HEALTH

Examination of a Physical Education Personal Health Science Course: Face-to-Face Classroom Compared to Online Hybrid Instruction

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Abstract

Many studies have compared traditional face-to-face courses to online or distance education courses. The purpose of this study was to examine academic performance, perceptions, and experiences of participants enrolled in different academic learning environments. Pre and Post Content Knowledge Tests and a student evaluation were used to measure perceptions and experiences of participants. From the first result (perception), no significant difference ($p > .05$) was found between the two class formats in course evaluation, showing college students had similar perceptions regardless of class format. With the second result (experience), a significant difference ($p = .031 < .05$) was found between the two class formats in self-evaluation, indicating participants in this study had better experiences from the traditional face-to-face class format.

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The number of distant learners is steadily increasing in higher education in the United States. According to Allen and Seaman (2010), "thirty percent of all higher education participants are taking at least one course online" (p. 2). Advances in technology have many learning institutions offering online programs to accommodate the needs of students. Approximately 63% of academic leaders reported online learning is an important factor when looking at their long-term strategic goals of providing degree granting programs, to provide educational opportunities to students who cannot, or choose not, to attend classes on a college campus, and to provide training opportunities for economic development (Allen & Seaman, 2010; Yaman, 2009). Hybrid learning is also becoming popular as a blended learning environment. Allen and Seaman defined hybrid learning as "web facilities [traditional] format, where web-based technology is used to deliver 1% to 29% of the course contents such as syllabus and assignments" (p. 5). With the hybrid movement, many researchers are comparing face-to-face and hybrid learning in respect to student academic achievement. Shachar and Neumann (2003) conducted a meta-analysis on 86 studies from many different academic disciplines (e.g., hospitality management, mathematics, pharmacology, social work, psychology, business) and found two thirds of the studies showed online and hybrid course students performed better than participants in a face-to-face course.

Although many studies have shown that students perform better in online or hybrid courses as opposed to face-to-face courses from a wide variety of studies, limited research has been conducted in the area of physical education (PE) courses (e.g., Lim, Kim, Chen, & Ryder, 2008; Melton, Graf, & Chopak-Foss, 2009; Reasons, Valadares, & Slavkin, 2005; Yaman, 2009). In addition, some of these studies involving health education courses also examined perceptions or satisfaction of students within an online, hybrid, or traditional course (Lim et al., 2008; Melton et al., 2009; Utts, Sommer, Acredolo, Maher, & Matthews, 2003; Tesone & Ricci, 2008).

Lim et al. (2008) investigated the effects of three different methods of instructional delivery including online, traditional, and hybrid on student achievement and satisfaction within a wellness course. The results of the study indicated that students in the online learning group and the hybrid had statistically significant higher levels of achievement than students in the traditional group. These

findings may suggest that well-designed online learning and hybrid learning can be effective in teaching wellness.

Melton et al. (2009) evaluated student achievement and satisfaction with a hybrid online delivery compared to a traditional format in a general health course. Results indicated the hybrid delivery was preferred over the traditional format in a general health course. Reasons et al. (2005) compared face-to-face, online, and hybrid courses in teacher education and health services. They found online courses led to better student outcomes. Final grades were highest for participants who completed online courses as opposed to face-to-face or hybrid delivery.

So and Brush (2008) examined the relationship of the students' perceived levels of collaborative learning, social presence, and overall satisfaction in a hybrid health education course. Results indicated that students who had a higher perception of collaborative learning tended to be satisfied with their online or hybrid course. In addition, the social presence was positive but not statistically significant.

Some studies have found no significant difference, however. Tucker (2011) found no significant difference in pretest scores and final grades but found significant differences in posttest and final exam scores. Studies have also found no significant difference in classroom instruction compared to online instruction. Block, Undermann, Felix, Reineke, and Murray (2011) also found no significant difference in student performance for those enrolled in either an online or a face-to-face health and wellness course. Davies and Mendenhall (1998) evaluated an online fitness and lifestyle management course and a classroom course. They found no significant differences in test scores among the two groups.

A growing number of online courses are being developed and offered in higher education, but limited research is available in the area of online compared to face-to-face courses in PE. The purpose of this study was to examine academic performance, perceptions, and experiences of participants enrolled in two different academic learning environments. The two learning environments included the traditional face-to-face classroom setting and the hybrid online setting. The hybrid setting consisted of a predetermined number of face-to-face classroom meetings and online coursework. The research questions included the following: Were there significant academic performance differences between the face-to-face and the online hybrid learning groups? Were there differences in perceptions

and experiences between the face-to-face and the online hybrid learning groups?

Methods

Participants

Research participants were selected based upon purposeful sampling. According to Rossman and Rallis (2003), purposeful sampling provides the researcher with "reasons (purpose) for selecting specific participants, events, processes" (p. 273). More specifically, convenience and criterion sampling techniques were chosen to identify potential participants. The convenience sampling allowed for easy access to participants that were enrolled in a Physical Education Department course in which data could be easily collected. A criterion sampling technique was also used for quality assurance. Thus, all participants in the study had to meet three criteria. First, each student had to be enrolled in a personal health science course. Second, participants had to be enrolled in one of two modes of instructional delivery based on their preference. The two modes of instructional delivery were traditional face-to-face and online hybrid group. Finally, participants had to be enrolled with the same assistant professor for the traditional face-to-face or online hybrid courses during 2010–2011.

Demographics

The participants of the study were undergraduate participants (N = 130) from a 4-year public university located in the Midwest. Of the 130 undergraduate participants, 28.5% (n = 37) were enrolled in the hybrid online courses and 71.5% (n = 93) were enrolled in the traditional classroom setting. Overall, the majority of participants in the study were female (70.6%), sophomores (44.4%), majoring in education (55.9%). The majority of the traditional face-to-face group learners were female (71.6%), sophomores (54.5%), majoring in education (55.9%). The majority of the online hybrid group learners were female (68.7%), seniors (31.0%), majoring in education (38.2%). Table 1 provides demographic characteristics of the participants with each class.

Table 1

Demographic Characteristics

Teaching Delivery	Female	Male	Fr	So	Jr	Sr
Hybrid						
Summer 2009	78.3	21.7	17.4	34.8	30.4	17.4
Summer 2010	59.1	40.9	13.6	13.6	18.2	44.5
Face to Face						
Fall 2009 (section 1)	66.6	33.4	25.0	62.5	4.20	8.30
Fall 2009 (section 2)	85.2	14.8	23.1	65.4	3.85	7.69
Spring 2010 (section 1)	68.0	32.0	29.2	54.2	16.6	00.0
Spring 2010 (section 2)	66.6	33.4	28.0	36.0	20.0	16.0

Procedures

Four sections of the personal health course were delivered face-to-face in a traditional classroom setting, and one section was delivered as an online hybrid course. Personal Health Science is a 200-level course offered through the Physical Education Department and is one of the courses that fulfills the UCC Self-Enhancement of Individual Development requirement. The course is an "examination of attitudes, research facts, and misconceptions pertaining to personal health needs and practices, nutrition, family living, sexuality, drug use and abuse, disease prevention, safety, first aid, and public health resources" ("University Core Curriculum," n.d., Section B3, para. 2). The Personal Health Science course is a required course for PE and kinesiology majors.

The traditional face-to-face courses met twice a week for 1 hr 15 min for 16 weeks on campus during the fall and spring semesters of 2010–2011. The hybrid online course met once a week for 1 hour for 5 weeks during the summer of 2010 and 2011. Both the traditional face-to-face and online hybrid courses were taught on campus by the same instructor, required the same textbook, and had the same course objectives, course content, assignments, exam, and quizzes.

Data Collection

The University's Institutional Review Board approved this study. Before data were collected, all participants in the study signed an informed consent form. Data were collected in two ways. Each student was instructed to complete a Pre Content Knowledge Test on the first day of class. After completing the course, participants

were asked to complete a Post Content Knowledge Test and the University Student Evaluation on Teaching Survey (USETS). The instructor provided a standardized explanation prior to requesting participants to complete each test and/or evaluation. Participants were also provided with the opportunity to ask questions.

Pre and post content knowledge test. The Pre and Post Content Knowledge Tests were developed by Insel and Roth (2008) and have been used by colleges and universities nationwide. The purpose of the Pre and Post Content Knowledge Tests was to measure the knowledge the participants were expected to master during the course. The Pre and Post Content Knowledge Tests consisted of 75 questions that were randomly selected from the Personal Health Science test bank. The test questions focused on health, stress, psychological health, sexuality, immunity and infections, cardiovascular disease, cancer, personal safety, nutrition, exercise, weight management, tobacco, alcohol, drugs, and aging. A panel of experts (University Personal Health Science instructors) examined the 75 questions to make sure the instrument displayed content validity, avoided biased items, and would elicit responses needed to measure student academic performance.

University student evaluation on teaching survey. The Office of Planning, Research, and Assessment administered the USETS to participants in the classes. The USETS reported on five sections: (a) demographics, (b) course evaluation, (c) self-evaluation, (d) profile, and (e) open-ended questions. The USETS used a 5-point Likert scale: *very good* (5), *good* (4), *satisfactory* (3), *poor* (2), and *very poor* (1). Per research by Lim et al. (2008), selected questions from the USETS were chosen for the present study that focused on the perceptions and experiences of participants. The items included questions related to course content, availability of instructor, quality of learning experience, and grading process.

The University Faculty Senate assembled a Student Evaluation of Teaching Task Force Committee to address student evaluation of university courses. The Task Force used information collected over a 13-year period to develop the USETS. The USETS was piloted and the Office of Planning, Research, and Assessment modified the survey. The USETS has been in existence since 2006 and provides valid and reliable results. A large body of research supports that student ratings of instruction, properly constructed and administered, provide valid and reliable results for improving teaching, as well as for documenting teaching performance for

administrative review (Theall, Abrami, & Mets, 2001). Over 90% of postsecondary institutions currently use student ratings because they are (1) multidimensional, (2) reliable and stable, (3) relatively valid against a variety of indicators of effective teaching, and (4) relatively unaffected by a number of variables hypothesized as possible biases (The University of Arizona, 2012).

Data Analysis

Multiple analyses were used during the study due to the variety of ways data were collected. Descriptive statistics (percentages, frequency distributions, means, ranges, and standard deviations) were analyzed to determine demographic characteristics. Levene's test was performed to verify whether variances were different in two groups. Because the test was significant ($p > .05$), the assumption of homogeneity of variances has been met. In other words, this study did not have sufficient evidence to reject the null hypothesis, and the authors can assume that the variances were approximately equal (Table 2). Independent *t* tests were computed to measure significant differences between pre and post content knowledge scores between the hybrid and traditional groups. Additionally, the USETS was divided into two parts (i.e., perception and experience of classes), and two more independent tests were implemented with each part separately to understand college students who took various class formats. Statistical significance was accepted at the alpha level ($p < .05$). All data were analyzed using SPSS (Version 20.0).

Table 2

Tests of Homogeneity of Variances and Independent t Tests

	Levene's Test	Class Format			
	Sig.	Hybrid Online	Face-to-Face (Traditional)	*t*	*p*
Academic Achievement	.198	4.49 (.5301)	4.64 (.4625)	-1.539	.127
Perception (Course evaluation)		4.59 (.4943)	4.62 (.4936)	-.246	.806
Experience (Self-evaluation)		4.24 (1.1927)	4.70 (.4301)	-2.240	.031*

Note. Standard deviations appear in parentheses below means.
*$p < .05$.

The qualitative data from the results of the USETS open-ended questions were examined to identify differences in perceptions and experiences between the face-to-face group and the online hybrid group. The researchers reviewed the open-ended questions that were asked on the USETS and used methods set forth by Glaser and Strauss (1967) and Wolcott (1994) to reduce the interview data.

First, the qualitative data were analyzed and interpreted by using a qualitative software system called HyperResearch 2.8 by ResearchWare. HyperResearch 2.8 enabled the researchers to rely on a thematic organization, pulling together data from all participants. The researchers were able to code and retrieve, build theories, and conduct analyses of the data. Second, the researchers became familiar with the data by reading and rereading the qualitative responses. Reading and rereading the qualitative responses was critical for coding and categorizing the data.

Third, each researcher identified key concepts that were marked with a series of codes extracted from the text. Open coding allowed the authors to organize and extract raw data related to the concepts of "perceptions" and "experiences" between the face-to-face group and the online hybrid group. Axial coding provided a means of clustering the categories as themes that emerged. The constant comparative analysis was used throughout the process, allowing the researchers to identify similarities and differences among the codes as key concepts, subcategories, and categories began to emerge (Rossman & Rallis, 2003). Finally, the researchers met and determined the final categories and themes that were based on the regularity of the identified concepts (Bogdan & Biklen, 2005; Glaser & Strauss, 1967; Huberman & Miles, 1994; Strauss & Corbin, 1998).

Results

The purpose of this study was to examine academic performance, perceptions, and experiences of participants enrolled in two different academic learning environments. The two learning environments included the traditional face-to-face classroom setting and the hybrid online setting. Two research questions were explored: (a) Were there significant academic performance differences between the face-to-face group and the online hybrid learning group? (b) Were there significant differences in perceptions and experiences between the face-to-face group and the online hybrid learning group. The results of the two research questions are presented.

Content Knowledge and Academic Achievement

The participants completed a Pre and Post Content Knowledge Test to see whether significant academic performance differences existed between the face-to-face group and the online hybrid learning group. From the independent *t* test with pre and post content knowledge scores, no significant difference ($p > .05$) was found between the two groups, indicating students had roughly similar levels of academic achievement from both hybrid online classes and traditional classes (Table 3).

Perceptions and Experience

The USETS was divided into two parts (i.e., perception and experience of classes), and two more independent tests were implemented with each part separately to understand college students who have taken different class formats. From the first result (perception), no significant difference ($p > .05$) was found between the two class formats in course evaluation, showing that college students had similar perceptions regardless of class format. Considering that the younger generation of college students might be familiar with Internet-based activities, this result might be natural. With the second result (experience), a significant difference ($p = .031 < .05$) was found between two class formats in self-evaluation, indicating participants in this study had better experiences from the traditional face-to-face class format. Given that classes of the traditional format allow students to interact with professors and classmates, participants might prefer face-to-face classes.

Additional qualitative responses provided perceptions for the traditional face-to-face and hybrid groups. The traditional face-to-face participants' perceptions (course evaluation) theme led to three of the 10 potential categories and included teaching style, enthusiasm, and communication of subject matter. The first category mentioned most often was related to teaching style. For example, a student responded, "She [the instructor] really made everyone feel comfortable and made the class interesting." Another student said, "The instructor was very professional with 'touchy' subjects." Finally, a student responded the instructor needed to "slow down on the slides so that people have time to write everything down." The second category included enthusiasm of the instructor. A student responded, "The instructor was so enthusiastic about the class while she was teaching, it was impossible to not be affected by her spirit."

Table 3

University Student Evaluation on Teaching Survey: Perceptions and Experiences

	Traditional		Online Hybrid			
	M	*SD*	*M*	*SD*	*M* Diff.	*P*
Course Evaluation (Perceptions)						
The course materials used helped me to learn	4.67	0.57	4.58	0.12	0.09	.739
The instructor was well organized	4.71	0.46	4.64	0.19	0.08	.718
The assignments helped me increase my understanding of the course content	4.48	0.68	4.65	0.09	0.17	.584
The instructor clearly communicated the subject matter	4.48	0.75	4.68	0.12	0.21	.552
The instructor showed enthusiasm for the course	4.57	0.75	4.84	0.07	0.26	.443
The instructor was prepared for each class	4.67	0.58	4.70	0.11	0.03	.906
The instructor's teaching style was effective for me	4.67	0.58	4.64	0.17	0.02	.926
The instructor was accessible to me outside of class	4.57	0.68	4.58	0.20	0.01	.978
The instructor treated me with respect	4.76	0.44	4.79	0.09	0.03	.873
The instructor evaluated me fairly	4.71	0.56	4.69	0.11	0.02	.931
Self-Evaluation (Experiences)						
I was prepared for each class	4.48	0.60	4.44	0.20	.038	.891
I believed I performed up to my potential in this course	4.29	0.78	4.49	0.30	.100	.649
I learned a lot in this course	4.48	0.68	4.63	0.14	.149	.633
I would recommend this instructor to other students considering this course	4.43	0.68	4.71	0.07	.287	.359

The third category was the instructor clearly communicated the subject matter. This was conveyed by a student: "The instructor is easy to learn from and does a good job conveying the concepts." In addition another student said, "The instructor is a great teacher and presents the material in a fun and interesting way through class activities and participation." Another student responded, "The instructor is really well organized and had effective teaching skills... she [the instructor] is very knowledgeable about the material and makes it fun to learn." There were insufficient responses to warrant a category for the experience (self-evaluation) theme.

Additional qualitative responses provided perceptions for the hybrid group as well. The hybrid group participants' perceptions (content evaluation) led to three of 10 potential categories, including communication of subject matter, course materials, and understanding of the course content. For the first, a student said the instructor provided "easy access to communication [which] has helped me during this course." The second category was related to the course materials. A student said, "The professor has pointed out excellent assignments and power points and it has truly helped." Finally, the third category was conveyed by students who mentioned they understood the course content. For example, a student responded, "Learned a lot of material.... like the course" and "she [instructor] did a really good job of making it similar to a physical classroom's learning environment." Again, as with the traditional face-to-face group, there were insufficient responses to warrant a category for the experience (self-evaluation) theme.

Discussion

The purpose of this study was to examine academic performance, perceptions, and experiences of participants enrolled in two different academic learning environments. The two learning environments included the traditional face-to-face classroom setting and the hybrid online setting. Results of the academic achievement indicated students had roughly similar levels of academic achievement from hybrid online and traditional classes (Table 2). This is consistent with the results of other studies (Block et al., 2011; Davies & Mendenhall, 1998; Melton et al., 2009). They found no significant difference in student performance for those enrolled in classroom instruction compared to online instruction. This would suggest that both the traditional face-to-face section and online hybrid section provide the same knowledge gains.

The second research question led to interesting results on determining whether a significant difference existed in perceptions and experiences between the traditional group and hybrid learning group. From the first result (perception), no significant difference ($p > .05$) was found between the two class formats in course evaluation, showing that college students had similar perceptions regardless of class format. With the second result (experience), a significant difference ($p = .031 < .05$) was found between the two class formats in self-evaluation, indicating participants in this study had better experiences from the traditional face-to-face class format. However, Melton et al. (2009) found hybrid delivery was preferred over the traditional format in a general health course. Yaman (2009) found that male students and seniors preferred the online teaching methods compared to female students and to freshman. Given that classes of traditional format allow students to interact with professors and classmates, participants might prefer face-to-face classes. In addition, there were results from the qualitative responses. The traditional face-to-face participants' perceptions (course evaluation) themes led to three of the 10 potential categories and included teaching style, enthusiasm, and communication of subject matter. Additional qualitative responses provided perceptions for the hybrid group as well. The hybrid group participants' perceptions (content evaluation) led to three of 10 potential categories, including communication of subject matter, course materials, and understanding of the course content. The findings suggest that teaching style and enthusiasm are difficult to convey in an online hybrid class. This is evidenced by a student response: "I loved having her for my teacher. She always showed so much enthusiasm and told us stories to help us understand." Another student responded, "Really well organized and had effective teaching skills. She really gets involved in what she teaches, which makes it enjoyable to come to class."

Limitations of the Present Study

Several limitations existed to the study that threatened the internal and external validity. First, not all of the participants were present for the USETS when it was administered. Ninety percent of the participants completed the survey, which is considered a more than acceptable return rate for surveys. However, the researchers could not predict how the participants that did not fill out the survey felt. Second, the study population was a convenience sample of college participants enrolled in a core curriculum course. Therefore, these

findings may not be generalized to other college participants. Third, the study was conducted in a nonlaboratory setting, and therefore, the researchers could not control for all variables. Fourth, one of the researchers was the instructor of the course. This could influence the interpretation of the data. Fifth, the course length of the online hybrid course was shorter by 11 weeks compared to the spring and fall semester 16-week course. Finally, there were a limited number of qualitative responses in the online hybrid group.

Conclusion

According to the data collected by Allen and Seamen (2010), "over three-quarters of academic leaders at public institutions report that online is as good as or better than face to face instruction" (p. 3). The main focus of this study found that participants could increase knowledge regardless of the method of delivery. This is supported by a few student comments in the hybrid group. For example, "Learned a lot of material... like the course" and "she [instructor] did a really good job of making it similar to a physical classroom's learning environment." Based on the findings of this study, perhaps the mode of delivery does not matter. Perhaps these findings indicated that the delivery of an effective course depends upon teaching experience. Future studies should explore participants' perceptions of the effectiveness of distance education based on their experiences and the retention of the course information over time.

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