

Student Satisfaction with Online Learning Experiences Associated with COVID-19

Original Research

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Abstract

Introduction: The devastation of COVID-19 has profoundly disrupted the U.S. educational system. Student dissatisfaction with online learning has adversely effected enrollment and student retention. Identifying factors that contribute to student satisfaction with online learning experiences is imperative to bolstering student retention and enrollment. This study examines student opinions related to overall satisfaction of online learning experiences during the COVID-19 shift to remote learning.

Methods: A single electronic, university wide, survey was sent out to all 16,212 students enrolled at a Southern, regionally accredited university. The survey remained open for five weeks during the fall 2020 semester. A single e-mail reminder data was sent to all students with a link to the survey and the survey closing date. Descriptive, inferential and qualitative analyses were conducted.

Results: Student satisfaction with online learning experiences during COVID-19 were much lower than previously reported averages. Student satisfaction significantly differed based on sex and program type. Female students ($M=1.53$, $SD=.500$, $p=.005$) and students enrolled in online programs ($M=1.53$, $SD=.500$ $p<.001$) reported significantly higher levels of satisfaction with online learning amid the onset of COVID-19, in comparison to male students ($M=1.42$, $SD=.495$) and students enrolled in traditional (face-to-face or hybrid format) programs ($M=1.46$, $SD=.499$). Qualitative analyses found that student opinions about instructional design elements pertaining to course structure (content, sequence and methods), sociology and compassion influenced student satisfaction with online learning experiences.

Conclusions: Student sex, type of program, elements of course design, and instructor compassion influenced student satisfaction with learning experiences during the onset of COVID-19. Improvement in course structure and student-teacher interaction may improve student rates of satisfaction with online learning experiences.

Key Words: Education, Remote-learning, Pandemic

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Introduction

The Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) global pandemic, more commonly known as the Coronavirus 2019 (COVID-19), resulted in worldwide quarantines, social distancing mandates, and face-to-face restrictions during Spring 2020 forcing millions of colleges and universities to quickly transition to online learning.¹ Millions of students experienced an immediate, dramatic and potentially fragmented shift to remote learning when



mandates imposed made it compulsory for faculty and students to quickly acclimate to the new guidelines requiring use of digital platforms. The sudden rush to move courses to an online learning environment, coupled with the potential lack of formal training in online instructional design by and course development, may have impacted student overall satisfaction with online learning experiences.²

Student satisfaction plays a significant role in student retention.^{3,4} Numerous studies have shown that teaching online requires a unique approach and differing pedagogy from the traditional, face-to-face classroom.^{5,6,7,8} Many institutions of higher education have not examined student satisfaction in relation to online learning experiences. Studies available have found that student characteristics, elements of course design and structure, and social environment impact student satisfaction and retention rates.^{2,3,9-11} Further, studies have shown evidence that technologies used, student support, feelings of connectedness, and instructional strategies impact satisfaction with online learning experiences and student retention.¹⁰⁻¹³ One particular study found that faculty instructional methods was the single most important factor in student satisfaction.³

Unfortunately, most student retention models have been designed for the face-to-face classroom, making it very difficult to apply them to the online learning environment.⁹ The Cognitive Apprenticeship Model (CAM) has been used to explore components that make up an effective online learning community. CAM is a design framework that holds relevance as a method for the development of web-based learning environments. CAM posits that four dimension make up effective online learning environment: content, methods, sequencing and sociology.¹⁴ This model may be beneficial to illuminate student opinions of what supported and what hindered students' satisfaction with online learning experiences. Further very few studies have examined student opinions about instructional practices in relation to satisfaction within the online environment and especially not during the onset of COVID-19.

Exploring factors that contribute to student satisfaction with online learning experiences is imperative to bolstering student retention and enrollment. Therefore, the purpose of this study is 1) Examine student satisfaction with online learning experiences associated with COVID-19, and 2) Identify student characteristics that influence student satisfaction with online learning experiences associated with COVID-19 and 3) Examine student opinions of areas of instructional strength and areas of instructional improvement that influenced their satisfaction with online learning experiences during COVID-19. We hypothesize that due to the abruptness of the COVID-19 transitions, that student satisfaction with online learning experiences may be adversely effected. The knowledge gained from this study may help with the development of future online learning courses by providing key insights into areas of strength, as well as areas of improvement, as identified by online learners.

Scientific Methods

This study used a cross-sectional, retrospective survey design to examine student satisfaction of online learning experiences associated with COVID-19 during Fall 2020 Semester. Institutional Review Board (IRB) approval was granted by the participating University. Consent for participation in the study was passive in nature. Survey completion served as verification that students read information pertaining to the study and consented to study participation. Completion of surveys took approximately 10 to 15 minutes.

Sample

Utilizing a university listserv, all students (N= 16,212) at a regionally accredited, national university located in the Southern region of the United States received an e-mail detailing the purpose and the voluntary nature of the study. Additionally, a link to the survey generated by Qualtrics XM Survey system was included in the e-mail to all students. The survey remained open for five weeks during the fall 2020 semester. Students were able to access the link and complete the survey at any time over the five week period. An e-mail reminder with the link to the survey, study information, and notification of the survey closing date was sent to all students approximately two weeks before the availability of the survey was terminated. Using the Qualtrics Sample Size Calculator, it was determined that a sample size of 376 student surveys should yield a representative student sample, with a 95% confidence level and 5% margin of error. To increase the likelihood of student participation and completion of the survey, a total of 15 students were randomly selected to receive a \$20 gift card.

Participants

Criteria was created for participation in the study. Participants were aged 18 and older. Participants were enrolled in courses at the participating university throughout the spring and fall 2020 semesters.



Measurement Tool

The “Student Perceptions of Online Learning Experiences Associated with COVID-19” survey tool was developed after reviewing existing instruments and numerous studies about online learning environments, and student satisfaction.^{1,4,10,14-16} In this study, the term learning experiences was defined as any instructional components of the online learning environment. Face validity and content validity measures were conducted. Minor revisions were made to the survey (organization, rewording of items, and addition/deletion of items). The survey included demographic questions, 5-point Likert-scale questions with a neutral mid-point, and open-response questions.

The final survey for this study was composed of 34 questions: 1) Twelve demographic questions, 2) Eighteen traditional, balanced Likert type questions, and 3) Three open-ended questions. The question pertaining to satisfaction asked: “How satisfied were you with your online learning experience during the COVID-19 transition?” [Extremely dissatisfied; Somewhat satisfied; Neither satisfied nor dissatisfied; Somewhat satisfied; Extremely satisfied]. Opened ended questions used for qualitative analyses, prefaced with the phrase “Regarding your satisfaction level...” included: 1) Immediately FOLLOWING the COVID-19 transition to online learning (Spring 2020), in what ways do you feel your instructors at NKU did well with online instruction? and 2) “Immediately FOLLOWING the COVID-19 transition to online learning (Spring 2020), in what ways do you feel your instructors could have improved upon their online instruction?”

Statistical Analysis

Descriptive statistics were used to summarize demographic data (sex, age, race, yearly income and student satisfaction) and survey responses. Similar to previous studies, responses were dichotomized from *Extremely satisfied*, *Somewhat satisfied*, *Neither satisfied nor dissatisfied*, *Somewhat dissatisfied*, and *Extremely dissatisfied* to either *Satisfied* or *Dissatisfied*.^{17, 18} To understand the differences in overall student satisfaction based upon student characteristics (demographics), two sample t-test analyses, parametric and non-parametric analyses (two-sample t-test assuming unequal variances) were performed. Specifically, differences in overall student satisfaction based on sex, race, income, and program type were examined. Quantitative analyses were conducted in SPSS version 24.¹⁹

Thematic, qualitative content analyses were performed manually utilizing Microsoft Office Excel 2016. Employing a deductive approach, the Cognitive Apprenticeship Model (CAM) was used to systematically categorize (code) student responses into sub themes and corresponding major themes (content, sequencing, methods and sociology).⁴⁰ Sub-themes for content included: 1) learning outcomes were clearly stated, 2) learning outcomes were realistic, and 3) content was supportive of learning outcomes. Sub-themes for sequence included: 1) organization, 2) scaffolding of complexity of learning materials, and 3) autonomy. Sub-themes for methods included: 1) helpfulness of learning materials, 2) availability of learning materials, 3) provision of rubrics, and 4) provision of feedback. Sub-themes for sociology included: 1) peer engagement, 2) accessibility of instructor, and 3) timeliness of instructor responses. Lead authors reviewed and coded responses independently. After coding responses with corresponding CAM sub-themes, authors conferred to determine inter-coder agreement. Inter-coder reliability (.82) was well above the acceptable range (between .81 and 1) of agreement.⁴¹ Any discrepancies with coding were settled using a negotiated agreement method and adjustment to coding were made accordingly.⁴²

Results

Participants

A total of 16,212 students received the survey email. Of these students, 11% (1707) of students completed the survey. Students under the age of 18, and students not enrolled in courses during the spring 2020 semester were excluded from the study. The final sample consisted of 1,186 (7%) eligible graduate and undergraduate students enrolled in courses during the Spring 2020 semester. Participants were predominately female (69.2%), with the majority of students identified as European American (white; 80%). Just over half of all participants indicated an income of less than \$50,000 (55.18%). It is important to note, the sample was representative of the overall student population.

Descriptive & Inferential Analyses

Concerning overall student satisfaction, the majority of students (43.7%) indicated they were dissatisfied with the transition to online learning due to COVID 19 (Table 1). Males reported higher rates of dissatisfaction (50.2%) compared to females (40.6%). White students (37.1%) reported higher rates of dissatisfaction than black students (36.3%) and all other races of students combined (37%). Students reporting a total yearly income of less than \$50,000 a year were less satisfied (46.3%) than students reporting a total yearly income of \$50,000 or above (40.8%). Regarding program type, students who were enrolled in programs that were completely online prior to COVID-19 indicated

higher rates of satisfaction with the transition to online learning (56%), in comparison to students in traditional programs (face-to-face; hybrid or a mixture of these; 38.3%).

Inferential analyses showed significant differences in overall satisfaction based upon sex and program type. Females reported significantly higher levels of satisfaction with the transition to online classes related to COVID-19 in comparison to males ($p=.05$). Program type also significantly impacted student satisfaction. Students who were enrolled in online programs reported significantly higher levels of satisfaction in comparison to students in traditional (hybrid, face to face, or a mixture of these type of courses) programs ($p=.000$). Student satisfaction did not significantly differ based on income or race (Table 2).

Qualitative Analysis

Qualitative analysis indicated five major themes, the four CAM themes (content, sequence, methods, sociology) and one additional theme (compassion) for areas of instructional improvement and three major themes, two CAM (methods, sociology) and one additional theme (compassion), for areas of instructional strength regarding satisfaction level with online learning experiences during Spring 2020. Several sub-themes emerged as most pertinent in regards to student satisfaction/dissatisfaction with their online learning experiences during spring semester of 2020. Emerging sub-themes for areas of improvement based upon student perceptions included: 1) unrealistic expectations, 2) learning materials were not helpful or engaging, 3) poor course organization, 4) poor interaction (accessibility, response time and communication), and 5) lack of compassion (flexibility, leniency and understanding (Table 3). Major sub-themes for areas of strength based on student perceptions included: 1) clarity of course expectations, 2) interaction, and 3) compassion (Table 4).

Table 1: Student Demographics

Ages	N	%
Under 18	43	2.5%
18 to 25	1252	73.3%
26 to 32	172	10.1%
33 to 38	91	5.3%
39 to 44	56	3.3%
45 & Up	93	5.5%
Took Spring Classes (2020)		
Yes	1186	72%
No	461	28%
Race		
African American (Black)	81	7%
European American (White)	932	80%
All Other Races	155	13%
Sex		
Female	794	69.2%
Male	336	29.2%
Other	18	1.6%
Income		
Less than \$50,000	628	55.2%
\$50,000 or Above	510	44.8%
Program Type		
Traditional	877	76.5%
Fully Online	269	23.4%
Overall Student Satisfaction		
Satisfaction	411	42.3%
Neutral	135	14.0%
Dissatisfied	424	43.7%

Percent's denote valid percent's; missing values excluded

Table 2. Student Satisfaction by Sex, Income, Program Type and Race

Variables	N	Level of Satisfaction M SD	df	t	p value
Sex					
Male	253	1.42 .495	487	-2.8	.005*
Female	570	1.53 .500			
Income					.519
Below \$50,000	456	1.46 .499	825	-1.8	
\$50,000 or Above	371	1.53 .500			
Program Type					
Online	194	1.53 .500	329	5.0	.000*
Traditional	638	1.46 .499			
Race 1					
White	664	1.49 .500	830	-.244	.807
All Other Races	168	1.50 .501			
Race 2					
White	664	1.49 .500	713	-.549	.583
Black	51	1.53 .504			

* = statistically significant

Table 3: Themes and Quotes for Student Opinions of Areas for Instructional Improvement

CAM Category / Theme	Sub-Theme	Quotes
Content	Unrealistic Expectations	<ol style="list-style-type: none"> 1. "The expectations were too high. Given the current situation the work load and expectations nearly tripled... it felt impossible to keep up with the expectations. From peer discussions, I know others were struggling with similar situations." 2. "Their expectations didn't change following online learning. Given that students are dealing with much more stress, many of us losing our only source of income this year, and trying to teach ourselves the online content is difficult. Professors didn't seem to care and upheld the same standards as pre-covid which is a bit unrealistic..."
Sequence	Poor Course Organization	<ol style="list-style-type: none"> 1. "Many professors were unorganized and had a hard time adjusting to online learning (understandably). Many of them didn't teach online before, and the transition was difficult ... could have organized their canvas pages better....there was no standard template for the online classes.... Be more organized. Publish materials earlier." 2. "Not the faculty. There should have been tutorials developed ...that would lead a student through the clumsy website ... developed years ago and has not brought into the 21st century."
Methods	Learning Materials Not Helpful	<ol style="list-style-type: none"> 1. "I feel like some of the work that was given out was busy work and wasn't really beneficial as a supplemental material. I think they could have done a better job of assigning work (homework, quizzes and modules) that was more beneficial to student learning." 2. "They could have created more applicable learning. I felt like a lot of the assignments immediately following COVID-19 were just "busy work". Some of the assignments felt like filler and I didn't really learn much from them. Some more substantial learning materials would have been nice. Provide homework relevant to the course."

Sociology	Poor Interaction	<ol style="list-style-type: none"> 1. "It was next to impossible to get ahold of instructors. They were not available. I emailed, texted, and tried to contact via canvas, but I've was left with no response more often than not... I had professors who didn't dedicate any time to online instruction, they just canceled assignments and there were no instructions as to what to do." 2. "Some teachers seemed to disappear of the face of the earth and only appeared every other week via an email. The lack of contact made it hard to learn what was going on, and I definitely felt like I stopped getting anything from the course... One of my teachers never answered my emails until I had a few minutes left to submit my assignment & the same professor never gave me feedback..."
Compassion	Lacked Compassion	<ol style="list-style-type: none"> 1. "Some professors were unwavering in the due dates, no matter your excuse for being unable to submit it. They could adjust to the students issues. Could have been understanding outside of class life struggles, but instead made stricter guidelines instead of being more flexible considering the situation. There was a time where my whole family got Covid and 3 of my family members died (2 uncles and my grandma) and they did not care to adjust their times." 2. "Instructors could have done better by knowing that we were in a difficult time so that could have made the transition easier and work load lighter due to the current situation. I feel like they did poorly being flexible, compassionate and lenient. Most of them did not care about your situation. They offered no flexibility and no forgiveness. It would have been nice for more understanding of student circumstances due to COVID"

Table 4: Themes and Quotes for Student Perceptions of Areas for Instructional Strength

Theme	Sub-Themes	Quotes
Methods	Availability of Learning Materials	<ol style="list-style-type: none"> 1. "I feel like they did well with putting up new materials on time" 2. "Uploaded materials with plenty of time to access them before class."
Sociology	Interaction	<ol style="list-style-type: none"> 1. "They were always up for questions. They were there to help me when I felt I didn't understand anything.... The majority of my professors had accessible office hours and got grades & feedback back to us in a timely manner." 2. "They always answered questions and e-mails in a timely manner. They were available to help more often in my opinion... Office hours for individual meetings with professors were much more flexible than in previous face-to-face classes."
Compassion	Compassionate	<ol style="list-style-type: none"> 1. "My instructors did a great job with creating flexibility in the course. They seemed to be very understanding of the situation we were all abruptly put in and allowed the course to be flexible to accommodate that." 2. "I think almost all of the instructors were very understanding of the fact that we were adjusting to a new environment, and they were very forgiving and not so critical because they were also learning as much as the students were....Instructors were flexible, provided support and encouragement."

Discussion

The present study examined student satisfaction with online learning experiences associated with COVID-19. Most students were dissatisfied with their online learning experiences associated with COVID-19. Student characteristics that significantly influenced student satisfaction with online learning experiences included sex, and program type. Unlike past studies, race and income did not significantly influence student satisfaction in the study.²⁷⁻³⁰ Male students and students enrolled in traditional programs (face-to-face, hybrid or a combination of these) were significantly less



satisfied than female students and students who were enrolled in fully online programs prior to COVID-19. In relation to overall satisfaction with online learning experiences associated with COVID-19, qualitative data indicated all four major CAM themes (content, sequence, methods, sociology, and compassion), and one additional theme (compassion) were areas of improvement related to satisfaction with online learning experiences. Further, two major CAM themes (methods & sociology) and one additional theme (compassion) were areas of strengths related to satisfaction. In general, students reported more instances for areas of improvement than areas of strength.

As hypothesized, the present study found high rates of student dissatisfaction (44%) with online learning experiences in comparison to other studies conducted prior to COVID-19 (between 14% and 22.6%).^{20,21} The substantial difference in rates of dissatisfaction may be attributed to confounding factors related to COVID-19. Potential factors may include the abruptness of the transition, lack of time and preparation, change in learning platform, change in lifestyle, and insufficient faculty knowledge related to limited training on best practices for effective online learning environments.

Similar to past studies,^{21,22} female students were significantly more satisfied with their online learning experiences in comparison to male students during the transition to online learning due to COVID-19. Past research indicates that female students are often more satisfied with online learning experiences because female students are often more proactively engaged with their learning community (ask for assistance, spend more time engaging with their instructors and peers, etc.), and are confident, independent learners, in comparison to male students.^{2,10,12,22-24} Further, engaged learners are more likely to report higher rates of overall satisfaction with online learning.²⁴ Based upon the findings of the current study, it may be beneficial to explore level of engagement among male students in the online learning environment.

Aligning with previous research, students who reported enrollment in a fully online program prior to the transition to online learning associated with COVID 19 were significantly more satisfied with their online learning experience in comparison to students enrolled in traditional programs (face-to-face, Hybrid, online or a mixture of these).^{21,22} Several factors may influence the traditional students' level of satisfaction with online learning experiences. Past studies have indicated that the lack of autonomy to choose learning method (being forced to learn online), lack of previous experience with online courses, lack of face to face interaction with the instructor and classmates that is typical of the traditional classroom, and poor course organization/delivery, may impact overall satisfaction.^{25,26} Unfortunately, COVID-19 brought about unprecedented, forced changes, leaving many students unprepared for the shift to online learning. Traditional students with little or no experience with online learning platforms may have felt more stress and anxiety about online learning in comparison to those students who were more experienced.

Qualitative analyses asked students to provide their opinion on areas of instructor improvement and areas of strength. Five themes for areas of improvement, and three themes for areas of strength emerged in regards to student satisfaction with online learning experiences. Emergent themes for areas of improvement related to satisfaction were identified as unrealistic expectations, poor course organization, lack of interaction, learning materials not helpful, and lack of compassion. Emergent themes for areas of strength for online learning experiences related to satisfaction included availability of learning materials, interaction and compassion. Most student responses in this study corresponded well with the dimensions of the Cognitive Apprenticeship Model (CAM). CAM posits all four dimensions are needed for an effective learning environment (content, methods, sequencing and sociology). All four dimensions were mentioned in student responses as related to level of satisfaction (Table 3).¹⁴ One theme identified was not part of CAM, but emerged from student responses for both area of improvement and area of strength. This theme was identified as "compassion" as student responses encompassed terms such as understanding, flexibility, and leniency regarding instructors.

Previous studies have indicated that high teacher expectations contribute to student satisfaction with online learning experiences.^{31,32} Differing from past studies, students expressed dissatisfaction with the high expectations posed by teachers. Specifically, students noted that expectations during the onset of COVID-19 were not realistic and burdensome, and thus negatively influenced satisfaction. Many students reported that lack of experience, confidence, time and support with online learning platforms may have contributed to feelings of unrealistic expectations. These findings further corroborate previous study results in that lack of time, knowledge and skills to support online learning were major shortcomings that lead to feelings of dissatisfaction.³³ Supporting students through knowledge and skill development may improve self-efficacy for online learning and thus improve satisfaction.



Many students felt course organization (development and design of course resources and curriculum) could be improved. The importance of course organization has been supported as a primary factor related to overall satisfaction with online learning experiences in past studies.^{34,35} The unprecedented and rushed shift to online learning within a single week, may not have been sufficient time for instructors to create and review the courses to ensure pedagogical best practices. Additionally, a handful of students expressed that many institutions of higher education utilize a consistent course layout templates (shells) for instructors, and provide students with tutorials for course navigation. Further, students felt that it was the responsibility of the administration to support improvements in course organization (Table 3). Providing training opportunities that teach best practices for online course organization for new and inexperienced faculty may improve student satisfaction.

In contrast to other studies,^{2,3} this study found that many students expressed dissatisfaction with learning materials (lecture slides and homework assignments, etc.). Specifically, students felt learning materials were not helpful. Only a small number of studies have examined quality of instructional materials in relation to student satisfaction.^{2,3} Many students in this study, felt the learning materials provided during the onset of COVID-19 did not promote nor reinforce learning of the course content. Several students felt coursework was “busy work” and did not contribute to learning. Ensuring that learning materials reinforce course objectives may improve student satisfaction.

Two major themes, interaction and compassion, emerged in both areas of strength and improvement. Students in this study commonly described interactions, such as instructor accessibility, response time and general communication as factors influencing satisfaction. When student were unable to access instructors, did not received responses to e-mail or other communications, and did not receive communication about general course happenings, students voiced dissatisfaction. However, when instructors were accessible, provided timely responses to students and provided general information about courses, students expressed satisfaction with their online learning experiences. Several studies have shown that instructor presence, and learner-instructor interactions are significant predictors of student satisfaction with online learning experiences.³⁶⁻³⁹ Improving student-teacher interaction may help students feel supported and engaged, and may improve student overall satisfaction with online learning experiences.³⁶

Within this study, compassion was often referred to by students as instructor understanding, flexibility, leniency, and empathy. Many students expressed they were dissatisfied with the level of compassion shown by their instructors, and hoped that instructors would improve their understanding of student situations by modifying course requirements and due dates. However, satisfied students expressed that instructor compassion was an area of instructional strength. Further, satisfied student often felt instructors were sensitive and understanding to individual circumstances and flexible during COVID-19. Findings from this study coincided with the 2015 study by Parahoo et al., which found that empathy (i.e. compassion) was a significant predictor of student satisfaction with online learning. Improved empathy and understanding among instructors may enhance satisfaction in online learners.

Availability of learning materials was another major theme that emerged as an area of strength related to student satisfaction with online learning experiences. Supporting previous studies,^{4,10,12,25} students in this study expressed their satisfaction with the autonomous nature of the online environment. Specifically, students were satisfied with the ability to access materials when needed, and with the opportunity to choose the pace in which they completed tasks. Providing students with the resources needed in a timely manner may help reduce anxiety, improve self-regulation, and aid in timely completion of assignments.

Although the depth of the knowledge gained in this study was rich, this study is not without limitations. Due to the novelty of the COVID-19 virus, this study may be difficult to replicate. Though the sample was representative of the population, the majority of the sample was predominately European American (white). Therefore, differences in-between races was not able to be analyzed. Thus, this study also found a lack of homogeneity in the sample, which was addressed using non-parametric analyses. Qualitative data, although robust and in-depth, does not allow for researchers to quantify responses in the same manner as quantitative data. Another limitation is the general design of study. This study relied on self-report which could introduce several biases, such as recall bias and response bias, which would not allow for authentication/validation of the responses provided. Further, the study design was a cross-sectional design, thus providing only a snapshot of the situation and not allowing for review of associated changes over time.

Conclusions

This study found that students were overall dissatisfied with their online learning experiences associated with COVID-19. Specifically, sex, type of program, expectations, course organization, helpfulness of learning materials, interactions,



compassion and availability of learning materials influenced student satisfaction with online learning experiences. Improving course structure and student-teacher interaction, may improve student rates of satisfaction with online learning experiences. Implications for educators, administrators, and students for this study include 1) Instructor training on best practices for online course development and interaction, and 2) Creation of support materials for online course navigation for students.

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