Internet and Higher Education 13 (2010) 272–276

Contents lists available at ScienceDirect

Internet and Higher Education

Online or face-to-face learning? Exploring the personal factors that predict students' choice of instructional format

Anthony R. Artino Jr. *

Department of Preventive Medicine & Biometrics, Uniformed Services University of the Health Sciences, 4301 Jones Bridge Road, Bethesda, MD 20814-4712, United States

ARTICLE INFO

Keywords:
Choice
Achievement emotions
Motivational beliefs
Online learning
Satisfaction
Web-based training

ABSTRACT

Notwithstanding the growth of online learning, little is known about the personal factors that predict student decisions to enroll in online courses. This study examined the relations between several personal factors and students' choice of instructional format. After completing an online course, service academy undergraduates ($N = 564$) completed a survey that assessed their motivational beliefs (task value and self-efficacy), achievement-related emotions (enjoyment, boredom, and frustration), and satisfaction with the course. Results indicated that students who preferred to take future courses in an online format (as opposed to face-to-face) also reported greater confidence in their ability to learn online (self-efficacy) and greater satisfaction with their recent online learning experience. Logistic regression analysis confirmed and extended these findings, indicating that membership in the online preference group was predicted by higher self-efficacy and satisfaction, and lower task value beliefs. Taken together, results from this study provide researchers and practitioners with a better understanding of how several personal factors relate to students' choice of instructional format.

Published by Elsevier Inc.

1. Introduction

Over the last decade, institutions of higher education around the world have recognized online learning as a viable alternative (or supplement) to traditional, classroom instruction (Larreamendy-Joerns & Leinhardt, 2006; Tallent-Runnels et al., 2006). For example, according to the annual survey of 2500 U.S. colleges and universities conducted by the Sloan Consortium (Allen & Seaman, 2008), online enrollments have more than doubled from an estimated 1.6 million students in the fall of 2002 to 3.9 million students in the fall of 2007. What is more, in just one year (2006 to 2007) online enrollments in U.S. postsecondary institutions grew by 12.9%, a rate far greater than that of the overall higher education population (Allen & Seaman, 2008).

Notwithstanding the growth of online learning, little is known about the personal factors that predict student decisions to enroll in online courses. The purpose of the present study was to address this under-researched area by examining the relations between several personal factors and students' choice of instructional format (online versus face-to-face). In doing so, this study was meant to provide further insight into the theory, research, and practice of online learning. For example, corporate and military organizations require practical guidance as they try to persuade workers to participate in lifelong learning activities. These organizations, hoping to maintain their competitive advantage, want their workers to *choose* to update their knowledge and skills by participating in future online learning opportunities (Resnick, 2002). This study was meant to provide researchers and practitioners with greater understanding of the personal factors that may affect such choices.

2. Theoretical framework and study hypothesis

2.1. Theoretical framework

The model presented in Fig. 1 was adapted from Pekrun (2006) and forms the theoretical foundation of this study. This model takes a social-cognitive approach to academic motivation and emotion and proposes that contextual features of the learning environment affect students' motivational beliefs about their capabilities and the value of learning activities. In turn, these beliefs influence achievement emotions, such as enjoyment and boredom (Pekrun, 2006), which then link to various academic outcomes, such as academic achievement and satisfaction.

For this study, three components of the model were used to predict students' choice of instructional format: motivational beliefs, achievement emotions, and satisfaction.

2.1.1. Motivational beliefs

In terms of motivational beliefs, two constructs were employed. The first is self-efficacy for online learning, which can be defined as students' judgments of their capabilities to successfully perform academic tasks in an online environment (Bandura, 1997). Generally,

* Tel.: +1 301 319 6988; fax: +1 301 295 0933.
E-mail address: anthony.artino@usuhs.mil.

1096-7516/$ – see front matter. Published by Elsevier Inc.
doi:10.1016/j.iheduc.2010.07.005

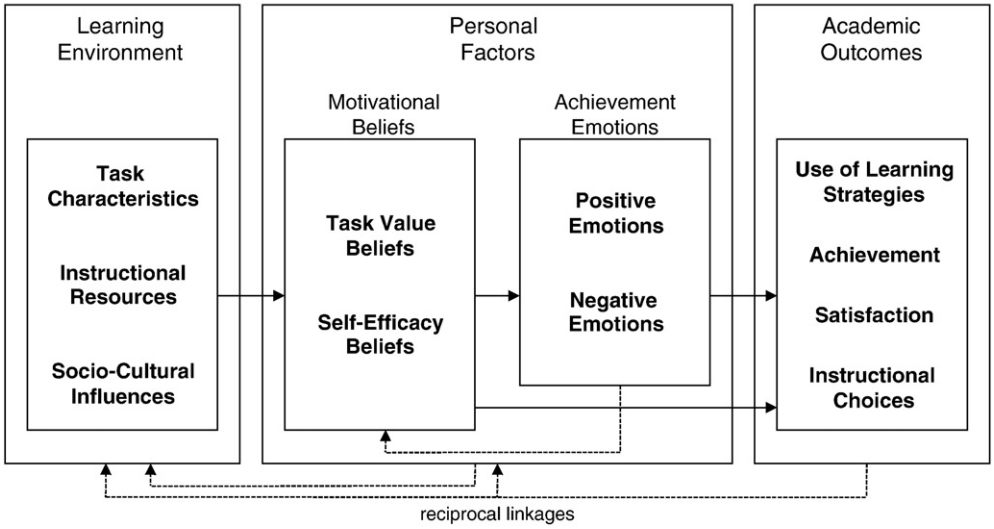

Fig. 1. A general social-cognitive model of academic motivation and emotion (adapted from Pekrun, 2006).

research has shown that self-efficacy beliefs positively predict many academic outcomes, including, for example, choice of scholastic activities (Bandura & Schunk, 1981), level of academic effort (Salomon, 1984), and school achievement (Moos & Azevedo, 2009; Robbins et al., 2004).

Task value is the other motivational belief examined in this study; it can be defined as students' judgments of how interesting, important, and useful a course is to them (Eccles & Wigfield, 2002). Research has typically demonstrated that task value beliefs, like self-efficacy, positively predict many important academic outcomes, such as cognitive engagement (Artino, 2009; Pintrich & De Groot, 1990), choice of future learning activities (Eccles & Wigfield, 2002), and school achievement (Artino & Stephens, 2009; Zusho, Pintrich, & Coppola, 2003).

2.1.2. Achievement emotions

Achievement emotions are the second set of personal factors in the conceptual model. Although limited, research and theory in this area has grown considerably in the last five years (Schutz & Pekrun, 2007). Pekrun (2006), for example, has proposed a control-value theory of achievement emotions. This social-cognitive theory defines achievement emotions as discrete emotions that are associated with achievement-related activities; for example, the enjoyment that results from learning something new or the boredom associated with an uninteresting lecture. According to Pekrun (2006), achievement emotions are determined, in part, by two motivational beliefs: competence perceptions (e.g., self-efficacy beliefs) and subjective value (e.g., task value beliefs). The limited empirical work using control-value theory has indicated that achievement emotions predict students' use of learning strategies (Artino, 2009), continuing motivation to participate in future learning activities (Artino, 2009), and academic achievement (Artino & Stephens, 2009; Pekrun, Goetz, Titz, & Perry, 2002).

2.1.3. Satisfaction

Satisfaction is the final construct examined in this study. Several scholars have identified student satisfaction as an important outcome in online settings (Dabbagh & Bannan-Ritland, 2005; Moore & Kearsley, 2005). In particular, course satisfaction has been found to relate to course attrition, as well as students' intentions to enroll in future online courses (Chiu, Sun, Sun, & Ju, 2007; Roca, Chiu, & Martinez, 2006). What is more, student satisfaction is often considered an essential outcome in job-related learning contexts (Klein, Noe, & Wang, 2006).

2.2. Study hypothesis

The purpose of this study was to examine the relations between several personal factors and students' choice of instructional format (online versus face-to-face). Based on a theoretical framework derived from social-cognitive theory, as well as previous empirical work, students' motivational beliefs (task value and self-efficacy), achievement emotions (enjoyment, boredom, and frustration), and satisfaction with a recent online course were hypothesized to predict their choice to take future courses in an online format.

3. Materials and methods

3.1. Participants

The participants were undergraduates (sophomores and juniors) from a U.S. service academy. For the purpose of this investigation, all students who participated in the online course described below ($N = 564$) were also invited to participate in the study. There were no exclusion criteria and participation in the study was completely voluntary.

3.2. Instructional materials

The instructional materials consisted of a self-paced online course developed by the U.S. Navy. Self-paced online courses are a specific type of online learning in which students use a web browser to access a learning management system and complete web-based instruction at their own pace. While completing such courses, students do not interact with an instructor or other students. In the present study, the self-paced online course was delivered through Navy *e*-Learning, the U.S. Navy's official learning management system. This system, which functions as the single entry portal for all distance learning in the U.S. Navy, is designed to provide anytime, anywhere education and training to the Navy's more than 1.2 million active-duty and reserve personnel (Persons, 2004).

The online course was the first part of a two-stage training program in aviation physiology and survival training, and the course was required for all service academy undergraduates. The online

course was composed of four, 40-minute lessons, and each lesson incorporated text, graphics, and video. In addition, each lesson ended with a quiz that consisted of 12 to 15 multiple-choice, declarative knowledge-type questions. Students who did not score at least 80% on any given quiz were required to return to the beginning of the lesson, review the material, and then retake the quiz. Quiz items were drawn from a pool of test questions, and thus each time an end-of-lesson quiz was attempted, the items were slightly different than the previous assessment. Upon successful completion of the online course, students advanced to the second stage of their training, which consisted of traditional instruction at a local training site.

3.3. Procedures

Participants were contacted via email by their service academy instructor and were provided with directions for accessing the learning management system and completing the self-paced online course. Once logged into the system, students had the ability to proceed through the course at their own pace, logging in and out as necessary until they successfully completed all four course lessons.

Approximately 3 weeks after completing the online course, service academy students arrived at a local training site for the face-to-face portion of their instruction. Prior to any classroom instruction, students were invited to complete an anonymous survey. The voluntary survey was administered as a paper-based, self-report questionnaire, and students did not receive compensation for completing the survey.

3.4. Instrumentation

The study instrument was composed of 59 items divided into two sections. Section 1 included 49 Likert-type items with a response scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Six subscales (27 items from section 1) were utilized in this study:

1. *Motivational beliefs*. Two subscales from Artino and McCoach (2008) were used to assess students' motivational beliefs: (a) a five-item *self-efficacy* subscale assessed students' confidence in their ability to learn the material presented in a self-paced, online format ($\alpha = 0.87$) and (b) a six-item *task value* subscale assessed students' judgments of how interesting, important, and useful the online course was to them ($\alpha = 0.86$). Sample items included "I am confident I can learn without the presence of an instructor to assist me" (self-efficacy) and "It was personally important for me to perform well in this course" (task value).
2. *Achievement emotions*. Three subscales from Pekrun, Goetz, and Perry (2005) were used to assess students' achievement emotions: (a) a four-item *enjoyment* subscale assessed students' course-related enjoyment ($\alpha = 0.89$), (b) a five-item *boredom* subscale assessed students' course-related boredom ($\alpha = 0.87$), and (c) a four-item *frustration* subscale assessed students' course-related frustration, annoyance, and irritation ($\alpha = 0.87$). Sample items included "While completing this online course I enjoyed myself" (enjoyment), "While completing this online course I was bored" (boredom), and "While completing this online course I felt frustrated" (frustration).
3. *Satisfaction*. Students' overall satisfaction with the online course was assessed with a three-item *satisfaction* subscale ($\alpha = 0.90$) adapted from Artino (2008a). Sample items included "Overall, I was satisfied with my online learning experience" and "This online course met my needs as a learner."

Section 2 of the survey was composed of eight background and demographic items, including one item used as a variable in this study:

Choice of instructional format. Students' choice of instructional format was assessed with a single self-report item: "In the future, the material covered in the online portion of this course could be completed in a traditional, face-to-face classroom instead of in an online course. If you had the choice, which instructional method would you prefer for learning about basic aviation physiology topics/concepts?" The response options were 1 (*face-to-face classroom*) or 2 (*online*).

4. Results

Results are divided into four main sections: (a) characteristics of the study participants, (b) findings from a confirmatory factor analysis aimed at validating the survey structure, (c) descriptive statistics and independent-samples *t* tests to explore differences between the two self-selected groups (face-to-face or online), and (d) logistic regression to investigate the unique contribution of the independent variables in predicting group membership (face-to-face or online).

4.1. Study participants

Among the 564 undergraduates enrolled in the online course, all students agreed to complete the anonymous survey (response rate = 100%). As indicated in Table 1, the sample included 435 men (77%) and 129 women (23%). It is worth noting that the high percentage of men in this sample is consistent with the undergraduate population at this service academy. The mean age of the participants was 20.5 years ($SD = 1.0$, range 18–25).

Of the 564 service academy participants, 361 (64%) indicated that, if they had the choice, they would rather take future aviation physiology courses in an online format. A chi square analysis revealed that the proportion of men and women in the two self-selected groups (face-to-face or online) did not differ: Pearson $\chi^2\,(1) = 0.67$, $p = 0.42$.

4.2. Confirmatory factor analysis

Confirmatory factor analysis was used to provide construct validity evidence for the survey subscales and to substantiate the hypothesized six-factor structure. All fit indices were deemed adequate and fell within recommended standards (see Hu & Bentler, 1999). The chi square was statistically significant, χ^2 (309, $N = 564$) = 927.99, $p < 0.001$; however, the normed chi square (3.00) was $\leq$ 3.00, the comparative fit index (0.93) was just below 0.95, and the root-mean-square error of approximation (0.06) was $\leq$ 0.06, all indicating that the model fit the data well.

4.3. Descriptive statistics and independent-samples t tests

Final subscale statistics are presented in Table 2; Cronbach's alphas for the subscale scores were quite good, ranging from 0.86 to 0.90 (Gable & Wolfe, 1993). Table 2 also presents results from the independent-samples *t* tests. To control the type I error rate, a Bonferroni adjustment was used ($\alpha = 0.05/7 = 0.007$). The *t*-test results revealed statistically significant group differences on two of the seven variables (note: final grade was also included in these

Table 1
Demographic information for the total sample and the two self-selected groups (face-to-face or online).

Participants			Demographics					
			Gender				Age	
			Male		Female			
	N	%	*n*	%	*n*	%	*M*	*SD*
Total sample	564	100	435	77	129	23	20.5	1.0
Face-to-face	188	33	148	79	40	21	20.6	1.1
Online	361	64	273	76	88	24	20.5	0.9

Table 2
Cronbach's alpha, means (standard deviations), and independent-samples t and Cohen's d statistics for the seven measured variables by self-selected group.

Variable	Cronbach's alpha	Overall ($N=548$)	Self-selected group		t statistic	Cohen's d
			Online ($n=360$)	Face-to-Face ($n=188$)		
Task value	0.86	3.84 (0.68)	3.81 (0.68)	3.88 (0.69)	−1.18	−0.10
Self-efficacy	0.87	3.92 (0.70)	4.01 (0.67)	3.74 (0.75)	4.05*	0.40
Enjoyment	0.89	3.09 (0.87)	3.10 (0.87)	3.07 (0.86)	0.27	0.02
Boredom	0.87	2.66 (0.86)	2.66 (0.85)	2.66 (0.86)	0.00	0.01
Frustration	0.87	2.39 (0.94)	2.35 (0.92)	2.46 (0.97)	−1.30	−0.12
Satisfaction	0.90	3.69 (0.80)	3.78 (0.77)	3.50 (0.81)	3.97*	0.36
Final grade	–	89.33 (3.88)	89.40 (3.78)	89.30 (4.14)	0.30	0.03

Note. Bonferroni adjustment was used to control for inflation of type I error associated with multiple comparisons: alpha = 0.05/7 = 0.007. The self-reported variables were measured on a 5-point, Likert-type agreement scale. The final grade variable ranged from 80 to 100. Due to missing data, the overall N reported is less than the 564 students who completed the survey.
* $p<0.001$.

analyses). Specifically, students who preferred to take future courses in an online format reported higher levels of self-efficacy for learning online ($p<0.00$ l, $d=0.40$) and greater satisfaction with their recent online learning experience ($p<0.00$ l, $d=0.36$). The effect sizes for these differences were moderate (Cohen, 1988).

4.4. Logistic regression analysis

Logistic regression was used to investigate the unique contribution of the independent variables in predicting group membership (face-to-face = 1, online = 2). In this analysis, age, gender, and final grade were included to control for their potential effects on the outcome.

Table 3 provides a summary of the logistic regression analysis. As indicated, these results not only supported but also extended the findings garnered from the independent-samples t tests. All model fit statistics improved with the addition of the nine variables to the model. In particular, 67.7% of students were correctly classified (−2 log likelihood = 636.85; χ^2 (9) = 39.05, $p<0.001$) and the likelihood ratio R^2 (i.e., the proportional reduction in deviance produced by the final model when compared to the null model) was 0.06. Three variables were statistically significant predictors of group membership: task value ($b=-0.57$, $p<0.01$), self-efficacy, ($b=0.43$, $p<0.01$), and satisfaction ($b=0.64$, $p<0.001$). As indicated by the odds ratios, membership in the online preference group was 1.53 and 1.89 times more likely for every one unit increase in the self-efficacy and satisfaction subscales, respectively. Alternatively, task value (despite not being statistically significantly different at the mean level) was a significant predictor of group membership; that is, membership in the online group was 0.56 times *less* likely for every one unit increase in the task value subscale.

Table 3
Model summary for the logistic regression model with nine independent variables predicting group membership (face-to-face = 1, online = 2).

Variable	b	SE	OR	Model fit statistics			
				−2 Log likelihood	Likelihood ratio χ^2	Likelihood ratio R^2	% Correctly classified
Age	−0.08	0.09	1.34	636.85	39.05**	0.06	67.7
Gender	0.29	0.23	0.92				
Task value	−0.57*	0.19	0.56				
Self-efficacy	0.43*	0.15	1.53				
Enjoyment	−0.15	0.16	0.86				
Boredom	0.15	0.17	1.16				
Frustration	−0.07	0.15	0.93				
Satisfaction	0.64**	0.17	1.89				
Final grade	−0.01	0.03	1.34				

Note. b = unstandardized regression coefficient; OR = odds ratio. The −2 log likelihood for the null model = 675.90; percent correctly classified in the null model = 65.8.
** $p<0.001$.
* $p<0.01$.

5. Discussion

Using a social-cognitive approach, this study examined the relations between several personal factors and students' choice of instructional format. Taken together, findings partially confirmed the hypothesis that motivational beliefs, achievement emotions, and satisfaction would predict students' choice to take future courses in an online format. Specifically, results indicated that students' instructional choice was closely related to their self-efficacy beliefs and overall satisfaction with a recent online course. These findings support and extend prior research in online learning environments, suggesting that students' confidence and satisfaction are important outcomes in online situations — outcomes that may ultimately influence their decisions to take future online courses.

Although it is clear that self-efficacy (in particular, self-efficacy for learning online) is positively related to achievement outcomes (Moos & Azevedo, 2009), it seems that self-efficacy beliefs may also positively influence students' choice about future learning activities. That is, as expected, students with greater confidence in their ability to learn online seem to be more inclined to choose online learning options. Likewise, it seems that students who are satisfied with a recent online learning experience are also more likely to choose online learning options in the future, a finding that is consistent with previous empirical work (Chiu et al., 2007; Roca et al., 2006). Accordingly, an important instructional implication is that online teachers may be able to positively impact students' instructional choices by first addressing their self-efficacy beliefs and online learning satisfaction (for specific online teaching recommendations see, for example, Artino, 2008b; Bangert, 2004; Rovai, 2004, 2007).

Also of interest in this study was the finding that membership in the online preference group was predicted by lower task value beliefs. This result suggests that individuals who find the content of a course interesting, important, and useful would rather take that course in a face-to-face format. Moreover, this result supports the notion that while students often appreciate the convenience of online learning, if given the choice, many would rather complete courses in a traditional, classroom-based format (Moore & Kearsley, 2005). Evidence from this study suggests that this preference for face-to-face learning may be related to the extent to which students value the course content. This finding is especially interesting in light of previous empirical work which suggests that task value beliefs also predict superior academic performance, and the use of adaptive self-regulated learning strategies, in online situations (Artino, 2009; Artino & Stephens, 2009). Thus, somewhat paradoxically, students with higher task value beliefs for a particular course seem to prefer learning in a traditional classroom (as opposed to an online learning environment); although it seems these same students may actually function *more effectively* in online settings than students with lower task value beliefs. The implications of this finding are not entirely clear and may warrant further investigation.

5.1. Limitations and future directions

Two important limitations should be considered when interpreting the current results. First, this study used a very simple, cross-sectional, post-only design (Shadish, Cook, & Campbell, 2002). Although cross-sectional designs often benefit from high construct validity (Judd & Kenny, 1981), findings from this correlational study are limited with respect to the inferences that can be drawn. Accordingly, longitudinal studies are needed to determine the extent to which the personal factors examined here predict future learning choices. A second limitation of this study is the extremely homogenous sample surveyed. Although service academy undergraduates are similar to their civilian university counterparts in many respects, there are some important differences. For instance, most service academy undergraduates are considered high-ability students, the majority are men, and none are physically disabled (United States Naval Academy, 2007). Therefore, results from this study have limited generalizability beyond the present sample and should be replicated in more heterogeneous online learning environments within higher education (Shadish et al., 2002).

6. Conclusions

Recent trends in higher education suggest that online learning will continue to be an important part of lifelong learning in the modern age. Despite the central role of online learning, few empirical studies have examined the personal factors that predict students' preference for online formats. This investigation addressed this gap in the literature, and its findings provide researchers and practitioners with a better understanding of how several personal factors relate to students' instructional choices. From a practical standpoint, this information may be valuable for organizations as they work to encourage their employees' participation in lifelong learning activities via the web. In an ever-changing global economy, participation in such lifelong learning is often considered a requirement for modern workers hoping to maintain their competence and competitive advantage (Fletcher, Tobias, & Wisher, 2007).

Acknowledgements

An earlier version of this manuscript was presented at the 2010 annual meeting of the American Educational Research Association, Denver, CO.

The author is a military service member. The views expressed in this article are those of the author and do not necessarily reflect the official policy or position of the Department of the Navy, Department of Defense, nor the U.S. Government.

References

Allen, I. E., & Seaman, J. (2008). *Staying the course: Online education in the United States, 2008.* Retrieved November 20, 2008, from http://www.sloan-c.org/publications/survey/pdf/staying_the_course.pdf

Artino, A. R. (2008a). Motivational beliefs and perceptions of instructional quality: Predicting satisfaction with online training. *Journal of Computer Assisted Learning*, *24*, 260–270.

Artino, A. R. (2008b). Promoting academic motivation and self-regulation: Practical guidelines for online instructors. *TechTrends*, *52*(3), 37–45.

Artino, A. R. (2009). Think, feel, act: Motivational and emotional influences on military students' online academic success. *Journal of Computing in Higher Education*, *21*, 146–166.

Artino, A. R., & McCoach, D. B. (2008). Development and initial validation of the online learning value and efficacy scale. *Journal of Educational Computing Research*, *38*, 279–303.

Artino, A. R., & Stephens, J. M. (2009). Beyond grades in online learning: Adaptive profiles of academic self-regulation among Naval Academy undergraduates. *Journal of Advanced Academics*, *20*, 568–601.

Bandura, A. (1997). *Self-efficacy: The exercise of control.* New York: W. H. Freeman and Company.

Bandura, A., & Schunk, D. H. (1981). Cultivating competence, self-efficacy, and intrinsic interest through proximal self-motivation. *Journal of Personality and Social Psychology*, *41*, 586–598.

Bangert, A. W. (2004). The seven principles of good practice: A framework for evaluating online teaching. *Internet and Higher Education*, *7*, 217–232.

Chiu, C., Sun, S., Sun, P., & Ju, T. L. (2007). An empirical analysis of the antecedents of web-based learning continuance. *Computers and Education*, *49*, 1224–1245.

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences*, 2nd ed. Hillsdale, NJ: Lawrence Erlbaum Associates.

Dabbagh, N., & Bannan-Ritland, B. (2005). *Online Learning: Concepts, strategies, and application.* Upper Saddle River, NJ: Pearson Education, Inc.

Eccles, J. S., & Wigfield, A. (2002). Motivational beliefs, values, and goals. *Annual Review of Psychology*, *53*, 109–132.

Fletcher, J. D., Tobias, S., & Wisher, R. A. (2007). Learning anytime, anywhere: Advanced distributed learning and the changing face of education. *Educational Researcher*, *36*, 96–102.

Gable, R. K., & Wolfe, M. B. (1993). *Instrument development in the affective domain: Measuring attitudes and values in corporate and school settings.* Boston: Kluwer Academic Publishers.

Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling*, *6*, 1–55.

Judd, C. M., & Kenny, D. A. (1981). *Estimating the effects of social interventions.* Cambridge: Cambridge University Press.

Klein, H. J., Noe, R. A., & Wang, C. (2006). Motivation to learn and course outcomes: The impact of delivery mode, learning goal orientation, and perceived barriers and enablers. *Personnel Psychology*, *59*, 665–703.

Larreamendy-Joerns, J., & Leinhardt, G. (2006). Going the distance with online education. *Review of Educational Research*, *76*, 567–605.

Moore, M. G., & Kearsley, G. (2005). *Distance education: A systems view*, 2nd ed. Belmont, CA: Wadsworth.

Moos, D. C., & Azevedo, R. (2009). Learning with computer-based learning environments: A literature review of computer self-efficacy. *Review of Educational Research*, *79*, 576–600.

Pekrun, R. (2006). The control-value theory of achievement emotions: Assumptions, corollaries, and implications for educational research and practice. *Educational Psychology Review*, *18*, 315–341.

Pekrun, R., Goetz, T., & Perry, R. P. (2005). *Achievement emotions questionnaire (AEQ): User's manual.* Munich, Germany: University of Munich, Department of Psychology.

Pekrun, R., Goetz, T., Titz, W., & Perry, R. P. (2002). Academic emotions in students' self-regulated learning and achievement: A program of qualitative and quantitative research. *Educational Psychologist*, *37*, 99–105.

Persons, D. (2004). *Navy e-Learning migrates to Navy Knowledge Online.* November. Retrieved April 20, 2009, from http://www.news.navy.mil/search/display.asp?story_id=15816.

Pintrich, P. R., & De Groot, E. V. (1990). Motivational and self-regulated learning component of classroom academic performance. *Journal of Educational Psychology*, *82*, 33–40.

Resnick, M. (2002). Rethinking learning in the digital age. In G. Kirkman (Ed.), *The global information technology report: Readiness for the networked world*. London: Oxford University Press.

Robbins, S. B., Lauver, K., Le, H., Davis, D., Langley, R., & Carlstrom, K. (2004). Do psychosocial and study skill factors predict college outcomes? A meta-analysis. *Psychological Bulletin*, *130*, 261–288.

Roca, J. C., Chiu, C., & Martinez, F. J. (2006). Understanding e-learning continuance intention: An extension of the Technology Acceptance Model. *Human-Computer Studies*, *64*, 683–696.

Rovai, A. P. (2004). A constructivist approach to online college learning. *Internet and Higher Education*, *7*, 79–93.

Rovai, A. P. (2007). Facilitating online discussions effectively. *Internet and Higher Education*, *10*, 79–88.

Salomon, G. (1984). Television is "easy" and print is "tough": The differential investment of mental effort in learning as a function of perceptions and attributions. *Journal of Educational Psychology*, *76*, 647–658.

Schutz, P. A. & Pekrun, R. (Eds.). (2007). *Emotion in education*. San Diego, CA: Academic Press.

Shadish, W. R., Cook, T. D., & Campbell, D. T. (2002). *Experimental and quasi-experimental designs for generalized causal inference.* Boston: Houghton-Mifflin.

Tallent-Runnels, M. K., Thomas, J. A., Lan, W. Y., Cooper, S., Ahern, T. C., Shaw, S. M., et al. (2006). Teaching courses online: A review of the research. *Review of Educational Research*, *76*, 93–135.

United States Naval Academy (2007). *Class of 2011 profile [Fact sheet].* Retrieved January 18, 2008, from http://www.usna.edu/Admissions/documents/Classof2011Profile.pdf

Zusho, A., Pintrich, P. R., & Coppola, B. (2003). Skill and will: The role of motivation and cognition in the learning of college chemistry. *International Journal of Science Education*, *25*, 1081–1094.