
Faculty Professional Development and Student Satisfaction in Online Higher Education

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Abstract

With the ever-increasing availability of online education opportunities, understanding the factors that influence online student satisfaction and success is vital to enable administrators to engage and retain this important stakeholder group. The purpose of this ex-post-facto, nonexperimental quantitative study was to investigate the impact of faculty professional development, faculty degree status, and faculty longevity upon online student satisfaction and success. A large, archived dataset from an online public state university was analyzed. Repeated measures Hierarchical Linear Modeling (HLM) analysis was used to explore changes in student satisfaction over time. Results showed that both training and degree were not significant predictors of student satisfaction. On the contrary, faculty longevity was found to be a predictor of student satisfaction. Recommendations for future research include incorporating qualitative analysis and expanding the study to diverse institutional types to determine whether findings are consistent.

Introduction

Faculty abilities and the degree to which institutions develop faculty talent are among the most reliable measures of academic excellence (Astin, 1996; Burke, 2005; Jackson, Jones, & Rodriguez, 2010; Sweitzer, & Volkwein, 2009). Given the emergence and expansion of

online education at all levels, ongoing evaluation of online faculty qualities, teaching methods, competencies, and best practices is important to ensure that online education demonstrates and maintains academic quality comparable, if not superior, to traditional higher education (Meyer & Murrell, 2014b; 2014c; Mujtaba, 2011). Standardized, regularly scheduled faculty development, training, and remediation options, as needed, have been shown to enhance student outcomes and help administrators ensure quality teaching, credibility, and accreditation (Meyer & Murrell, 2014b; 2014c; Mujtaba, 2011). Given the rapidly increasing demand and competition in the online higher-education market, examining the faculty factors that result in increased student satisfaction is critical to assist administrators in decision making and resource allocation.

University education is undergoing a paradigm shift in how information and knowledge are transferred. Online education expanded rapidly over the past twenty years and continues to represent the fastest growing sector of higher education (Allen & Seaman, 2013). Online education is expanding access to students internationally and domestically to students who would otherwise be unable to attend college (Christensen, Horn, Caldera, & Soares, 2011; Simpson, 2013). Additionally, online education has increased access for non-traditional, working adults and older students returning to obtain an advanced degree or continuing education for personal satisfaction or professional advancement (Christensen, Horn, Caldera, & Soares, 2011; Simpson, 2013). The increasing demand has led established universities to develop whole online programs across all degree levels and disciplines. Fully online institutions have emerged and now directly compete for traditional-aged college students (Allen & Seaman, 2013; Mujtaba, 2011). As university administrators struggle to respond to market forces and adapt to new technological contexts, they face the challenges of maintaining academic quality and credibility (Allen & Seaman, 2013).

Despite overall increases in acceptance of online education by faculty and administrators and a majority's indicating that online education was "just as good" as or "better" than traditional face-to-face instruction, almost one-quarter of chief academic officers continue to perceive online instruction as inferior to traditional instruction (Allen & Seaman, 2013). The perceived level of faculty acceptance decreased in 2012 regardless of institutional type and number of online offerings (Allen & Seaman, 2013). Because academic leaders indicated that lack of faculty acceptance of online education is a critical barrier to success (Allen & Seaman, 2013), educators in the online environment have begun to receive greater emphasis and attention (Meyer, & Murrell, 2014a; 2014b). Preparing faculty to be effective online instructors requires a new paradigm comprising technical proficiency and virtual engagement (Meyer, & Murrell, 2014b; 2014c; Mujtaba, 2011). To remain competitive and demonstrate equivalent academic quality, chief academic officers must provide resources and training for their faculty teaching online courses (Burke, 2005; Sweitzer, & Volkwein, 2009) as well as appropriate means to assess that training and academic quality (Allen & Seaman, 2013; Meyer, & Murrell, 2014a; 2014b). Unlike a traditional classroom that relies heavily on lectures and dialog, the online learning environment requires that faculty play "learning facilitator" (Vaill, & Testori, 2012, p.111) -- which, absent face-to-face interaction, requires the use of various multimodal resources to engage students. As Vaill and Testori (2012) reminded us, faculty quality and effectiveness largely determine institutional success. (Vaill, & Testori, 2012).

Problem Statement

While perceptions of online education have steadily improved, administrators, faculty, students, and the general public remain skeptical regarding the overall quality of the online

educational experience (Allen & Seaman, 2013). Because instructor quality and student satisfaction are significant predictors of successful learning outcomes, the implementation and evaluation of faculty training activities and their potential impact on student satisfaction prove as useful means to demonstrate academic quality and institutional credibility, and may reduce any remaining uncertainty about online academic institutions.

Though nearly all of the institutions surveyed provide some form of training for their online faculty (Allen & Seaman, 2011; Meyer, & Murrell, 2014b; 2014c), the training quality and methods vary widely (Meyer, & Murrell, 2014a; Vaill, & Testori, 2012). Additionally, little is known about whether the training improves facilitation skills or outcomes in any changes in student satisfaction (Meyer, & Murrell, 2014b; 2014c). According to a 2014 study, more than 90% of institutions surveyed evaluated their online faculty training based on faculty satisfaction with the training itself rather than any direct measure of course or student outcomes, such as changes in teaching practices or improvements in student performance (Meyer, & Murrell, 2014b; 2014c).

The link between instructor quality and student satisfaction is well established; however, far less is known about the potential value of faculty training to improve student satisfaction directly, particularly in an online environment. Given the rapid expansion of online institutions, coupled with continuing skepticism regarding online academic quality, additional research is needed to evaluate faculty training and its potential contribution to student satisfaction. Further, the question of whether student satisfaction scores improve over time regardless of faculty training or degree remains unclear. In addition to providing a practical evaluation of faculty training practices and online undergraduate student satisfaction data to contribute to the body of knowledge, the results of the proposed study would document whether faculty professional development improves student satisfaction and whether training effectiveness varies by faculty degree status or faculty longevity.

Purpose of the Study

The purpose of this ex-post-facto, nonexperimental quantitative study was to investigate the impact of faculty professional development and degree status on student satisfaction. An archived data set from an online public state university was analyzed to compare student satisfaction before and after faculty training intervention. Student satisfaction was measured by end-of-course evaluations. Faculty characteristics and professional development data were reported along with comparisons of student satisfaction based on variations in faculty degree status (master's versus terminal) and pre to post faculty professional development course participation. Descriptive statistics were reported on the sample characteristics and range of student satisfaction scores for each pre to post intervention and by faculty degree status. Data were also tracked over seven terms to determine whether student satisfaction scores improved for faculty over time.

Research Questions

1. Do faculty members in online higher education perform better over time vis-a-vis student satisfaction?
2. What impact do faculty training and degree have upon student satisfaction over time?

Null Hypotheses

H10. No difference exists in faculty member performance over time vis-a-vis student satisfaction.

H20. No difference exists in student satisfaction scores based on faculty training and degree.

Literature Review

Key theories inform postsecondary professional development, specifically online instructional design, andragogy, and student development theories. These related theoretical frameworks were multifaceted and complex, and they were composed of motivation (Maslow, 1958), adult learning (Knowles, 1973), transformative theory (Mezirow, 2000), and the foundational theories of Vygotsky (1987) and Piaget (1929) regarding social learning and knowledge construction. Guskey (2002) and Guskey and Huberman (1995) drew upon learning theories to develop a clear and simple model of teacher change based on training and professional development that reflects a recursive relationship between teacher beliefs and attitudes in response to improvements in student outcomes that result from implementing new practices.

While adult learning and transformative theory provide a means to understand how and why faculty learn, Rogers's (2010) diffusion of innovation theory is useful to explain faculty willingness and motivation to implement remediation or training as well as the steady expansion and acceptance of online learning. Because the theory describes how individuals adopt and spread new ideas, the theory aligns well with the emphasis on faculty training to increase the rate of online education diffusion, adoption, and acceptance. Rogers's diffusion of innovation theory provides a bridge between learning theories and faculty training within online higher education.

Additional theories relevant to the study are student involvement and student satisfaction theories. Student involvement refers to the amount of time and energy students devote to their academic lives, including their studies and engagement in college related activities as well as interaction with other students and faculty. Astin (1984) is a foundational author of research on student development and student involvement theories, which emphasize the "behavioral mechanisms or processes that facilitate student development" (p. 522) as well as student satisfaction. According to Astin (1984), involvement is the investment of both psychological and physical energy and manifests in many forms and degrees; involvement can be measured both qualitatively and quantitatively; student learning and development are directly related to the quality and quantity of the student's investment; and the effectiveness of any program is measured by how well that program increases student involvement.

Based on years of study, numerous researchers concluded that the quality and quantity of faculty and student interactions predict how invested a student feels and the likelihood of ultimate student satisfaction and success (Astin, 1984; Kuh, & Hu, 2001, Noel-Levitz, 2014). A goal for this study was to understand the ways in which a distance education institution can implement clear and consistent faculty training and development activities that will ultimately improve student satisfaction and organizational outcomes.

That faculty quality and student satisfaction are key indicators of institutional and academic quality is well established (Astin, 1996; Burke, 2005; Jackson, Jones, & Rodriguez, 2010; Noel-Levitz, 2014; Sweitzer & Volkwein, 2009). Given the increased reliance on online learning, systematic training and evaluation of online faculty qualities, teaching methods, competencies, and best practices as well as the degree to which faculty training improves student satisfaction are valuable means to ensure and demonstrate academic quality comparable, if not superior, to traditional higher-education institutions (Meyer & Murrell, 2014b; 2014c; Mujtaba, 2011). Regardless of institutional type, traditional institutions'

incorporation of online components or fully online campuses, faculty development and evaluation in online course design and delivery require technical proficiency and engagement (Meyer, & Murrell, 2014b; 2014c; Mujtaba, 2011). To remain competitive and demonstrate academic quality, chief academic officers must provide resources and training for their faculty teaching online courses (Burke, 2005; Sweitzer, & Volkwein, 2009) as well as means to evaluate training efficacy (Allen & Seaman, 2013; Meyer, & Murrell, 2014a; 2014b).

Faculty characteristics and faculty engagement with students and are key measures of academic quality (Astin, 1996; Burke, 2005; Jackson, Jones, & Rodriguez, 2010; Sweitzer, & Volkwein, 2009). Given the increasing presence of online education at all levels, ongoing evaluation of online faculty qualities, teaching methods, competencies, and best practices is an important means to ensure that online education demonstrates and maintains the academic quality comparable, if not superior, to traditional higher education (Meyer, & Murrell, 2014b; 2014c; Mujtaba, 2011). Faculty development, training, and remediation (as needed) can scaffold to achieve academic goals and improve student outcomes and to describe and audit the steps that online institutions take to promote quality teaching as well as demonstrate academic credibility (Meyer, & Murrell, 2014b; 2014c; Mujtaba, 2011). Regular, formal, research-based faculty professional development that promotes faculty engagement and student satisfaction is critical to prepare faculty to transition their teaching skills to the online environment.

Online University Organizational Structures

Distance learning has been defined as a learning environment in which "students and teachers are separated by distance and sometimes by time" (Moore & Kearsley, 1996, p. 1). Distance education exists in several different forms. Two common types include, but are not limited to, single-mode and dual-mode institutions. Single-mode institutions provide the online mode exclusively. In other words, single-mode universities do not provide any traditional classrooms (Moore & Kearsley, 2011). A dual-mode institution added a distance component to an already-established traditional classroom model (Moore & Kearsley, 2011).

A separate administrative unit typically manages the distance education component, essentially replacing what had been a correspondence delivery method with a newer online system to provide course offerings via traditional classroom and online delivery. Additionally, instructors of traditional courses are often encouraged to include an online component in their courses (e.g., online quizzes and webinars). In a relatively short timespan, the demand for the online courses has dramatically increased, which has, in turn, increased the size, scope, and operating budgets for separate online organizational units (Moore & Kearsley, 2011). Similarly, researchers have described the variations in online courses on a continuum from Web-enhanced and media-enhanced to fully online (Hartman, Dziuban, & Moskal, 2000).

Diffusion of Innovation

Once the traditional higher-education paradigm is disrupted, the process by which participation in online education shifts from the margins to the mainstream can be understood using Rogers's diffusion of innovation theory (2003). Rogers described diffusion of innovation as "the process in which an innovation is communicated through certain channels over time among members of a social system" (p.5). Successful outcomes for early adopters of innovation (in this case, various forms of online higher education) provide information and

reduce uncertainty, motivating others to participate and contributing to further diffusion and expansion. As traditional institutions develop online program options to improve convenience and compete with innovative new higher-education entrants, online institutions should focus on demonstrating quality to attract and retain dedicated instructors and improve institutional prestige to compete for highly qualified students.

Faculty Professional Development and Training

Distance educators must manage the online modality by using a wide variety of technologies and classroom platforms while engaging with students and teaching the course curriculum (Allen & Seaman, 2011; Hixon, Barczyk, Buckenmeyer, & Feldman, 2011; Lackey, 2011; Meyer, & Murrell, 2014b). In addition to orienting and socializing new faculty, the training and professional development opportunities provided by the hiring institution may be the only teacher training in which new faculty participate (Hixon, Barczyk, Buckenmeyer, & Feldman, 2011).

A number of faculty training varieties and models is used in online distance education. Gibson and Blackwell (2011) divided online faculty training models into four categories -- formal or informal, voluntary or required -- and describe the common varieties as coaching and mentoring, immersion and workshop. Gibson and Blackwell (2010) and Palloff and Pratt (2007) recommended comprehensive training that encompasses both the pedagogical and technical aspects of online training.

Based on a recent survey of 39 institutions that collected data on faculty development for online teaching (Meyer, & Murrell, 2014b), nearly all provided training on how to assess student learning (97%) and create online communities (91%). Eighty-one percent of the institutions surveyed provided training on the learning management system (e.g., Blackboard Learn, Instructure Canvas, etc.), student learning styles, and instructional design models. Workshops were the most common method of providing faculty training among the institutions surveyed (Meyer, & Murrell, 2014b). However, the delivery of online faculty training varies widely (Allen & Seaman, 2011; Hixon, Barczyk, Buckenmeyer, & Feldman, 2011; Lackey, 2011; Meyer, & Murrell, 2014b). Training may be developed and delivered by the institution or by an external third party and can range from informal, individualized consultations to formal, instructor-led courses (Allen & Seaman, 2011; Meyer, & Murrell, 2014b).

Mujtaba (2011) described the best practices for ongoing faculty training and professional development to improve teaching and student learning outcomes. Based on the author's professional experiences and best practices used by several universities and corporations, Mujtaba recommended an immersion "train the trainer" model that includes the following steps: hire, orient, model, mentor, teach, evaluate and develop. Mujtaba recommended the following best practices: formal, standardized, regular faculty training; frequent communication regarding program updates, technology usage, organizational announcements, and invitations for faculty input; standardized mechanisms for student feedback and documentation; regular student learning assessments; faculty peer review; and adequate compensation for training and course development. Institutional implementation of consistent, formal faculty training and remediation are required to ensure faculty engagement and student satisfaction to improve and maintain positive student outcomes (Mujtaba, 2011).

Faculty and Student Engagement

The migration from traditional to online classrooms has created new challenges for both faculty and students (Keengwe, Georgina, & Wachira, 2011). Faculty must be technologically literate in general, as well as proficient in online delivery and able to integrate their teaching skills and best practices (Gibson & Blackwell, 2010; Keengwe, Georgina, & Wachira, 2011). According to Keengwe, Gerogina and Wahira (2011), students taught by faculty who have received both pedagogical training (i.e., how to implement learning communities, improve classroom management, and cultivate faculty-student interactions) and focused technological training report increased learning and more positive perceptions of the online learning environment.

That faculty interaction and student satisfaction are key predictors of student achievement and success, regardless of institutional type or instructional modality, has been well established (Astin, 1984; 1996; Kuh, 1996; Kuh, & Hu, 2001; Tinto, 2010). A plethora of research documents the importance of such faculty qualities as educational background and engagement to improve student satisfaction and outcomes (Astin, 1984; 1996; Kuh, 1996; Tinto, 2010). According to Tinto (2012), far less is known about how research on faculty training and professional development can be translated into effective institutional practice toward improving the student experience.

Undoubtedly, the instructor (regardless of teaching modality) has a critical influence on his or her students' academic experience (Gibson, Tesone, Hodgetts, & Blackwell, 2001). Faculty who teach online appreciate professional development opportunities and prefer institutional administrators who value online education and demonstrate an understanding of the differences in an online teaching environment and the workload that comes with it (Allen & Seaman, 2013; Bolinger & Wasilik, 2009). Chronic technological difficulties, inadequate tools, and unreliable infrastructure to teach effectively in the asynchronous environment are reasons faculty report lower satisfaction and support by their institution (Bolinger & Wasilik, 2009).

The historical trend has been that most faculty feel positively toward and satisfied with their online teaching experiences (Bolliger, & Wasilik, 2009; Hagedorn, 2000; Hartman, Dzubian, & Moskal, 2000, NEA, 2000). Faculty satisfaction within the online context depends upon several factors. More specifically, the motivating factors that faculty provide as reasons for continuing to teach in an online environment "can be categorized into three groups: (a) student-related, (b) instructor-related, and (c) institution-related" (Bolliger, & Wasilik, 2009, p.106).

Online faculty indicated student-related satisfaction in knowing that they are serving a diverse population, including students who may not otherwise attend college were it not for the online option. Faculty described the online environment as positive with regard to innovation as well as faculty-student and peer-peer communication, but they lament the lack of face-to-face interaction (Bolliger, & Wasilik, 2009). The extent to which faculty can feel that what they do improves student learning is an important instructor-related satisfier. Although the hiring institution can attempt to choose faculty who are intrinsically motivated or motivated by student interactions, institution-related motivators fall within university administrator's control. Key factors that the institution can provide include appropriate technological infrastructure and appropriate training on teaching effectively in an online environment (Bolliger, & Wasilik, 2009).

Astin (1984) described student development theory with particular attention to student involvement. Student involvement refers to the amount of time and energy students devote to

their academic lives, including their studies and engagement in college related activities as well as interaction with other students and faculty. Numerous research studies have supported theories of student development by measuring relevant constructs, including student engagement, student satisfaction and their relationship to student achievement, persistence, and graduation (Astin, 1984; Kuh, & Hu, 2001).

The Effects of Student-Faculty Interaction in the 1990s by Kuh and Hu (2001) was a large-scale study of student-faculty interaction that included over 5,000 undergraduate students from 126 four-year U.S. colleges and universities nationwide. The survey utilized the College Student Experiences Questionnaire (CSEQ), which has been validated and used to collect data on self-reported learning and development as well as the quality and frequency of student-faculty interactions. According to the study's results, student-faculty interaction frequency tended to increase from freshman to senior years. Key findings demonstrated a positive relationship between the faculty interaction frequency and student effort, learning outcomes, and satisfaction.

Student Satisfaction

Evaluation in higher education typically focuses on student content knowledge as demonstrated by course grades, the alignment of courses, and program and institutional goals. However, key affective factors are equally important to explain and predict student learning in online settings (Kuo, Walker, Belland, & Schroder, 2013). Student satisfaction is among the most useful attitudinal constructs to predict whether students will persist and ultimately complete their studies. Further, higher-education institutions consider student satisfaction a key determinant online program quality (Yukselturk & Yildirim, 2008).

As college costs have escalated and student enrollments among traditional age students have steeply declined, student satisfaction has become a high priority among college administrators (Noel-Levitz, 2014). While a number of factors contribute to student satisfaction, including financial concerns, ease and convenience, college reputation, and campus culture, faculty engagement with students has a consistent, direct relationship to student satisfaction (Noel-Levitz, 2014). Colleges with high student satisfaction have corresponding high graduation rates. Students who report high satisfaction, defined in large part by their opinions of faculty teaching, tend to persist to graduation, which improves institutional outcomes and contributes to student satisfaction (Noel-Levitz, 2014).

In their most recent publication, the National Student Satisfaction and Priorities Report, the authors made the following recommendations to promote faculty-student engagement and measure improvements in student satisfaction:

- 1) Satisfaction assessment is a way to keep tabs on the priorities of students and to create an environment where improvement matters.
 - 2) Measurement is necessary for action.
 - 3) Student satisfaction assessment can set the retention agenda and provide crucial data for accreditation and strategic planning.
 - 4) Communication with students can combat perception issues.
 - 5) Satisfaction has benefits beyond serving your current students.
- (Noel- Levitz, 2014, p. 13)

Faculty characteristics and behaviors, particularly faculty actions that engage students in distance environments, directly contribute to student satisfaction (Kuh, & Hu, 2001). Because student satisfaction is correlated with several outcome measures -- such as

persistence (Tinto, 2010; 2012), course quality (Moore & Kearsley, 1996), and student success (Noel-Levitz, 2011) -- taking steps to improve how faculty engage with students in their online courses has a clear and direct benefit to the institution.

Method

Participants in this study were drawn from an archived, large data set from an online public, state university in the United States. Seventy-five faculty members in the university were purposely selected because, during the set period of this study, (a) they had been teaching online courses; (b) they were required to participate in a professional development course as a requirement of continued employment; and (c) they had been evaluated by students through the use of post-course surveys before and/or after participation in the training course. Student satisfaction scores were not available for all the participants across all terms as is often the case with longitudinal data. However, these missing data do not pose problems with the multilevel approach employed in this study (Field, 2013). Seven terms (from fall 2010 to fall 2013) were used to trace student satisfaction scores longitudinally. There was a gradual increase in the total number of participants who were evaluated by students on post-course surveys and there was also a small rate of faculty attrition.

All the participants had a master's or doctoral degree from a regionally accredited university in order to be eligible to teach at the study institution. For this study, faculty members' highest degree was entered and used as a basis for comparison of end-of-course student satisfaction scores, overall and as a change from pre- to post-professional development intervention.

Faculty Certification Courses (FCC) are offered every term to improve facilitation and other skills, such as APA format training. At the study institution, faculty are required to participate in at least one FCC course per calendar year to remain in good standing and are paid a stipend of \$100 for completion. Each course lasts three weeks and is designed around a topic of interest for online faculty. In this case, the course was Information Literacy in the Online Classroom.

Student satisfaction was measured using a student satisfaction scale, which consisted of six items, all representing instructor-related satisfaction: (a) The instructor provided timely feedback on my assignments (72 hours or less), (b) The instructor demonstrated knowledge and expertise in the course content, (c) My online interaction with the instructor met my expectations, (d) The instructor typically responded to my questions in a timely manner (24 hours or less), (e) My interaction with the instructor outside of the discussion board met my expectations, and (f) My interaction with the instructor in the discussion board met my expectations. Response options used the same 4-point Likert scale: (1= does not meet expectations, 2= somewhat meets expectations, 3= meets expectations, and 4= exceeds expectations). The scale had a high level of internal consistency, as determined by a Cronbach's alpha of .957.

Every semester, at the end of every course, students in the faculty members' online courses rated their satisfaction level on the scale, resulting in 1199 evaluations in the data set, meaning that a faculty member in this study, on average, has 2.28 student evaluations per semester. All the values on the scale averaged across all items and the average scores across all courses taught by a faculty member during a semester were averaged again to measure the faculty member's overall student satisfaction per semester, resulting in only one student

satisfaction score for a faculty member per semester. In this way, the data were restructured for each faculty member to have repeated measures of student satisfaction over time.

Data Analysis

Hierarchical Linear Modeling (HLM) was used to test a repeated-measures model with term or measurement occasion and training (Level 1 predictors) and degree (Level 2 predictor) predicting online faculty members' student satisfaction scores across seven semesters. The terms were coded as follow: 0=Fall 2010, 1=Spring 2011, 2=Fall 2011, 3=Spring 2012, 4=Fall 2012, 5=Spring 2013, and 6=Fall 2013. The first term (Fall 2010) was set to zero so that it could provide a meaningful zero point. A dichotomous variable was created in order to indicate whether the faculty member had completed the selected professional development course (0=not received, 1=received). Faculty highest degree status was also coded as a dichotomous variable (0=master, 1=doctoral or terminal). The scores on training and degree were centered on the overall mean before they were entered into the model hierarchically so that they could provide a meaningful zero point as well.

Results

Given the nature of the HLM analysis, several models with different predictors were tested step by step, while looking at the change in student satisfaction scores over time. Table 1 summarizes the results from the HLM analysis.

Table 1. *Result of Hierarchical Models Testing the Effect of Faculty Longevity, Training, and Degree on Student Satisfaction*

	Null Model Estimate (Standard error)	Model 1 Estimate (Standard error)	Model 2 Estimate (Standard error)	Model 3 Estimate (Standard error)
Intercept	3.54 (.05)	3.44 (.05)	3.44 (.05)	3.44 (.04)
Level 1 Time		.03(.01)**	0.03* (.02)	0.03 (.01)**
Level 1 Training			0.02 (.06)	
Level 2 Degree				- 0.11 (.07)
Change in Model R2	--	.03	--	--

Note. N=75 online faculty members measured over 7 semesters. R2 is the HLM version of the reduction in variance, * $p < .05$, ** $p < .01$

Given the hierarchical nature of the study, first determining a baseline (or null) model for the individual level outcome variable (faculty's student satisfaction score) was important. These analyses show how much variance resides within and between individuals and serve as a baseline for further analyses. Results from HLM analysis of the intercept-only model indicated that 26.46% of total variance resides between faculty members and that 73.54% of the total variance resides within faculty members, thereby supporting the HLM approach. The estimate for the intercept in the model was 3.54 which was the average student satisfaction score across all the faculty members and measurement occasions. When considering the range of the student satisfaction variable (from 1 to 4), it showed that participants in this study received relatively higher scores over time from their students as a whole.

In the first model, time or term (measurement occasion) was entered as a fixed effect to

determine the linear trend of student satisfaction scores across the seven semesters. Time or term was also entered as a random effect to allow the linear trend of student satisfaction vary across the faculty members. In general, online faculty members showed significant growth over the seven semesters with regard to student satisfaction. The intercept in the first model changed from 3.54 to 3.44, meaning that, in the 2010 fall semester, the student satisfaction scores started at 3.44 on average across all the participants. The estimate for time or term was .03, meaning that the participants' student satisfaction scores increased by .03 on the scale each term and the increase was statistically significant, $b = .03$, $t = 3.16$, $p < .01$. Specifically, student satisfaction scores significantly increased over time, reducing the residual variance by 3.27% from the null model.

In the second model, training was entered as a fixed and a random effect as well. Training did not significantly predict student satisfaction score, $t = .30$, $p = .77$ and, thus, was deleted in the model.

In the third model, degree was entered as a fixed effect. Degree was not significantly related to student satisfaction score, $t = -1.51$, $p = .14$. The estimate for degree had negative value ($b = -.11$), meaning that faculty members who have a master's degree turned out to perform better than those who have a doctoral or terminal degree. Overall, online faculty members showed significant growth over time with regard to student satisfaction; however, neither degree nor professional development training had significant impacts on student satisfaction over time.

Conclusion

This study was designed to evaluate professional development and faculty qualities as markers of student satisfaction. Archived faculty and student data collected since 2009 by a large online public university constituted the data sources for this study. Records from 75 faculty members who met the criteria of having student satisfaction scores for professional development course participation were analyzed to test the hypotheses. Based on the findings, neither degree status nor professional development significantly affected student satisfaction; however, faculty were evaluated more favorably in terms of student satisfaction over time. As such, the null hypothesis for research question 1 was rejected, but the null hypothesis for research question 2 was accepted.

An important limitation was the degree to which student end-of-course evaluations reflected instructor quality. While student surveys are ubiquitous, they do not necessarily provide a fair and accurate assessment of faculty teaching skills. Another potential limitation regarding the student survey data was a small sample of student evaluation responses per course. The use of a consistent tool to measure student satisfaction and a large sample size may have mitigated the noted limitations.

Because this study was limited to the findings from one institution, it should be replicated across diverse institutional types to determine whether the findings are similar. In addition, qualitative studies could be conducted to determine faculty perspectives of the effectiveness of the professional development offered and to develop a deeper understanding of factors that influence student satisfaction with their faculty both before and after professional development interventions. Finally, a study comparing how different professional development interventions affect student satisfaction should be conducted beyond the scope of the training provided in this study.

The researchers were intrigued that faculty with only a master's degree overall outperformed terminally degreed faculty on post-course student surveys. Based on early qualitative indicators, students seemingly experience higher levels of instructor presence and engagement from faculty without a terminal degree. Because universities often emphasize high ratios of terminally degreed faculty, further research is needed to determine whether this emphasis is misguided based these preliminary findings.

Professional development is heralded as an important factor in faculty growth. The researchers set out to examine whether professional development directly affected student satisfaction. This was not the case. The research reveals that administrators should use professional development as a tool for faculty retention rather than a driver of student satisfaction. This study's findings show that faculty longevity leads to student satisfaction. The investment in professional development, then, is well worth the cost if it promotes faculty retention.

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