Students' Perceptions about Online Learning

Devang Mehta and Hiral Shah
North Carolina A&T State University / St. Cloud State University

Abstract

Though there are advantages of online learning, such as convenience and flexibility, there are issues associated with it, for instance, communication, student engagement, student motivation, study ethics, and plagiarism. It is very important that courses are developed and taught with planning. Instructors' success begins with the development of a well-planned course. Students can learn effectively from a well-designed course, and it will be a joyful experience on both sides. Whether a course is face-to-face (f2f), web-enhanced, hybrid, or online; careful research should be performed to develop it. There was a need to examine the advantages and disadvantages of online and face-to-face courses. A survey was conducted to inquire students about their perceptions of online learning versus face-to-face learning so that findings will be helpful in developing online courses or converting existing face-to-face courses to online courses.

This research study investigates undergraduate and graduate students' perceptions of online learning versus face-to-face learning at two universities. The findings will be beneficial to implement better teaching strategies to deliver web-based instruction effectively and improve online learning. Online teaching has increased in the past decade because of advancements in computer technology, the internet, smart devices, and distance learning software. Current trends have shown that in the United States over 32% of college students, roughly 6.7 million, are currently taking at least one online course[1].

Keywords

Online, face-to-face, learning, teaching, perceptions

Introduction

There is fierce competition among educational institutions to recruit and retain students. Some students work either part-time or full-time to pay tuition and other expenses. In 2017, 81 percent of undergraduate students were employed part-time, whereas 43 percent of undergraduate students worked full-time[2]. Educational institutions face challenges of limited physical space[3]. It is expensive to purchase and maintain physical spaces, such as classrooms and labs. In addition, students do not have to be in a closed space surrounded by others which is safer in situations like the COVID-19 pandemic. As a result, there is a need to offer online courses. It has been always a challenge to deliver instructions online effectively, engage students, motivate students, monitor students' work, and maintain ethical standards. Some engineering education courses are hands-on in which operations of equipment are required. These types of courses are difficult to convert to an online format. On the other hand, there are lecture-based or software-dependent courses

that can be taught online or transformed into online teaching from traditional face-to-face teaching.

The purpose of conducting this research was to investigate undergraduate and graduate students' perceptions about learning online versus face-to-face. Some students preferred online learning because of the flexibility and convenience of learning. Whereas some students felt that online courses did not provide much interactivity and sometimes it was difficult to receive assistance from instructors. Based on the review of literature the following research questions were created.

1. What are students' opinions of various aspects of online learning as compared to face-to-face learning?
2. What are the aspects of online learning that students like?
3. What are the aspects of online learning that students dislike?
4. Is there a difference in means of students' perceptions between undergraduate and graduate students at two universities to learn online?

Henderson[4] defined "face-to-face classes as traditional synchronous courses that provide 100 percent of class instruction in a traditional classroom setting". These courses are enriched, enhanced, or supplemented by the addition of an online component and require that students be actively engaged in that online component. Since instructors use some form of online tools in teaching face-to-face courses, the terms face-to-face and web-enhanced are used interchangeably in the content. Sixteen aspects of online learning were identified (refer to Table 3). The study had its limitations in that not all courses were compatible with online teaching and not all students were compatible with online learning. Also, not all instructors were well equipped or trained for teaching online courses. The study was further delimited to collect data from a targeted group of students from two universities. The findings may not be generalized to other students. It was assumed the data were reliable, unbiased, and error-free.

Review of Literature

Today, increasingly more people have quality internet access and live in a society that is connected virtually almost all the time. Also, new ways of seeing the world and behavior changes are noticeable in addition to changes in consumption and relationships with teaching and work. Seeking dynamism, easy access to information, and interactivity remotely, with these technological advances, the trend is that several sectors must adapt to keep up with these transformative evolutions. A distance modality is a great tool for education, as it brought great opportunities for an audience that was previously unable to study for several reasons. It is through distance education that people at any location and within the time available individually can access the content of the most diverse areas and expand their knowledge and skills[5], well as it is also financially advantageous[6,7].

Instructors must have or seek knowledge about the online platform that is entering to develop effective materials for students[8]. Learning theories can help instructors to create more attractive and relevant resources[9] therefore, the main factor affecting the quality of education has changed from the teacher's ability to the student's enthusiasm to learn new things[7]. Communication is another extremely critical factor that must always be considered because it causes interactive experiences and can make learning more participatory and engaged. This can be a bottleneck for

online education and that needs to be continuously corrected so that students do not feel abandoned.

Online learning has become an essential part of higher education, 66% of higher education institutions use online learning as part of the long-term strategy[10]. There are some retention problems in f2f courses because sometimes students do not connect to course materials or instructors[11]. On the other hand, online teaching is more likely to retain students throughout the course, as multimedia tools are more involved[5] including flexibility and cost. According to Normam[6] and Sharma[7], face-to-face courses remain ahead of online courses, as people often still have the wrong thought that online students are not as smart as entering a face-to-face college. However, online courses show increasing levels of satisfaction[5,8], but the significant value that the method offers is considered as effective as a classroom. Encouraging the use of technology works twice because, while enhancing or engaging students, it also allows students to buy confidence in the use of technology in future studies that may be completed online and, in the workforce[12].

Peh & Foo[13] concluded that online courses should address the needs and concerns of different students, course materials are supposed to be interactive and visually appealing, need to incorporate human-computer interaction with students, and both students and instructors should be responsible for a better online learning experience. Results of the Song, Singleton, Hill, & Koh study[14] indicated that most learners agreed that course design, learner motivation, time management, and comfort with online technologies impact the success of an online learning experience. Nakos, Deis, and Jourdan[15] discovered that the primary reasons for students to take online courses are: (a) scheduling convenience, (b) ability to take more classes per semester, (c) work schedule, (d) time conflict with another course, and (e) lack of equivalent on-campus course. Gibson[16] found the major advantage of online courses was related to the ease of accessibility of conducting classwork anywhere. Lim, Kim, Chen, & Ryder[17] investigated that students in the online learning and the combined learning (online and traditional) groups had significantly higher achievement than students in the traditional learning group. Thus, online courses have their advantages, if they are developed through a thoughtful process, and all the issues linked with them are considered.

Methodology

An empirical research study was conducted to investigate the perceptions of students about online courses against face-to-face courses. It was a descriptive research design. An online survey instrument was prepared to collect data from students. The questionnaire consisted of a mix of closed-ended and open-ended questions. There were sixteen questions for which a five-point Likert scale was designed as: (1) strongly disagree, (2) disagree, (3) no opinion, (4) agree, and (5) strongly agree to gather students' opinions (refer to Table 3 for survey questions). The population of this study included students who have taken online and face-to-face courses at two universities where researchers taught STEM courses. A targeted sampling technique was used to select students who were enrolled in the researchers' courses at North Carolina A&T State University (NC A&T SU) and St. Cloud State University (SCSU). Undergraduate students were selected from NC A&T SU and graduate students were selected from SCSU to measure undergraduate students' perceptions against graduate students' perceptions. All participants were in the STEM programs and had some online learning experience. Most face-to-face courses were

web-enhanced courses that participants were enrolled in. The online learning management tools, such as Blackboard, Canvas, D2L, or Edmodo, can be incorporated into face-to-face courses but primary instructions are still in-person. Blackboard and D2L were utilized in face-to-face courses to enhance traditional teaching at the participated universities. Whereas, Blackboard and D2L were solely used for online learning at NC A&T SU and SCSU respectively. The researchers analyzed Likert Scale data to calculate the means of responses. Later, the two-sample t-test was performed to compare undergraduate students' means of NC A&T SU against the graduate students' means of SCSU regarding online and face-to-face learning.

Findings

A total of 91 responses were received from two universities. The response rate was 100 percent because the participants were chosen and agreed to participate in the survey. All participants had experience with online learning tools because a Learning Management System was used in face-to-face courses.

Table 1 shows the demographics of the 64 participants from NC A&T SU. The majority of respondents were undergraduates, seniors, males, and traditional students. Traditional students who usually enroll immediately after high school, are typically between 18 and 22 years old, attend full-time, live on campus, and do not have major work or family responsibilities. Whereas, non-traditional students are postsecondary students who are 25 years old and older[18]. 34 students had taken exclusively online courses out of a sample size of 64 students.

Table 1. Demographics of Undergraduate Student Participants from NC A&T SU

Classification	Freshmen = 3	Sophomore= 8	Junior = 14	Senior = 38
Gender	Male = 38	Female = 26		
Traditional vs. Non-Traditional	Traditional = 52	Non-traditional = 10		
Web-Enhanced Courses Taken	52			
Online Courses Taken	34			

Table 2 illustrates the demographics of the 27 participants from SCSU. The majority of respondents were graduate students, males, and traditional students. 28 students had taken exclusively online courses out of a sample size of 34 students.

Table 2. Demographics of Graduate Student Participants from SCSU

Classification	Graduate = 27			
Gender	Male = 21	Female = 6		
Traditional vs. Non-Traditional	Traditional = 29	Non-traditional = 5		

Web-Enhanced Courses Taken	34
Online Courses Taken	28

It was found that there were more male students than female students in the undergraduate and graduate STEM programs at NC A&T SU and SCSU. See Figure 1 for more details.

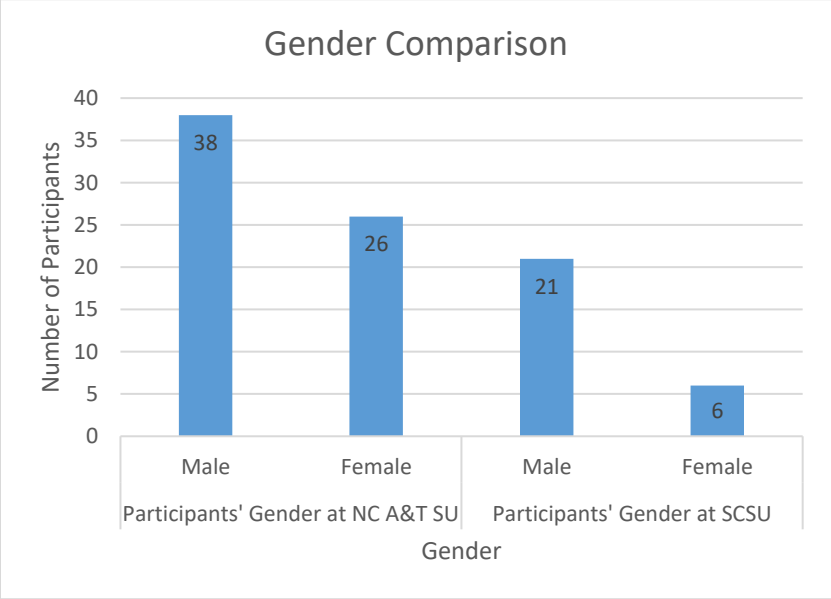

Figure 1. Gender Comparison at NC A&T SU and SCSU

Table 3 exhibits the two-sample t-test to demonstrate the differences of means between two universities for various aspects of online learning in the form of questions. A five-point Likert scale as 1 = strongly disagree, 2 = disagree, 3 = no opinion, 4 = agree, and 5 = strongly agree was used to collect data. It was discovered there were no significant differences except for Question 9 at $\alpha = 0.05$. The $p = 0.009$ indicates that the undergraduate students at NC A&T SU had a higher mean, $\bar{x} = 4.4$, than the graduate students at SCSU, $\bar{x} = 3.9$. The undergraduate students at NC A&T SU agreed more than the graduate students at SCSU that online courses are not for everyone maybe because undergraduate students do not have as much experience as graduate students do. It was also noticed for Questions 1, 7, and 15 the standard deviation readings spread out unequally at NC A&T SU and SCSU. The findings discovered agreements for almost all questions except Question 16. Students at NC A&T SU ($\bar{x} = 3.0$) and SCSU ($\bar{x} = 2.6$) do not agree that they do not check online materials for f2f courses as frequently as for the online courses. They believe they read and check the course materials for both formats the same way whether it is f2f or online.

Table 3. Two-Sample t-Test Data Analysis

	QUESTIONS	**Mean –** Do Students from NC A&T SU and SCSU, have similar responses to the questions?	**Standard Deviation –** Are the readings from NC A&T SU and SCSU, spread out from the

			average value in a similar way for the questions?
1	Online courses are more convenient (commute, parking, etc.) than web-enhanced f2f courses.	Yes NC A&T SU: 3.7031 SCSU: 3.8148 P = 0.580	No NC A&T SU: 1.2173 SCSU: 0.68146 P = 0.004
2	Online courses provide better flexibility (learn at your speed) than web-enhanced f2f courses	Yes NC A&T SU: 3.7969 SCSU: 3.5556 P = 0.295	Yes NC A&T SU: 0.94583 SCSU: 1.0127 P = 0.562
3	Web-enhanced f2f courses involve more instructor-student interactions as compared to online courses.	Yes NC A&T SU: 4.2031 SCSU: 4.1852 P = 0.923	Yes NC A&T SU: 0.83912 SCSU: 0.78628 P = 0.809
4	Web-enhanced f2f courses have more scope to apply various teaching strategies.	Yes NC A&T SU: 3.8413 SCSU: 3.9630 P = 0.517	Yes NC A&T SU: 1.0193 SCSU: 0.70610 P = 0.094
5	Web-enhanced f2f courses are the right fit for undergraduate students as compared to graduate students.	Yes NC A&T SU: 3.3175 SCSU: 3.7407 P = 0.058	Yes NC A&T SU: 1.0599 SCSU: 0.90267 P = 0.345
6	Online courses are the right fit for graduate students as compared to undergraduate students.	Yes NC A&T SU: 3.4921 SCSU: 3.5556 P = 0.773	Yes NC A&T SU: 0.99795 SCSU: 0.93370 P = 0.685
7	I prefer to take web-enhanced f2f courses in comparison with online courses.	Yes NC A&T SU: 3.6393 SCSU: 3.9259 P = 0.173	No NC A&T SU: 1.1259 SCSU: 0.78082 P = 0.029
8	I often get help in a timely manner from my instructors in web-enhanced f2f courses as compared to online courses	Yes NC A&T SU: 3.7419 SCSU: 3.8519 P = 0.621	Yes NC A&T SU: 1.0702 SCSU: 0.90739 P = 0.441
9	Online courses are not for everyone.	No NC A&T SU: 4.4444 SCSU: 3.9259 P = 0.009	Yes NC A&T SU: 0.81869 SCSU: 0.82862 P = 0.971
10	Online courses are best fit for self-starters, self-learners, self-motivated, and self-managed students in comparison with web-enhanced f2f courses.	Yes NC A&T SU: 4.1094 SCSU: 3.9630 P = 0.492	Yes NC A&T SU: 1.0708 SCSU: 0.85402 P = 0.364
11	I usually perform better in web-enhanced f2f courses against online courses.	Yes NC A&T SU: 3.5556 SCSU: 3.6667 P = 0.585	Yes NC A&T SU: 0.98009 SCSU: 0.83205 P = 0.352
12	All courses are not the best fit for online teaching as compared to web-enhanced f2f courses.	Yes NC A&T SU: 4.3281 SCSU: 4.0370 P = 0.162	Yes NC A&T SU: 0.75708 SCSU: 0.93978 P = 0.372
13	All instructors are not the best fit for online teaching in comparison with web-enhanced f2f teaching.	Yes NC A&T SU: 4.1719 SCSU: 3.8148 P = 0.125	Yes NC A&T SU: 0.98488 SCSU: 1.0014 P = 0.943

14	Instructors should be trained for online teaching as compared to web-enhanced f2f courses.	Yes NC A&T SU: 3.9531 SCSU: 4.0370 P = 0.671	Yes NC A&T SU: 0.86244 SCSU: 0.85402 P = 0.949
15	Workshops should be conducted for students to take online courses in comparison with web-enhanced f2f courses.	Yes NC A&T SU: 3.5625 SCSU: 3.7037 P = 0.439	NO NC A&T SU: 1.0216 SCSU: 0.66880 P = 0.020
16	I don't check online materials frequently for web-enhanced f2f courses as compared to strictly online courses.	Yes NC A&T SU: 3 SCSU: 2.5926 P = 0.148	Yes NC A&T SU: 1.3333 SCSU: 1.1522 P = 0.246

Recommendations

Future research studies should be conducted over a larger population and at different universities. The following recommendations were offered based on the results of the study and the review of the literature to develop and teach engineering courses online effectively. These recommendations may apply to another similar format of courses.

- Research before developing an online course.
- Focus on engaging students and communication.
- Add more enhancing materials to engage students.
- Update, modify and review the contents.
- Create more interactive online content.

Conclusions

It is clear that students preferred online courses over face-to-face courses for convenience and flexibility because they did not have to commute to campus, they did not have to search for available parking space, and they learned at their own pace. The findings meet the results of previous studies. However, there are issues associated with online learning. Students thought there were not enough and effective interactions in online courses, they did not receive help in a timely manner, there was not much flexibility in online teaching to incorporate various teaching strategies, and they performed better in face-to-face courses. The findings revealed that online courses were not for everyone, not all courses were best suited for the online format, and all instructors were not the best fit for online teaching. Online courses were the best fit for self-starters, self-learners, self-motivated, and self-managed students in comparison with face-to-face courses. Most of the student comments perceived taking online or face-to-face courses had nothing to do with whether they are undergraduate or graduate students. It was found that there was no difference among students with regards to checking online course materials frequently for face-to-face courses compared to entirely online courses. Most of the findings were consistent with previous research studies. In addition, it was determined from the two-sample t-test that there was no significant difference in opinions for online learning versus f2f learning between undergraduate students at NC A&T SU and graduate students at SCSU except for one aspect. The graduate students believe more that online courses are for everyone than the undergraduate students. The demographics results demonstrated that there were more male

students than female students in the STEM programs. It is concluded an online course is supposed to be developed with careful consideration. An understanding of the above-mentioned factors is crucial as educational institutions endeavor into online education programs to attract and retain students.

References

1. Cavanaugh, J., & Jacquemin, S. (2015). A large sample comparison of grade-based student learning outcomes in online vs. face-to-face courses. Online learning, 19(2).
2. The Condition of Education. College student employment. National Center for Education Statistics. Retrieved from https://nces.ed.gov/programs/coe/indicator_ssa.asp#f2.
3. Saaid, M. N. F., Ayob, M. A., Yunus, A. I. A., Razali, A. W., & Maarot, K. A. (2018). The challenges of space management in higher education institution. IOP Conference Series: Materials Science and Engineering, 429(1):012102. doi:10.1088/1757-899X/429/1/012102.
4. Henderson, A. (2015). What is the difference between a hybrid and web-enhanced course? Ask Library. Retrieved from http://asklibrary.com.edu/faq/60542.
5. Dexway, (2020). 5 Reasons why online learning is more effective, *Dexway* From https://www.dexway.com/5-reasons-why-online-learning-is-more-effective/.
6. Norman, S. (2016). 5 Advantages of online learning: Education Without Leaving Home. *eLearning Industry*, From https://elearningindustry.com/5-advantages-of-online-learning-education-without-leaving-home/amp
7. Sharma, P. (2017). An easy, smart & intelligent way to learn: "Online Education", *International Journal of Advanced Research in Computer Science Vo*l. 9 No. 9, pp. 735-737.
8. Cooper, S. (2020), 5 strategies to improve your online teaching: Are you new eLearning teaching, or looking for strategies to improve your online teaching methods? *eLearning industry* From https://elearningindustry.com/5-strategies-improve-your-online-teaching.
9. Arghode, V., Brieger, E. and McLean, G. (2017), "Adult learning theories: implications for online instruction", *European Journal of Training and Development*, Vol. 41 No. 7, pp. 593-609.
10. Allen, I. E., & Seaman, J. (2014). Grade change: Tracking online education in the United States. Retrieved from http://sloanconsortium.org/publications/survey/grade-change-2013
11. DMI (2020), How online learning can improve academic performance, *Digital Marketing Institute, From* https://digitalmarketinginstitute.com/blog/how-online-learning-can-improve-academic-performance
12. Griffith, D. (2017), The feasibility of flipping: An exploratory analysis of flipped classroom in a developing country, *The journal of effective teaching, Vol. 17 No. 2, pp.72-89.*
13. Peh, W.L., & Foo, S. (2001). Students' perceptions of online learning: A case study of Singapore Temasek Polytechnic's virtual school of business project. Library and Information Science Research (LIBRES),11(2), Retrieved from http://www.libres-ejournal.info/934/.
14. Song, L., Singleton, E. S., Hill, J. R., & Koh, M. H. (2004). Improving online learning: Student perceptions of useful and challenging characteristics. The Internet and Higher Education, 7(1), 59–70.
15. Nakos, G. E., Deis, M. H., & Jourdan (2002). Students' perceptions of on-line courses: An exploratory study. Turkish Online Journal of Distance Education, 3(1), 58–66.
16. Gibson, J. (2008). A comparison of student outcomes and student satisfaction in three MBA human resource management classes based on traditional vs. online learning. Journal of College Teaching & Learning, 5(8), 1-9.
17. Lim, J., Kim, M., Chen, S. S., & Ryder, C. E. (2008, June). An empirical investigation of student achievement and satisfaction in different learning environments. Journal of Instructional Psychology, 35(2), 113–119.
18. Nontraditional Undergraduates / Definitions and Data. Who is nontraditional. National Center for Education Statistics. Retrieved from https://nces.ed.gov/pubs/web/97578e.asp.

Devang Mehta

Devang is an Associate Professor at North Carolina A&T State University. Engineering graphics research interests: computer graphics technology and management. Dr. Mehta's research interests include applications of video games, animations, simulations, and web technology in various disciplines to solve problems. Educational research interests: investigating innovative teaching strategies and instructional tools to make learning effective and prepare students for STEAM careers. Membership/leadership: American Society of Engineering Education; Association of Technology, Management, and Applied Engineering; and Graphics Communication Education Association.

Hiral Shah

Hiral is a Professor in the Engineering Management program at St. Cloud State University. Dr. Shah received "Outstanding Educator" award from the Minnesota State Chancellor and Board of Trustees for excellence in teaching in 2020. She is an Editor of the "Guide to the Engineering Management Body of Knowledge" book. She is a fellow of ASEM and is a Certified Enterprise Integrator (CEI), Certified Professional in Engineering Management (CPEM), Certified Scrum Master (CSM), and Project Management Professional (PMP). Her research interests are in the area of online teaching, curriculum and certification exam development, project management, and lean manufacturing.