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Critical Success Factors for Online Education: Longitudinal Results on Program Satisfaction

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Abstract:

For the past 15-20 years, many researchers have investigated the differences (or lack thereof) between online and face-to-face (F2F) course delivery and student learning. Most of this body of research concerns an individual course, an individual faculty, or a particular technology or tool. However, we do not yet know much about the factors that an online degree program requires to succeed. Which factors have the greatest impact on student satisfaction with an online degree program? We collected data on seven potential critical success factors from 2009 to 2014 to measure their impact on student satisfaction. The final model shows course conduct, admissions, curriculum, and prior experience with online courses at that same location to be significant predictors of program satisfaction.

Keywords: Online Education, Critical Success Factors, Degree Program Satisfaction.

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1 Introduction

Since the Internet became commercialized circa 1993, it has pervaded contemporary life. Many commerce, information-gathering, and entertainment activities have shifted completely to rely on the Internet to connect providers with consumers. We watch videos with YouTube and Netflix, purchase dog food from Amazon, search for the truth on Wikipedia, and debunk urban legends on Snopes. We purchase airline tickets on Orbitz, use Passbook to store our boarding passes, watch TV on our devices using an airline's mobile app, and hail an Uber car to get home.

Education has also moved into the online arena (Menchaca & Bekele 2008; Cheawjindakarn, Suwannatthachote, & Theeraroungchaisri, 2012). At first, educators provided traditional classroom students with files or multimedia before shifting to delivering education online as the method of delivery itself. Long-established distance education programs quickly moved into delivering their content on the Web, and, by 2001, a traditional university had registered webmba.edu (Freeman, Landon, Waissi, & Daykin, 2004). The correspondence courses via mail that an author of this paper (and his mother) completed have long disappeared in favor of the interactivity, speed, and richness of delivery that courses and programs delivered via the Internet afford.

One can access education on the Internet in a variety of forms. One can watch documentaries on YouTube, perform training courses on Lynda.com, and obtain help with specific subjects on many websites, such as Khan Academy. One can also take massive open online course (MOOCs) from individual universities and consortia such as edX and Coursera that can reach over 100,000 students in a single course. Further, individuals who seek traditional degrees delivered in non-traditional ways can also complete bachelor's and master's degrees online. While many come from well-known universities, others come from non-accredited schools or even so-called diploma mills that have contributed to the stigma that people sometimes attach to distance/online education.

Schools that offer online education often find themselves in a quandary of balancing convenience with perceived quality. Despite being two decades old, many people still see Internet publishing and open access as inferior to paper journals (Watson & Montabon, 2014; Woszczynski & Whitman, 2016) and Internet-based education as not being a real educational experience that compares to the experience in the classroom (Tucker, 2001; Bernard et al., 2004; Redpath, 2012). Yet, given the demands on their time, working professionals today often simply cannot commit to full-time, residential study that many traditional programs require, which also puts the consumers for such education (the students) in a bind (Hannay & Newvine, 2006). Given these issues from both the institutional and individual perspectives, we need to understand whether the students are satisfied with their decisions to enroll in online degree programs.. As such, we ask the following research question (RQ):

RQ: What critical success factors impact student satisfaction with an online degree program?

This paper proceeds as follows: in Section 2, we review the relevant literature on critical success factors and their relationship to online degree programs. In Sections 3 and 4, we present the research hypotheses and the research methodology, respectively. In Section 5, we present the results and, in Section 6, discuss their implications. Finally, in Section 7, we conclude the paper.

2 Critical Success Factors and Key Performance Indicators

Critical success factors refer to the elements that a project or activity requires to succeed. One can measure e-learning success in terms of learning outcomes and learner satisfaction (Phipps, Wellman, & Merisotis, 1998; Golloday, Prybutok, & Huff, 2000; Allen, Bourhis, Burrell, & Mabry, 2002), two dependent constructs that the e-learning literature has widely accepted. Researchers have typically measured learning outcomes by assessing students' progress on relevant objectives that the instructor has set, such as their progress on gaining factual knowledge, learning fundamental principles, and learning to apply what they have learned to solve problems. Researchers have typically measured learner satisfaction as the degree of satisfaction that students have with perceived outcomes of taking online courses, the courses themselves, and their instructors (Eom, Ashill, & Wen, 2006; Gray & DiLoreto, 2016). Together, research refers to these measures as key performance indicators (KPIs)—quantifiable measures a project's or activity's outcomes. They relate and connect to critical success factors in that they enable one to measure performance after one has implemented critical success factors.

Early research in this area focused on the technology, how students used it, the instructor (Volery & Lord, 2000; Soong, Chan, Chua, & Loh, 2001), and numerous aspects about the course itself (its suitability to the learning environment, the course-creation process, course content, and the course-maintenance process) Papp (2000) as possible course-level critical success factors. Results showed that instructor and student technical competency, collaborative course design, and user-friendly resources/tools represented important factors. Another early study found the "technology (ease of access and navigation, interface design, and level of interaction), the instructor (attitudes towards students, instructor technical competence, and classroom interaction), and the previous use of the technology from a student's perspective" (Volery, 2001, p. 89) to be the most important factors for success.

In subsequent years, numerous studies continued to look at these same variables. Instructor preparedness and attitudes (Selim 2005, 2007; Sun, Tsai, Finger, Chen, & Yeh, 2008) and student attitudes, anxiety, self-efficacy, and perceptions of ease of use and usefulness (Selim 2005, 2007; Johnson, Hornik, & Salas, 2008; Sun et al., 2008, Elkaseh, Wong, & Fung, 2015) continued to receive attention and support. The technology used to deliver the course, which researchers sometimes referred to as the learning environment or learning management system, continued to be significant and positively associated with e-learning success (Selim 2005, 2007; Menchaca & Bekele, 2008; Cheawjindakarn et al., 2012; Elkaseh et al., 2015). Course design and quality, which researchers most often referred to as instructional design, did as well (Sun et al. 2008; Menchaca & Bekele, 2008; Cheawjindakarn et al., 2012; Elkaseh et al., 2015).

In addition to these variables that researchers have extensively studied over time, they have also studied additional variables such as institutional support (Selim 2005, 2007; Cheawjindakarn et al. 2012), support services (Menchaca & Bekele, 2008; Cheawjindakarn et al., 2012), course interaction (Johnson et al. 2008), course assessment and evaluation (Sun et al. 2008; Cheawjindakarn et al., 2012), and learning styles (Menchaca & Bekele, 2008; Elkaseh et al., 2015) and found them to be significant as critical success factors. However, as with the earlier research, researchers identified and measures all these factors from an individual's experience in a course.

Most recently, a special issue of *Decision Sciences Journal of Innovative Education* focused on the critical success factors in online education. This focus (see Eom & Ashill, 2016; Li, Marsh, & Rienties, 2016) indicates a perceived need to effectively manage these critical success factors in order to ensure (or increase) success. Eom and Ashill (2016) found that the factors of course design, the instructor, and dialogue (both instructor-student and student-student) all significantly predicted student satisfaction and student learning outcomes. Other factors such as intrinsic student motivation predicted student learning outcomes, but student satisfaction did not. Li et al. (2016) also found the course design (quality of teaching materials, assessment strategies, and workload) to impact satisfaction with student learning.

From the opposite end of the spectrum, McPherson and Nunes (2006) assessed the critical success factors for e-learning from an institutional/organizational perspective, which they categorized into four groups: leadership, structural, and cultural issues; design issues; technological issues; and delivery issues (implementation). Likewise, White (2007) looked at the issue from an institutional perspective by focusing on management/leadership and structural differences across organizations.

Research exists on critical success factors for face-to-face (F2F) courses, but F2F and online (especially fully online) courses differ in many ways, such as in student-instructor interaction, technology usage/reliance, facilities, available support services, and so on (Bolliger & Martindale, 2004). Still, prior research shows that factors such as student characteristics, quality of relationships with faculty, curriculum and instruction, student life, support services (availability of career advisors), and facilities most influence student satisfaction (Bean & Bradley, 1986, Astin, 1993; Bolliger & Martindale, 2004).

This prior research on critical success factors has used the online course as the focal point and the basis for the dependent variables of success, satisfaction, performance, or quality. In addition, few researchers have conducted longitudinal studies (Menchaca & Bekele, 2008). While the courses and their instructors represent important levels of measurement for learner satisfaction, the overall degree program and the various components that come together to create a degree program represent another. These components differ to those that researchers have used to measure course-level satisfaction. For example, when measuring satisfaction with a course, factors such as advising and course availability have no relevance. However, when assessing an entire degree program and not an individual course or an individual faculty, these factors have much relevance. We could not find anything that appears to look at

the program level (though Menchaca and Bekele (2008) allude to the fact that programs differ from courses), and, as such, we decided to conduct this research.

3 Research Hypotheses

From the perspective of an individual course, the literature has much to offer regarding the critical success factors that influence student success and satisfaction. However, we do not know which critical success factors impact student success or satisfaction with an online degree *program*.

Some possible key performance indicators (see, e.g., Burke & Minassians, 2002; Arif & Smiley, 2004; Cloete & Bunting, 2004; Terkla, 2011) for an online degree program include student job placement, student salary, financial sustainability, how well the market accepts the program, how well accreditors accept the program, faculty satisfaction, student satisfaction, and student graduation/throughput rate. We chose student satisfaction as the indicator for an online degree program's success. Satisfaction has a positive influence on student motivation and positively predicts retention (Bolliger & Martindale, 2004). In addition, since we collected data from students who completed a degree program (see Section 4), placement data and salary data did not exist. Finally, we chose not to use learning outcomes (such as grades or GPA) in order to avoid problems with self-reporting and confidentiality issues with institutional data.

Based on the existing literature and our modifications to an online degree program, we develop several hypotheses related to possible critical success factors for an online degree program. Common factors in the literature (even though they relate to a single course) include course quality, interactivity, faculty availability, learning style, and the learning management system. We felt these same factors, when measured across a degree program, would have similar value and impact.

Course quality refers to how well students rate their courses, their fellow students (classmates), and basic course information (syllabus and schedule). Overall, course quality has received perhaps the most support in the literature related to success and satisfaction over the years (Aldemir & Gülcan, 2004; Novitzki, 2005; Selim 2005, 2007; Sun et al., 2008; Menchaca & Bekele, 2008). Course quality should benefit the collection and combination of multiple courses in a degree program as it does individual courses. As such, we hypothesize:

H1: Course quality has a positive impact on satisfaction.

Interactivity refers to the various forms of interactivity in courses—that is, between faculty and students and between students and other students (Moore & Kearsley, 2005)—and the ways the courses encourage interactivity by allowing students to contribute their personal experiences and participate in synchronous/asynchronous group communication. Overall, researchers have widely studied interactivity and found it to be a significant success factor (Phillips & Peters, 1999; Soong et al., 2001; Allen et al., 2002; Aldemir & Gülcan, 2004; Moore & Kearsley, 2005; Selim, 2005; Johnson et al., 2008). As such, we hypothesize:

H2: Interactivity has a positive impact on satisfaction.

Faculty refers to the availability of faculty to provide assistance and the timeliness of that assistance. Researchers have found overall faculty availability to be a significant factor in e-learning success and satisfaction (Aldemir & Gülcan, 2004; Bolliger & Martindale, 2004; Weaver, 2008). As such, we hypothesize:

H3: Faculty has a positive impact on satisfaction.

Learning style refers to the breadth of learning styles that courses afford, the balance of online activities, and how well the online activities promote active learning. Researchers have found that a course's learning style and activities have positive impacts on success and satisfaction (McPherson & Nunes, 2006; Menchaca & Bekele, 2008). The same should hold true for a degree program. As such, we hypothesize:

H4: Learning style has a positive impact on satisfaction.

LMS measures various aspects and functionality of the learning management system that courses use, such as its overall ease of use and how well it allows users to perform basic tasks such as uploading files,

downloading files, participating in discussions, and completing assessments. Researchers have widely studied learning management systems at the individual course level of analysis (Hara & Kling, 2000; Volery & Lord, 2000; Soong et al., 2001; Selim, 2005; McPherson & Nunes, 2006; Selim, 2007; Menchaca & Bekele, 2008), and, since programs use the same system as individual courses do, we expect to find similar results. As such, we hypothesize:

H5: LMS has a positive impact on satisfaction.

Course availability refers to both the breadth (number of different disciplines/subject areas) and depth (number of courses in specific disciplines/subject areas) of the available courses in a degree program. Given this definition, course availability lacks relevance when one focuses on a single course. Course availability provides students with choices and flexibility in the courses they select as they progress through a degree program (DeShields, Kara, & Kaynak, 2005). Greater course availability should lead to greater satisfaction with the program. As such, we hypothesize:

H6: Course availability has a positive impact on satisfaction.

Advising refers to students' interactions with the advising/admissions office regarding course registration, course planning, and the admissions process. These events and interactions pertain more to a degree program rather than a single course. Research has shown advising and admissions, as support services that an educational institution provides, to be significant success factors (Bolliger & Martindale, 2004; DeShields et al., 2005, Menchaca & Bekele, 2008). As such, we hypothesize:

H7: Advising has a positive impact on satisfaction.

We did not include the additional factors faculty attitudes, affordability, students' attitudes and anxiety towards technology, and the program's relationship to career services in the study. We felt faculty attitudes would have less impact for an entire degree program than a single course as Aldemir and Gülcan (2004) and others have previously studied. A degree program's affordability, while relevant to students in selecting a program, likely has less relevance once they enroll and start taking classes, a distinction that Golloday et al. (2000) has made in discussing the separation of enrollment management factors from course-specific factors. Previous institutional surveys (used internally to measure and manage students' issues with technology on campus) showed that the students were comfortable with technology, both specific to the technology used in their degree program and in general. We did not believe this factor would have much if any impact due to the likely homogenous data we would collect for it even though researchers have studied it at the individual course level (Volery & Lord, 2000; Soong et al., 2001). Finally, a majority of the students (85%+) in the degree program we studied were full-time employees who took classes on a part-time basis. As a result, we expected career services and its role in students' pursuing and attaining post-degree employment (Astin, 1993) to not represent a significant factor in the overall degree program. Note that we originally collected data not to develop or test theory but to measure program efficacy and identify any factors that needed immediate attention according to the students. Figure 1 shows our research model.

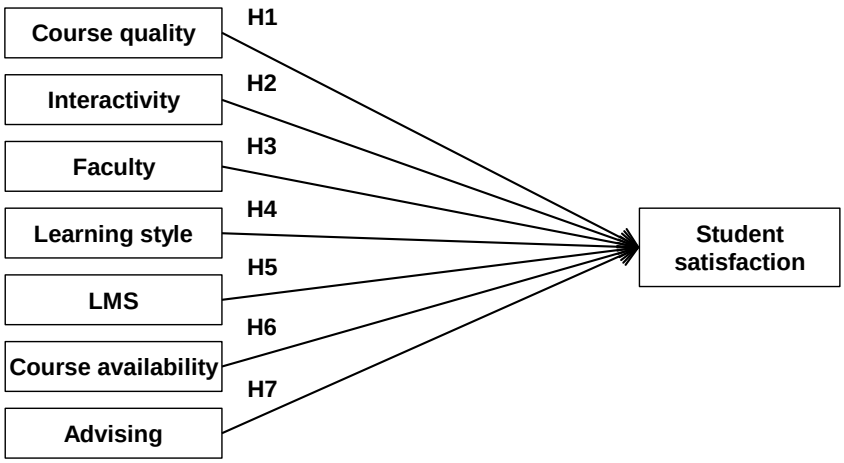

Figure 1. Research Model

4 Methodology

From 2009 to 2014, the business school at a medium-sized, Midwestern U.S. university surveyed all students who took online graduate courses in its MBA program on several variables about their experiences with the potential critical success factors and hypotheses we identify in Section 3. In addition, the survey included questions regarding program satisfaction (i.e., whether the students would recommend the degree program to a friend or colleague and whether the program met their expectations and needs). An initial version of the survey, which the business school implemented in 2005, served as the basis for the surveys used in 2009-2014. All of the questions pertained to the MBA degree program as a whole, not a particular course or a particular faculty. The survey informed the students that "this comprehensive survey is a means to obtain feedback from you in order to gain a better understanding of the strengths and weaknesses of our online graduate programs across a variety of measurement variables". Further, the survey told them to consider their "overall experience in online graduate courses" and to "indicate your perceptions of the following aspects of the online graduate program". These statements focused the students' responses on the overall program and not on any one specific course. The survey also collected demographic data on age, gender, years of full-time employment, and the number of online courses and face-to-face courses the students had taken at the institution. See Appendix A for the full survey.

The degree program taught all courses 100 percent online, which means the factors identified and studied applied to all students in the same manner since face-to-face interactions had no potential confounding effect (Golladay et al., 2000). In all, the MBA program taught approximately 45 unique courses over the six-year period, and each course was offered multiple times. The business school implemented the survey through Qualtrics with email reminders sent at various points in the two-week survey window. The business school scheduled the survey in mid-March on average; that is, approximately two-thirds of the way through the corresponding semester after midterms and spring break but before the end-of-semester crunch from projects and final exams. The business school administered the same survey in each year between 2009 and 2014 and, thus, could collect "real-time" impressions and opinions as opposed to after-the-fact recollections. Most survey questions used a seven-point Likert scale (anchored from strongly agree to strongly disagree).

5 Results

We obtained 418 surveys across the six years. Table 1 shows the yearly breakdown of the demographic statistics. While the number of respondents fluctuated year to year, the average age and average years employed remained relatively consistent. Over time, the percentage of male students dropped to the point where female respondents outnumbered male respondents in the most recent survey year (matching the trend in the overall student population).

Table 1. Survey Demographics

Survey year	Respondents	Usable surveys	Average age	Percent male	Average Years employed	Average Web courses taken	Average non-Web courses taken
2009	113	77	32.7	66.3	4.8	5.78	4.95
2010	83	55	33.4	78.2	5.1	4.78	4.47
2011	92	49	33.4	76.5	5.5	6.65	3.71
2012	85	27	31.8	55.6	4.3	3.26	6.85
2013	87	56	32.9	53.6	5.6	6.11	4.66
2014	67	49	33.9	44.9	5.3	5.00	3.08

We performed a confirmatory factor analysis (CFA) on the questions in the survey to ensure that they loaded on their intended factors. To do so, we used the software package R with RStudio as the interface. We added the *psych* library to perform the confirmatory factor analysis. When we removed nulls, the usable number of surveys dropped to 313.

Since the business school did not take the questions for the survey from existing valid instruments, we had to conduct a factor analysis to ensure that the survey actually measured the factors we intended it to. While the dependent variable of student satisfaction held up as expected in the factor analysis, the factor

analysis also showed that the expected seven factors converged into only four distinct factors as independent variables. In addition, six of the 30 items in the original survey failed to load on any factor (variance > = 0.5). Thus, we discarded those questions and ran the factor analysis again. This time, all 24 questions loaded onto one of the five factors with a variance of 0.5 at minimum. We named these factors course conduct, learning management system (LMS), admissions (renamed from advising as all remaining questions related strictly to the admissions part of the advising function), curriculum, and satisfaction (see Table 2). Table 3 shows the accompanying factor correlation matrix.

Table 2. Standardized Loadings (Pattern Matrix) based on Correlation Matrix

	Course conduct	LMS	Satisfaction	Admissions	Curriculum
QualityCourse	0.60	0.01	0.29	-0.04	0.04
QualityStudents	0.58	0.18	-0.05	0.13	0.02
InteractivityFacStud	0.76	0.05	-0.09	0.07	0.10
InteractivityStudStud	0.69	-0.05	-0.12	-0.07	0.06
InteractivityContributions	0.68	-0.14	0.09	0.05	-0.01
InteractivityDiscussions	0.68	0.03	-0.01	-0.09	-0.02
FacultyAvailable	0.57	0.09	-0.03	0.11	0.09
LearningAppropriate	0.72	0.02	0.19	0.02	-0.07
LearningMultipleStyles	0.79	0.04	0.05	0.02	0.03
LearningBalance	0.86	0.01	-0.03	-0.05	-0.04
LearningActive	0.75	0.04	0.13	-0.03	0.02
LMSDashboard	0.06	0.91	-0.06	0.03	-0.05
LMSSoftware	-0.05	0.93	0.03	-0.04	0.01
LMSUploading	0.04	0.67	-0.01	0.04	0.04
LMSDownloading	-0.05	0.68	0.07	0.01	0.05
LMSDiscussions	0.13	0.50	0.13	-0.02	0.01
LMSAssessments	0.07	0.60	0.09	0.02	0.06
CoursesBreadth	-0.04	0.01	0.04	-0.01	0.99
CoursesDepth	0.14	-0.03	-0.05	0.06	0.73
AdvisingAdmissionsClear	0.00	0.05	-0.02	0.76	0.00
AdvisingAdmissionsTimely	-0.02	-0.03	0.03	0.99	0.01
SatisfactionRecommend	0.10	0.02	0.80	0.09	-0.04
SatisfactionExpectations	0.15	0.04	0.81	0.04	0.03
SatisfactionNeeds	-0.06	0.01	0.93	-0.03	0.07

Table 3. Correlation Matrix of Factors

	Course Conduct	LMS	Curriculum	Admissions	Satisfaction
Course Conduct	1				
LMS	0.42	1			
Curriculum	0.29	0.15	1		
Admissions	0.14	0.21	0.29	1	
Satisfaction	0.68	0.29	0.34	0.23	1

We then ran several checks for the appropriateness of the model. The CFI for the model was 0.936, which exceeds the 0.93 recommended for appropriateness. The root mean square residual (RMSR) was 0.03, well below the 0.1 needed for consideration (Henry & Stone, 1994). The RMSEA was 0.086, a mediocre fit

but below the 0.10 cutoff that Bentler (1990) recommends. Finally, the Tucker-Lewis Index for the model was 0.889, slightly below the 0.90 minimum that Bentler (1990) recommends for model consideration.

Next, we calculated the alpha for each factor to find and measure internal consistency. The alpha was quite high for each factor: course conduct (0.93), LMS (0.88), curriculum (0.87), admissions (0.87), and satisfaction (0.93).

We then used multiple regression to test the model with the four factors (course conduct, LMS, curriculum, and admissions) predicting satisfaction.

As Table 4 shows, three of the four hypothesized variables were significant in this model at the 0.05 level. At this point, as Johnson, Aragon, Shaik, and Palma-Rivas (2000) and Allen et al. (2002) suggest, we added the control variables: age, gender, years of work experience, number of courses taken online at this college, and number of non-Web (i.e., face-to-face) classes taken at this college.

Table 4. Regression Model of Four Factors

	Estimate	Standard error	t value	Pr(>|t|)
(Intercept)	0	0.04184	0.000	1.000
Course conduct	0.6867	0.04985	13.776	<2e-16 ***
LMS	-0.0455	0.04941	-0.920	0.3583
Curriculum	0.1241	0.04563	2.719	0.0070 **
Admissions	0.1178	0.04472	2.634	0.0090 **
*** Significant at p < 0.001, ** significant at p < 0.01 Residual standard error: 0.6495 on 309 degrees of freedom Multiple R-squared: 0.5585 Adjusted R-squared: 0.5510 F-statistic: 74.64 on 4 and 236 degrees of freedom; p-value <2.2e-16				

As Table 5 shows, no control variable was significant at the 0.05 level, and including the control variables did not affect any variable of interest in significance level. Moreover, the adjusted r-squared for the two models did not appreciably differ (0.5510 to 0.5603).

Table 5. Regression Model of Four Factors with Control Variables

	Estimate	Standard error	t value	Pr(>|t|)
(Intercept)	0.292623	0.254118	1.152	0.2507
Course conduct	0.656280	0.051275	12.799	<2e-16 ***
LMS	-0.013328	0.050734	-0.263	0.7930
Curriculum	0.127166	0.045639	2.786	0.0058 **
Admissions	0.116591	0.044589	2.615	0.0095 **
Age	-0.011265	0.006887	-1.636	0.1032
Gender	0.016164	0.087898	0.184	0.8543
EmployYears	0.011956	0.009479	1.261	0.2085
WebCOB	-0.014144	0.009415	-1.502	0.1344
NonWeb	0.010553	0.007052	1.497	0.1359
*** Significant at p < 0.001, ** significant at p < 0.01 Residual standard error: 0.6428 on 304 degrees of freedom Multiple R-squared: 0.5767 Adjusted R-squared: 0.5603 F-statistic: 34.97 on 9 and 303 degrees of freedom; p-value < 2.2e-16				

At this point, to create a more succinct model in which insignificant variables did not pull away variance from the significant variables, we followed Efroymson's (1960) methodology to backward eliminate variables in the regression model whereby we individually eliminated variables that lacked significance at the p < 0.10 level until we arrived at model that Table 6 shows.

Table 6. Final Regression Model

	Estimate	Standard error	t value	Pr(>|t|)
(Intercept)	0.1056	0.0614	1.720	0.0868 ~
Course conduct	0.6528	0.0452	14.437	<2e-16 ***
Curriculum	0.1293	0.0452	2.860	0.0046 **
Admissions	0.1128	0.0436	2.565	0.0103 *
WebCOB	-0.0204	0.0087	-2.330	0.0207 *

*** Significant at p < 0.001, ** significant at p < 0.01, * Significant at p < 0.05, ~ significant at p < 0.10
Residual standard error: 0.6433 on 309 degrees of freedom
Multiple R-squared: 0.5669
Adjusted R-squared: 0.5596
F-statistic: 150.5 on 3 and 309 degrees of freedom; p-value < 2.2e-16

This regression model succinctly shows that the course conduct, curriculum, admissions, and the number of Web classes students took directly predicted program satisfaction at a minimum $p < 0.01$ level. The overall adjusted r-squared of the reduced model barely changed from the model with all the variables (0.5603 to 0.5596).

6 Discussion and Implications

While researchers have conducted much work with online education at a class level, we examined it from the program level. To do so, we analyzed seven possible factors that would impact satisfaction and found only three had a significant impact (see Table 6). Moreover, one of these three factors (course conduct) recombined many of the original scale items. In the end, we found that course conduct, the admissions process, the program's curriculum, and students' past experience with Web-based courses predicted student satisfaction with their online degree program. We somewhat expected these results since the theory has not yet developed around program-level variables the way that it has around individual courses. We discuss the factors individually and then discuss some more general implications.

Course conduct comprised questions 1a-b, 2a-d, 3a, and 4a-d from the survey in Appendix A. Where we hypothesized that course quality, interactivity, faculty, and learning style would all differ, the surveys showed that they really measured the same things in the eyes of the students. These questions, somewhat similar to the constructs course design and dialogue that researchers have used to measure course-level satisfaction, address issues of interactivity between the students, faculty, and content; faculty availability; appropriate assessments; and the course-design components learning styles, active learning, and course activities. Many online programs use professional instructional designers to help faculty take their knowledge and transition it to the online arena, and, from an instructional design perspective, research has shown this construct to be at the heart of quality course design. This study furthers the importance of this construct by showing that students view this construct as critically important for overall program design as well. Moreover, this finding can give instructional designers guidelines as to what students think are important in the process.

Admissions comprised questions 7d and 7e from Appendix A. These two questions address the clarity and timeliness, respectively, of the admissions process. While it fell outside our scope here to study the value of the admissions function in depth, the fact that it significantly predicted students' satisfaction with the overall program should lead programs to think about the level of detail they add to this process instead of just making it about filling out forms. Commercial providers and partners to online education, such as 2U and Academic Partnerships, have large dedicated staff for this process.

Curriculum comprised questions 6a and 6b from Appendix A, which address the breadth and depth of the courses available in a program according to students. We found that curriculum significantly predicted course satisfaction, which, from a program level, shows that students seek a sufficiently broad and deep curriculum that meets their needs. Program directors should consider this factor rather than just assembling a collection of classes that have little in the way of unifying theme or direction.

The valence of the control variable previous Web courses is interesting. The final model indicates that students with more experience in Web courses had less satisfaction with their online program, which is counterintuitive to our beliefs and what should be a self-selection bias that only students who stay in the program will be the ones who answer the survey and, as such, should be more satisfied. We can only

posit guess as to what might have caused this effect. One possible explanation could involve a "honeymoon effect" whereby individuals' initial satisfaction with the program (to avoid buyer's remorse) wears off over time.

Program administrators would be wise to consider why satisfaction may drop with the number of courses students have taken in the past since no administrator wants to have students unhappy with the program as they turn to becoming alumni who would recruit more students to the program and support their alma mater's future efforts. Our finding contradicts Arbaugh and Duray's (2002) study that found a direct relationship between the number of classes taken and overall satisfaction. Researchers need to conduct more work to identify the factors that may cause this experience-satisfaction relationship to flip one way or the other.

Administrators in graduate business programs may spend much time and effort looking at the choices of online education delivery and support platforms, commonly known as learning management systems (LMS). However, our model showed this variable to be quite insignificant. As such, the platform's actual end users, the students, might not care that much about whether a program adopts vendor A's platform over vendor B's. However, we examined only the students' ratings about the student-facing side of the LMS, which may explain this finding. Administrators spend time looking at not only the front end but also the back end of these systems. The back-end functions (which integrate the LMS with other university systems, such as account and course administration) help students enroll in the LMS and obtain advice, helps instructors upload grades, and so on. Students may have thought quite differently about the LMS if administrators did not make careful decisions about these interactions, and they may not consider such aspects now compared to when LMS first appeared and did not have these functions. Once an LMS has reached a baseline level of functionality and interoperability, online program directors may better focus on administrative items such as advising and working with faculty on developing the curriculum and courses as opposed to spending excessive hours on selecting the LMS itself, though we need more research to better understand this phenomenon.

Note that some issues with the correlation of the factors may have existed. We do not find it that surprising that course conduct had a high correlation (0.68) with the dependent variable satisfaction given how much explanatory power it had in the model. Even though the survey items loaded on one and only one factor in the factor analysis, we found some minor correlation between the other independent variables in the model. While we may hope for perfectly uncorrelated independent variables, one can find them more in textbooks than reality. Some factors naturally correlate with each other, and future research could examine the amount of natural correlation between these constructs.

Ideally, we would have liked to compare the online program with face-to-face programs. Unfortunately, we could not compare our students' satisfaction with the online MBA program and their satisfaction with a face-to-face MBA program since it is unlikely any student would do both programs consecutively. However, we do see from previous research with face-to-face MBA programs (Conant, Brown, & Mokwa, 1985) that quality of instruction, coursework degree requirements, class size, graduate advice, and career opportunities (though not career services) predict satisfaction with these programs. We can surmise some similarities between these factors and the factors we examined, especially in terms of course conduct/quality of instruction, but it appears that the students in our sample found front-end admissions more important than back-end functions. The students in our sample were also far less inclined to have intended to change their career than the earlier group of more traditional, full-time MBA students. We cannot make a claim about modality of instruction as opposed to student career objectives based on our data.

In furthering comparisons between F2F and online programs, one must wonder about the interactivity between not only students and faculty but also students and students. Unfortunately, we made no attempt to measure the social networks of the students in the program in depth beyond a simple question about student-to-student interaction. Some students attend graduate school not only to learn but also to build professional and social networks for their first or next job or for the opportunity to begin their own start-up company. Baldwin, Bedell, and Johnson (1997) looked at this networking and career objective under the full-time MBA program scenario and found it to be important, particularly in the teamwork context. This networking and career objective may also be why Conant et al. (1985) found career opportunities to significantly predict satisfaction in a F2F full-time MBA program even when the career services function did not. This area has many opportunities for future research about how online program administrators can build models that maximize student interaction and whether students who choose online education really value it at all.

7 Conclusion

In this study, we examined many possible critical success factors for online graduate business programs. We found that only three factors directly affected student satisfaction with the program we examined (i.e., course conduct, the overall curriculum, and the quality of the admissions process) and that, together, they accounted for nearly 60 percent of the variance.

With our research, we show the issues that program should concentrate on when creating and marketing it to students. As programs focus on not only admissions but also retention rates and graduation rates, this research can help direct program directors about the most important areas to concentrate on and, perhaps, which ones they can pay less attention to given that they often have limited resources.

This research provides a new approach to understanding the critical success factors of online learning. Instead of focusing on an individual course or the students' experiences with technology in a course, which researchers have continually examined (e.g., Gruber, Fuß, Voss, & Gläser, 2010; Kuo, Walker, Belland, & Schroder, 2013), we focused on an entire degree program. In addition, we used six years of longitudinal data as opposed to a snapshot of a single semester as Menchaca and Bekele (2008) suggest. Researchers need to conduct additional work to better understand the critical success factors of an online degree program as measured against retention rates, graduation rates, and other key performance indicators such as program ranking, reputation, industry connections, and job placement success as Thouin, Hefley, and Raghunathan (2018) suggest.

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Appendix A: Survey Instrument[1]

1) Course quality

a) Quality of the courses has been high (QualityCourse)
b) Quality of fellow students has been high (QualityStudents)
c) The course syllabi and course schedules were informative and helpful (QualitySyllabi)

2) Interactivity

a) Interactivity between faculty and students has been high (InteractivityFacStud)
b) Interactivity between students and other students has been high (InteractivityStudStud)
c) The courses provided opportunities for students to contribute their own experiences (InteractivityContributions)
d) The use of discussions and chat sessions to encourage interactivity has been high (InteractivityDiscussions)

3) Faculty

a) Faculty have been available for questions, assistance, and office hours (FacultyAvailable)
b) Faculty have responded to my emails in a timely manner (FacultyResponsive)

4) Learning style

a) The methods of learning have been appropriate for my learning style (LearningAppropriate)
b) The courses utilized multiple teaching styles and learning styles (LearningMultipleStyles)
c) The courses balanced various online activities, such as discussions, practical applications, readings, assignments, etc. (LearningBalance)
d) The courses were designed to make students active learners (LearningActive)

5) LMS

a) The LMS dashboard page is easy to follow and use (LMSDashboard)
b) The LMS software is easy to use (LMSSoftware)
c) Uploading files and assignments is straightforward and simple (LMSUploading)
d) Downloading files and assignments is straightforward and simple (LMSDownloading)
e) The discussion forums are easy to use (LMSDiscussions)
f) The mail function is easy to use (LMSMail)
g) Taking/completing assessments (quizzes and exams) is straightforward and simple (LMSAssessments)

6) Courses

a) There is sufficient breadth of courses (# of disciplines) to choose from (CoursesBreadth)
b) There is sufficient depth of courses (choices of disciplines) to choose from (CoursesDepth)

7) Advising

a) Course registration was simple and straightforward (AdvisingRegistration)
b) COB advising was available when I needed it (AdvisingAvailable)
c) COB advising staff were able to assist me with my course planning and other needs (AdvisingAssist)
d) The admissions process was clear (AdvisingAdmissionsClear)
e) The admissions process was handled in a timely manner (AdvisingAdmissionsTimely)

8) Satisfaction

a) I would recommend this program to a friend or colleague (SatisfactionRecommend)
b) I feel the program has met my expectations (SatisfactionExpectations)
c) I feel the program has met my needs (SatisfactionNeeds)

[1] All on a seven-point scale: (1: strongly agree, 2: agree, 3: somewhat agree, 4: neutral, 5: somewhat disagree, 6: disagree, 7: strongly disagree).

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