfaction, or at higher levels, such as enhanced work processes, but for these measures to be applied at the team level, proper sampling methods, such as randomization between different types of groups and greater numbers of groups (at least larger than 10 in each group) are required, if quantitative analyses are to be done. Additionally, a learning group requires members to communicate to introduce potential outcome or intermediate variables, such as the level of trust, work norms, and collaboration.

Purpose of the Study

In view of the widespread use and growing interests of online and blended learning groups, this study purported to examine whether these two groups differed in learning outcomes and how important instructional variables established in the literature impacted them. The following research questions were developed:

1. Is there a difference in team learning outcomes and team's perception of instructional conditions between online and blended learning groups?
2. How instructional variables are related to learning and performance measures?
3. To what extent do instructional variables predict team learning and performance?

Methodology

Participants and Setting

Participants in this study were 222 undergraduate students (73 male and 149 female) enrolled into a course in program evaluation offered by an HRD program at a southeastern university. Among them, 156 were between 18-19 years old, 43 were between 20-29 years old, and 23 were 30 years old or above. Regarding job status, 54 were fulltime workers, 98 were part time workers, and 70 were fulltime students. The course has an approximate enrollment of 20 students in each semester. The data were collected over 17 semesters from the same course between 2000 and 2005. The course was developed to teach curriculum contents on learner and program evaluation for HRD undergraduate students. The course was delivered completely online for the first three and half years, and then, modified for the following two years to take the form of a blended course. This history of the course resulted in 44 online learning groups and 25 blended learning groups.

Regarding the online delivery method, the instructor developed thirteen online learning modules and the workload of one module was equivalent to that of one week's classroom instruction. Learning modules provided subject content in learner and program evaluation. Several interactive learning activities including online discussions, case study analyses, and online tests and surveys were utilized within the modules to provide the learners with opportunities to apply learned content during learning. All learners were asked to attend the first and last class meeting for course orientation and group project presentation respectively.

The modified blended format offered one (occasionally two) out of three onsite classroom instruction every week to accommodate the university academic system. This change originated from the mutual interests of the university (having the majority of part-time and fulltime students in the course present on campus) and the instructor in enhancing pedagogy. After each week's classroom instruction, the learners were asked to complete online learning modules which included various learning activities, such as a review of the content, links to learning resources, group discussions and project. Care was given to create an equal amount of study hours between these two different delivery formats.

Instrument and Procedure

After confirming the viability of online questionnaire (MacElroy, 1999; Raziano, Jayadevappa, & Valenzula, 2001), team learning and performance outcome measures and instructional variables based on the literature review were collected. Participants were required to complete questionnaires. All of the question items except feedback-soliciting open-ended items were required to successfully complete each questionnaire. Questionnaires for learning included pre- and post measures on course contents (labeled as actual learning and viewed as a knowledge test) and competencies for eighteen course objectives (labeled as perceived learning). The competency measure utilized a five point Likert-type scale learning (1-do not understand to 5-completely understand). One questionnaire that measured their level of interests in application to work was implemented at the end of the course only. For fulltime students who did not possess directly applicable work experiences, the nature of the course crossed over to others, such as instructional design and learning theories, thus directions asked to imagine their application within his/her chosen academic discipline. This also used a five point Likert-type scale with 1 indicating none and 5 showing a very frequent use.

Participants also responded to 17 close-ended questions that measured their perception about the course in the areas of the quality of the instructor, learning activities, the level of learning support, and perceived workload. All question items in this category also used a five point Likert-type scale. For instructor quality, five items asking instructor's subject matter expertise, responsiveness to students' questions, questioning techniques, use of examples, and an ability to make clear presentations were included. For learning activities, five question items asking students' perception of the quality of course discussion, case studies, assignments, group and individual projects were included. For learning support, three question asked students' perceived feedback of assignments, study questions, and technical support. For workload, four items assessed perceived weekly hours spent on the course, assignments, and how those hours compared to other online and onsite courses of equal credit hours. Lastly, to measure the level of team performance, several items assessed the members' contribution toward learning as a group and completing group assignments and projects (1-not contributed to 4-fully contributed). This was collected at the end. Examining the result of Shapiro-Wilk's normality test with alpha level at .5 and skewness and kurtosis indicated that normality assumptions were met for all items.

Data Analysis

Basic descriptive statistics analyzed the test scores and the perceived degree of learning, application of learning, and selected instructional variables of the course. The independent-sample *t*-test was used to compare how those two groups, online and blended learning groups differed in learning outcomes and perceived instructional conditions. Correlation analyses were performed to test inter-relationships among instructional variables and learning outcome measures. Finally, the stepwise regression analysis was performed to explore the influence of instructional factors on various learning outcome measures. These exploratory approaches were taken over MANOVA and covariate analyses due to the lack of clarity in conceptual relationships between learning and collaboration measures and the lack of randomization and experimental control to justify identifying treatment effects. The result of correlation analysis and the Exploratory Factor Analysis led us to confirm one dimensionality of chosen instructional variables to comprise the overall instructional quality.

Findings

Before we examined the differences between online and blended learning groups via group-averaged scores, descriptive analyses examined the mean and standard deviation of different groupings, such as by gender, age, and two delivery modes by individuals. The overall results did not show any grouping to be a potential moderator, thus we proceeded to perform the independent-sample *t*-test. The *t*-test indicated that online and blended learning groups were not different in terms of any learning outcome measures (Table 1). The largest difference in outcome measures was detected in the level of perceived contribution to the group work. Also, blended learning groups reported a significantly higher score on member contributions (M = 3.81, SD = .26) than members of the online delivery groups (M = 3.64, SD = .35). Interestingly, two groups displayed larger differences in the perceptions of instructional variables in the course rather than differences in learning outcomes. Overall, blended learning groups reported more positive perceptions regarding the quality of the instructor, learning activities, and learning supports. They also reported comparatively higher scores in the perceived course difficulty, study time, and course workload. Among them, difficulty level, workload, study time, and learning support indicated statistically significant differences.

Table 1. *Comparisons on Instructional Variables and Learning Outcomes between Online and Blended Groups*

	Online Delivery Group (n = 44)	Blended Delivery Group (n = 25)	*p*-value
Instructional factors			
- Instructor quality	3.73 (.98)	3.83 (.86)	.708
- Learning activity	3.53 (.88)	3.85 (.79)	.208
- Difficulty level	3.29 (.94)	3.33 (.87)	.009
- Work load	3.65 (.86)	3.81 (.81)	<.001
- Study time	3.57 (1.00)	3.73 (.87)	<.001
- Learning support	3.48 (.86)	3.65 (1.06)	<.001
Learning outcomes			
- Perceived learning (PL)	3.89 (.40)	3.88 (.30)	.910
- PL gain	.82 (.53)	.78 (.50)	.742
- Posttest	11.23 (2.79)	11.52 (2.21)	.607
- Actual learning gain	3.12 (2.38)	3.00 (2.31)	.861
- Learning application	3.76 (.39)	3.72 (.35)	.665
Team collaboration	3.64 (.35)	3.81 (.26)	.027

We also compared learning outcome variables between those who had no complaints with team collaboration (defined as scoring 4 or above out of five) and those with some complaints (defined as scoring 3 or below out of five) regardless of the course delivery format. The learner groups with no complaints reported significantly higher mean scores in perceived learning (n = 129, M = 3.95, SD = .57, p < .05), posttest (n = 85, M = 12.63, SD = 3.35, p < .01), and learning application (n = 129, M = 3.80, SD = .61, p = .05) than those with some complaints (n = 86, M = 3.78, SD = .67 on perceived learning, n = 43, M = 10.79, SD = 3.35 on posttest, and n = 86, M = 3.63, SD = .71 on learning application).

Relationships between Instructional Variables and Learning Outcome Measures

Results from the correlations between instructional and outcome variables showed a wide range of relationships (Table 2). Overall, a strong positive relationship was found between the raw and the gain scores within each measure of comprehension (r = .859, p < .01) and competence (r = .545, p < .01). This helped eliminate the concern of the *regression toward the mean* phenomenon to make each score eligible for a valid dependent measure with our preference placed on the use of knowledge tests over perception data. This is further supported from the absence of a significant relationship between those two measures whether the raw or the gain score are used. It was not surprising to find strong correlations between perceived course difficulty, workload, and study time (p < .01). The relationship between learning support with various outcome measures was very weak with none of them showing any statistical significance. Neither the result of the posttest score or gain score on it from the pretest were statistically significant in regards to any instructional variables, although a low to moderate positive relationships were detected in comparison with perceived learning (r = .185 ~ .291). Learners' willingness to apply course learning to work were highly correlated with their perception of the quality of the instructor, activities, and perceived learning, but its relationship with the knowledge test was almost non-existent. Lastly, perception of team collaboration was positively correlated with learning support (r = .339, p <.01) and perceived learning (r = .296, p < .05), negatively correlated with course difficulty (r = -.318, p < .01), workload (r = -.212), and study time (r = -.266, p < .05).

Table 2. *Correlations between Instructional Variables and Learning Outcome Measures*

	Perceived learning	Perceived learning gain	Posttest	Actual learning gain	Application	Collaboration
Instructor quality	.407**	.403**	.180	.214	.484**	.059
Activity	.504**	.340**	.115	.184	.578**	.124
Course difficulty	.138	.247*	.073	.217	.258*	-.318**
Workload	-.095	.047	-.116	.001	-.057	-.212
Study time	.214	.242*	.056	.173	.263*	-.266*
Learning support	.167	.001	.080	.149	.190	.339**
Collaboration	.296*	.181	-.145	-.174	.173	

*Significant at the 0.05 level (2-tailed). **Significant at the 0.01 level (2-tailed).

Influence of Instructional Factors on Team Learning Outcomes and Collaboration

The exploratory nature of this study placed team collaboration as a separate dependent measure and explored multiple learning outcome measures, such as raw and gain-scores in knowledge tests, perceived competence, and a post-measure of learning application. With the findings of no significant differences in all outcome measures between online and blended learning groups, stepwise regression analysis was performed. Results showed that either the quality of the instructor or the activity was selected as the primary variable (due to a very high correlation between them, when one was selected, the other was eliminated) and study time additionally contributed to account for the variation of adjusted perceived learning (δR^2 = .366, p < .01) or its gain score (δR^2 = .243, p < .01). Examining the last column indicates that changes in the amount of study time may result in greater changes in perceived learning, but caution is required since all instructional variables were not captured as continuous data. These variables were also very useful in predicting almost half of the variation in their willingness to apply to work, but none of them made an entry into predict the outcome of team collaboration. Students' study workload seemed to negatively influence team level learning outcomes in the perceived learning, perceived learning gain, and learning application while the difficulty level of the course tended to negatively influenced team's collaboration during learning.

Table 3. *Stepwise Regression of Learning Outcomes for All Groups*

Learning Outcomes	R^2	δR^2	Predictors	β
Perceived learning	.398	.366	Learning activity	.265
			Study time	.316
			Workload	-.244
Perceived learning gain	.281	.243	Instructor quality	.270
			Study time	.453
			Workload	-.354
Learning application	.500	.474	Learning activity	.314
			Study time	.348
			Workload	-.256
Team collaboration	.183	.155	Learning support	.123
			Difficulty level	-.138

Discussion and Implications for HRD Education

While various forms of learning groups are frequently practiced, empirical research efforts are rather scarce (Arbaugh, 2005). Findings from this study indicated that learning outcomes were not significantly different between online and blended learning groups. However, these two groups showed a differing level of perceptions toward some of the important instructional variables, such as course workload, study time, and learning support. Although not statistically significant, these two groups also showed differing degree of perceived course difficulty. This study also found instructional variables, such as the quality of the instructor or course activities and study time to be very useful in predicting perceived learning outcomes, but learning support only was useful in predicting the success of team collaboration. Although online and blended learning groups did not differ in any measured learning outcomes in terms of statistical significance, it was also interesting to find a slightly higher score on team collaboration and instructional variables from the blended learning groups (Table 1). Such findings as team level learning outcomes are influenced by instructional variables in comparison to delivery forms (e.g., online and blended groups) that support the greater importance of instructional methods over media, such as different group forms in this study (Clark, 1990).

Findings from this study point to a couple of major themes of discussion that is important for improving current practices of utilizing learning groups through online and blended formats. First, selecting qualified instructors and designing or working with learning activities that are meaningful and applicable seem to be most important. Recommended strategies include: (a) making learning content applicable (Baldwin & Ford, 1988); (b) utilizing reflective learning activities to apply learning content to personal situations (Clark & Taylor, 1992); and (c) facilitating a structured learning process by step-by-step guided practices and individuals' independent practice to reinforce learning (Lim, 2002).

Second is the importance of learning support for team collaboration in technology-based groups. Online instruction has been challenged for the limited capability to engage learners in learning events. Variables such as the quality of the instructor and the quality of the learning activities were not helpful in understanding the level of team collaboration, but the result of the correlation and regression analyses showed that perceived workload, difficulties, and study time negatively correlated to the construct. And learning support was the only successful predictor in team collaboration variation. Findings supported that team collaboration was higher in blended learning groups at $p. <.05$ level. Daniels and Moore (2000) suggested blended learning as a potential solution for improving learners' perceived isolation in online environments through member collaborations. Researchers showed that a lack of belonging sense to learning communities keeps learners from developing shared feelings and emotional comfort in online environments (Oh & Lim, 2005, Rovai, 2002). To address this in online environments, Fortaine (2002) suggested that delivering vivid learning experiences and enhancing social presence as crucial. Similarly, Lim (2002) suggested several instructional techniques for online instruction including: (a) providing immediate feedback on learners' questions and timely technical support; (b) asking short questions checking the understanding of major learning content at frequent intervals during instruction; (c) sending learners' learning progress report on a regular basis to promote learners' motivation for learning achievement; and (d) using humor so the learners feel emotionally refreshed and engaged. Onsite instruction can have a place to manage such practices more efficient and immediate.

Muilenburg and Berge (2002) suggested more comprehensive institution-wide support, such as supportive administration, organizational change management, technical support, promotion of social interactions and open access, program evaluation, and student support services.

Limitations and Future Research

Using multiple dependent measures in this study (e.g., perceived competence, knowledge tests, and volition of application) showed that perception data inflated the results of both the correlations and the regression analysis. Before any generalizations are made upon the potential effectiveness of instructional variables in predicting group-level learning outcomes, refinements in measurement through using more objective measures, such as knowledge tests, improvement in work processes, and quantifiable accomplishments will be helpful. The data from a single population in a university setting may also reflect the unique institutional characteristics to the study findings.

Enhancing team level learning performance and learning collaboration is an important research area within the HRD discipline. In future studies, various refinements to the current design are warranted. Such refinements will be feasible through approaches, such as careful inclusion of important grouping categories (e.g., group work experiences, preferences and attitudes toward group-based learning), randomization of members across different group formats, if settings permit, and replication efforts across different topics, settings, discipline, and learners.

References

Allen, I. E., & Seaman, J. (2007). Online nation: Five years of growth in online learning. *Sloan Consortium Survey*. Retrieved November 3, 2007 from http://www.sloan-c.org/publications/survey/pdf/online_nation.pdf.

Aragon, S., & Johnson, S. (2002). Emerging roles and competencies for training in E-learning environments. *Advances in Developing Human Resources 4(*4), 424, 439.

Arbaugh, J. B. (2005). Is there an optimal design for on-Line MBA courses? *Academy of Management Learning & Education, 4*, 135-149.

Baldwin, T. T., & Ford, J. K. (1988). Transfer of training: A review and directions for future research. *Personnel Psychology, 4*(1), 63-105.

Berge, Z. L. (2002). Active, interactive, and reflective learning. *The Quarterly Review of Distance Education*, *3*(2), 181-190.

Carmen, J. M. (2002). *Blended learning design: Five key ingredients*. Retrieved August 18, 2004 from http://www.knowledgenet.com/pdf/Blended%20Learning%20Design_1028.PDF.

Clark, R. C. (1990). Instructional methods vs. instructional media. *Bulletin of the American Society for Information Science,* 16(6), 16-19.

Clark, R., & Taylor, D. (1992). Training problem solving skills using cognitive strategies: Novice versus expert problem solvers. *Performance and Instruction, 31*(3), 32-37.

Driscoll, M. (2002). *Web-based training: Creating e-learning experiences.* (2nd ed.). San Francisco: Jossey-Bass.

Daniels, H. L., & Moore, D. M. (2000). Interaction of Cognitive Style and Learner Control in a Hypermedia Environment. *International Journal of Instructional Media, 27*(4), 1-15.

Fontaine, G. (2002). Presence in "Teleland." In K. E. Rudestam & J. Schoenholtz-Read (Eds.), *Handbood of Online Learning: Innovations in Higher Education and Corporate Training* (pp. 21-52). Thousand Oaks, CA: Sage.

Foxon, M. J. (1997). The influence of motivation to transfer, action planning, and manager support on the transfer process. *Performance Improvement Quarterly, 10*(2), 42-63.

Garavaglia, P. L. (1993). How to ensure transfer of training. *Training & Development, 47*(10), 63-68.

Hannafin, M.J., Land, S.M., & Oliver, K. (1999). Open learning environments: Foundations and models. In C. Reigeluth (Ed.), *Instructional Design Theories and Models* (Vol II). Mahway, NJ: Erlbaum.

Hirumi, A. (2002). A Framework to Analyzing, Designing, and Sequencing Planned E-Learning Interactions. *Quarterly Review of Distance Education, 3*(2), 141-160.

Huett, J., Moller, L., & Young, J. (2004). Building support for online courses from faculty and students. *Quarterly Review of Distance Education, 5*(4), 253-264.

Johnson, D. W., & Johnson, R. T. (2006). Cooperation and the use of technology. In D. H. Jonassen (Ed.), *Handbook of research on educational communications and technology* (2 ed., pp. 785-811). Mahwah, NJ: Lawrence Erlbaum Associates.

Kearsley, G. (1997). *A guide to online education*. Retrieved September 2, 2005 from http://fcae.nova.edu/kearsley/online.html

LaPadula, M. (2001). A Comprehensive look at online student support services for distance learners. *American Journal of Distance Education, 17*(2), 119-129.

Lave, J., & Wenger, E. (1991). *Situated learning: Legitimate peripheral participation*. Cambridge, UK: Cambridge University Press.

Lee, W.W., Owens, D., & Benson, A. (2002). Design considerations for Web-based learning systems. *Advances in Developing Human Resources 4(*4405-423.

Lim, D. H. (2002). Perceived differences between classroom and distance education: Seeking instructional strategies for learning application. *International Journal of Educational Technology, 3*(1), Retrieved August 30, 2005 from http://www.outreach.uiuc.edu/ijet/v3n1/d-lim/index.html

Lim, D. H., Yoon, S. W., & Morris, M. L. (2006). Combined effect of instructional and learner variables on course outcomes within an online learning environment. *Journal of Interactive Online Learning, 5*(3), 255-269.

MacElroy, B. (1999). Comparing seven forms of online surveying. *Quirk's Marketing Research Review*. Retrieved March 2, 2006 from http://www.quirks.com/articles/article.asp?arg_ArticleId=510

Morabito, J., Sack, I., & Bhate, A. (1999). *Organization modeling: innovative architectures for the 21st century*. Upper Sadle River, NJ: Prentice Hall.

Muilenburg, L., & Berge, Z. (2002). *A framework for designing questions for online learning.* Retrieved September 6, 2007 from http://www.emoderators.com/moderators/muilenburg.html.

Nonaka, I., & Konno, N. (1998). The concept of "BA": Building a foundation for knowledge creation. *California Management Review, 40*(3), 40-54.

Oh, E., & Lim, D. H. (2005). Cross Relationships between Cognitive Styles and Learner Variables in Online Learning Environment. *Journal of Interactive Online Learning, 4*(1), 53-66.

Osguthorpe, T. R., & Graham, R. C. (2003). Blended learning environments. *Quarterly Review of Distance Education, 4*(3), 227-233.

Picciano, A. G. (2006). Blended learning: Implications for growth and access. *Journal of Asynchronous Learning Networks, 10*(3), 85-91.

Raziano, D.B., Jayadevappa, R., & Valenzula, D. (2001). E-mail versus conventional postal mail survey of geriatric chiefs. *The Gerontologist, 41*(6), 799-804.

Reece, M. and Lockee, B. (2005). Improving training outcomes through blended learning. *Journal of Asynchronous Learning Networks, 9*(4), 49-57.

Rosenberg, M.J. (2006). Beyond e-learning: Approaches and Technologies to Enhance Organizational Knowledge, Learning, and Performance. San Francisco: Pfeiffer.

Rovai, A. (2002). Sense of community, perceived cognitive learning, and persistence in asynchronous learning networks. Internet and Higher Education, 5(4), 319-332.

Singh, H., & Reed, C. (2001). *A white paper: Achieving success with blended learning: 2001 ASTD State of the industry report*. Alexandria, VA: American Society for Training & Development.

Sullivan, R. (2002). Transfer of learning: A guide for strengthening the performance of health care workers. Retrieved June 21, 2005, from http://www.reproline.jhu.edu/english/6read/ 6training/tol/pdf/tol.pdf

Thorne, K. (2003). *Blended learning: How to integrate online & traditional learning*. London: Korgan Page Ltd.

Yang, Y., & Cornelious, L. F. (2005). Online Journal of Distance Learning Administration, 8(1), 1-16. Retrieved August 20, 2007, from http://distance.westga.edu/~distance/ojdla/spring81/yang81.pdf

Yoon, S., & Lim, D.H. (2007). Strategic blending: A conceptual framework for improving learning and performance. *International Journal on E-Learning, 6*(3), 475-489.