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Developing an online learner satisfaction framework in higher education through a systematic review of research

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Abstract

Satisfaction is a critical aspect of student success in online education. In this systematic review, we examine 98 articles which studied various aspects of online learner satisfaction. We specifically analyzed publication patterns, context, research methodology, research instruments, and research themes and factors pertaining to online learner satisfaction research. Among these 98 studies, the journal *Internet and Higher Education* published the highest number of articles ($n = 8$), and the majority of studies were conducted in the United States ($n = 37$). Thirty five percent of the studies were conducted with undergraduate students. The majority of the studies (89%) was quantitative, 68% were descriptive, and 94% used surveys. Learner characteristics was the most examined theme, followed by engagement and course delivery. Program quality, assessment, and learner support were some of the themes that were least studied. In 46 studies researchers adopted or modified existing items or instruments to measure student satisfaction. The framework benefits both online learning practitioners and researchers.

Keywords: Online courses, Online students, Student satisfaction, Systematic review

Introduction

Student satisfaction has been identified as an important factor in the journey of online students in higher education because it can impact students' engagement, motivation, learning, performance, success, and ultimately retention and graduation rates (Astin, 1993; Sahin & Shelley, 2008; Wickersham & McGee, 2008). In fact, student satisfaction was considered so important to the quality of online courses that the Sloan-Consortium included it as one of the five pillars in its quality framework (Moore, 2005). In general, satisfaction is defined as fulfillment of a need, contentment or enjoyment (Merriam-Webster, n.d.). Astin (1993) defined student satisfaction as students' perception of value pertaining to their educational experience which can encompass many elements and is therefore recognized as a multi-faceted concept (Wickersham & McGee, 2008). Building on existing literature, we define online learner satisfaction as *"the fulfillment of a student's need and perceptions of contentment with learner, instructor, course, program, and organizational related factors in the online learning environment."*

Student satisfaction is a complex construct. Some factors that have the potential to influence student satisfaction in online learning environments identified in the literature are active and authentic learning, autonomy, computer and internet self-efficacy, course design, community, flexibility, instructional materials, instructor behaviors, interaction, outcomes, platform interface, technology reliability, self-efficacy, social and technical ability or preparedness, student factors, support services, presence, and usefulness (Bayrak et al., 2020; Bolliger & Martindale, 2004; Bolliger & Wasilik, 2012; Dennen et al., 2007; Garrison et al., 1999; Inman et al., 1999; Ke & Kwak, 2013; Kuo et al., 2013; Liaw, 2008; Lin et al., 2008; Palloff & Pratt, 2003; Sahin & Shelley, 2008; Shee & Wang, 2008).

Online student satisfaction has been studied by a larger number of researchers between the years 2010 and 2019. Bolliger and Martindale (2004) examined key factors for determining student satisfaction in online courses, and investigated student satisfaction in undergraduate (2012b) and doctoral courses (2012a). Similarly, Inman et al. (1999) investigated instructor and student attitudes toward distance learning whereas Dennen et al. (2007) examined instructor-learner interaction in online courses. Some researchers focused on developing a scale for measuring online student satisfaction. Bayrak et al. (2020) focused on the development of an online course satisfaction scale and Shee and Wang (2008) developed an evaluation of the web-based e-learning system based on learner satisfaction. Ke and Kwak (2013) examined constructs of student-centered online learning on learning satisfaction.

Other researchers have studied satisfaction as an important variable when investigating the effectiveness of online education. Liaw (2008) examined students' perceived satisfaction, behavioral intention, and effectiveness of e-learning. Kuo et al. (2014) studied Interaction, Internet self-efficacy, and self-regulated learning as predictors of student satisfaction in online education courses. Researchers have also worked on building frameworks and models to study online student satisfaction. Lin et al. (2008) focused on building a social and motivational framework for understanding satisfaction in online learning. Sahin and Shelley (2008) proposed a distance education student satisfaction model.

It is the purpose of this study to synthesize this body of research, find patterns, contextualize settings, identify methodologies employed, and offer recommendations.

Systematic reviews on online learner satisfaction

Student satisfaction in online learning environments in higher education contexts was central to seven meta-analyses or systematic reviews (Table 1). Two meta-analysis examined teaching and social presence in online learning and their relationship with student satisfaction. Caskurlu et al.'s (2020) meta-analysis of 30 articles looked at relationships between teaching presence, teaching presence subscales, and student outcomes (e.g., perceived learning, satisfaction). The studies Caskurlu et al. included represented multiple disciplines in higher education. The authors indicated that teaching presence and satisfaction, and the three factors of teaching presence and satisfaction had a moderately strong relationship. Significant moderators for the teaching presence and satisfaction relationship were discipline, length of the course, and type of scale (e.g., Community of Inquiry instrument or Teaching Presence Scale). Correlations were stronger "in hard-pure disciplines" (p. 157), courses that were taught for a longer time period, and when

Table 1 Studies that focus on student satisfaction in online learning environments

Author(s)	Coverage	Learning Environments	Focus	Methodology	Number of studies	Factors examined
Caskurlu et al. (2020)	1997–2018	Fully online	Relationship between student outcomes and teaching presence	Meta-analysis	30	Perceived learning, student satisfaction, teaching presence, and teaching presence subdimensions (instructional design and organization, course facilitation, and direct instruction)
Ebner and Gegenfurtner (2019)	2010–2018	Synchronous webinar, asynchronous online, and face-to-face	Comparison of student learning and satisfaction in different learning environments	Meta-analysis	5	Learning and satisfaction in asynchronous and synchronous online, and face-to-face learning
Perfetto (2019)	2010–2014	Distance, online, hybrid	Best practices in RN to BSN instruction delivered via distance, online, and hybrid	Systematic review	19	Online course design, academic integrity, community, and learner characteristics; and learning outcomes and satisfaction
AlSamarraie et al. (2018)	2000–2015	E-learning, distance, online, web-based, virtual, blended	Users' e-learning continuance satisfaction	Systematic review	16	Ease of use, information quality, system quality, task-technology fit, and utility value
Richardson et al. (2017)	1992–2015	Fully online	Relationship between social presence and student outcomes	Meta-Analysis	25	Social presence, student learning, and student satisfaction
George et al. (2014)	2000–2013	Online, hybrid, and traditional	Effectiveness of online/hybrid and traditional environments	Systematic review	59	Student outcomes such as learning, skill acquisition, and satisfaction, and student attitudes
Lahti et al. (2014)	Open dates	e-learning: computer-assisted, CD-ROM, online, and traditional	Effectiveness of e-learning compared to traditional environments	Meta-analysis	11	Student learning, skills, and satisfaction

the CoI scale was used to measure teaching presence. Richardson et al. (2017) looked at relationships between social presence, student learning, and student satisfaction in the online learning environment in a meta-analysis. Their analysis included 25 studies from different disciplines. Results of this meta-analysis showed that there was a strong positive correlation between social presence and perceived student satisfaction and social presence and perceived student learning. Significant moderators for the strength of correlation between social presence and satisfaction were course length, instrument used, and discipline. For social presence and perceived learning, significant moderators were discipline, audience, and course length.

Two additional meta-analysis compared learning environments and studied learner satisfaction in addition to learning outcomes. Ebner and Gegenfurtner's (2019) included five research-based articles that compared learning and learner satisfaction in webinars, asynchronous online courses, and face-to-face courses. The authors included studies in higher education and training. When effect sizes were extracted, results showed that learners were more satisfied with face-to-face courses compared to webinars, and learners in the asynchronous online group were more satisfied with webinars than with courses delivered asynchronous online. Lahti et al. (2014) studied the effectiveness of e-learning for nursing students compared to traditional methods, although the authors used the term e-learning more broadly to include variations of distance learning (e.g., computer-based learning). Included variables in this meta-analysis were student outcomes (learning and skills) and satisfaction. Results showed that while there were small improvements for e-learning students in terms of performance in a few of the studies, there were no statistically significant differences for student outcomes between the two learning environments. Differences in student satisfaction were not assessed because the few included studies that reported satisfaction did not include usable data for the analysis.

Three systematic reviews focused on online learner satisfaction of which two were specific to the health professions. Perfetto (2019) conducted a systematic review of literature to gain insights into best practices in registered nurse to baccalaureate in nursing programs delivered online or hybrid that may affect retention. The synthesis of 19 articles revealed four themes that were central to studies reviewed: course design, community, academic integrity, and students' demographics. Seventeen of these articles focused on the importance of good quality design in online courses and its relationship to student learning and satisfaction. Eleven of the articles that Perfetto included highlighted the importance of online course community and its impact on student satisfaction, success, and retention.

A review by George et al. (2014) compared online and traditional learning of undergraduate students in health professions such as dentistry, medicine, pharmacy, and physical therapy. In this review, George et al. focused primarily on student outcomes such as learning or clinical skills and satisfaction, and attitudes. Of the 29 articles reviewed by George et al. addressed student satisfaction included in the review, there were no differences in satisfaction between learning environments, whereas results in four of the articles showed higher satisfaction in online and blended courses. Focusing broadly on multiple disciplines in higher education, Al-Samarraie et al. (2018) examined instructors' and students' continuance satisfaction with online learning systems to identify

predictors of satisfaction. The authors included 16 articles in their systematic review that revealed 11 factors as potential predictors of continuance satisfaction: attitude, confirmation; ease of use; attainment, intrinsic, and utility value; information and system quality; social influence; task–technology fit; usefulness.

Table 1 summarizes the key aspects of the reviews discussed.

Some of the relevant meta-analyses or systematic reviews mentioned above included samples from a specific discipline only such as health sciences (George et al., 2014; Lahti et al., 2014; Perfetto, 2019) compared student satisfaction in different learning environments such as face-to-face vs. online (Ebner & Gegenfurtner 2019) or investigated relationships between other variables such as social or teaching presence, student learning, and satisfaction (Caskurlu et al., 2020; Richardson et al., 2017). Several existing reviews or meta-analyses (see Table 1) included comparison studies based on a variety of learning environments (e.g., online, blended or traditional), combined a variety of delivery methods (e.g., CD-ROMs, computer-assisted, etc.) with online learning or did not provide adequate context or a definition of the term online learning.

Purpose and research questions

A systematic review that examines student satisfaction in online learning environments independently of discipline and other factors has not yet been conducted. There is a need to examine this important construct in the literature to present a more complete status of published research on online learner satisfaction between 2010 and 2019 and examine it from a multidimensional perspective focusing on the learner, course, instructor, program, and organization. This systematic review fills this gap in the literature.

This systematic review focuses on the following questions:

1. What are publication patterns (publication timeline and publication outlet, research context, research methods) of research on online learner satisfaction?
2. What research themes and factors pertaining to online learner satisfaction were investigated in the studies published?
3. What measures were used to examine online learner satisfaction?

Methodology

This systematic review on online learner satisfaction was adapted from the systematic review process described in the Cochrane Handbook by Higgins et al. (2019): (1) determine the research question, (2) define eligibility criteria and methods for review, (3) search for studies, (4) apply eligibility criteria, (5) collect data and critically appraise, (6) analyze and present results, (7) interpret results and form conclusions, and (8) complete the structured report.

Eligibility criteria for screening studies

An inclusion/exclusion criterion was developed, and the initial studies were screened based on the criteria included in Table 2.

Table 2 Inclusion/exclusion criteria

Criteria	Inclusion	Exclusion
Publication date	2010–2019	Prior to 2010 and after 2019
Publication type	Scholarly articles of original research	Book chapters, technical reports, dissertations
Focus of the article	Article had to focus on online learner satisfaction as one of the research questions or research variables	Articles that did not have a focus on online learner satisfaction
Instructional setting	Studies published in higher education context	Studies published in K-12, corporate, and other settings
Research methods	Study included an identifiable methods section with empirical data collection	Theoretical, conceptual articles, and systematic reviews of research
Language	Articles published in English	Articles published in other languages

Data sources and search strategies

Eight databases indexed in EBSCO host with Full Text were utilized in this study. These included: Academic Search Complete, APA PsycInfo, Business Source Complete, CINAHL Plus with Full Text, Communication & Mass Media Complete, Education Research Complete, ERIC, Library, Information Science & Technology Abstracts. The following search terms were used for this study as a search term in the title between the years 2010 and 2019: Satisfaction AND (Online or Virtual or elearning) AND (Student or Learner). Articles published after 2019 were excluded because many focused on the context of emergency remote education due to the pandemic.

Process flow of the systematic review

A PRISMA flow chart to depict the process flow used in the selection of articles is shown in Fig. 1. The initial search resulted in 338 articles. Through a deduplication process, importing to Zotero, results were reduced to 159 articles. These articles were then screened at the title, abstract, and full text levels. A title screen resulted in 144 articles. During the abstract screen, we reduced the number to 127 articles. All full texts of these 127 articles were reviewed, and a total of 98 articles were included in this systematic review.

Data coding and analysis

A review and coding form was created on Google Forms by the two researchers. The codebook was developed based on findings from prior studies and refined from the initial screening of articles in this review. The protocol included 12 items, and a description of the codebook is included in Table 3.

Research studies were coded by two researchers. Two researchers independently coded 10% of the articles with an interrater reliability of 94.6%. Area of disagreement were discussed through meetings before future coding. The researchers met biweekly to discuss any challenges and clarifications during the review process. To finalize research themes and factors, the two researchers discussed each article and coded them using three rounds of iterative coding. Articles were excluded during title, abstract, and full-text screening. Some of the reasons for exclusion included were not an empirical study, no satisfaction measures, not studying an online environment or not conducted in a higher education setting.

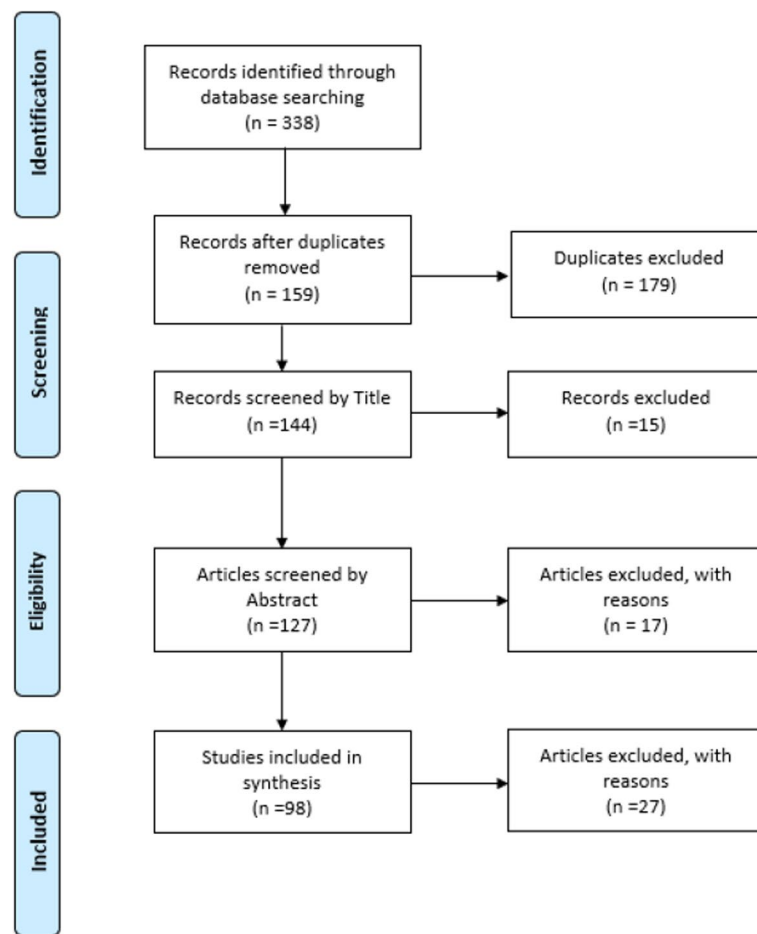


Fig. 1 Process flow of article selection

A timeline chart was drawn for the publication years. Frequency and percentage tables were generated for all the other variables. Research theme and online learner satisfaction factors data were further discussed to collapse categories and identify themes. The themes were used to develop an online learner satisfaction framework.

Results

Publication patterns

Publication trends

Publication trends by years of the 98 articles included in the study is shown in Fig. 2. The highest number of articles ($n = 17$) on online learner satisfaction was published in 2016 followed by a decrease and then an increase.

Publication outlet by journals is included in Table 4. Journals that published three or more articles on online learner satisfaction are included in Table 4. The journal Internet and Higher Education published the highest number of articles on online student satisfaction.

Table 3 Codebook with descriptions

Codebook criteria	Description
Study ID	Each article extracted was assigned a unique study ID
Year of publication	Publication year was coded
Author name	Author names were included during coding but excluded during analysis
Journal name	Journal title was coded
Discipline name	Discipline was coded as Education, Sciences, Engineering, Arts, Health Sciences, Business, Computer Science, Law, Multiple Sciences or Not Reported
Student level	Student level was coded as undergraduate, graduate, both undergraduate and graduate, or not reported
Instructional delivery	Instructional delivery was coded as online, blended, and blended/online
Country	Country was coded as United States, and open coded for other countries
Research methodology	Research methodology was coded as quantitative, qualitative or mixed-methods
Research design	Research design was coded as Descriptive, Regression Experimental or Quasi-Experimental, Correlational, Factor Analysis, Basic Qualitative, Structural Equation Modeling (SEM), Hierarchical Linear Modeling (HLM), Grounded Theory and Naturalistic Inquiry
Data collection	Data collection was coded as Survey, Grades, Extant Data, Documents, Pre/Post tests, Interviews, Focus Groups and Grade Point Average (GPA)
Research themes	Using open coding, research themes were coded as Learner Characteristics, Engagement, Learning Strategies, Instructor Facilitation, Faculty Characteristics, Instructional Design, Course Technologies, Course Quality, Learner Support, Course Delivery, and General Satisfaction
Satisfaction factors	Using open coding, a number of satisfaction factors were coded

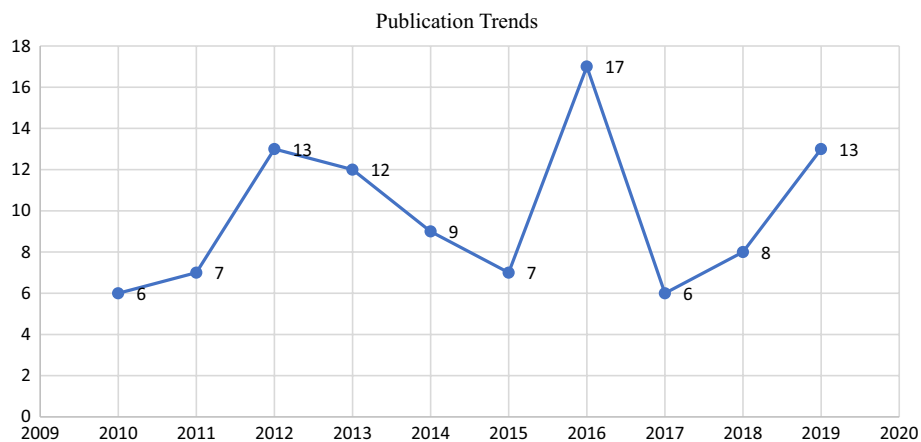


Fig. 2 Publication trends

Contexts

The disciplines in which the research articles were conducted were coded. This information is included in Table 5. The highest number of studies were published in the discipline of Education; 21.4% of studies did not report the discipline.

Table 4 Publication outlet

Publication outlet	Frequency	Percentage
Internet and Higher Education	8	8.1
Online Journal of Distance Learning Administration	6	6.1
International Review of Research in Open and Distance Learning	6	6.1
Computers and Education	3	3.0
Decision Sciences Journal of Innovative Education	3	3.0
Distance Education	3	3.0
International Journal on E-Learning	3	3.0
Canadian Journal of Learning and Technology	2	2.0

Table 5 Disciplines

Disciplines	Frequency	Percentage
Not reported	21	21.4
Education	20	20.4
Multiple disciplines	16	16.3
Business	14	14.3
Other	10	10.2
Health Sciences	6	6.1
Sciences	5	5.1
Computer Science	2	2.0
Psychology	2	2.0
Communication	2	2.0
Total	98	100

Table 6 Country

Country	Frequency	Percentage
United States	37	37.8
Not specified	28	28.6
Other	9	9.2
Multiple countries	5	5.1
Australia	4	4.1
Slovenia	3	3.1
Turkey	3	3.1
United Kingdom	3	3.1
Malaysia	2	2.0
Saudi Arabia	2	2.0
Spain	2	2.0
Total	98	100.00

Country

The countries in which studies were conducted were open coded. The majority of the studies (37.8%) were conducted in the United States. Almost twenty nine percent

of studies did not report the countries in which the studies were conducted. Table 6 includes the information pertaining to country.

Student level

The level of higher education students studied was coded as undergraduate, graduate, both, or not reported. The highest percentage of studies (34.7%) were conducted with undergraduate students, 23.5% of studies included both undergraduate and graduate students, and 18.4% of studies were conducted with only graduate students. Almost a quarter of reviewed studies (23.5%) did not include information regarding the level of students who participated in the studies.

Research methodologies

Research methodologies were coded as quantitative, qualitative, and mixed-methods. The majority of the studies (88.8%) used a quantitative methodology, whereas only 10.2% utilized mixed-methods and only 1.0% used qualitative methodology.

Research design

Table 7 includes the various research designs included in the studies. Some studies reviewed had multiple research designs. The majority of the studies (68.4%) were descriptive, followed by regression design (27.6%) and experimental or quasi-experimental designs (27.6%).

Data collection methods

Data collection methods are included in Table 8. Surveys were used most frequently in the studies (93.9%), followed by students' grades (14.3%). Some studies reviewed had multiple data collection methods.

Online learner satisfaction research themes and factors

Research themes are included in Table 9. Some studies had more than one focus, and up to three themes were identified for applicable studies during our analysis. When studying online learner satisfaction, learner characteristics was the most examined theme ($n = 38$), followed by engagement ($n = 35$), and course delivery ($n = 22$). The satisfaction

Table 7 Research design

Research design	Frequency	Percentage
Descriptive	67	68.4
Regression	27	27.6
Experimental or quasi-experimental	27	27.6
Correlational	23	23.5
Factor analysis	22	22.4
Basic qualitative	9	9.2
Structural equation modeling	9	9.2
Hierarchical linear modeling	4	4.1
Grounded theory	1	1.0
Naturalistic inquiry	1	1.0

Table 8 Data collection methods

Data collection	Frequency	Percentage
Survey	92	93.9
Grades	14	14.3
Extant data	6	6.1
Documents	5	5.1
Pre/Post tests	4	4.1
Interviews	3	3.1
Focus groups	2	2.0
GPA	2	2.0

Table 9 Online learner satisfaction research themes and factors

Themes	Factors	Frequency
Learner		
Learner characteristics	Learner anxiety, agency, preference, academic self-concept, technology anxiety, technology access, motivation, learning style, cultural differences, e-readiness, computer self-efficacy, study attitudes, gender, gpa, age, ethnicity, academic standing, competence, personality type, comfort, learner abilities, awareness, future enrollment preference, and recommendation to a friend	38
Engagement	Social presence, interaction, collaboration/group work, community, relatedness, connectedness, and communication	35
Learning strategies	Metacognitive strategies, self-directed learning, self-regulation, time spent online per week, study behavior, and study environment	4
Instructor		
Instructor facilitation	Online lectures, course announcements, teaching process, instructor time spent, instructor behaviors and actions, instructor availability, response time, instructor feedback, instructor presence, and teaching quality	12
Faculty characteristics	Faculty empathy, faculty longevity, instructor interest, and teaching experience	8
Course		
Instructional design	Course orientation; learning outcomes; course structure; course clarity; use of multimedia; usability; course content; learning resources; instructional activities; transactional distance; autonomy; challenge and difficulty; and flexibility	19
Course technologies	Elearning and eclassroom properties; elearning tools and resources; learner-interface interaction; and perceived usefulness and ease of use	6
Assessment	Assessment methods, course assignment, and evaluation	4
Course quality	Course material quality and technology quality	8
Program and organization		
Learner support	Information and service quality; infrastructure support; instructional support; peer support; technical support program support; and organizational support	4
Program quality	Program authenticity and university reputation	3
Course delivery	Environment, length of course, self-paced program, course modality	22
General satisfaction	Overall satisfaction	5

research themes were categorized into learner, instructor, course, program, organization levels, and general satisfaction. Studies in the general satisfaction category included studies with a multitude of variables.

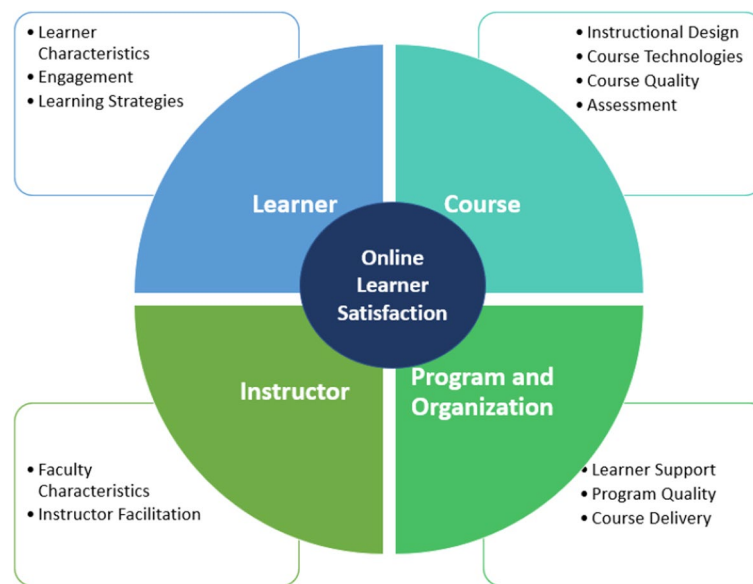


Fig. 3 Online Learner Satisfaction (OLS) framework

Online learning satisfaction (OLS) framework

Based on the findings, the following framework (Fig. 3) was developed to include the themes of online learner satisfaction identified in this systematic review. There were four themes that emerged, Learner-Related Satisfaction, Instructor-Related Satisfaction, Course-Related Satisfaction, and Program and Organization-Related Satisfaction.

Learner-related satisfaction themes and factors

Among the 12 satisfaction research themes, there were three themes which were learner related. These included learner characteristics, online engagement, and learning strategies. Learner characteristics included satisfaction factors such as learner anxiety (Abdous, 2019), agency (Dziuban et al., 2015), preference (Marmon et al., 2014), academic self-concept (Zhan & Mei, 2013), technology anxiety (Bolliger & Halupa, 2012), technology access (Noviyanti, 2019), motivation (Burbuagh et al., 2014), learning styles (Cole et al., 2014), cultural differences (Zhu, 2012), e-readiness (Ilgaz & Gülbahar, 2015), computer self-efficacy (Kuo et al., 2014), study attitudes (Divjak et al., 2018), gender, GPA, age, ethnicity, academic standing (Andersen et al., 2013), competence (Ke & Kwak, 2013), personality type (Bolliger & Erichsen, 2013), comfort (Alshare et al., 2011), learner abilities (Gyamfi & Sukseemuang, 2018), awareness (Bradford, 2011), future enrollment preference (Reio & Crim, 2013), and recommendation to a friend (Wengrowicz et al., 2018).

Engagement included satisfaction factors such as social presence (Strong et al., 2012), interaction (Cole et al., 2014), collaboration/group work (Marmon et al., 2014), community (Bickle et al., 2019), relatedness (Chen & Adesope, 2016), connectedness (LaBarbera, 2013), and communication (Al-Asfour, 2012).

Learning strategies included factors such as metacognitive strategies (Ejubovic & Puška, 2019), self-directed learning (Kirmizi, 2015), self-regulation (Inan et al., 2017),

time spent online per week (Kuo et al., 2013), study behavior (Divjak et al., 2018), and study environment (Choi, 2016).

Instructor-related satisfaction themes and factors

There were two satisfaction research themes that were instructor related and these included faculty characteristics and instructor facilitation.

Faculty characteristics included factors such as faculty empathy (Parahoo et al., 2016), faculty longevity (Kane et al., 2015), instructor interest (Dias & Trumpy, 2014), and teaching experience (Al-Asfour, 2012).

Instructor facilitation included factors such as online lectures (Bae & Cho, 2019), course announcements (Noviyanti, 2014), teaching process (Ilgaz & Gülbahar, 2015), instructor time spent (Kane et al., 2015), instructor behavior and actions (Jackson et al., 2010), instructor availability or response time (Bickle et al., 2019), instructor feedback (Ladyshevsky, 2013), instructor presence (Gray & DiLoreto, 2016), and teaching quality (Bickle et al., 2019).

Course related satisfaction themes and factors

There were four research themes that were course related: instructional design, course technologies, assessment, and course quality.

Instructional design included factors such as course orientation (Watts, 2019), learning outcome (Gyamfi & Sukseemuang, 2018), course structure (Cole et al., 2014), course clarity (Yelvington et al., 2012), use of multimedia (Garratt-Reed et al., 2016), usability (Ilgaz & Gülbahar, 2015), course content (Li et al., 2016), learning resources (Estelami, 2012), instructional activities (Bae & Cho, 2019), transactional distance (Wengrowicz et al., 2018), autonomy (Chen & Adesope, 2016), challenge and difficulty (Bradford, 2011), and flexibility (Divjak et al., 2018).

Course technologies included factors such as elearning and eclassroom properties (Gomezzej & Čivre, 2012), elearning tools and resources (Keengwe et al., 2012), learner-interface interaction (Cho, 2011), and perceived usefulness and ease of use (Al-Azawei & Lundqvist, 2015). Assessment included factors such as assessment methods (Cassidy, 2016), assignment completion (Kurucay & Inan, 2017), course assignments (Estelami, 2012), and evaluation (Ilgaz & Gülbahar, 2015). Course material quality was evaluated the use of the Quality Matters Checklist (Shin & Cheon, 2019) and technology quality (Harsasi & Sutawijaya, 2018) pertained to course quality.

Program and organizational-related satisfaction themes and factors

There were three research themes that were related to programs and organizations: learner support, program quality, delivery, and general satisfaction.

Learner support included factors such as information and service quality, and infrastructure support (Machado-da-Silva et al., 2014), instructional support, peer support, technical support (Lee et al., 2011), program support (Gyamfi & Sukseemuang, 2018), organizational support (Gazza & Matthias, 2016).

Program quality included factors such as program authenticity (Gyamfi & Sukseemuang, 2018) and reputation of the university in the market (Harvey et al., 2017). Delivery included factors such as environment (Guest et al., 2018), length of the course (Ferguson & DeFelice, 2010), and self-paced programs (Gyamfi & Sukseemuang, 2018).

General satisfaction

There were also a number of studies that focused on general satisfaction (Alkhalaf et al., 2013; Forteza et al., 2015; Palmer et al., 2014). Studies in this category examined overall satisfaction without any investigating specific variables or in some cases they examined too many variables without emphasizing on any particular one.

Online learner satisfaction measurements

The measurement of student satisfaction in the studies reviewed was accomplished by a variety of approaches—using (a) existing items, subscales, instruments or student course evaluations and (2) developing subscales or instruments. Forty-six studies adopted or modified existing items or instruments to measure student satisfaction with a variety of aspects including—but not limited to—collaboration (Wengrowicz et al., 2018), learning perceptions (Baker & Unni, 2018), online teamwork (He & Huang, 2017), and programs and student services (Gazza & Matthias, 2016). Other authors utilized instruments that measured overall online course satisfaction (Inan et al., 2017). Some of the instruments were translated into different languages depending on context or region. Some researchers chose to use one or a few items, whereas others used the entire instrument. The number of Likert-type items included in adopted or modified measurements ranged from one to 36; however, not all articles included the number of items.

Nineteen studies used university-based student course evaluations or opinion surveys to measure students' satisfaction in online courses (e.g., Dias & Trumpy, 2014; Shin & Cheon, 2019). Palmer et al. (2014) modified an existing student course evaluation measure. Twenty studies developed their own subscales or scales to measure student satisfaction. Some of articles did not include all items or specified the number of scale items; of those that did, the range of Likert-type items was three to 28. In some cases, however, it was unclear how the instruments were developed or validated (e.g., Forteza et al., 2015). Some studies resulted in the development and validation of named student satisfaction instruments. For example, Davis (2016) developed the Satisfaction of Online Learning (SOL) scale and Gray and DiLoreto (2016) created the Student Learning and Satisfaction in Online Learning Environments (SLS-OLE) instrument. Ten studies did not include specifics as to whether the instruments utilized were existing instruments or by whom they had been created.

Discussion

Publication patterns on online learner satisfaction

From analyzing the publication trends, the highest number of studies in this review were published in 2016 and were published in the journal *Internet and Higher Education*. Most of the studies were conducted in the discipline of education, followed by studies conducted in multiple disciplines. However, 21.4% of the studies did not report the

discipline where the study was conducted. It is important for researchers to identify the discipline in the studies in order to provide context for the reader.

Most of the studies were conducted in the United States. One of the reasons for this result could be that the databases included in the search were accessed through a U.S.-based university, and the language used in the analysis was English. In this review, studies examined satisfaction of undergraduate or graduate students, whereas some studies included participants from both levels. This shows that online learning has been implanted at both—undergraduate and graduate—levels in different countries.

On analyzing research methodology components, it was found that the majority of the studies in this review were quantitative. Therefore, online learner satisfaction has been studied mostly through a quantitative lens and not through a qualitative lens. Only one study used qualitative research methods though 10 studies used mixed-methods. This fact points towards the need for more qualitative and mixed-method studies. Additionally, most researchers utilized survey instruments for the collection of data. The use of other data collection instruments and data collection methods to collect qualitative data is encouraged in future studies.

Satisfaction themes and factors

Most of the satisfaction factors examined pertained to learner characteristics, engagement, and course delivery themes. These themes are critical to online learner satisfaction. While these are considered important in the literature, there is a need for studies that investigate themes that have been studied to a lesser degree such as program quality, assessment, and learner support or areas that are not frequently studied. Only four studies each had studied learner support, assessment, and learning strategies, whereas three studies had examined program quality. These are all important aspects of online learning; hence, other researchers should consider studying them further and their impact on learner satisfaction. It is also important for the researchers to start focusing on specific factors that impact satisfaction instead of studying general satisfaction.

Instruments used to measure online student satisfaction

Not surprisingly, many researchers (46.9%) adopted or modified existing instrument to measure online student satisfaction. Those measurements included a wide range of number of items. Some studies (19.4%) utilized course evaluations or opinion surveys administered to students at the researchers' institutions. A large number of studies (20.4%) integrated measures developed by the researchers who conducted the studies. However, some information was lacking regarding the psychometric properties of those instruments. Some only reported reliability, whereas others failed to report reliability and validity. In order to be transparent and allow other researchers to replicate studies, authors are encouraged to include all pertinent information. As mentioned previously, many of the instruments measured a variety of aspects pertaining to the students' online learning experiences, very few measured student satisfaction holistically.

Comparison of online learner satisfaction themes with prior systematic reviews

Prior Systematic Reviews were presented in the literature review. The majority of studies reviewed by Perfetto (2019) focused on the relationship of online course

design and outcomes such as student success or satisfaction in hybrid and online RN to BSN courses. Almost half of the articles included in our review focused on aspects of course design. An extensive amount of literature exists on quality online course design; however, instructional design pertaining to learner satisfaction for elements such as cultural aspects, holistic approaches, interventions, and micro-learning have not been explored sufficiently. Another theme or factor that materialized in both reviews was learner characteristics and community. Several studies have addressed learner characteristics in connection with learner satisfaction and success or outcomes because it is important to support diverse learners with different needs properly. A substantial number of researchers have investigated online course community, yet only a few studies have focused on learner satisfaction in regard to building and sustaining communities at the program or institutional level.

Al-Samarraie et al. (2018) investigated satisfaction through the lens of users' continued use of e-learning systems. Most variables pertaining to satisfaction in this review were technology-based due to the nature of the study's purpose. The following factors examined overlapped with factors we found: information quality (e.g., course material quality), system quality (e.g., technology quality), ease of use, usefulness, and student attitude. Other factors that Al-Samarraie et al. included were confirmation, attainment value, intrinsic value, task-technology fit, and social influence.

A review of comparison studies (traditional versus online or alternative delivery methods) with a focus on effectiveness of eLearning included 59 studies (George et al., 2014). Student satisfaction was measured and compared between the different modes of delivery in 29 articles. George et al. concluded that online learning is as effective as traditional learning. Higher education student satisfaction in online learning compared to traditional learning was found in only one study. Students in blended courses had higher levels of satisfaction compared to students in traditional courses in three of the included studies. Several articles in our systematic review were also comparison studies, particularly older articles. However, media comparison studies focused on the effectiveness of a variety of learning environments have often yielded non-significant differences. In the majority of studies that can be found in the No Significant Difference database (National Research Center for Distance Education and Technological Advancements, 2019), Nguyen (2015) found that distance or online learning "is at least as effective, if not better, than traditional education" (p. 315). More recently Martin et al. (2022) conducted a second-order meta-analysis to confirm a statistically significant overall average effect size of distance learning impacting cognitive, affective and behavioral outcomes in comparison to face-to-face learning. Therefore, researchers should move beyond conducting comparison studies when investigating learner satisfaction in online learning environments.

Limitations

There are some methodological limitations to this systematic review. First, only eight databases were used in this review. Undoubtedly, other relevant articles exist that were not included in this review. Second, the number of search terms was limited to words such as satisfaction, student or learner, online or virtual, or elearning. If authors used different terms or combination of terms, most likely, the article was

not included in this review. Third, the review only included articles written in English. Research articles that report findings from online student satisfaction studies in other languages were not included in this review. Last, up to three research themes were coded in this systematic review. Some of the included articles investigated a plentitude of themes.

Implications and future directions

One of the strengths of this review is the development of the online learner satisfaction framework. This framework succinctly summarizes what has been learned from this review and identified important aspects for online learner satisfaction in the last decade. This multidimensional framework of online learner satisfaction assists instructors, instructional designers, and administrators to focus on four aspects of online learner satisfaction: learner, course, instructor, program, and organization. For example, the research themes such as learner characteristics during the design of the course and learner engagement during the delivery of the course is important for online learner satisfaction. These two elements were studied the most.

This framework can be used by other researchers to build upon their research studies or practitioners to use during the design process. In addition, the students. This review also provides researchers with guidance on most studied and least studied satisfaction themes, contexts, study participants, and research methodologies. The various factors that are tabulated can be used by researchers for the development of instruments to measure online learner satisfaction. The majority of studies were quantitative and used survey-based methods. Some of the instruments were limited in scope or were dated. There is a need for a more comprehensive and updated scale to measure online learner satisfaction. Additionally, researchers may want to consider qualitative or mixed methodologies in their future study designs such as interviews and focus groups to study online learner satisfaction.

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FM initiated and managed the study, collected the data and analyzed the data. FM was also responsible for writing the Methods and Results section. DB supported on the through analysis, and writing the literature review and the discussion. Both authors read and approved the final manuscript.

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Availability of data and materials

The entire list of articles can be accessed at https://docs.google.com/document/d/1GerGFInWwCwu0VeBldz7TRrOZ2WdKn9bOv_UDTKo/edit.

Declarations

Competing interests

The authors on this manuscript do not have any financial and non-financial competing interests in the publication of this manuscript.

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