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A Multi-Faceted and Practical Analysis of Online Courses at UHCL

Angela Kelling, Shanta Goswami Varma, and Nicholas J. Kelling
University of Houston-Clear Lake

Online courses are ubiquitous, but the research findings on student learning outcomes and opinions of these courses are mixed. Therefore, this research comprehensively investigated online courses at UHCL by analyzing them from the perspective of both user groups, students who consume the courses and faculty who deliver the courses. For this study, the examination was performed through questionnaires and archival data to achieve as complete a picture of online courses at the University of Houston-Clear Lake as possible. Face-to-face courses tended to be favored in terms of both student performance measures and faculty and student opinions. However, the advantages of online courses resulted in equality in terms of student preference to take and faculty effort to teach these courses. Suggestions for supporting online students are discussed.

Online education offerings continue to expand, with nearly a third of students reporting having taken at least one online course (Online Learning Consortium, 2016). The percentage of students taking at least one online course has continued to increase, even as overall enrollments have begun to decline (Allen & Seaman, 2017). However, despite the popularity of online courses, opinions of them remain mixed. The majority of academic leaders believe that learning outcomes are equivalent or superior to face-to-face courses (Online Learning Consortium, 2016), while only about one-fourth of faculty report feeling the same way (Straumsheim, Jaschik & Lederman, 2015), perhaps stemming from a generational divide (Correa, 2010). Faculty tentativeness "is recognized as the most significant barrier to the growth of online education" (Stewart & Crone, 2016, p. 31).

Students tend to report that they take online courses because they are self-paced, flexible, and convenient (Mahoney, 2009), and satisfaction with online courses is often equal to satisfaction with face-to-face courses (Driscoll, Jicha, Hunt, Tichavsky, & Thompson, 2012). However, student expectations are often unrealistic (Bork & Rucks-Ahidiana, 2013). Some students report enrolling in online courses because they believe the course will be less difficult (Brown, 2012). Additionally, students are often unprepared for the technological skills (Bork & Rucks-Ahidiana, 2013; Correa, 2010) and level of self-directed learning required (Mahoney, 2009), leading them to become overwhelmed, frustrated, and discouraged. Bork and Rucks-Ahidiana (2013) state, "[T]he asynchronous nature of the interaction and pedagogy in online courses exacerbates the challenge of identifying and resolving misaligned expectations" (p. 1). Additionally, students who enroll in online courses are more likely to be in at-risk groups, such as employed students, non-traditional students, and part-time students (Aud et al., 2011). Indeed, students appear to withdraw from online courses much more frequently (Brown, 2012), often citing time management as the main reason (Varner, 2013). A recent survey of institutions offering online programs found that the focus of most online programs is on enrollment growth and revenue, leading Legon and Garrett (2017) to suggest that institutions need to emphasize "strategies that increase student completion" (p. 24). It is crucial to examine performance in online courses to ensure that they are not increasing access without also advancing progress towards a degree.

Data on the learning experience of online courses is varied. A direct comparison study of online and face-to-face sociology classes found a performance difference, perhaps related to course type or structure, but likely resulting from a selection effect given that student GPA explained more of the variance than course type (Driscoll et al., 2012). Other direct comparisons have found no difference, including a study in which students willing to take an online course were randomly assigned to online or face-to-face for an Introduction to Computer Science course (Olson, 2002). However, those who wanted a face-to-face course only, which was a much larger group, performed better on weekly quizzes. Therefore, some of the difference in performance may result from self-selection into online courses and may not be a product of the courses themselves. Additionally, the course type may impact the learning experience, with some courses being easier to adapt to the online format than others are. Bennet and Green (2001) state that student learning outcomes should be examined before a new course type is offered online. However, many course types are offered online without the supporting research.

Given the increasing reliance on online courses, it is crucial to examine them from multiple angles. For this study, the examination was performed through surveys and archival data to achieve as complete a picture of online courses at the University of Houston-Clear Lake (UHCL) as possible. UHCL was exclusively an upper-level and graduate university before admitting its first freshman class in the fall of

Table 1
Percentage of Students Reporting That Their Online Courses had Each Required Quality Assurance Element

	Yes		No	
Syllabus posted	245	99.2%	2	0.8%
Course schedule posted	240	98.0%	5	2.0%
Helpful links to outside resources	195	79.3%	51	20.7%
Was course information easy to find	209	85.3%	36	14.7%
Did assignments have written learning objectives?	204	82.9%	42	17.1%
Encouraged to complete course evaluation	182	74.3%	63	25.7%

2014 (www.uhcl.edu). The student population does not match the anecdotal typical college population, with many students falling into the at-risk groups. It is a commuter campus, with 43.3% of students living over 10 miles from campus. Additionally, the student population is older, with an average student age of 29 years and with 95.0% of students age 21 or older in 2016. Therefore, students are more likely to have jobs and families, making online courses appealing for their flexibility and convenience.

UHCL has been emphasizing online courses to meet the needs of students and currently has four bachelor's and nine master's degrees completely online. Although the majority of courses at UHCL are still face-to-face (Fall 2016: 74.6%, 1159 of 1553; Spring 2017: 69.4%, 1145 of 1651), a significant amount of courses are offered as hybrids (Fall 2016: 13.1%, Spring 2017: 12.9%) or online only (Fall 2016: 12.9%, Spring 2017: 17.7%). Additionally, these numbers represent an increase over a decade ago when well over 80% of courses were face-to-face (Fall 2006: 87.1%, 1192 of 1368; Spring 2007: 84.4%, 1198 of 1420).

The current research set out to examine the quality of the course structure, student outcomes, and opinions of the both the faculty that teach the courses and the students that take them. This comprehensive analysis aims to explore online courses from the perspective of both users. Even though students are the main consumers of the online courses, it is also important to determine how accepting faculty are of online courses with their ever increasing presence. This project focused on examining opinions and implementation of online courses at UHCL.

Study 1: Quality Assurance

Methods

Participants

Participants consisted of 247 students in online classes during Fall 2015 at UHCL. Most (n=143, 58%) were undergraduates. All had taken at least one online course, with the vast majority (71.3%) reporting having taken three or more classes. The students represented a variety of majors.

Questionnaire

The questionnaire consisted of demographic questions addressing the degree program, progress, and number of online courses taken. Additionally, there were 25 questions to assess if the course had the required elements and other aspects of the course, such as main form of communication with instructor or mode of evaluation. These questions were based on the Quality Assurance checklist used by UHCL to assess online courses before their first offerings (available at https://www.uhcl.edu/computing/course-development/quality-assurance). The checklist is based on the Texas Higher Education Coordination Board and Southern Association of Colleges and Schools requirements for online courses.

Procedure

The questionnaire was administered in the Fall semester of 2015. All students in online courses in Fall 2015 (n=1,974, 12.5% response rate) were recruited by email. The survey was conducted online using Qualtrics.

Results

The majority (n=155) reported that they were satisfied with the online course offerings in their program. Additionally, the majority of required elements were reported as present in their online courses (see Table 1). The majority of online courses (65.3% of 245 responses) were not based solely on test and quiz scores, with students reporting that papers, discussions, and other assignments contributing to the grade in many classes. Of the 241 students who answered about communication with their instructor, the main methods of communication were email (98.8%) and discussion board (60.2%) with face to face meetings (13.7%), phone appointments (10.4%) and chat (6.6%) used somewhat infrequently.

Study 2: Online versus face-to-face course metrics

Methods

Procedure

All courses that were offered in both online and face-to-face instruction modes from Fall 2014 through Summer 2016 were included in an analysis of withdrawal rates and overall grade point average (GPA).

Results

A total of 180 different courses were offered in both formats during the time frame analyzed. The online versions included 762 sections with 18,811 in a duplicated headcount. The face-to-face versions included 928 sections with a 20,282 duplicated headcount. In a comparison across instruction formats, GPA was higher in face-to-face courses (M=3.21) than online (M=3.13, t_{1688}=3.03, p=.002); whereas the percentage of students dropping the course was higher in online (M=8.98%) than face-to-face (M=6.14%, t_{1629}=-4.65, p<.0001). A paired t-test examining mean GPA and percentage drop for individual courses between instruction modes found the same pattern (pairs=180; GPA: face-to-face M=3.35, online M=3.21, t_{179}=5.44, p<.001; percentage drop: face-to-face M=5.34%, online M=7.92%, t_{179}=-3.16, p=.002).

Study 3: Student Opinion of Online Courses from Graduating Student Survey

Methods

Participants

Participants included 5,922 UHCL students who completed the graduating student survey between Spring 2008 and Spring 2016. The survey included a question about whether the student enrolled in online courses, as well as one assessing online course satisfaction.

Procedure

All students who submitted a degree petition were recruited to fill out the graduating student survey every semester. The survey and data are maintained by the UHCL Office of Institutional Effectiveness. Relevant data were pulled from the archives.

Results

The vast majority of participants took online courses (78.6%), with a minimum of 68.1% in the Spring of 2008 and a maximum of 84.7% in the Spring of 2016. The majority of students rated the online course experience as excellent or good (81.4% of 4813 who rated) with a mean rating of 3.1 on a 4 point scale (range=3.01 to 3.22).

Study 4: Student Opinion of Online Courses from the Focused Survey

Methods

Participants

Participants included 462 UHCL students. Of these, 85 had not taken an online course and provided limited data. The other 377 students had taken at least one online course and completed at least 50% of the survey for inclusion in the sample. Most participants were younger than 35 (67.1%). Most participants were female (74.5%, 281 of 373), which is representative of the student population (consistently above 60% female). Additionally, most participants were full-time students (63.8%, 240 of 376). Although the majority of participants were White (52.3%), there was some diversity with representation of Hispanic or Latino (21.8%), Asian (13.8%), and Black (8.8%) students. These numbers also reflect the student population, which is mostly White (~40%), followed by Hispanic or Latino (~25%), Asian (~7%) and Black (~9%). There was also representation of Bachelor's (60.0%, 225 of 375), Master's (37.3%, 140) and even Doctoral (2.7%, 10) students. Participants reported pursing many different majors with the most common being Psychology (49), Early Childhood Generalist (27), General Business (20), Criminology (18), and Computer Science (16).

Procedure

The survey was administered through Qualtrics from February through April 2017. Participants were recruited by an email sent to the list of current and recently graduated students maintained by University Computing and Telecommunications Department. Given the nature of this email list, a true response rate cannot be calculated. Once participants agreed to the informed consent, they answered demographic questions. Participants who answered no questions or only demographic questions were removed from the study. After the demographic questions, participants were asked how many fully online courses they have taken. If they answered none, they were asked to indicate the main reason they have chosen not to take online courses and directed to the end of the survey. If they reported that they have taken online courses, they were asked the additional questions about online courses. Students who completed the survey were eligible to be entered in a drawing for one of five gift cards valued at $10.

Table 2
Comparison of Student Ratings of Online Courses on Several Elements by College

	College of Business			
	N	Mean	SD	Median
Online classes: more effort to learn the material	80	4.33	0.95	5.00
Online classes: more effort to earn a good grade	80	4.56	0.82	5.00
Overall, I am satisfied with my online classes	80	3.73	1.25	4.00
I prefer to take face-to-face classes	80	3.45	1.37	4.00
I prefer to take online classes	80	3.43	1.43	4.00
	College of Education			
Online classes: more effort to learn the material	61	3.67	1.86	4.00
Online classes: more effort to earn a good grade	61	4.33	1.01	5.00
Overall, I am satisfied with my online classes	61	3.85	1.26	4.00
I prefer to take face-to-face classes	61	3.75	1.19	4.00
I prefer to take online classes	61	3.38	1.58	4.00
	College of Human Sci & Humanities			
Online classes: more effort to learn the material	137	4.02	1.12	4.00
Online classes: more effort to earn a good grade	137	4.28	1.08	5.00
Overall, I am satisfied with my online classes	137	4.07	1.15	4.00
I prefer to take face-to-face classes	137	3.66	1.1	4.00
I prefer to take online classes	137	3.59	1.42	4.00
	College of Science & Engineering			
Online classes: more effort to learn the material	86	3.35	2.29	3.00
Online classes: more effort to earn a good grade	86	3.76	2.25	4.00
Overall, I am satisfied with my online classes	86	3.77	1.33	4.00
I prefer to take face-to-face classes	86	3.9	0.97	4.00
I prefer to take online classes	86	3.49	1.36	4.00

	Kruskall-Wallace		
	H	df	p
Online classes: more effort to learn the material	27.586	3	<.001
Online classes: more effort to earn a good grade	35.947	3	<.001
Overall, I am satisfied with my online classes	6.374	3	0.095
I prefer to take face-to-face classes	3.883	3	0.274
I prefer to take online classes	1.793	3	0.617

Each question is rated on a five-point Likert scale, with higher means indicating higher agreement. Means, medians, and standard deviations are given for each pair. Additionally, the Kruskall-Wallace test value and significance are reported.

Results

For the students who had not taken an online course, the only data collected were demographics and the main reason as to why they had not enrolled in an online course. Of the 85 students who had not taken an online course, the majority were in College of Science and Engineering (CSE: 49.4%), followed by College of Human Sciences and Humanities (HSH: 22.4%), College of Business (BUS: 21.2%), and College of Education (COE: 7.1%). Four individuals failed to identify a main reason they had not taken an online course. The 81 participants who did indicate a reason reported the main ones being a lack of offerings (64.2%) followed by quality of online courses (17.3%).

For students who had taken at least one online course, most who reported a college were from HSH (38.2%, 144 of 376), followed by CSE (23.3%), BUS (21.8%) and COE (16.4%). Most participants were frequent Internet users, with 87.0% using the Internet six or more times per day. Most (67.9%) had taken less than half of their courses online. However, there was diversity in number of courses taken online, with the most frequently reported number being 2-4 (36.1%), followed by 5-9 (26.5%), 10+ (20.2%), and 1 (17.2%). The main reasons students reported taking online courses were convenience (48.3%)

and time requirements (27.9%). Additionally, many students who chose the other category (18.3%) listed convenience in the text box.

Students did not tend to believe that online courses were easier than face-to-face courses (71.8%), with most split between slight disagreement (29.3%, 110 of 376), neither agreement nor disagreement (23.9%), and strong disagreement (18.6%). There were not differences in satisfaction or preference by college, but there were differences in opinions on level of effort, with those in BUS and HSH reporting that online courses required more effort than COE and CSE (see Table 2). There were also differences by number of courses taken, with reported difficulty of, preference for, and satisfaction with online courses increasing with number of courses taken (see Table 3).

Students tended to believe that online courses could achieve student learning outcomes at least equivalent to face-to-face courses (see Table 4) with the mean percentage of agreement (strongly or somewhat) across course types being 55.3% (SD=7.13) and a mean value across course types of 3.53 (SD=1.023) on the five-point Likert scale.

Table 3

Comparison of Student Ratings of Online Courses on Several Elements by Number of Online Courses Taken

	1 Online Course			
	N	Mean	SD	Median
Online classes: more effort to learn the material	64	3.47	1.18	4.00
Online classes: more effort to earn a good grade	64	3.81	1.18	4.00
Overall, I am satisfied with my online classes	64	3.59	1.28	4.00
I prefer to take face-to-face classes	64	4.17	0.81	4.00
I prefer to take online classes	64	3.23	1.40	3.00
	2-4 Online Courses			
Online classes: more effort to learn the material	127	3.83	1.2	4.00
Online classes: more effort to earn a good grade	127	4.28	1.07	5.00
Overall, I am satisfied with my online classes	127	3.61	1.3	4.00
I prefer to take face-to-face classes	127	3.95	1.05	4.00
I prefer to take online classes	127	3.09	1.54	3.00
	5-9 Online Courses			
Online classes: more effort to learn the material	100	4.06	1.135	4.00
Online classes: more effort to earn a good grade	100	4.38	0.95	5.00
Overall, I am satisfied with my online classes	100	4.23	1.06	5.00
I prefer to take face-to-face classes	100	3.54	1.13	4.00
I prefer to take online classes	100	3.76	1.26	4.00
	10+ Online Courses			
Online classes: more effort to learn the material	74	4.04	1.21	4.00
Online classes: more effort to earn a good grade	74	4.3	1.15	5.00
Overall, I am satisfied with my online classes	74	4.16	1.17	5.00
I prefer to take face-to-face classes	74	2.97	1.29	3.00
I prefer to take online classes	74	4.08	1.23	5.00

	Distribution		
	H	df	p
Online classes: more effort to learn the material	0.167	369	0.001
Online classes: more effort to earn a good grade	0.187	369	<.001
Overall, I am satisfied with my online classes	0.22	368	<.001
I prefer to take face-to-face classes	-0.327	368	<.001
I prefer to take online classes	0.247	368	<.001

Each question is rated on a five-point Likert scale, with higher means indicating higher agreement. Means, medians, and standard deviations are given for each pair. Additionally, the Spearman rho test value and significance are reported.

Table 4
Percentage of Student Responses for Each Answer Choice by Course Types

	General Education	Upper level undergraduate	Graduate
In general			
strongly disagree	5.82	6.94	8.67
somewhat disagree	11.08	10.83	10.03
neither agree nor disagree	18.84	20.56	31.98
somewhat agree	32.96	34.17	26.29
strongly agree	31.30	27.50	23.04
At UHCL			
strongly disagree	5.34	6.96	9.04
somewhat disagree	9.55	11.70	12.05
neither agree nor disagree	25.00	22.56	33.42
somewhat agree	30.34	31.48	21.37
strongly agree	29.78	27.30	24.11
In my department or discipline			
strongly disagree	7.02	9.52	11.78
somewhat disagree	11.52	13.73	11.78
neither agree nor disagree	23.88	21.01	31.78
somewhat agree	30.90	30.81	20.55
strongly agree	26.69	24.93	24.11

The question addressed whether online courses can achieve student learning outcomes that are at least equivalent to those of face-to-face courses.

There were no differences by college (H_3=3.877, p=.275) or age category (H_4=3.792, p=.435) for opinions of student learning outcomes. However, there was a difference based on numbers of online courses taken (H_3=19.441, p<.001), with those having taken 10+ courses having higher agreement (Mdn=4.00, M=3.98, SD=0.875, N=76) than those having taken 1 (Mdn=3.44, M=3.41, SD=1.003, N=65; Dunn p=.018), 2-4 (Mdn=3.44, M=3.34, SD=1.077, N=136; Dunn p=.012), or 5-9 (Mdn=3.67, M=3.55, SD=0.973, N=100; Dunn p=.019). Students reported slightly preferring online courses for general education (M=2.87, SD=1.541) and slightly preferring face-to-face courses for upper-level undergraduate (M=3.22, SD=1.451) and graduate courses (M=3.30, SD=1.435).

Overall, students had more favorable opinions of face-to-face classes than online classes. Face-to-face courses were rated as better in interaction level with instructors, availability of instructors, delivery of material, ability to participate and contribute to class, assessment difficulty, ease of cheating, instructor preparation, instructor effort to teach, student effort to learn the material, student effort to earn a good grade, ability of instructors to reach at-risk students, ability of instructors to reach exceptional students, preparation for additional classes in the fields, and overall satisfaction (see Table 5). However, the two formats were rated as equivalent in terms of preference to take.

Study 5: Faculty Opinions of Online Courses

Method

Participants

Participants included 87 Instructors at UHCL. Participants were almost equally split between male (47.1%) and females (49.4%) and diverse across ages with most (79.3%) between 35 and 65. They were predominately White (75.9%). Most (89.6%) had a PhD or similar (EdD, JD). Respondents included tenured (52.9%), tenure track (25.3%), and non-tenure track (18.4%) instructors, but most were full-time (94.3%). Most had been teaching more than 10 years (62.1%), followed by 5-10 years (18.4%), 3-5 years (8.0%), 6 months-3 years (5.7%), and less than 6 months (1.1%). Specialties were also diverse, with each of UHCL's four colleges represented: College of Business (25.3%), College of Education (13.8%), College of Human Science and Humanities (36.8%), and College of Science and Engineering (19.5%). Just under a quarter (24.1%) had taken an online course as a student for credit.

Questionnaire

The questionnaire consisted of demographic questions, questions about their online teaching

Table 5
Comparison of Student Ratings of Online and Face-To-Face Courses on Several Elements

		Online			Face-to-face			Wilcoxon signed rank		
	N	Mean	SD	Median	Mean	SD	Median	Z	df	p
Interaction level satisfactory	373	3.57	1.267	4.00	4.36	0.862	5.00	-8.846	372	<.001
Instructors are available	373	3.86	1.182	4.00	4.34	0.847	5.00	-6.278	372	<.001
Instructors able to deliver material	372	4.04	1.132	4.00	4.46	0.792	5.00	-5.934	371	<.001
Able to fully participate and contribute to class	371	4.04	1.132	4.00	4.44	0.824	5.00	-4.601	370	<.001
Assessments are of appropriate difficulty	370	3.97	1.180	4.00	4.24	0.944	4.00	-3.861	369	<.001
Easy for students to cheat	368	2.76	1.294	3.00	2.20	1.096	2.00	-6.466	367	<.001
Require more effort for instructors to prepare	369	3.16	1.183	3.00	3.54	0.980	4.00	-4.339	368	<.001
Require more effort for instructors to teach	367	2.74	1.173	3.00	3.73	1.015	4.00	-9.574	366	<.001
More effort for students to learn material	367	4.21	1.103	5.00	3.21	1.044	3.00	-10.613	366	<.001
More effort for students to earn a good grade	367	3.87	1.194	4.00	3.46	0.996	4.00	-5.176	366	<.001
Allow instructors to reach at-risk students	368	3.10	1.171	3.00	3.62	0.911	4.00	-5.809	367	<.001
Allow instructors to reach exceptional students	366	3.31	1.123	3.00	3.77	0.904	4.00	-6.460	365	<.001
Prepare students for additional classes in that field	365	3.72	1.202	4.00	4.19	0.865	4.00	-6.726	364	<.001
Overall, satisfied with my classes	366	3.90	1.236	4.00	4.25	0.847	4.00	-4.260	365	<.001
Prefer to take	368	3.50	1.431	4.00	3.68	1.165	4.00	-1.547	367	<.001

Each question is rated on a five-point Likert scale, with higher means indicating higher agreement. Means, medians, and standard deviations are given for each pair. Additionally, the Wilcoxon signed rank test value and significance are reported.

experience, questions about their opinions of online versus face-to-face courses, and questions about their opinions on the use of technology in online courses. All opinion questions used a five-point Likert scale.

Procedure

A recruitment email was sent to 339 Instructors in the faculty email list, and the response rate was 26%. The survey was administered through Qualtrics in November through December 2016. Once participants agreed to the informed consent, they answered demographic questions. Participants who answered no questions or only demographic questions were removed from the study. After the demographic questions, participants were asked how frequently they teach online. If they answered never, they were asked to indicate the main reason they have chosen not to teach online and directed to the end of the survey. If they reported that they do teach online, they were asked the additional questions about online courses.

Results

One-third of participants (n=29) had never taught online, with the main reason reported being quality of online courses (55.2%). Several reported other reasons, including technology issues, the effort, lack of opportunity, and lack of a fit for their department or the courses they teach. For the 56 who reported teaching online, most teach every semester including summers (48.2%), followed by occasionally (21.4%), nearly every semester excluding summer (16.1%), and about once a year (14.3%). The types of courses include undergraduate only (18 out of 52, 34.6%), graduate only (11.5%), and both (53.8%). The majority (56.4%) reported feeling very or extremely prepared to teach their first online course; however, extensive training was reported by only 14 participants, whereas 16 reported no training and 19 reported receiving only Blackboard (or equivalent) platform training.

Faculty tended to believe that online courses could achieve student learning outcomes at least equivalent to face-to-face courses (see Table 6) with the mean

Table 6
Percentage of Faculty Responses for Each Answer Choice by Course Types

	General Education	Upper level undergraduate	Graduate
In general			
strongly disagree	7.69	9.62	9.43
somewhat disagree	26.92	19.23	18.87
neither agree nor disagree	9.62	5.77	11.32
somewhat agree	38.46	38.46	33.96
strongly agree	17.31	26.92	26.42
At UHCL			
strongly disagree	7.84	11.76	13.73
somewhat disagree	25.49	17.65	19.61
neither agree nor disagree	13.73	5.88	9.80
somewhat agree	35.29	35.29	27.45
strongly agree	17.65	29.41	29.41
In my department or discipline			
strongly disagree	14.00	7.84	11.76
somewhat disagree	22.00	19.61	19.61
neither agree nor disagree	14.00	5.88	7.84
somewhat agree	34.00	37.25	29.41
strongly agree	16.00	29.41	31.37

The question addressed whether online courses can achieve student learning outcomes that are at least equivalent to those of face-to-face courses.

Table 7
Comparison of Faculty Ratings of Online and Face-To-Face Courses on Several Elements

		Online			Face-to-face			Wilcoxon signed rank		
	N	Mean	SD	Median	Mean	SD	Median	Z	df	p
Interaction level satisfactory	50	3.26	1.322	4.00	4.52	0.762	5.00	-5.021	49	<.001
Can be available	50	4.40	1.107	5.00	4.78	0.507	5.00	-2.830	49	0.017
Able to deliver material	49	4.10	1.177	5.00	4.90	0.306	5.00	-4.077	48	<.001
Assessments are of appropriate difficulty	49	4.41	1.019	5.00	4.82	0.391	5.00	-3.079	48	0.002
Easy for students to cheat	48	3.60	1.106	4.00	2.54	0.988	2.00	-4.169	47	<.001
Require more effort to prepare	47	4.26	0.871	4.00	2.74	0.966	3.00	-4.715	46	<.001
Require more effort to teach	47	3.55	1.265	4.00	3.36	1.131	3.50	-0.708	46	0.479
More effort for students to learn material	46	4.15	0.965	4.00	2.83	0.851	3.00	-4.493	45	<.001
More effort for students to earn a good grade	48	3.65	1.120	4.00	2.90	0.905	3.00	-3.086	47	0.002
Allow instructors to reach at-risk students	45	2.67	1.225	2.00	3.91	0.848	4.00	-4.486	44	<.001
Allow instructors to reach exceptional students	45	3.27	1.136	3.00	4.11	0.910	4.00	-3.640	44	<.001
Prepare students for additional classes in that field	46	3.33	1.076	4.00	4.15	0.788	4.00	-3.878	45	<.001
Overall, satisfied with my classes	44	3.45	1.210	5.00	4.55	0.627	4.00	-4.642	43	<.001
Prefer to teach	47	2.85	1.142	3.00	3.57	0.994	3.50	-2.406	46	0.016

Each question is rated on a five-point Likert scale, with higher means indicating higher agreement. Means and standard deviations are given for each pair. Additionally, the paired t-test value and significance are reported.

percentage of agreement (strongly or somewhat) across course types being 59.3% (SD=5.80) and a mean value across course types of 3.38 (SD=1.189) on the five-point Likert scale. There were differences by gender with women (Mdn=4.00, M=3.76, SD=.995, N=32) more likely to agree that online courses are equivalent than men (Mdn=2.67, M=2.89, SD=1.236, N=18; H_1=9.974, p=.019). There were no differences by college (H_3=6.729, p=.081), age category (H_4=4.323, p=.364), tenure status (H_2=3.27, p=.195), previous experience as an online student (H_2=4.944, p=.084), or frequency of teaching online (H_4=3.537, p=.472). Faculty reported preferring face-to-face courses for general education (M=3.94, SD=1.019), upper-level undergraduate courses (M=3.96, SD=.932), and graduate courses (M=3.70, SD=1.196).

Overall, faculty had more favorable opinions of face-to-face classes than online classes. Face-to-face courses were rated as better in interaction level, availability, delivery of material, assessment difficulty, ease of cheating, preparation effort, student effort to learn the material, student effort to earn a good grade, ability to reach at-risk students, ability to reach exceptional students, preparation for additional classes in the field, overall satisfaction, and preference of teaching (see Table 7). The two formats were rated as equivalent in terms of effort to teach.

General Discussion

Overall, online courses are widespread at UHCL, increasing the availability of courses to the non-traditional student population. Most online courses appear to be taught in a way that meets the standards of UHCL, which are based on the THECB and SACS Quality Assurance requirements. Because the courses tend to follow best practices, they are able to reach the level of equivalency seen in this study. Satisfaction with online courses tends to be high. Additionally, both students and faculty tend to agree that online courses can meet the same student learning outcomes of face-to-face courses. However, with student outcomes (withdrawal rates and grades) and preference mostly favoring face-to-face courses, convenience and other demands on time may be driving their course selection. Online courses have many advantages, including time independence, location independence, and the inclusion of self-paced and active learning. However, many of those advantageous aspects can become disadvantages if students are not prepared and motivated to tackle the course demands, suggesting that students may need more support to succeed in online courses (Legon & Garrett, 2017).

Faculty tend to judge faculty-student interactions inferior in online courses. If interactions are limited, it can be more difficult to support struggling students (Straumsheim et al., 2015). For the UHCL students, it is unclear from this analysis if the students who withdrew or performed poorly in the online courses were more frequently from at-risk groups, such as employed students, non-traditional students, and part-time students (Aud et al., 2011). However, the difference in performance between formats suggests that providing additional interventions, better promoting current resources, or requiring the use of the provided resources might improve preparation and completion of online courses (Bork & Rucks-Ahidiana, 2013). This conclusion is substantiated by the data concluding that students adjust to online courses because their satisfaction and preference for online courses increases as they take more courses. However, their reported difficulty level also increases, suggesting that although support before their first online course is most crucial, students may need support even after they have taken several online courses. UHCL has been offering Writing Center and Student Success Center tutoring online, and it began a Math Center help online in Fall 2017. Student resources prior to their first online course should be expanded and required prior to registration. This requirement would better prepare students for the computer knowledge and independent learning requirements of online classes, enhancing their chances for success because the first online course can be an overwhelming experience.

Online courses by their nature have less student-faculty interaction, an issue exacerbated by the trend of requiring much higher class sizes in online courses (Tomei, 2004). Although many successful online educators attempt interaction through email, discussion boards, and online chats, the limitations of these avenues may be heightened if the courses have large class sizes. This trend is also disturbing because larger online courses were found to be less rigorous, even in upper level courses (Stewart & Crone, 2016). The lack of interaction and lack of higher level student learning outcomes may interact with student and faculty considerations to impact the equivalency of online courses. Instructional interventions may help bridge this potential gap. Providing faculty with better learner management skills may help provide better guidance to at-risk students, thus increasing retention and student success.

Instructors may also need to be given better support for teaching online. Being a successful face-to-face instructor does not automatically transfer to an online format. Beginning to teach online requires a time investment and adjustment by the faculty and can be demanding (Stewart & Crone, 2016). A larger class size puts greater demands on the faculty member and reduces his ability to foster student engagement, which has been linked to retention in online courses (Estes, 2016). Bennet and Green (2001) point out that technology will not fix a poorly designed course and can make well-designed courses worse as instructors

are often forced to make their curriculum fit the technology available rather than choosing the technology that best delivers their course. It may be that additional technology is needed, or it could be that the technology is available, but not understood. Faculty should take better advantage of various provided pedagogical and technology trainings offered to overcome some of these deficiencies and concerns. Additionally, administrators should not force faculty to teach online if it is not a preferred format, but they should support faculty who do prefer online formats, especially if the flexibility of the courses enhances work-life balance.

Although this study is an in-depth analysis of online courses, it is limited to one university, which is a non-traditional campus. However, it is quite likely that many of these findings are at least somewhat universal, especially given the ubiquitous nature and generalized benefits of online courses. This work adds to the corpus of work on online courses by examining several aspects of online courses in one study. This work does highlight significant research needs. A deeper analysis of the students withdrawing or performing poorly to determine if they are in the at-risk groups or if other factors—such as lack of faculty presence in online courses, student work load, cost of books, work/life balance of students, affordability of classes (in terms of tuition), and accessibility—are driving the higher drop-out rates in online courses would be beneficial. This analysis would better inform future interventions to help students in online classes.

Claiming that online courses increase access to education is only a reality if students are able to complete the courses and advance in their progress towards a degree. If the drop-out rate is driven mainly by the students who cannot enroll in face-to-face courses, those students may need interventions to utilize the potential offered by online courses and provide them with genuine access. Additionally, it would be beneficial to explore ways in which students can be better supported in choosing their preferred class. UHCL already offers evening classes to allow non-traditional students to enroll, but perhaps a more systematic review of the scheduling choices would allow students who are employed or raising families to enroll in face-to-face courses if they would prefer those to online courses. Future studies should also examine student learning outcomes through a true assessment of knowledge and not just grades in a course. Although some work has been done in this area, it tends to be case studies of individual courses and often focuses only on grades from comprehensive finals or similar artifacts (see McFarland & Hamilton, 2006). More work needs to be done that assesses learning across multiple course types.

The complexity of online course development is not inherently negative, but it requires careful investigation and analysis. There are significant costs and benefits to both students and instructors found in our research and the literature (for example, Li & Irby, 2008). However, even potential difficulties, such as the challenge to convert face-to-face teaching styles to online, and thus requiring a mediation through the technology's limitations (Correa, 2010; McShane, 2004; Smith, Ferguson, & Carris, 2001), do not limit the potential impact and value of online instruction. Rather, online course offerings must be carefully designed and structured to operate in an individualized and specific niche, which will not only be affected by the student and faculty populations, but also the university's mission. Careful design and structure not only amplify the benefits of online offerings for students, such as creating enhanced scheduling flexibility, but also ameliorate the potential negatives, such as the higher course drop-out rates and lower GPAs identified in this sample. These are crucial endeavors as online courses become even more ubiquitous.

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DR. ANGELA KELLING is an Assistant Professor of Psychology at University of Houston-Clear Lake. She earned her doctorate in experimental psychology from the Georgia Institute of Technology. Dr. Kelling's main research interests are animal welfare and learning (formal and informal). She teaches a variety of psychology courses, both face-to-face and online.

DR. SHANTA GOSWAMI VARMA is the Special Advisor to the Chancellor for Distance Education and Collaborative Partnership at Auburn University at Montgomery and has over 20 years of experience in national and international higher education. Areas of research interest and expertise include e-learning, online teaching, partnership building, program development and implementation, marketing and outreach, faculty training and development, regulatory and accreditation requirements, curriculum and instruction, recruitment and retention, and social/cultural anthropology. Dr. Varma has taught undergraduate and graduate courses for interdisciplinary programs at Empire State College - CDL, The University of Houston - Clear Lake, and at Auburn University at Montgomery.

DR. NICHOLAS KELLING is an Assistant Professor of Psychology at the University of Houston-Clear Lake. He earned his Georgia Institute of Technology. As a human factors specialist, his research interests focus on the utilization of technology in educational and entertainment settings.