A Multi-Institutional Study of Factors Influencing Faculty Satisfaction with Online Teaching and Learning

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Abstract
Faculty satisfaction is an essential component in an online teaching and learning environment. The researchers of the current quantitative study identified factors that influence online instructors' satisfaction at 10 different four-year public and private higher education institutions in the state of Ohio. The researchers also validated the modified OFSS-R survey (Blundell, 2015) within the study. The participants (N = 382), were faculty members who taught fully online at the 10 institutions. Results of the study revealed that instructor satisfaction was influenced by three main factors: (1) the instructor-student interaction; (2) the role of technology; and (3) the institutional support. Study results also revealed that the OFSS-R survey is valid and reliable measurement of perceived faculty satisfaction in a fully online environment.

Keywords: exploratory/confirmatory factor analysis, satisfaction, online learning, student-student interaction, student-faculty interaction, student-materials interaction

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When teachers do not focus on the development of student understanding and have poor conceptions of learning technologies, they tend to use e-learning as a way of delivering information by bolting it on to course design in an unreflective way. Teachers who focus on the development of student understanding and have richer conceptions of learning technologies, not only integrate e-learning into their approach to teaching, but also stress the importance of the integration of learning across physical and virtual spaces (Ellis & Goodyear, 2010, p. 104).

It is well-known that online learning is an emerging and constantly evolving method/medium that is commonly used to provide synchronous and asynchronous instruction in higher education at the graduate and undergraduate levels (Wallace, 2003). Research in this field has indicated that learning outcomes in an online environment can be comparable to those in the traditional classroom (Stack, 2015). However, some studies have reported faculty concerns regarding online teaching, such as frustrations with technical issues, faculty workload, and students' (lack of) access to technology, to name a few (Wingo, Ivankova, & Moss, 2017).

As more courses across disciplines are implemented and delivered via this medium, further course and program assessment is needed in order to facilitate, improve, and reaffirm the efficacy of a student's learning experiences using these methods. An online course can be assessed through different lenses and using numerous outcomes, e.g., institutional and faculty perspectives, students' grades, etc. Some researchers have reported that faculty satisfaction, one of the pillars in the Sloan Consortium's five pillars of quality online education, is an important contributor to the quality of online courses (Bolliger & Martindale, 2004; Bolliger, Inan, & Wasilik, 2014). That is, faculty satisfaction and student outcomes covary when predicting success in online programs (Hartman et al., 2000). In addition, a strong correlation exists between the level of faculty satisfaction with the structure and effectiveness of online course design and student satisfaction in those courses (Bolliger & Wasilik, 2009; Wasilik & Bolliger, 2009; Wendt & Wendt, 2012). Undoubtedly, more evidence is needed to understand why faculty at some institutions do or do not embrace online teaching (Hiltz et al., 2007). To that end, the researchers in this study aimed to identify factors that influence online instructors' satisfaction at 10 different four-year public and private higher education institutions in the state of Ohio. This was achieved by conducting both an exploratory factor analysis (EFA) and a confirmatory factor analysis (CFA) to identify specific factors that influence instructors' satisfaction in an online environment. Bolliger and Wasilik (2009), in their original study and expanded upon through this study, defined faculty satisfaction "as the perception that teaching in the online environment is "effective and professionally beneficial" (p. 105).

The study's participants were faculty members who taught fully online courses in 10 private and public higher education institutions in the state of Ohio. A fully online course is defined as one where more than 80% of the course interaction is online (Picciano & Dziuban, 2007). Also, both synchronous (real time) and asynchronous (not real time) modes were considered as online learning. The current study was guided by the following research questions:

1. What factors can be identified in data pertaining to instructors' perceived satisfaction in the online environment?
2. Is the data collection instrument valid and reliable in measuring perceived faculty satisfaction in a fully online environment?

Review of Relevant Literature

In online teaching and learning, a variety of factors influence instructors' and students' perceptions of satisfaction. Research trends in this field have mostly been conducted and reported independently, i.e., from the students' perspective and the instructors' perspective, individually. With respect to research from the students' perspective: Sun et al. (2008) investigated critical factors affecting students' perceived satisfaction in online learning. They reported that student

computer anxiety, instructor attitude toward online learning, online learning course flexibility, online course quality, usefulness, ease of use, and diversity in assessments are critical factors affecting students' perceived satisfaction. Similarly, Bolliger and Martindale (2004) investigated key factors that determine student satisfaction in online courses. Results revealed that three factors (instructor, technology, and interactivity) influenced students' satisfaction, with the instructor factor found to be the most important, suggesting that instructors play a critical role in facilitating positive online instructional outcomes.

Factors Influencing Faculty Satisfaction

Bolliger and Wasilik (2009) investigated factors influencing instructors' perceived satisfaction in online courses. They reported that three main factors (student-related, instructor-related, and institutional-related), influence instructors' satisfaction in online courses. Fredericksen et al. (2000) conducted research, via a series of case studies throughout the SUNY Learning Network (SLN) focused on "appraising the satisfaction of faculty with SLN and determining what factors contribute to faculty satisfaction" (p. 246). They found "[s]uccessful, satisfied on-line instructors have effective course designs and effective teaching practices," (p. 258), and SLN was found capable of achieving "high levels of faculty satisfaction efficiently and consistently on a large scale with a comprehensive approach to the support of SUNY faculty, their development as on-line instructors, and effective support and attention to the instructional design of their on-line courses" (p. 258). Blundell (2015) declared despite the many measures that can be taken to determine faculty satisfaction, the overwhelming measure used is an assessment of their satisfaction with the design of their courses. Hartman et al. (2000) explored factors that contributed to faculty satisfaction and ultimately improved faculty performance and instructional efficacy. They found that administrative leadership and robust institutionalized models for faculty development were essential for creating high-quality online learning courses, and that "technology-focused faculty development programs should strive to become woven into the fabric of the institution and agents of institutional transformation" (p. 158).

Blundell (2015) further asserted "that increasing levels of faculty satisfaction with online course design lays a stronger foundation toward creating this environment" (p. 1). Meyer (2014) readily identified the connection between "faculty satisfaction with the online teaching experience and the faculty's commitment to improving what they do in their online courses" (p. 93), where faculty satisfaction comprises one pillar in the Sloan Consortium five pillars of quality online education. The Sloan Consortium claims increased faculty satisfaction results from a combination of institutional support and faculty development through functional training in online instructional skills. It is necessary to note that one of the other pillars is student satisfaction, and when this pillar is considered along with faculty satisfaction, they form two sides of the same online learning coin. Consequently when both needs are met, opportunities abound for institutions to "increase learning effectiveness, achieve lower dropout rates, decrease the use of over-crowded buildings and ultimately decrease labor costs through creative development of technology enhanced and fully online courses" (Lorenzo & Moore, 2002, p. 5).

Schifter (2002) found "[f]aculty participants in distance education appear to be more highly motivated by intrinsic issues […] (i.e. intellectual challenge, and overall job satisfaction) than nonparticipating faculty" (p. 11), and "faculty participating in distance education were much more likely to be motivated to participate by issues that are intrinsic motivations (i.e., overall job satisfaction)" (p. 12), findings that are readily supported and expanded upon by other researchers. Hartman et al. (2000) suggested a strong correlation exists between faculty satisfaction and student

learning, and conclude that although faculty satisfaction's impact on student satisfaction may often be considered independently, "they are not independent but rather co-linear. In the absence of positive learning outcomes, teachers will encounter great difficulty succeeding, even with superior support and resources" (p. 477). Jackson et al. (2010), claimed "[f]aculty actions which initiate and maintain interactivity within the online class directly impact the quality of the online education experience" (p. 79), and "[w]hile attempts to define and measure student success in online education has been met with limited and debated results, researchers agree that student satisfaction […] is directly affected by degree and type of interactions between the assigned faculty member and enrolled online students" (p. 79).

As outlined in the sections that follow, Epp et al. (2010) found a "primary difference between online and face-to-face interaction is the difference between spoken and visual communication and text-based communication" (p. 49). Komarraju et al. (2010) examined various types of student–faculty interactions concluding they "can be crucial in developing students' academic self-concept and enhancing their motivation and achievement" (p. 332). This is reinforced by Stephenson (1992), who found "an increase in student-instructor interactions produces an increase in achievement" (p. 28). Komarraju et al. (2010) concluded that institutions actively fostering "close and frequent contact between their students and faculty members are more likely to reap a host of [other] benefits" (p. 332). Luo et al. (2017), after examining the effects of student-instructor, student-content, and student-student interactions, concluded they "play a positive role in the formation of student's sense of community[…] [affecting] student's stickiness with e-learning system" (p. 157).

Instructor-to-student Interaction

Shea et al. (2005) found that higher levels of interaction influence faculty decisions to adopt, reject, or continue with online teaching. The factors that reflected interaction in this study included faculty perceptions of interactions with their students, between their students, knowing students, and lower feelings of isolation. Arbaugh (2001) reported that immediacy behaviors (e.g., instructors use of personal examples, humor, name recognition, and openness toward encouragement of student ideas and discussion) were positive predictors of student learning and course satisfaction. In another study, Rabe-Hemp et al. (2009) found that respondents in the online course reported significantly higher levels of in-class participation and more student-to-professor contact than traditional students. Paradoxically, Bair and Bair (2011) found that technology both brought faculty and students together and that it separated them, i.e., some students reported that they appreciated being able to connect with the instructor, other students, and the databases without having to commute to campus, while others missed the physical presence of other students. Similarly, Dwyer et al. (2007) reported that faculty were able to establish personal interaction with students in an online environment. However, Fish and Gill (2009) found that faculty members in their study favored the face-to-face interactions of traditional classes.

This review would not be complete without alluding to social presence theory that traces "its roots in the social psychological theories of interpersonal communication and symbolic interactionism," and which has been applied in the "context of mediated communication" (Osei-Frimponga & McLean, 2018, p. 11). Osei-Frimponga and McLean (2018) claimed that "social presence bridges the perceived distance and projects some level of closeness between participants, which also depends on the media information richness" (p. 11).

Student-to-student Interaction

Noble (1998) opined that re-establishing student-student relationships is a crucial factor in maintaining instructional satisfaction for faculty. Additionally, Noble (1998) stated that in order to ensure this relationship is maintained, courses should not be 'assembled' and exchanged for profits in the open markets, i.e., ones that determine the value of said courses and ultimately the programs that they accumulate toward, by "'owners who may or may not have any relationship to the original creators and participants in the education process" (p. 46).

Driscoll et al. (2012) reported that students who like to work with others and who view interaction with their instructor as important to learning tend to be more satisfied with the course, independent of the type of classroom setting (online vs. face-to-face) that they were in. In another study, Picciano (2002) found no differences among students who had low, moderate and high interactions, as measured by the number of postings on the discussion board in the class management system; however, on a written assignment, the high interaction group scored significantly higher than the low and moderate groups. In addition, Joo et al. (2011) reported that social presence had a significant effect on cognitive presence. That is, students engage in teamwork and build a sense of community by interacting with their peers, enabling them to share diverse ideas and extend their knowledge base. Furthermore, Kim et al. (2011) found that interactivity among participants was a predictor of social presence (how students develop closeness among them to form a learning community) but not of learning satisfaction. Contrary to the previous studies, Kuo et al. (2014) reported that learner-learner interaction was not a significant predictor of student satisfaction; however, learner-instructor interaction and learner-content interaction (strongest predictor) were significant predictors of student satisfaction.

Institutional Support

With respect to institutional support, Hislop and Ellis (2004) reported that the course design, preparation, and teaching of their courses did not have any impact on the faculty's workload. Similarly, Meyer (2012) reported that several professors felt that their teaching productivity had increased. Several professors also reported that they freed up time which was spent on service on research. In addition, Wasilik and Bolliger (2009) reported that instructors could manage an online class better than a traditional classroom. In fact, Van de Vord and Pogue (2012) found that overall, although more time is spent teaching face-to-face per student than in the online environment, that certain aspects of online teaching (e.g., grading students' work and recording grades) took considerably more time online than in the face-to-face classroom.

Despite the previous positive findings, Simonson et al. (2009), Allen and Seaman (2009), and De Gagne and Walters (2009) found that instructors considered teaching online courses as time-consuming and that the lack of release time prevented them from teaching online classes. In addition, Green et al. (2009) reported that compensation for teaching online courses was viewed as inadequate due to the high workload. Furthermore, Betts (1998) and O'Quinn and Corry (2002) reported that reliable technology was another element with which faculty were concerned. That is, some faculty expressed that the lack of technical skills, as well as a lack of technical support, prevented them from teaching in online environments.

Connecting Instructional Technology, Instructional Design, and Faculty Satisfaction

Lee (2001) in making the connection between instructional technology, instructional design and faculty satisfaction, claimed "it has been found that the individuals' perception of

organizational support influences their work motivation and commitment, and then both lead to improved job performance" (p. 154), and "when the organization is perceived as being more supportive, job satisfaction is higher" (p. 154). Lee (2001) concluded "[c]onsidering the faculty perception of instructional support [instructional technology and instructional design] was mostly negative, faculty, motivation and commitment were, ironically, strong overall" (p. 158), however, "[t]he level of faculty satisfaction with their own teaching was not as high as their motivation and commitment" (p. 158). In making their connection between instructional technology, instructional design, and faculty satisfaction, Wasilik and Bolliger (2009) focused their study "on elements that directly influence satisfaction of faculty with teaching online" (p. 174) and found that degrees of faculty satisfaction depended on the following elements: Institutions valuing and supporting online teaching, unilateral increases in online teaching workloads sans complimentary compensation and reward, availability of professional development opportunities, providing instructional design and development support, ongoing technical difficulties and deficient technical support, quality control issues, errant student evaluations of online instruction affecting reappointment, tenure and/or promotion, and retention of intellectual property rights. They reaffirmed "faculty satisfaction is an important element in the evaluation of online courses and programs and can be used to measure the quality of these online offerings" (Wasilik & Bolliger, 2009, p. 174).

Benbunan-Fich et al. (2005) considered technology to be a contextual or moderating factor in Asynchronous Learning Networks (ALN) because they "modify or influence the effect that ALN will have on learning" (p. 25). They further explained that instructors become satisfied with online teaching when they effectively combined current information and communication technologies with beneficial institutional support services, e.g., instructional design and educational technologies, learning facilities, academic and administrative amenities, technology, and infrastructure. Further, Benbunan-Fich et al. (2005) stated that "faculty satisfaction is enhanced when the institution supports faculty members with a robust and well-maintained technical infrastructure, training in online instructional skills, and ongoing technical and administrative assistance" (p. 31). Figure 2.4, which depicts the Dynamic Model of Online Interaction Learning Theory added to their accompanying Chapter Summary, reinforces these claims. McLawhon and Cutright (2012) found no statistically significant differences measuring online instructor satisfaction against either (1) "with the authority to make decisions about content and methods based on individual instructor learning styles" (p. 349), or (2) "technology-based institutional support based on individual instructor learning styles" (p. 349), or when (3) "testing for homogeneity of variance for satisfaction with equipment and facilities and facilities" (p. 349). However, when the ANOVA was conducted, it resulted in a significant value ($p < .05$), where "the variance in satisfaction with decisions was explained by learning style" (p. 349). Their Tukey post hoc test reinforced this finding, showing "[r]espondents categorized as aural learners reported different levels of satisfaction with equipment and facilities than both physical and social learners" (p. 349).

Factor Analysis

Factor analysis is a statistical procedure that is used to identify the interrelationships among a large group of observed variables. Using data reduction, a smaller set of these variables are grouped into dimensions or factors that have common characteristics (Nunnally & Bernstein, 1994). There are two major classes of factor analysis: exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) as explained below.

EFA is used to explore underlying dimensions of the construct of interests (Pett, Lackey, & Sullivan, 2003). Osborne (2014), claims "[i]n the modern social sciences, it [EFA] is perhaps most frequently used to explore the psychometric properties of an instrument or scale" (p. 1). It is used when the researcher may not have any specific expectations with respect to the number of factors. Even if the investigator has such expectations (e.g., validity research), the researcher is not required to declare them; the analysis is not influenced by these expectations either (Thomson, 2004). This was the approach that Bigatel et al. (2012) used to explore behaviors, attitudes and beliefs that reflect potential competencies for online teaching success. An EFA analysis produced seven factors such as administration/leadership, active teaching/responsiveness, and technological competence, which the authors recommended to be used as a framework to design and develop faculty development programs for online instructors. In addition, the survey developed and used in this study may be used as an assessment tool for needs assessment purposes or used for other research studies.

Regarding CFA, Thomson (2004) states that investigators are required by the analysis to have a priori expectation with respect to (1) the number of factors, (2) variables reflecting given factors and (3) factors correlation. CFA tests the fit of factor models. In other words, CFA is use when the researcher has some knowledge about the underlying structure of the construct under investigation. Also, it can be used to test the utility of the underlying dimensions of a construct identified thought EFA (Pett et al., 2003). A CFA approach was used by Yu (2018) who examined the construct validity of the Online Learning Readiness instrument (SOLR), a survey that had been previously created by Yu and Richardson (2015) and used to measure social competencies, communication competencies, and technical competencies in online learning. EFA results, using various fit indices (e.g., CFI, NFI and RMSEA), indicated that the model fit was acceptable, which confirms that the SOLR is a reliable instrument for researchers and practitioners in higher education to measure their students' level of readiness for online learning.

Summary

The aforementioned literature indicates that various factors influence user satisfaction, such as strong institutional support and instructors' and students' interaction and subsequent motivation. In the research conducted by Blundell (2015), a larger population of faculty teaching fully online courses was surveyed in 10 private and public higher education institutions in Ohio but did not identify specific factors that were influenced by online faculty's perceived satisfaction. Thus, the purpose of the current research study was to (a) determine what factors could be identified in data pertaining to instructors' perceived satisfaction in the online environment and (b) whether the data collection instrument used within Blundell's (2015) study is valid and reliable in measuring perceived faculty satisfaction in a fully online environment. Both EFA and CFA were conducted to make these determinations.

Methods

Measurement Instrument

The measurement instrument was based on the Online Faculty Satisfaction Survey (OFSS) scale developed by Bolliger and Wasilik (2009), who investigated factors affecting teacher's perceived satisfaction in online courses. The OFSS had a total of 36 questions which included 28 items with a 4-point Likert scale, ranging from 1—*strongly disagree* to 4—*strongly agree*. Items

were created based on constructs related to issues impacting teaching in the online environment derived from the literature and were categorized by Bolliger and Wasilik (2009) into three groups: (1) student-related, (2) instructor-related, and (3) institution-related. To examine alignments between constructs and each survey item, see Bolliger and Wasilik, 2009, p. 110 (Table 2).

Initial face validity included examination by a content and psychometric expert and the instrument's administration to 25 individuals to determine if the items were clear and concise. After data collection, the total scale had a high internal reliability (0.85). For this quantitative, non-experimental study, a modified version of Bolliger and Wasilik's (2009) survey was used. Blundell (2015), revised and modified Bolliger and Wasilik's (2009) original survey (OFSS-R, see Table 1 below), compressing the original scale to 28 items. The first 15 items in the OFSS were excluded in Blundell's (2015) revised scale, OFSS-R, because they pertained to Bolliger and Wasilik's (2009) introductory question, which was not examined in his study. The researchers of this study conducted factor analyses on items 16 through 43, and their respective means and standard deviations seemed to follow that order as well (see Table 2). Blundell's (2015) OFSS-R scale parallels Bolliger and Wasilik's (2009) OFSS version, except for the clarification in wording of statements—specifically, the term "fully" was inserted in front of the words "online" across the 28 items. After data collection, Blundell's (2015) scale also had a high internal reliability (.85). In this study, Blundell's (2015) adapted OFSS-R scale was applied to identify faculty's degree of satisfaction by exploring factor structures from their self-reported responses (see Table 1). Likert-scale items appearing in bold in the "Available Response" column were reverse-coded on analysis.

Table 1

Online Faculty Satisfaction Survey [OFSS] Instrument, revised as the OFSS-R.

	Question Number and Description	Available Response
16.	The level of my interactions with students in the fully online course is higher than in a traditional face-to-face class.	Strongly Agree [1]; Agree [2]; Disagree [3]; Strongly Disagree [4]
17.	The flexibility provided by the fully online environment is important to me.	Strongly Agree [1]; Agree [2]; Disagree [3]; Strongly Disagree [4]
18.	My fully online students are actively involved in their learning.	Strongly Agree [1]; Agree [2]; Disagree [3]; Strongly Disagree [4]
19.	I incorporate fewer resources when teaching a fully online course as compared to traditional teaching.	**Strongly Disagree [1]; Disagree [2]; Agree [3]; Strongly Agree [4]**
20.	The technology I use for fully online teaching is reliable.	Strongly Agree [1]; Agree [2]; Disagree [3]; Strongly Disagree [4]
21.	I have a higher workload when teaching a fully online course as compared to the traditional one.	**Strongly Disagree [1]; Disagree [2]; Agree [3]; Strongly Agree [4]**
22.	I miss face-to-face contact with students when teaching fully online.	**Strongly Disagree [1]; Disagree [2]; Agree [3]; Strongly Agree [4]**
23.	I do not have any problems controlling my students in the fully online environment.	Strongly Agree [1]; Agree [2]; Disagree [3]; Strongly Disagree [4]
24.	I look forward to teaching my next fully online course.	Strongly Agree [1]; Agree [2]; Disagree [3]; Strongly Disagree [4]

25.	My students are very active in communicating with me regarding fully online course matters.	Strongly Agree [1]; Agree [2]; Disagree [3]; Strongly Disagree [4]
26.	I appreciate that I can access my fully online course any time, and at my convenience.	Strongly Agree [1]; Agree [2]; Disagree [3]; Strongly Disagree [4]
27.	My fully online students are more enthusiastic about their learning than their traditional counterparts.	Strongly Agree [1]; Agree [2]; Disagree [3]; Strongly Disagree [4]
28.	I have to be more creative in terms of the resources used for the fully online course.	**Strongly Disagree [1]; Disagree [2]; Agree [3]; Strongly Agree [4]**
29.	Fully online teaching is often frustrating because of technical problems.	**Strongly Disagree [1]; Disagree [2]; Agree [3]; Strongly Agree [4]**
30.	It takes me longer to prepare for an online course on a weekly basis than for a face-to-face course.	**Strongly Disagree [1]; Disagree [2]; Agree [3]; Strongly Agree [4]**
31.	I am satisfied with the use of communication tools in the fully online environment (e.g., chat rooms, threaded discussions, etc.).	Strongly Agree [1]; Agree [2]; Disagree [3]; Strongly Disagree [4]
32.	I am able to provide better feedback to my fully online students on their performance in the course.	Strongly Agree [1]; Agree [2]; Disagree [3]; Strongly Disagree [4]
33.	I am more satisfied with teaching fully online as compared to other course delivery methods.	Strongly Agree [1]; Agree [2]; Disagree [3]; Strongly Disagree [4]
34.	My fully online students are somewhat passive when it comes to contacting the faculty regarding course related matters.	**Strongly Disagree [1]; Disagree [2]; Agree [3]; Strongly Agree [4]**
35.	It is valuable to me that my students can access my fully online course from any place in the world.	Strongly Agree [1]; Agree [2]; Disagree [3]; Strongly Disagree [4]
36.	The participation level of my students in the class discussions in the fully online setting is lower than in the traditional one.	**Strongly Disagree [1]; Disagree [2]; Agree [3]; Strongly Agree [4]**
37.	My students use a wider range of resources in the fully online setting than in the traditional one.	Strongly Agree [1]; Agree [2]; Disagree [3]; Strongly Disagree [4]
38.	Technical problems do not discourage me from teaching fully online.	Strongly Agree [1]; Agree [2]; Disagree [3]; Strongly Disagree [4]
39.	I receive fair compensation for fully online teaching.	Strongly Agree [1]; Agree [2]; Disagree [3]; Strongly Disagree [4]
40.	Not meeting with my fully online students face-to-face prevents me from knowing them as well as my on-site students.	**Strongly Disagree [1]; Disagree [2]; Agree [3]; Strongly Agree [4]**
41.	I am concerned about receiving lower course evaluations in the fully online course as compared to the traditional one.	**Strongly Disagree [1]; Disagree [2]; Agree [3]; Strongly Agree [4]**
42.	Fully online teaching is gratifying because it provides me with an opportunity to reach students who otherwise would not be able to take courses.	Strongly Agree [1]; Agree [2]; Disagree [3]; Strongly Disagree [4]
43.	It is more difficult for me to motivate my students in the fully online environment than in the traditional setting.	**Strongly Disagree [1]; Disagree [2]; Agree [3]; Strongly Agree [4]**

Participants

The participants in this study consisted of all faculty members contracted to instruct fully online courses for spring 2011 through fall 2013. This scope and timeframe considered and compared improvements suggested or limitations imposed under the Strategic Plan for Higher Education 2008–2017: University System of Ohio, proposed by the Ohio Board of Regent's then-Chancellor Eric Fingerhut and supported by then-Governor Ted Strickland (Ohio Board of Regents, 2008). Eligibility criteria dictated that survey participants must be faculty who instructed fully online courses at higher education institutions located in Ohio that provided at least four-year degree programs. Among these institutions, participants were purposely recruited from the Ohio Quality Matters Consortium (OQMC) website, a nationally recognized institution that represents more than 60 four-year institutions of higher education in the state of Ohio. OQMC is "a group of member schools that subscribe to the national Quality Matters rubric [QMR]" (Ohio Quality Matters Consortium, n.d., para. 1). The QMR became the fundamental premise of Blundell's (2015) research study, given that the 13 public and 27 private four-year institutions were all members of the OQMC. It is important to note no individual email addresses of potential respondents were obtained through OQMC, only that of the OQMC contact person at each of the 40 institutions.

The survey was administered and distributed using Qualtrics® software to all participants via email. As indicated above a total of 40 public and private four-year higher education institutions in the state of Ohio were formally approached to distribute the survey among their faculty body. Only 10 institutions agreed to participate (five public and five private), the remainder either declined to participate (four public and four private), or did not respond to the Survey Participation Request (4 public and 18 private). An initial sample of 427 valid responses from 3,487 surveys was used in this study; however, due to missing values in demographics, the final sample size was reduced to 382 valid responses, representing 10.9% of the total response rate.

Data Analysis

Descriptive analyses were calculated using SAS software and factor analyses processes were conducted by using Mplus 7.0 (Muthén and Muthén, 2012). Blundell's (2015) OFSS-R configured with a four-point ordinal scale, violated normal assumption when testing with the Shapiro-Wilk test. Thus, as recommended by Muthén and Muthén (2012), the 28 items were computed with EFA technique using the estimator of the Mean-and-Variance-adjusted-Weighted-Least-Squares method (WLSMV using GEOMIN rotation), which optimizes estimators that may be caused by non-normal distribution. The matrix in the WLSMV was more optimized than the maximum likelihood parameter in estimating the factor loadings across ordinal constructs (DiStefano & Kamphaus, 2006). Evaluations were also conducted with model goodness of fit (GFI) indices, which describe how well the proposed factor structures fit values in the study population in EFA (Muthén & Muthén, 2012). GFI indices at or above .95, Adjusted Goodness of Fit (AGFI) at or above .90, and Root Mean Square Error of Approximation (RMSEA) less than .06, were deemed satisfactory for well-fitting mode.

Statistical criteria for determined factors in this study used at least equal to or greater than 0.4 (high/moderate) loading on one factor, low cross-factor loading close to 0.0, high/moderate reliability (higher than 0.06), and good discrimination between the factors (Fabrigar et al. 1999). Factor structures were also investigated by using multiple steps of EFA techniques, such as a criterion of Kaiser's eigenvalue (default: 1), a scree plot, and a number of factorial solutions.

Table 2

Means and Standard Deviations

Factor		Item	*M*	*SD*
1	28.	I have to be more creative in terms of the resources used for the fully online course.	3.08	0.73
	26.	I appreciate that I can access my fully online course any time, and at my convenience.	3.61	0.49
	23.	I do not have any problems controlling my students in the fully online environment.	3.23	0.42
	35.	It is valuable to me that my students can access my fully online course from any place in the world.	3.50	0.50
	17.	The flexibility provided by the fully online environment is important to me.	3.38	0.49
	37.	My students use a wider range of resources in the fully online setting than in the traditional one.	3.16	0.36
	34.	My fully online students are somewhat passive when it comes to contacting the faculty regarding course related matters.	2.50	0.78
	41.	I am concerned about receiving lower course evaluations in the fully online course as compared to the traditional one.	2.46	0.87
	25.	My students are very active in communicating with me regarding fully online course matters.	3.25	0.43
	19.	I incorporate fewer resources when teaching a fully online course as compared to traditional teaching.	1.88	0.72
	33.	I am more satisfied with teaching fully online as compared to other course delivery methods.	3.23	0.42
	43.	It is more difficult for me to motivate my students in the fully online environment than in the traditional setting.	3.13	1.22
2	22.	I miss face-to-face contact with students when teaching fully online.	3.16	0.80
	31.	I am satisfied with the use of communication tools in the fully online environment *(e.g., chat rooms, threaded discussions, etc.)*.	3.18	0.38
	29.	Fully online teaching is often frustrating because of technical problems.	2.52	0.77
	38.	Technical problems do not discourage me from teaching fully online.	3.33	0.47
	40.	Not meeting with my fully online students face-to-face prevents me from knowing them as well as my on-site students.	2.91	0.95
3	21.	I have a higher workload when teaching a fully online course as compared to the traditional one.	2.98	0.86
	39.	I receive fair compensation for fully online teaching.	3.21	0.41
	30.	It takes me longer to prepare for an online course on a weekly basis than for a face-to-face course.	2.81	0.90
	36.	The participation level of my students in the class discussions in the fully online setting is lower than in the traditional one.	2.34	0.83
	27.	My fully online students are more enthusiastic about their learning than their traditional counterparts.	3.12	0.32
	32.	I am able to provide better feedback to my fully online students on their performance in the course.	3.22	0.41

Results

Descriptive Univariate Analysis

Table 3 presents overall demographic characteristics (N = 382) showing participant characteristics. Responses that included one or more missing values in the demographic variables column (i.e., race, sex, and age) were deleted from the table. Of the completed responses (i.e., those not missing one or more values in the demographic variable column), a high proportion of participants self-identified as Caucasian (87.7%), indicated involvement in public institutions (92.7%), were between 45–64 years of age (54.7%), and classified themselves as a lecturer/instructor (39.0%).

For survey items related to teaching experience, the highest responses were from participants with 3–5 years of online teaching experience (63.1%), but most participants responded that less than 20% of their course sections were allocated as fully online (34.6%).

Table 3

*Descriptive information for Sample Population who completed the survey (*N*= 382)*

Variable Category	Variable Type	*N*	Proportion (95% CI)
Demographic Variables			
Sex	Male	139	36.4 [31.4, 40.8]
	Female	243	63.6 [59.2, 68.6]
Institute	Public	354	92.7 [90.3, 95.0]
	Private	28	7.3 [5.0, 9.7]
Faculty Rank	Full professor	47	12.3 [9.2, 15.7]
	Associate Professor	99	25.9 [21.7, 30.4]
	Assistant Professor	87	22.8 [18.6, 26.7]
	Lecturer/Instructor	149	39.0 [34.0, 43.7]
Race	African-American	9	2.4 [0.8, 3.9]
	Asian	22	5.8 [3.7, 8.1]
	Caucasian	335	87.7 [86.4, 92.4]
	Latino or Hispanic	8	2.1 [0.8, 3.7]
	Others	8	2.1 [0.8, 3.7]
Age Range	less than 35	59	15.4 [12.0, 19.1]
	35–44	89	23.3 [19.1, 27.5]
	45–54	106	27.7 [23.3, 32.2]
	55–64	103	27.0 [22.8, 31.7]
	greater than 65	25	6.5 [4.2, 9.4]

Non-demographic Variables			
Computer Proficiency	Beginner/Intermediate	178	46.6 [41.9, 51.8]
	Advanced	204	53.4 [48.2, 58.1]
Online Course Teaching	1–2 years	59	15.4 [11.8, 19.1]
	3–5 years	241	63.1 [58.4, 68.1]
	Greater than 6 years	82	21.5 [17.8, 25.6]
Proportion of Online Teaching	Less than 20%	132	34.6 [29.8, 39.3]
	21–40%	74	19.4 [15.4, 23.3]
	41–60%	50	13.1 [9.4, 16.5]
	61–80%	31	8.1 [5.2, 11.3]
	Greater than 80%	95	24.9 [20.9, 29.1]
Education Training Session	Frequently provided	48	12.6 [9.4, 16.0]
	sometimes	113	29.6 [25.1, 34.3]
	Not really	221	57.9 [53.1, 63.1]

It should be noted that some specific demographic information and course design features were not collected and were therefore not reported in this study (specifically, course disciplinary distribution in terms of subject areas as well as the degree to which each course used either synchronous and/or asynchronous delivery modes). In addition, all instructor participants in this study taught fully online, however, data concerning the course designers, whether the course was designed by themselves or by other colleagues or instructional designers, cannot be reported. A further study could examine this demographic information.

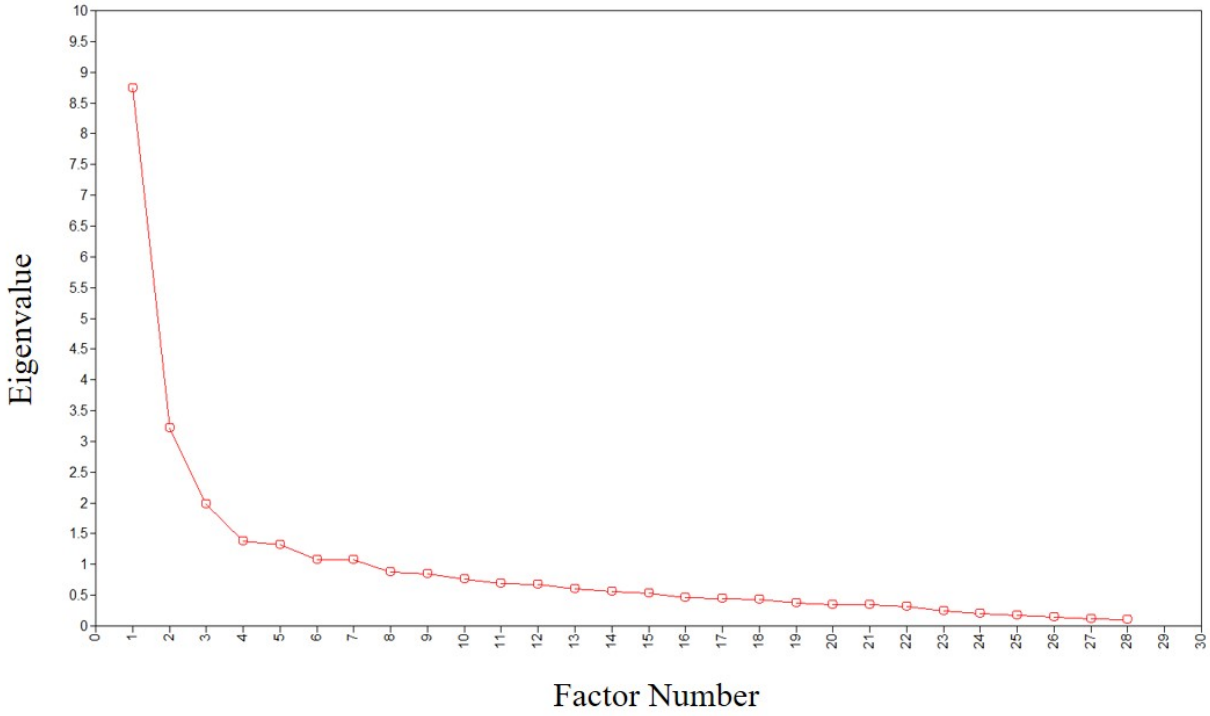
Preliminary Factor Analysis

A preliminary data assessment was conducted using Bartlett's Test of Sphericity ($p < .05$) and the Kaiser-Mayer-Olkin measure of sampling adequacy (KMO = .88). These researchers also determined measures of sampling adequacy (MSA) revealed diagonal correlation was high but off-diagonal correlations were low. In short, Bartlett's Test, KMO, and MSA results indicated that the matrix of current data can be factorized.

Exploratory and Confirmatory Factor Analysis

For EFA, the current data were generated in three factor constructs using eigenvalues and scree plot. When restricted at eigenvalue greater than 1.0, it was shown that seven factors should be maintained. Further information revealed with scree plot suggested that only three components should be adequately retained (see Figure 1). Based on the latter technique (because the former did not show the sampling error), the three-factor component in this data was well-depicted in the factor structures.

Figure 1. Scree Plot for Potential Factor Structures.



To capture the nature of the study respondents' characteristics of the data were determined by deleting ambiguously related variables (a less than 0.4 factor-loading on one factor), and by minimizing redundant values (a high cross-loading on at least two factors). Accordingly, the two low-loaded variables were excluded in the final factor structures such as **Question 24**: I look forward to teaching my next fully online course, and **Question 18**: My fully online students are actively involved in their learning. With this, the three high-cross loaded variables were eliminated; namely, **Question 16**: The level of my interactions with students in the fully online course is higher than in a traditional face-to-face class, **Question 20**: The technology I use for fully online teaching is reliable, and **Question 42**: Fully online teaching is gratifying because it provides me with an opportunity to reach students who otherwise would not be able to take courses.

Table 4

Exploratory Factor Analysis Factor Loadings Among All Faculty Members Contracted To Instruct Fully Online Courses, From Spring 2011 Through Fall 2013 (Excluding Summer Semesters) Teaching At Four-Year, Public And Private Higher Education Institutions In The State Of Ohio

Underlying Structures	Factor 1 Instructor-Student Interaction	Factor 2 Technology	Factor 3 Institutional Support	Cronbach's alpha
28. I have to be more creative in terms of the resources used for the fully online course.	0.756*			0.81
26. I appreciate that I can access my fully online course any time, and at my convenience.	0.753*			
23. I do not have any problems controlling my students in the fully online environment.	0.739*			
35. It is valuable to me that my students can access my fully online course from any place in the world.	0.728*			
17. The flexibility provided by the fully online environment is important to me.	0.707*			
37. My students use a wider range of resources in the fully online setting than in the traditional one.	0.696*			
34. My fully online students are somewhat passive when it comes to contacting the faculty regarding course related matters.	0.685*			
41. I am concerned about receiving lower course evaluations in the fully online course as compared to the traditional one.	0.659*			
25. My students are very active in communicating with me regarding fully online course matters.	0.658*			
19. I incorporate fewer resources when teaching a fully online course as compared to traditional teaching.	0.645*			
33. I am more satisfied with teaching fully online as compared to other course delivery methods.	0.509*			
43. It is more difficult for me to motivate my students in the fully online environment than in the traditional setting.	0.431*			
22. I miss face-to-face contact with students when teaching fully online.		0.820*		0.75
31. I am satisfied with the use of communication tools in the fully online environment (e.g., chat rooms, threaded discussions, etc.).		0.787*		
29. Fully online teaching is often frustrating because of technical problems.		0.598*		

38. Technical problems do not discourage me from teaching fully online.		-0.400*		
40. Not meeting with my fully online students face-to-face prevents me from knowing them as well as my on-site students.		0.522*		
21. I have a higher workload when teaching a fully online course as compared to the traditional one.			0.776*	0.71
39. I receive fair compensation for fully online teaching.			0.624*	
30. It takes me longer to prepare for an online course on a weekly basis than for a face-to-face course.			-0.533*	
36. The participation level of my students in the class discussions in the fully online setting is lower than in the traditional one.			0.634*	
27. My fully online students are more enthusiastic about their learning than their traditional counterparts.			0.466*	
32. I am able to provide better feedback to my fully online students on their performance in the course.			0.427*	
Estimated Variance Explained (%)	**18.8**	**11.1**	**8.7**	**38.6**

Note. Only items with factor loadings ≥ 0.35 are shown.

The result of the current EFA identified three factors. The model in EFA extracted the three factors of the valuable 23-scale items which accounted for 38.6% of the overall variance: Factor 1 accounted for 18.8%, Factor 2 accounted for 11.1%, and Factor 3 accounted for 8.7%. The first factor was named as *Instructor-student Interaction* because the items within this factor described faculty perceptions about their students' engagement with the course (see survey items 22, 23, 24, 25, 27, 32, 33, 34, 36, 40, 41, and 43 in Table 4). With its Spearman's correlation, internal consistency of this factor was 0.81 satisfactory.

The second factor was named *Role of Technology,* as these items related to achieving technical skills through communication tools (see survey items 17, 26, 29, 31, 35, and 38 in Table 4). The factor's internal correlation was 0.75 satisfactory.

The third factor was named *Institutional Support,* which was the factor structure that captured the faculty's respondents own perceived satisfaction. The items in this factor represented that instructors are willing to deliver content despite some challenges they may face, such as high workload and low resources (see survey items 19, 21, 28, 30, 37, and 39 in Table 4). The internal reliability was 0.71.

Because the three-factor model was derived from the current data in EFA, cross-validation of this configured construct domains were examined where the items of the data were adequately assigned. With a validation review of the model fit statistics in CFA, this current model held higher estimates (closer to one) for GFI at 0.87 and AGFI at 0.85, and RMSEA at 0.61, which indicated reasonable model fit (Thomson, 2004).

As a caveat, and for the readers' interpretation, there is not a clear cutpoint by which to judge the adequacy of the model based solely on the latter index (see Byrne, 1994). The estimate of Bentler-Bonett Normed Fit Index (NFI at 0.82) was greater than 0.8. Therefore, overall

estimates from model fit statistics indicated this three-factor model was relatively well-fitted and could sustain the study population's underlying thoughts for their job satisfaction and behaviors.

Summary

The aforementioned results are congruent with the factors found by Bolliger and Wasilik (2009) who identified three main factors (student-related, instructor-related, and institutional-related) that influence instructor satisfaction in online courses. At the same time, these results diverge from the findings of Bolliger and Martindale (2004), who found that the instructor factor was the most important factor related to satisfaction, whereas the current study identified that the Instructor-student Interaction factor played the largest role in overall perceived satisfaction. These results may be due to the fact that the current study uses a different population with a larger sample size than the Bolliger and Martindale study (2004). Additionally, the sample used in the current study may have included instructors who have different perspectives, whereas Bolliger and Martindale (2004) collected data from students. The latter findings are congruent with the findings from Evans and Myrick (2015) who reported that technical problems were a concern.

Discussion

The aims of the current study were to identify factors that influence online instructors' perceived satisfaction, at four-year public and private institutions in the state of Ohio, as well as validating the data collection survey. EFA revealed that three factors influenced instructors' satisfaction: (1) instructor-student interaction; (2) the role of technology; and (3) institutional support, as discussed below.

The Instructor-student Interaction Factor

Study results found that the Instructor-student Interaction Factor was the strongest predictor of perceived faculty satisfaction, which indicates that fully online instructors strive to provide the best available pedagogical approaches, experiences, and resources to facilitate students' accessibility to the online environment, as well as to promote students' engagement in these platforms, which may consequently lead to successful learning and teaching. The current results support the findings of Hartman et al. (2000), who reported that there is a strong correlation between faculty satisfaction and student learning. Similarly, these findings correlate with those found by Shea et al. (2005), who found that higher levels of interactions (e.g., faculty perceptions of interactions with their students) influence faculty decisions to adopt, reject, or continue with online teaching. Overall, this study's findings indicate strongly that faculty are able to establish personal interactions with their students in an online environment have higher levels of perceived satisfaction than those who do not, as also reported by Dwyer et al. (2007).

More specifically, transferring one's face-to-face materials into an online learning management system, brings about either instructor or student satisfaction. The mediums are distinctly different from one another when it concerns both instructor and student "presence." Osei-Frimponga and McLean (2018) further reinforced the findings in this factor. In addition, Tu (2000) premised this connection by stating "social presence is defined as consciousness of another person in an interaction and the salience of an interpersonal relationship" (p. 27), and continued by stating social learning theory can be "explained in terms of a continuous reciprocal interaction of personal environmental determinants" (p. 30). Tu (2000) concluded that social presence is a crucial success factor when instruction is premised/founded on social/cognitive learning, and the

level and voracity of social interaction "is the key to explain how social presence affects social learning and socio-cultural learning" (p. 35), irrespective of whether the course is face-to-face or online. Furthermore, Kroncke (2006) declared that the most "groundbreaking" finding in correlations made between faculty satisfaction and student satisfaction in higher education was the "apparent impact that social relationships amongst faculty members can have on students' overall satisfaction" (p. 45).

The Technology Factor

The technology factor influenced faculty satisfaction, but to a lesser extent than the instructor-student satisfaction factor. This indicates that instructors may experience some issues with the learning management platforms provided by their institutions, and that these issues could impact their overall perceived satisfaction in fully online courses. These findings are congruent with the findings from Evans and Myrick (2015), who reported that technical problems were a concern. These results also support the findings of Betts (1998) and O'Quinn and Corry (2002), who found that some faculty expressed that the lack of technical skills, as well as the lack of technical support, prevented them from teaching in online environments.

More specifically, results indicate that technology can facilitate or constrain the online interactions between the faculty and students. For instance, Osei-Frimponga and McLean (2018) reiterate that although "social presence theory embodies social interactions, it is not a general theory of social cognition, rather it is a theory that sheds light on how technology could affect, distort, and enhance certain aspects of social cognition" (p. 11). Researchers in this study remain imminently conscious that students, although "digital natives," are still far from being technology-savvy when it comes to navigating the plethora of digital instructional technology tools and resources faculty expect them to master. Aydemira et al. (2015) proposed theoretical digital frameworks for online learning, and suggested that "[o]ne of the reasons for this might be the fact that theoretical framework[s are] not something that can be found readily available in the literature and rapid change in technology" (p. 1751). Yang (2003) shared that the Spanning Three Centuries Project engaged student researchers by using advanced computers and other similarly-capable digital consumer electronics to question, refute, and/or reinforce students' understanding of events, periods, and themes through others' lived-experiences. In sum, technology has both a supporting and catalyzing role in the constructivist development of the teaching and learning process.

The Institutional Support Factor

The least influential factor for fully online faculty's perceived satisfaction was institutional support, which indicates that instructors may not be fully satisfied with the resources provided by their institutions, such as workload lifts and or a fair compensation for teaching fully online courses. These findings confirm findings from previous research (Hartman et al., 2000), who found that administrative leadership and robust institutionalized models for faculty development are essential for creating high-quality online learning courses, and that "technology-focused faculty development programs should strive to become woven into the fabric of the institution and agents of institutional transformation" (p. 158). The present findings also support previous research by Lee et al. (2011), who considered framing institutional support of faculty as a crucial add-on "to pre-designed courses…it has since been recognized that it should be considered and integrated into course design" (p. 158). Another significant concern is institutional efficacy as weakened by higher than normal attrition rates in fully online courses. These researchers recognize online education is not a fit for all students, and that attrition rates for most distance education programs are worse

than for traditional college courses (Beck, 2000). However, they also recognize that students are responsible for persistence, and institutions are responsible for retention—where either are delinquent, both fail.

Survey Validation

Lastly, the current study validated Blundell's (2015) OFSS-R survey. At the same time, it revalidated Bolliger and Wasilik's (2009) OFSS survey, given the former was based on the latter. To determine the OFSS-R's internal consistency reliability, Cronbach's alpha was calculated. The total scale (28 items) had a high internal reliability (.85). Furthermore, coefficient alphas, calculated for each subscale, indicated that the instructor-student factor was high (.71), the technology construct was low (.13) and the institutional support was moderate (.53). Comparable Cronbach's alpha coefficients were reported by Bolliger and Wasilik (2009). The reliability for their scale (28 items) was high (.85) as well. Regarding the reliability for the subscales, the student dimension was high (0.86), whereas the instructor (0.55) and institution dimensions (0.55) were moderate. Reliability (Cronbach's alpha) results should be interpreted with caution because, for example, the number of items may have an effect on alpha (see Cortina, 1993).

Furthermore, this paper presented evidence of construct validity using correlational and measurement consistency between the targeted constructs (factors) and their indicators (survey items). The latter was done primarily by using factor analysis statistical measures (Dimitrov, 2013). Spearman's correlations indicate that the internal consistency reliability of Factor 1 (0.81), Factor 2 (0.75) and Factor 3 (071), was satisfactory. In sum, the OFSS-R survey is a valid and reliable data collection instrument for measuring perceived faculty satisfaction in a fully online environment.

Conclusion

The researchers of the current study identified factors that influence online instructors' perceived satisfaction at four-year public and private higher education institutions in the state of Ohio. The researchers also validated the data collection instrument of the study. Results of the study revealed that instructor's perceived satisfaction was influenced by three main factors: (1) the instructor-student interaction, (2) the role of technology, and (3) the institutional support. Results also revealed that the original data collection instrument is a valid and reliable measure of faculty's perceived satisfaction in a fully online environment.

The researchers of the current study recommend readers should exert some caution when interpreting the aforementioned findings because the current study used self-reported survey data from instructors, thus subjecting this study's findings to the limitations of such research methods. Additionally, faculty's perceived satisfaction levels may differ across academic contexts (e.g., undergraduate vs graduate levels) as well as historical circumstances (e.g. COVID-19 may change the online teaching and learning paradigm). Finally, it is noted that within this study, satisfaction is not correlated with actual instructors' performance or with student achievement. Objective measures of instructor and student performance as they relate to faculty's perceived satisfaction should be implemented in future research studies.

Despite some limitations, the current study contributes rich findings to the literature on instructor satisfaction in fully online courses. The results of this study help refine findings from previous research, such as that of Bolliger and Martindale (2004), who found that the instructor

factor was the most important of the factors related to faculty's perceived satisfaction teaching fully online courses. Similarly, Bolliger and Wasilik (2009) previously identified three main factors (student-related, instructor-related, and institutional-related) that influenced instructor satisfaction in online courses. Despite some similarities, the current study differs from the aforementioned studies in that it contained a larger sample size (N = 382) than the Bolliger and Martindale (2004) study (N = 303). Additionally, this study's researchers collected data from instructors, whereas Bolliger and Martindale (2004) collected data from students. Furthermore, the data collected for this study came from multiple institutions (10 public and private institutions of higher education) whereas Bolliger and Martindale's (2004) came from participants at one institution.

In sum, the design and results of this study are robust and contribute valuable research to the scholarly literature on the topic of faculty satisfaction on online learning environments. Additionally, this study also contributes valuable research related to the evaluation and measurement of faculty satisfaction from the instructor's perspective which, if positive, can contribute to faculty motivation, a predictor of success (Bolliger and Martindale, 2004). The findings also provide useful insights for school administrators, in that findings indicate administrators must allocate more resources to the online infrastructure (e.g., reliable software and hardware), so that instructors can better serve their students. A follow-up study should include a correlation between faculty satisfaction levels and students' grades with sample sizes larger than those used in the current study.

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