Attitudes Toward Course Delivery:
A Multi-University Study of Online,
On-ground, And Hybrid Instruction

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Abstract

This study examines the effectiveness of on-ground, online, and the hybrid delivery methods through a quantitative survey of students who were enrolled in Computer Information Systems courses at three universities during the 2016-2017 academic year. The results of the survey indicate that respondents preferred the on-ground course delivery method as opposed to the online course delivery method. Completely online course delivery was perceived as moderately effective with significant demographic differences based on both gender and age. Females and older students expressed completely online course delivery as more effective. The hybrid course delivery method was perceived as being more effective than the completely online course delivery method and the on-ground course delivery method was perceived as being the most effective. There were no significant demographic differences based on gender or age for hybrid or on-ground course delivery method.

Keywords: Online Education, Hybrid Learning, Web-Based Learning, Distance Learning, CIS Curricula

1. INTRODUCTON

Over the last decade, online and hybrid delivery methods have emerged as fundamental influences in educational delivery systems in higher education. The Babson Survey Research Group's Thirteenth Annual Report of the state of online learning in U.S. Higher education (Allen &

Seaman, 2016) reported that of 2,500 U.S. colleges and universities surveyed, students enrolled in online courses have increased from about 1.6 million in 2002 to 5.8 million in 2014. Of these 5.8 million students, 2.85 million were taking all their courses online and 2.97 million were taking some of their courses online. More than one in four students (28%) now take at least one online course (a total of 5,828,826 students, a year-to-year increase of 217,275). Additionally, the number of students not taking any online courses dropped by 434,236 from 2012 to 2013 and by 390,815 from 2013 to 2014.

Although the online and hybrid delivery methods continue to grow rapidly, many questions remain concerning the practicality and reliability of these formats, particularly from the student perspective in relation to Computer Information Systems (CIS).

Courses in CIS curricula as well as Information Technology or Computer Science range from instruction in computer programming languages, which requires hands-on development and extensive drill and practice to courses involving theoretical concepts; both elements can require an increased interaction with CIS faculty. It is not yet clear if online learning methods are advantageous to the delivery of such course content. Furthermore, it is not clear as to what degree online learning is effective in delivering CIS-specific course content.

The purpose of this study is to collect insights into students' perceptions of the online, hybrid and traditional on-ground delivery methods in relation to CIS courses. The results raise important considerations about using these delivery methods for CIS instruction. Specifically, the study intends to answer the following research questions:

1) What is the preferred course delivery method (online or on-ground) for CIS students and are there differences by gender or age?
2) How do CIS students rate the overall effectiveness of courses delivered COMPLETELY online and are there differences by gender or age?
3) How do CIS students rate the overall effectiveness of courses delivered via hybrid methods (partially online and partially on-ground) and are there differences by gender or age?
4) How do CIS students rate the overall effectiveness of courses delivered on-ground and are there differences by gender or age?

2. DEFINITIONS

For this study, *online* courses are defined as those in which 100 percent of the course content is delivered online. *On-ground* courses (traditional or "face-to-face" instruction) are defined as courses in which 100 percent of the course content is delivered in the on-ground classroom. The remaining alternative, *hybrid* (also called blended learning or partially online learning) involves a course that is partially delivered online and partially delivered in the classroom (i.e., between 30 percent and 80 percent of the course content is delivered online).

In addition to completely online courses and/or programs, the three universities involved in this study require online access to basic course information such as the syllabus, assignments and other resources even for on-ground courses. On-ground courses that incorporate such supplements are frequently considered to be online courses. However, for this research, courses that make use of these Web-based supplements are not considered online courses but are, instead, regarded as on-ground courses with online components or supplements.

3. LITERATURE REVIEW

A comprehensive meta-analysis research conducted by the U.S. Department of Education examining 12-year experimental and quasi-experimental studies found that despite what appears to be strong support for online learning, the studies in this meta-analysis do not demonstrate that online learning is superior as a delivery method. In many of the studies that involved a preference for online learning, the online and classroom conditions differed in terms of time spent, curriculum and pedagogy (Means, Toyama, Murphy, Bakia & Jones, 2009). This research also indicated that a blend of online and "face-to-face" instruction has been more effective (Means et al., 2009), which provides a rationale for the effort required to design and implement blended approaches.

Dobbs, Waid and del Carmen (2009) measured students' perceptions of online and on-ground course experiences and found that more students regarded on-ground courses to be easier than online courses. The participants of the study consisted of 180 students who were enrolled in online courses and 100 students who were enrolled in on-ground (traditional "face-to-face") courses. Student views about online education varied greatly between those who had never taken an online course and those who had taken

such courses. Those students with no online course experience felt that the faculty would have low expectations, but students who had taken at least one online course believed that high expectations were common with faculty. The study also found that the acceptance of online education increased as the number of online courses taken increased.

To determine how satisfied students were with both online and partially online courses, as well as to determine the factors that contribute to student satisfaction and dissatisfaction with online course delivery methods, Cole, Shelley, and Swartz (2014) conducted a three-year study involving 553 undergraduate and graduate students enrolled in business degree programs. The authors found that, overall, students were moderately satisfied with fully-online courses. However, the study revealed that the participants were slightly more satisfied with hybrid/partially-online courses. The students reported "Convenience" as the factor that contributed most to *satisfaction*. "Lack of interaction" (with both the professor and other students) was cited as the factor that contributed most to *dissatisfaction* with online courses (p. 122).

Ilgaz and Gülbahar (2015) developed a research model that involved "e-Readiness" and "e-Satisfaction." This model was developed to comprehensively measure a student's readiness *before* taking online courses, and the resulting satisfaction of students *after* taking online courses. The authors surveyed over 1,500 undergraduate and graduate students and discovered that students begin online classes with specific expectations; therefore, meeting or not meeting these expectations directly impacts students' satisfaction levels. Students expect to have an effective learning experience that emulates the physical classroom by "…interacting with the instructors and other participants" (p. 183). The authors also found that students are most satisfied with online classes if their expectations regarding "instructional content, communication and usability, and teaching process" were met by their online learning experience (p. 183).

Vidanagama (2016) conducted a study involving 209 undergraduate students enrolled in computer-related degrees. The author used the *Technology Acceptance Model* (TAM) to ascertain if several factors associated with online learning (e.g., perceived enjoyment, previous attitude, and perceived usefulness) are affected by technology. The author found that, among computing students, the perceptions of online courses can be affected by technological adequacy and ease of use. Students enrolled in computing degrees are more satisfied with online learning when the technological environment (*Learning Management System*, software used in courses, etc.) performs adequately and is easy to use. It can be inferred from this study that students in computing fields are *more critical* than students in other degree fields of the *technological environment* involved in online course delivery. This finding creates an additional challenge for educators who teach computer-related subjects in an online or partially-online environment.

To examine specifically students' perceptions of course delivery methods in the computing field, Kovacs, Peslak, Kovalchick, Wang and Davis (2017) found that only 54% of students preferred traditional on-ground course delivery and 46% preferred online course delivery.

4. METHODOLOGY

The current research involved the administration of a Web-based survey created in QuestionPro that consisted of 34 closed-ended questions. This survey was administered during the 2016-2017 Academic Year to students enrolled in CIS courses at three universities: one private, one state-owned and one state-related. The students at the state-owned university and the state-related university only included those seeking a bachelor's degree while the students at the private university included those seeking bachelor's, master's and doctoral degrees.

The students completed the survey online while enrolled in an on-ground, hybrid or online CIS course. A total of 287 students responded to the survey. To address the research questions, statistical analysis and tests were conducted in Statistical Package for the Social Sciences (SPSS 22.0) statistical software.

5. RESULTS

Demographics
The statistical analysis of the results begins with the general demographics of the survey participants. As shown in Table 1, out of a total of 287 survey respondents, 91.6% were valid results. And among the valid results, about 29% from a state university, 22% from a state-affiliated university and 49% from a private university. These universities provide a diverse socio-economic mix of participants.

University Type		Valid Percent
Valid (n=263)	State U.	28.5
	State-related U.	22.1
	Private U.	49.4
	Total	100.0

Table 1: Percentage of survey respondents by university

Due to the inherent gender bias in CIS programs, the ratio of male to female was fairly high. As shown in Table 2, about 81% of the survey respondents were male, 18% were female and 1% identified as other.

Gender		Valid Percent
Valid (n=220)	Male	80.8
	Female	18.3
	Other	.9
	Total	100.0

Table 2: Percentage of survey respondents based on gender.

The survey respondent age group was skewed with the general population but reflective of the specific population for receiving college education. As shown in Table 3, about 47% of the survey respondents were in the 18-21 age group, 29% were in the 22-30 age group , and 23% were in the over 30 age groups (15% in 31-40 age group, 4% in 41-50, 3.6% in 51-60, and 0.9% over 60).

Age Group		Number	Valid Percent
Valid (n=220)	18-21	104	47.3
	22-30	64	29.1
	31-40	33	15.0
	41-50	9	4.1
	51-60	8	3.6
	Over 60	2	.9
	Total	220	100.0

Table 3: Percentage of survey respondents by age group

Answers to Research Questions
Research Question 1: What is the preferred course delivery method (online or on-ground) for CIS students and are there differences by gender or age?

As reported in Kovacs, Peslak, Kovalchick, Wang and Davis (2017), 54% of students preferred traditional on-ground course delivery and 46% preferred online course delivery when answering the survey question "If given a choice to take the same course in an online format or an on-ground format, would you select the online format?"

There is a significant difference in course delivery preference of on-ground vs. online based on gender, as shown with the results of an ANOVA test depicted in Table 4. Male respondents had a higher mean preference (lesser effectiveness) of on-ground course delivery method than female. In a post hoc test, this difference between male and female respondents was statistically significant with p= .081.

Gender	N	Mean
Male	177	1.616
Female	40	1.425
Other	2	1.000
Total	219	1.575

Table 4: Preference for on-ground vs. online course delivery method by gender (p=0.081)

When examining age, a significant difference was also found with p=.005. Older students preferring on-ground course delivery (Table 5), except for the 51-60 age group, which found on-ground course delivery less effective.

Age Group	N	Mean
18-21	104	1.683
22-30	64	1.500
31-40	33	1.455
41-50	9	1.222
51-60	8	1.750
Over 60	2	1.000
Total	220	1.573

Table 5: Preference of on-ground vs. online course delivery method by age group (p=0.005)

Research Question 2: How do CIS students rate the overall effectiveness of courses delivered COMPLETELY online and are there differences by gender or age?

In general, effectiveness of completely online course delivery is moderate in this survey. As shown in Table 6, 73% of survey respondents found the completely online delivery method at least somewhat effective, but only 9% found this delivery method very effective. 27% found it somewhat ineffective to very ineffective. Clearly, there is a quality gap expressed here that can be improved. Efforts should be made to further study the reasons behind the lack of perceived effectiveness.

Perceived Effectiveness		Percent	Valid Percent
Valid	Very effective	5.2	8.9
	Effective	19.5	33.1
	Somewhat effective	18.5	31.4
	Somewhat ineffective	8.4	14.2
	Ineffective	5.2	8.9
	Very ineffective	2.1	3.6
	Total	58.9	100.0
Missing	System	41.1	
Total		100.0	

Table 6: Perceived effectiveness of courses delivered completely online

Table 7 shows significant gender differences were found between males and females concerning effectiveness of courses delivered completely online. Males, on average, classified completely online delivery as only somewhat effective; whereas, females classified this delivery method midway between effective and somewhat effective. Differences were significant at $p = .075$.

Gender	N	Mean
Male	130	2.992
Female	29	2.552
Total	159	2.912

Table 7: Effectiveness of courses delivered completely online by gender (p=0.075)

Regarding the effectiveness of completely online course delivery, there was also found to be a significant difference at $p=.049$ based on age group (refer to Table 8). Younger students found the courses delivered completely online to be less effective. This supports our prior finding that younger students prefer on-ground course delivery. Again, there is an anomaly with the 41-50 age group, which also rated less effectiveness.

Age Group	N	Mean
18-21	71	3.113
22-30	46	2.957
31-40	30	2.667
41-50	6	1.667
51-60	5	3.000
Over 60	2	2.000
Total	160	2.913

Table 8: Effectiveness of courses delivered completely online by age group (p=0.049)

Research Question 3: How do CIS students rate the overall effectiveness of courses delivered via hybrid methods (partially online and partially on-
ground) and are there differences by gender or age?

As shown in Table 9, in general, perceived effectiveness of hybrid courses (i.e., delivered partially online and partially on-ground) is higher than the perceived effectiveness of courses delivered completely online. 84% of survey respondents found the hybrid delivery method at least somewhat effective with 14% found this delivery method very effective. Only 16% found it somewhat ineffective to very ineffective. There is again a quality gap expressed here that can be improved. Efforts should be made to further study the reasons behind the improved perceived effectiveness.

Perceived Effectiveness		Valid Percent
Valid	Very effective	13.8
	Effective	42.5
	Somewhat effective	27.5
	Somewhat ineffective	9.0
	Ineffective	4.2
	Very ineffective	3.0
	Total	100.0

Table 9: Perceived effectiveness of the hybrid course delivery method

Contrary to the completely online course delivery method, neither age nor gender differences were found to be significant in relation to the effectiveness of courses delivered in a hybrid manner (refer to Table 10 and Table 11).

Gender	N	Mean
Male	129	2.628
Female	29	2.276
Total	158	2.563

Table 10: Perceived effectiveness of courses delivered in a hybrid manner by gender (not significant)

Age Group	N	Mean
18-21	71	2.437
22-30	46	2.870
31-40	29	2.414
41-50	6	2.500
51-60	5	2.600
Over 60	1	2.000
Total	158	2.563

Table 11: Perceived effectiveness of courses delivered in a hybrid manner by age group (not significant)

Research Question 4: How do CIS students rate the overall effectiveness of courses delivered on-ground and are there differences by gender or age?

As shown in Table 12, the respondents rated the on-ground course delivery method with the highest effectiveness. 92% of survey respondents found the on-ground delivery method at least somewhat effective, while 31% found this delivery method very effective and 43% found it effective. Only 8% found it somewhat ineffective to very ineffective. There is a quality gap expressed among online, hybrid and on-ground course delivery methods. Efforts should be made to further study the reasons behind the high perceived effectiveness of on-ground course delivery and shed insights to improve hybrid and complete online course delivery.

Perceived Effectiveness		Frequency	Valid Percent
Valid	Very effective	52	31.1
	Effective	72	43.1
	Somewhat effective	30	18.0
	Somewhat ineffective	5	3.0
	Ineffective	6	3.6
	Very ineffective	2	1.2
	Total	167	100.0
Missing	System	120	
Total		287	

Table 12: Perceived effectiveness of the on-ground course delivery method

Gender	N	Mean
Male	129	2.109
Female	29	1.793
Total	158	2.051

Table 13: Perceived effectiveness of courses delivered on-ground by gender (not significant)

Age Group	N	Mean
18-21	71	1.859
22-30	46	2.087
31-40	29	2.414
41-50	6	2.667
51-60	5	1.600
Over 60	1	2.000
Total	158	2.051

Table 14: Perceived effectiveness of courses delivered on-ground by age group (not significant)

Similar to the hybrid course delivery method, neither age nor gender differences were found significant for effectiveness of on-ground course delivery (refer to Table 13 and Table 14).

6. CONCLUSIONS

The research surveyed undergraduate, graduate and post-graduate CIS students in three universities during the 2016-2017 academic year to examine the perceived effectiveness of course delivery methods and whether demographic differences exist based on gender and age. Limitations of the study include use of three Northeast Universities, differences in courses and programs within these Universities and less than 100% participation for most questions although our response rate far exceeds the general expected response rate of 30-40% for internal surveys. (Surveygizmo, 2017). Also we feel that we feel that by diversifying our survey to three different Universities as well as different types of Universities improved the overall accuracy of our data. Many prior peer-reviewed studies have only surveyed one University.

The results showed that the survey respondents preferred the on-ground course delivery method over the online course delivery method. Demographic differences for course delivery effectiveness (on-ground vs. online) were significant based on both gender and age, with males and younger students expressing the most preference for the on-ground vs. online course delivery method. Completely online course delivery was perceived as moderately effective with significant demographic differences based on both gender and age. Females and older students expressed completely online course delivery as more effective. The hybrid course delivery method was perceived as being more effective than the completely online course delivery method. There were no significant demographic differences based on gender or age for hybrid course delivery method. Finally, the on-ground course delivery method was perceived as being the most effective and there were no significant demographic differences based on gender or age for on-ground course delivery method.

These findings suggest that there is a difference in perceived effectiveness of completely online, hybrid and on-ground course delivery methods for students enrolled in CIS courses and demographic differences in gender and age do exist. Further studies are needed to examine the reasons behind the lack of perceived effectiveness of both completely online and hybrid course delivery methods and to address

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the demographics differences in gender and age. Finally, with regard to the possible conclusion that students should take more face-to-face courses, this is not the objective of the study and should not be a conclusion. The study is a measure of current perceptions of online courses. The fact that they are perceived less favorably is a call to action for improvements in online delivery methods. Online courses and options for a variety of students are a given. The genie will not return to the bottle. Rather we need to improve online methods so that similar perceptions and results are achieved via online courses.

7. REFERENCES

Allen, I. E., & Seaman, J. (2016). 2015 Online Report Card Tracking Online Education in the United States. Babson Survey Research Group and Quahog Research Group. Retrieved May 23, 2017 from https://onlinelearningconsortium.org/survey_report/2015-online-report-card-tracking-online-education-united-states/

Cole, M. T., Shelley, D. J., & Swartz, L. B. (2014). Online instruction, e-learning, and student satisfaction: A three year study. *International Review of Research in Open and Distance Learning*, 15(6).

Dobbs, R. R., Waid, C. A., & del Carmen, A. (2009). Students' perceptions of online courses the effect of online course experience. *The Quarterly Review of Distance Education*, 10(1), 9-26.

Ilgaz, H., & Gülbahar, Y. (2015). A Snapshot of online learners: E-readiness, e-satisfaction and expectations. *International Review of Research in Open and Distance Learning,* 16(2).

Kovacs, P., Peslak, A., Kovalchick, L., Wang, W., & Davis, G. (2017). Effectiveness of Course Delivery Methods a Multi-University Study*. Issues in Information Systems (IIS)*.

Means, B., Toyama, Y., Murphy, R., Bakia, M., & Jones, K. (2009), Evaluation of Evidence-Based Practices in Online Learning: A Meta-Analysis and Review of Online Learning Studies. Retrieved May 12, 2017 from https://www.researchgate.net/publication/44840198_Evaluation_of_Evidence-Based_Practices_in_Online_Learning_A_Meta_Analysis_and_Review_of_Online_Learning_Studies

Suveygizmo (2017). Three Ways to Improve Your Survey Response Rate. Retrieved September 14, 2017 from https://www.surveygizmo.com/survey-blog/survey-response-rates/

Vidanagama, D. U. (2016). Acceptance of E-learning among undergraduates of computing degrees in Sri Lanka. *International Journal of Modern Education and Computer Science, 8*(4), 25-32.

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