

Achievement and Satisfaction in an Online versus a Traditional Health and Wellness Course

Anna Block

Laboratory Technician
Department of Exercise and Sport Science
University of Wisconsin – La Crosse
La Crosse, WI USA
atblock@hotmail.com

Brian Udermann

Associate Professor and Director of Online Education
Department of Exercise and Sport Science
University of Wisconsin – La Crosse
La Crosse, WI USA
udermann.bria@uwlax.edu

Manny Felix

Assistant Professor
Department of Exercise and Sport Science
University of Wisconsin – La Crosse
La Crosse, WI USA
reineke.davi@uwlax.edu

David Reineke

Associate Professor
Department of Mathematics
University of Wisconsin – La Crosse
La Crosse, WI USA
reineke.davi@uwlax.edu

Steven R. Murray

Full Professor
Department of Kinesiology
Mesa State College
Grand Junction, CO USA
smurray@mesastate.edu

Abstract

Online education has become a rapidly developing educational alternative. Many universities deliver online courses across a variety of disciplines. However, few studies have evaluated the efficiency of online health and wellness courses. The purpose of this study was to examine achievement and satisfaction in students who participated in an online or a traditional lecture-based health and wellness class. Eighteen subjects in an online health and wellness class and nineteen subjects in a traditional lecture-based class participated in this study. Outcomes included performance on a 50-point written exam (pre- and posttest) and three regular course exams. All participants completed a satisfaction survey. The online participants completed a perception survey. No significant differences were found between online and traditional courses in the 50-point written exam or in the three regular course exams. Significant differences were found in age, employment status, year in school, and the degree to which participants felt that they were encouraged to participate in class discussions. Overall, perceptions of the online course were positive. Data suggests that an online health and wellness class was an acceptable alternative to a traditional lecture-based class, when achievement on exams was the primary outcome measure.

Key Words: distance education, physical education, lecture-based, knowledge acquisition, no significant difference, perceptions, employment status, age, class standing.

Introduction

Alternatives to traditional lecture-style delivery of education have been offered for many years (Huang, 1996-1997). These alternatives, called distance education, became available with the development of a reliable mail delivery system during the late nineteenth century (Ascough, 2002; Rumble, 2001). Though

much has been written pertaining to online learning, the majority of articles are opinion pieces, “how-to” articles, or second-hand reports that do not include original subject-based research (Merisotis & Phipps, 1999). Minimal original research examining online instruction in physical education and health and wellness courses is available (Bennett & Green, 2001). Thus, the purpose of this study was to explore whether any differences exist between the achievement and satisfaction levels of students taking a traditional lecture-based health and wellness course and students taking a comparable online course.

Literature Survey

Distance learning has been defined as any approach to education delivery that replaces the same-time, same-place, face-to-face environment of a traditional classroom (Volery & Lord, 2000). According to this definition, distance education can take many forms such as mail correspondence, open- and closed-circuit audio and video presentations, telephone communications, and the increasingly popular Internet. With these alternatives, however, students are able to attain an education even if they live a great distance from an educational institution or when their respective campus does not offer desired courses (McLester, 2002). Moreover, student athletes and non-traditional students have been able to complete courses that otherwise would have been impossible because of their inability to attend regularly scheduled classes.

Advances in computer technology, particularly the development of the Internet, have improved the delivery of distance education. Many universities are developing and offering a multitude of courses designed to be taught using Internet services. With broadening horizons and the expanding utility of Internet resources available to universities and consumers, the potential for this form of education and life-long learning has become more accessible. In fact, from 2003 to 2004, online learners in the United States increased from 1.98 million to 2.35 million (Allen & Seamen, 2005).

Distance education is appealing for many reasons. Foremost, online courses do not require regular attendance at scheduled lectures. Thus, those working full-time or who have other responsibilities are drawn to online courses, as is the case with many non-traditional students. Another convenience of online education is the ability for students to learn materials at their own pace. Many online courses are presented in an asynchronous manner—where materials are time- and place-independent—allowing students to access course materials at any time (Newlin & Wang, 2002). In these instances, instructors can be contacted with a simple email, and students can receive feedback quickly. Online courses usually still have project due dates and examinations, but these courses generally provide students with flexible course options.

Although the advantages of online education are appealing, there are also disadvantages. For those who have never taken an online course or who have little computer experience, an online course may be frightening. For example, Wang, Newlin, and Tucker (2001) found that many Web-based students expressed feelings of intense anxiety about the technology. There are also disadvantages in online courses for individuals who need a great deal of structure. Online courses are frequently self-paced and those lacking self-discipline may struggle. However, these advantages and disadvantages are highly individual and should be considered by each individual learner.

Methods

Participants

Participants included students enrolled in sections of either a traditional health and wellness lecture course ($n = 447$) or an online health and wellness course ($n = 19$). The online participants included all 18 students who completed the study materials; 19 students from the traditional lecture-based health and wellness course were randomly selected—because of sample size difference between the two courses—from the participants ($n = 372$) who completed all portions of the testing.

The procedures for this study were reviewed and approved by the sponsoring university's Institutional Review Board for the protection of human subjects. Written informed consent was obtained prior to data collection and all participants were given the opportunity to complete all testing materials.

Procedures

The traditional course format included two lectures per week via PowerPoint and a lab portion once per week in the institution's field house. To begin each lecture, a 10-question review was completed from the information presented during the previous lecture. The lab portion included various physical activities; students completed six activity-related lab assignments. Three written, in-class examinations were given throughout the course.

The online course format included the same two PowerPoint presentations each week plus an additional document of narrative information for each presentation. Materials were presented using the Desire2Learn course management system (Desire2Learn Inc., Ontario, Canada). Weekly quizzes were given online using the same questions from the daily reviews in the traditional course. Students participated in weekly discussions using an online forum. Instead of weekly labs, students submitted weekly physical activity logs and were required to participate in three days of cardiovascular activity and one day of resistance exercise. The traditional course lab assignments were slightly modified for online presentation. The same three written examinations were given and online students were required to come to campus for examinations.

Demographic information was collected to obtain descriptive characteristics for the students in the two groups. A pretest examination was given to assess the participants' knowledge of course content prior to presentation of any course materials. The pretest examination contained 50 randomly selected multiple-choice questions from the three written examinations given during the previous semester of the traditional lecture-based health and wellness course. A posttest examination, composed of the same 50 questions as the pretest, was given at the completion of the course. Additional measurements of course achievement were collected including individual participant's scores from the three in-class written exams and the overall letter grade received for the course.

All participants completed a Satisfaction survey, which consisted of a modified Students' Evaluation of Educational Quality (SEEQ) survey (Centra, 1993). The SEEQ uses a 5-point Likert scale and the following variables: strongly agree (SA) 5, agree (A) 4, neutral (N) 3, disagree (D) 2, and strongly disagree (SD) 1. The participants completed this portion of the study upon termination of the course, after completing the posttest examination. A final survey, given only to the online participants, asked questions to determine their perceptions toward the online course. These questions used the same 5-point Likert scale as the Satisfaction survey. This measurement was completed at the termination of the course after both the posttest examination and the Satisfaction survey had been completed.

Statistical Analyses

All data were analyzed using the statistical software package SPSS (version 12.0). The mean distance from campus and the mean year in school for students in the online course were compared to the corresponding means in the traditional course using independent samples *t*-test. Because of the non-normality of age, a Mann-Whitney test was performed to determine if a difference in age existed between traditional and online students. Distributions for sex, employment status, and living arrangements across treatment groups were compared using a chi-square test for independence. Cross tabulations and chi-square tests were obtained to provide the distribution and comparison of responses to each question for the online and traditional students. The mean overall satisfaction of the online students was compared to that of the traditional students using a pooled *t*-test for independent samples at a level of significance of 0.05. Average scores of the twenty-five individual measures of the Satisfaction survey were compared for online vs. traditional courses using *t*-tests, each using a Bonferroni-corrected level of significance of 0.002, yielding an overall level of significance of 0.05. Frequency tables of the Perception measure of the online course also were constructed.

Results

In the traditional lecture-based health and wellness course, 372 (83.2%) students completed all requested study measures and 19 of these were randomly chosen for participation, while 18 of the 19 (94.74%) students in the online course completed all requested measures.

Significant differences ($P < 0.0005$) were noted between the ages of the students in the two courses, where the online course mean age (\pm SD) was 21.94 ± 7.62 , and the traditional course mean age was 18.47 ± 0.61 . A significant difference ($P < 0.0005$) existed between the groups in class standing (year in school), as the online students (2.35 ± 0.862) were further along in their education than the traditional students (1.16 ± 0.501). The scale used for this measure was as follows: 1 = freshman, 2 = sophomore, 3 = junior, and 4 = senior. A significant difference ($P = 0.034$) was found in employment status, where 72.2% of the students in the online course were employed part-time compared to only 36.8% of the traditional students. Also, only 22.2% of the online students were not employed, compared to 63.2% of the traditional students. One student (5.6%) in the online course was employed full-time, while none of the traditional students were employed full-time. No significant differences were found in sex ($P = 0.80$) or living arrangements ($P = 0.057$) between the online and traditional courses. Table 1 presents the demographic information.

Table 1. Demographic Information of Online and Traditional Students

	Online	Traditional
Age (years)*	21.94 ± 7.62	$18.47 \pm .61$
Sex	Male = 5, Female = 13	Male = 6, Female = 13
Year in School*#	$2.35 \pm .86$	$1.16 \pm .50$
On-Campus Housing	55.6%	84.2%
Employment Status*	Part Time: 72.2% Not Employed: 22.2% Full Time: 5.6%	Part Time: 36.8% Not Employed: 63.2% Full Time: 0%

*Reached 0.05 level of significance

#Scale: 1 = freshman, 2 = sophomore, 3 = junior, 4 = senior

No significant differences were noted in pretest score ($P = 0.348$), posttest score ($P = 0.461$), the pretest-posttest score difference ($P = 0.975$), or any of the three written examinations ($P = 0.381$, $P = 0.840$, and $P = 0.670$ for exams 1, 2, and 3, respectively); see Table 2.

Table 2. Course Performance of Online and Traditional Students

	Online (mean \pm SD)	Traditional (mean \pm SD)
Pretest Score	23.56 (\pm 4.29)	22.37 (\pm 3.27)
Posttest Score	33.61 (\pm 4.10)	32.47 (\pm 5.09)
Pretest Posttest Difference	10.06 (\pm 2.90)	10.10 (\pm 6.13)
Written Exam 1	40.22 (\pm 5.00)	41.63 (\pm 3.34)
Written Exam 2	41.11 (\pm 5.58)	40.79 (\pm 3.95)
Written Exam 3	42.11 (\pm 5.70)	41.42 (\pm 3.95)
Final Course Percentage*	87.13 (\pm 11.03)	90.86 (\pm 4.31)

*Presented for informative purposes only - grading system differed and thus results cannot be directly compared

Mean course satisfaction scores between the online (3.73 ± 0.857) and traditional (3.62 ± 0.937) courses ($P = 0.515$) were not significantly different. However, within the individual satisfaction questions, with a Bonferroni-corrected level of significance of 0.002, a significant difference ($P < 0.001$) was found between the online and traditional courses when the participant was asked whether "students were encouraged to participate in class discussions." The online students indicated that they felt more encouraged to participate in class discussions than the traditional students. Though all other

variables did not reach the corrected level of significance, many showed a trend toward significance. These trends, where the *P* value indicates higher satisfaction, can be found in Table 3, and all satisfaction information is presented in Table 4.

A survey assessing student perceptions was completed by the online students; see Table 5. Generally, students had positive perceptions of the online course. When asked if they had learned something that encouraged them to modify their lifestyles, 94.1% of students answered A or SA. The majority of students chose the online course for various personal reasons; it fit with the individual's class schedule (88.9% A or SA), the class fit around the individual's work schedule (72.2% A or SA), it was convenient and flexible (88.9% A or SA), and the individual wanted to try taking an online class (82.4% A or SA). Students also thought that their indirect cost of learning (e.g., gas, travel time) was reduced by taking the course online (72.2% A or SA). Also, most students (83.3% A or SA) felt that both the online and traditional sections of the health and wellness course should be offered. When asked if they would take another course online, 66.6% of students reported that they would.

Table 3. Satisfaction Questions nearing Significance

	Online (<i>P</i>)	Traditional (<i>P</i>)
"I have learned and understood the subject materials in the class"	0.011	
"Students felt welcome in seeking help or advice"	0.009	
"Instructor(s) were adequately accessible to students during office hours or by appointment"	0.037	
"Students were invited to share their ideas and knowledge"	0.009	
"Students were encouraged to express their own ideas and/or question the instructors"	0.021	
"Material explanation was clear"		0.027
"Course content prepared me for the exams."		0.013
"Methods of evaluating student work were fair and appropriate"		0.029
"Examinations/grades materials tested class content as emphasized"		0.034

P- value indicates higher satisfaction level for the particular participant group

Discussion

The present findings indicated that both the online and traditional course formats effectively presented materials and enhanced knowledge levels of students enrolled in a health and wellness course. No significant differences were found in either achievement or satisfaction between the online and traditional groups. Moreover, no significant differences were found with sex or any other achievement measures. Age, year in school, and employment status, however, were found to significantly differ between the two groups.

No significant differences were noted between achievement scores in the pretest, posttest, pretest-posttest difference, or mean written exam scores between the online and traditional courses. Thus, it can be suggested that both the online and the traditional courses provided the same degree of knowledge acquisition. This finding has been somewhat controversial in the literature, as some studies have found that there is no difference while others have found that either online or traditional courses perform better than the other. It may be that certain courses cannot effectively present materials in an online format (Allen et al., 2004). For instance, a course in social work history (Faux & Black Hughes, 2000) found that there was a significant difference between the traditional and online groups, where the traditional group scored significantly higher than the online group on posttest.

In a meta-analysis, Allen et al. (2004) examined the effectiveness of distance education versus traditional classes. The results indicated a small overall improvement in performance for the distance education courses.

The majority of the literature has found no significant difference in student knowledge gains between online and traditional courses (Dellana, Collins & West, 2000; Ashkeboussi, 2001; Navarro & Shoemaker, 2000; Lockyer, Patterson & Harper, 1999; Davies & Mendenhall, 1998). Yet, Merisotis and Phipps (1999) have indicated that a few researchers have been quick to critique the no significant difference finding. At this point, though, it appears that online courses provide a means for comparable learning potential on outcome measures.

Table 4. Satisfaction Information of Online and Traditional Courses

	Online (mean \pm SD)	Traditional (mean \pm SD)	P-value
Satisfaction Mean	3.73 \pm .58	3.62 \pm .40	.515
The class was intellectually challenging and stimulating	3.83 \pm .86	3.11 \pm .94	.143
I learned something which I consider valuable	4.06 \pm .64	3.95 \pm .62	.354
I intend to use the information learned in this class in my daily life	4.11 \pm .76	4.00 \pm .67	.841
My interest in the subject has increased as a consequence of this class	3.67 \pm .90	3.79 \pm .92	.117
I have learned and understood the subject materials in the class ⁺	4.00 \pm .97	3.89 \pm .32	.011
Material explanation was clear ⁺	3.06 \pm 1.11	4.05 \pm .40	.027
Course materials were well prepared and carefully explained	3.00 \pm 1.14	3.84 \pm .60	.081
Course content prepared me for the exams ⁺	3.28 \pm 1.32	3.84 \pm .37	.013
Proposed objectives agreed with those actually taught, so I knew where the class was going	3.94 \pm .80	3.89 \pm .46	.287
Students felt welcome in seeking help or advice ⁺	4.28 \pm .96	3.53 \pm .84	.009
Instructor(s) were adequately accessible to students during office hours or by appointment ⁺	4.33 \pm .77	3.53 \pm .77	.037
Examinations/graded materials tested class content as emphasized ⁺	3.50 \pm .99	3.89 \pm .32	.034
Feedback on examinations/graded material was valuable	3.33 \pm .77	3.63 \pm .68	.498
Methods of evaluating student work were fair and appropriate ⁺	3.56 \pm .98	3.79 \pm .42	.029
Required reading/texts were valuable	3.28 \pm 1.18	3.21 \pm .92	.579
Readings, homework, etc. contributed to appreciation and understanding of the subject	3.83 \pm .86	3.32 \pm .89	.054
Students were encouraged to participate in class discussions [*]	4.53 \pm .51	3.59 \pm .62	.001
Students were invited to share their ideas and knowledge ⁺	4.47 \pm .51	3.59 \pm .80	.009
Students were encouraged to ask questions and were given meaningful answers	4.12 \pm .60	3.65 \pm .61	.127
Students were encouraged to express their own ideas and/or question the instructors ⁺	4.29 \pm .59	3.59 \pm .62	.021
This class compared favorably with other classes at this institution	3.35 \pm 1.22	3.65 \pm .93	0.62
The lecture performance compared favorably with other lectures at this institution	3.06 \pm 1.03	3.88 \pm .78	.167
Subject difficulty compares to that of my other subjects	3.00 \pm 1.27	3.00 \pm 1.06	.884
Subject workload compares to that of my other subjects	3.24 \pm 1.03	2.59 \pm 1.00	.425
Subject pace was typical for my classes	3.59 \pm 1.06	3.53 \pm 0.72	.446

Scale: 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree

^{*} Significant at the 0.002 level, ⁺ Denotes trend at the 0.05 level

A consideration when providing educational alternatives is whether students enjoy the alternative forms. The current study found that mean satisfaction scores were not significantly different between sections. The only significant difference that resulted was the degree to which students believed that they were

encouraged to participate. This was similar to a finding in a meta-analysis (Allen, Bourhis, Burrell, & Mabry, 2002) that reported an overall slightly higher, non-significant level of satisfaction with traditional courses, but concluded that students found distance learning to be as satisfactory as traditional formats. The way in which the students in the present study participated varied slightly. The manner of participation in the traditional course was to ask questions and discuss in a very large lecture setting, while the online students participated in online discussions. Several studies (Newlin & Wang, 2002; Althaus, 1997; Huang, 1996-1997) have found online discussions to have positive effects on satisfaction and achievement. These sorts of online discussions provide a level of anonymity for students who may be intimidated in large lectures while also providing all students a platform to take as much time as they need when thinking about and discussing topics. This can lead to greater comprehension of materials and access into areas that in-class discussions many not provide time for. For these reasons, it may be beneficial for instructors to incorporate online discussions into a variety of different courses, not strictly those online. Althaus (1997) found that 67% of students felt that online discussions should be incorporated into other courses. Student satisfaction has also been evaluated through rating instructors. Wang and Newlin (2000) found that, in an instructor evaluation, the online and traditional courses were nearly identical, indicating that students were equally satisfied with how the courses were taught.

Table 5. Perceptions of Online Students

	Class Response
I learn better in an online class than in a traditional (lecture-based) class	27.8%
I learn the same in both environments	27.8%
I learn better when the pace is self managed	55.6%
I learn better when the class is structured by a teacher	38.9%
I feel like my indirect costs of learning were reduced with an online class	72.2%
I took this class because it fits with my class schedule	88.9%
I took this class because it fits around my work schedule	72.2%
I took this class because it was convenient and flexible	88.9%
I took this class because I wanted to try an online class	77.8%
I think that students should be required to take an online class	22.2%
I think that both class formats should be offered for HPR 105	83.3%
I think that online classes are a waste of time	77.8%*
I learned something in this class that has encouraged me to modify my lifestyle	94.1%
If I have the opportunity I will take another class online	66.6%

Percentages reported for the responses Agree and Strongly Agree, except for *, where the percentage is reported for Disagree and Strongly Disagree

Similar to current findings on age, Cooper (2001) found the average age of traditional students to be 23 and the average age of online students to be 27. Several authors (Karber, 2002; Eastman & Owens Swift, 2001; Volery & Lord, 2000) have noted that participants in online courses tend to be more mature students who elect to further their education. For example, Anstine and Skidmore (2005) indicated that their online M.B.A. course was reaching students who might not otherwise be in a graduate program, speculating that many of the students had children at home. Other studies, however, do not show this age trend (Sweeney & Ingram, 2001; Perez-Prado & Thirunarayanan, 2002). These studies found the majority of students to be in their early to mid-twenties. At the investigating institution, students register according to number of credits completed, and it is possible that the course was filled before younger students were able to register. Additional considerations for these differences include the possibility that different courses attract different age populations. Another possibility is that younger students were not comfortable with or interested in taking the course in an alternative manner. Older students may feel more prepared or may be more willing to take on the challenges of an online course as was shown

(Elvers, Polzella & Graetz, 2003) when 19 of 21 students reported that they disliked an online class because it was easy to get behind.

Similar to the findings of Cooper (2001), this study did not show any significant differences in sex between the online and traditional students. Yet, other researchers have found sex differences (Perez-Prado & Thirunarayann, 2002; Tu & McLissac, 2002). Again, as with age, different types of courses may be more appealing to one sex or may be needed for a course that is required for a major in which one sex typically dominates. The significant difference in sex could also be due to some other factor such as a skewed sex distribution at the university.

This study found a difference in employment status between online and traditional students. Employment status of students taking online courses has not been extensively evaluated in the literature; however, Cooper (2001) found similar results, and again this may be related to the age and maturity level of students who choose online courses.

The perceptions of the participating online students were positive. Previous results have indicated (Daugherty & Funke, 1998) that students appeared to be genuinely impressed by the variety and quality of learning materials offered in an online course. The authors believed that this led to an increased motivation to learn and that critical thinking was enhanced because of access to meaningful online resources. E-mail access was shown to have a positive influence as students thought that they received more individualized attention that helped offset the physical separation of student and instructor (Karber, 2002). The majority of students in each course format (Ashkeboussi, 2001) believed that each of the course formats allowed for effective interaction between students and instructors. Cooper (2001) found that 38% of students thought that they learned equally well in online and traditional environments and, similar to present results, when asked if they would take another online course, 81% indicated that they would. As in the current study, convenience and flexibility have been repeatedly cited (Cooper, 2001; Navarro & Shoemaker, 2000; Lockyer, Patterson, & Harper 1999) as reasons that students decide to take courses online.

Though the results of this study revealed no significant differences in nearly all variables explored, there are still many areas for further investigation. Larger samples of students should be recruited and samples should be randomized by group. Also, the courses should try to be kept exactly the same except for presentation method. However, this may be disadvantageous as a number of authors (Volery & Lord, 2000; Newlin & Wang, 2002; Bennett & Green, 2001) have indicated the need to structure online courses to meet their own unique needs and not simply duplicate traditional courses. These studies suggest that every effort should be made to ensure that course content be modified to be presented in the online format without compromising the substance and integrity of the course. Another area of interest includes that of individual learning styles (Diaz & Carnal, 1999; Sabry & Baldwin, 2003; Elvers, Polzella, & Graetz, 2003). Additionally, online courses need to be examined for an extended time to be sure that results are not due to the novelty of online courses (Bennett & Green, 2001).

Conclusions

The results of the present study indicate that academic achievement and student satisfaction were similar in both online and traditional lecture-based health and wellness courses. In addition, student perceptions regarding the online format were generally positive in nature.

REFERENCES

- Allen, I.E., & Seaman, J. (2005). *Growing by Degrees: Online Education in the United States, 2005*. The Sloan Consortium. Retrieved from <http://www.sloan-c.org>
- Allen, M., Bourhis, J., Burrel, N., & Mabry, E. (2002). Comparing student satisfaction with distance education to traditional classrooms in higher education: A meta-analysis. *The American Journal of Distance Education*, 16, 83-97.

- Allen, M., Mabry E., Mattery, M., Bourhis, J., Titsworth, S., & Burrell, N. (2004). Evaluating the effectiveness of distance learning: A comparison using meta-analysis. *Journal of Communication*, 54, 402-420.
- Althaus, S.L. (1997). Computer-mediated communication in the university classroom: An experiment with on-line discussions. *Communication Education*, 46, 158-174.
- Anstine, J., & Skidmore, M. (2005). A small sample study of traditional and online courses with sample selection adjustment. *Journal of Economic Education*, 36, 107-127.
- Ascough, R. (2002). Designing for online distance education: Putting pedagogy before technology. *Teaching Theology and Religion*, 5, 17-29.
- Ashkeboussi, R. (2001). A comparative analysis of learning experience in a traditional vs. virtual classroom setting. *The MAHE Journal*, 24, 5-21.
- Bennett, G., & Green, F.P. (2001). Student learning in the online environment: No significant difference. *Quest*, 53, 1-13.
- Centra, J.A. (1993). *Reflective faculty evaluation: Enhancing teaching and determining faculty effectiveness*. San Francisco: Jossey-Bass Inc.
- Cooper, L.W. (2001). A comparison of online and traditional computer applications classes. *THE Journal*, 28, 52-58.
- Daugherty, M., & Funke, B.L. (1998). University faculty and student perceptions of web-based instruction. *Journal of Distance Education*, 13, 21-39.
- Davies, R.S., & R. Mendenhall. 1998. *Evaluation comparison of online and classroom instruction for HEPE 129 – fitness and lifestyle management course*. ERIC, ED 427752.
- Dellana, S.A., Collins, W.H., & West, D. (2000). On-line education in a management science course – effectiveness and performance factors. *Journal of Education for Business*, 76, 43-47.
- Diaz, D.P., & Cartnal, R.B. (1999). Students' learning styles in two classes: Online distance learning and equivalent on-campus. *College Teaching*, 47, 130-135.
- Eastman, J.K., & Owens Swift, C. (2001). New horizons in distance education: The online learner-centered marketing class. *Journal of Marketing Education*, 23, 25-34.
- Elvers, G.C., Polzella, D.J., & Graetz, K. (2003). Procrastination in online courses: Performance and attitudinal differences. *Teaching of Psychology*, 30, 159-162.
- Faux, T.L., & Black Hughes, C. (2000). A comparison of using the internet versus lectures to teach social work history. *Research on Social Work Practice*, 10, 454-466.
- Huang, A.H. (1996-1997). Challenges and opportunities of online education. *Journal of Educational Technology Systems*, 25, 229-247.
- Karber, D.J. (2002). Comparisons and contrasts in traditional versus on-line teaching in management. *Higher Education in Europe*, 26, 533-536.
- Lockyer, L., Patterson, J., & Harper, B. (1999). Measuring effectiveness of health education in a web-based learning environment: A preliminary report. *Higher Education Research and Development*, 18, 233-246.
- McLester, S. (2002). Virtual learning takes a front row seat. *Technology and Learning*, 22, 24-36.
- Merisotis, J.P., & Phipps, R.A. (1999). What's the difference: Outcomes of distance vs. traditional classroom-based learning. *Change*, 31, 13-17.
- Navarro, P., & Shoemaker, J. (2000). Performance and perceptions of distance learners in cyberspace.

The American Journal of Distance Education, 14, 15-35.

Newlin, M.H., & Wang, A.Y. (2002). Integrating technology and pedagogy: Webinstruction and seven principles of undergraduate education. *Teaching of Psychology*, 29, 325-330.

Perez-Prado, A., & Thirunarayanan, M.O. (2002). A qualitative comparison of online and classroom-based sections of a course: Exploring student perspectives. *Education Media International*, 39, 195-202.

Rumble, G. (2001). Re-inventing distance education, 1971-2001. *International Journal of Lifelong Education*, 20, 31-43.

Sabry, K., & Baldwin, L. (2003). Web-based learning interaction and learning styles. *British Journal of Education Technology*, 34, 443-454.

Sweeney, J.C., & Ingram, D. (2001). A comparison of traditional and web-based tutorials in marketing education: An exploratory study. *Journal of Marketing Education*, 23, 55-62.

Tu, C.-H., & McIssac, M. (2002). The relationship of social presence and interaction in online classes. *The American Journal of Distance Education*, 16, 131-150.

Volery, T., & Lord, D. (2000). Critical success factors in online education. *The International Journal of Educational Management*, 14, 216-223.

Wang, A.Y., & Newlin, M.H. (2000). Characteristics of students who enroll and succeed in psychology web-based classes. *Journal of Educational Psychology*, 92, 137-143.

Wang, A.Y., Newlin, M.H., & Tucker, T.L. (2001). A discourse analysis of online classroom chats: Predictors of cyber-student performance. *Teaching of Psychology*, 28, 222-226.

Manuscript received 30 Nov 2007; revision received 20 Feb 2008.



This work is licensed under a

[Creative Commons Attribution-NonCommercial-ShareAlike 2.5 License](https://creativecommons.org/licenses/by-nc-sa/2.5/)