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Assessing Distance Learning: Quality, Satisfaction and Critical Success Factors as User Experience Factors

Avaliando Serviços de Ensino a Distância: Qualidade, Satisfação e Fatores Críticos de Sucesso como Dimensões de User Experience

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Abstract

Evaluations of distance education can be approached through different prisms - including the User Experience (UX) with the service. However, it is necessary to understand how to carry out evaluations within this scope. The objective of this article is to analyze processes and dimensions used in the evaluation of distance education artifacts through the constructs of Quality, Satisfaction and Critical Success Factors, and whether such results can be related to the discipline of UX and its application in the evaluation of e-learning services. The study, exploratory, quantitative-qualitative and descriptive, begins with a Systematic Mapping of Literature, and after, the results are discussed in the light of User Experience (UX). As a result, the literature on the subject is the most used source to define the dimensions of evaluation, however most studies aim to confirm whether the dimensions are adequate to empirical contexts of analysis, with e-learning geared towards higher education - the most studied object. Two major dimensions were categorized: Service (with 9 sub-dimensions) and User (with 3 sub-dimensions). It is considered that the dimensions can be related to the UX approach, being used as a starting point to structure studies aimed at the evaluation of e-learning, especially higher education. The results can collaborate for the construction of methods and tools based on UX, and that evaluate services in such context.

Keywords: Distance learning. Service design. User experience.

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Resumo

Avaliações da educação a distância podem ser abordadas por diferentes prismas - incluindo o da User Experience (UX) com o serviço. Entretanto, é necessário compreender como realizar avaliações dentro desse escopo. O objetivo deste artigo é analisar processos e dimensões utilizados na avaliação de artefatos da educação a distância (EaD) por meio dos construtos de Qualidade, Satisfação e Fatores Críticos de Sucesso, se tais resultados podem ser relacionados à disciplina da UX, e sua aplicação na avaliação de serviços de e-learning. O estudo, de cunho exploratório, quanti-qualitativo e descritivo, inicia com um Mapeamento Sistemático de Literatura (MSL) e, após os resultados, são discutidos à luz da User Experience (UX). Como resultados, a literatura sobre o tema é a fonte mais utilizada para definir as dimensões de avaliação; entretanto, a maioria dos estudos objetivam confirmar se as dimensões são adequadas a contextos empíricos de análise, sendo o e-learning voltado para o ensino superior o objeto mais estudado. Duas grandes dimensões foram categorizadas: Serviço (com 9 subdimensões) e Usuário (com 3 subdimensões). Considera-se que as dimensões podem ser relacionadas à abordagem de UX, sendo utilizadas como ponto de partida para estruturar estudos voltados à avaliação do e-learning, especialmente o superior. Os resultados podem colaborar para a construção de métodos e ferramentas baseados em UX, e que avaliem serviços em tal contexto.

Palavras-chave: *Educação a distância. Design de serviços. User experience.*

1. Introduction

In higher education, e-learning courses [1] had a 378.9% increase in enrollments from 2009 to 2019 (INEP, 2020). This data reflects the consolidation and importance of this educational service model. However, such growth also leads to greater competition among Higher Education Institutions (HEIs) that offer this modality, as well as increased dropout rates - in 2019, 59% of students dropped out of the course they started a year earlier (INEP, 2020).

Thus, the need for service ratings is essential in such a scenario and can benefit key stakeholders. (*stakeholders*[2]), both from the institutional point of view (course managers) and from the service users (students). Collecting experience data during the learner journey over time allows for quick adjustments and improvements in service design. As the class is not in person, this return is not immediately perceived and needs to be motivated, requiring a careful look so that the service, in general, meets the needs and desires of students.

1 Educational modality in which the didactic-pedagogical mediation in the teaching and learning processes occurs with the use of means and Information and Communication Technologies (ICTs), primarily using the internet, and students and education professionals develop educational activities in places and different times, with the support of qualified personnel, compatible access, monitoring and evaluation policies, among others (BRASIL, 2017).

2 Person or organization that has a legitimate interest in a project or entity. When discussing the decision-making process for institutions - including large business corporations, government agencies and not-for-profit organizations - the concept was broadened to include everyone who has an interest (or "stake") in what the entity does (MITCHELL; AGLE ; WOOD.

Such a return needs to be obtained by some parameter. The relationship between the individual and the service is mediated by different types of interaction, resulting from perception, meanings, forms of use, the act of remembering or thinking, values and functions within the context of use (KRIPPENDORFF, 2006; SCHIFFERSTEIN, HEKKERT, 2008). Several research areas are concerned with offering views to understand the user's interaction with a product or service, with different focuses and objectives. Among some possibilities, we include Usability, Human-Computer Interaction, User experience (UX), among others (SAFFER, 2007).

UX can be used during the systems development or evaluation phase in a complementary way, and its evaluation is a necessary activity in user-centered projects (TULLIS; ALBERT, 2013). User research is the way to measure UX from the process of discovering how people interpret and use products and services, through previously established indicators (GOODMAN; KUNIAVSKY, 2012), and seeks, in general, to improve under different aspects of the interaction between individual/system/context, being one of the possible approaches to evaluate online distance learning services – e-learning.

Although it is verified that the literature provides several generic tools for UX evaluation, they are too broad to be applied in the evaluation of any type of product, especially considering specific contexts (RIVERO, CONTE, 2017; VÄÄNÄNEN-VAINIO-MATTILA, SEGERSTÅHL, 2009) - such as the case of distance education services.

Evaluations focused on this scope have been adopting other criteria to obtain data on the user's perception, using, among others, constructs such as Satisfaction, Quality, Success or Critical Success Factors (CSFs). From a systematic mapping of the literature, we seek to analyze processes and dimensions used in the evaluation of distance education artifacts through the aforementioned constructs, and if such results can be related to the UX discipline, and its application in the evaluation of services of e-learning. The results can help in studies of different fields, especially those that propose to explore the domain of UX in evaluations within the context of online education services.

2. User Experience (UX)

The term "experience" has been widely discussed in several areas of knowledge, as well as in Education (PRESS; COOPER, 2009). Nielsen and Norman (2014) point out that UX can encompass all aspects of the end user's interaction with a service, and, to achieve a high quality user experience, there must be a continuous fusion of various disciplines involved in the context. Summarizing the elements found in some of the definitions of UX brought by the literature over time, it is perceived that it is holistic (it covers all aspects of the interaction), its evaluation is through user feedback[3]; applies to systems-products-services (various interactive systems), encompasses emotions (it is subjective: cognitive, emotional aspects and perceptions), is influenced by the triad user/system/context and encompasses the temporal context (before, during and after the use).

UX evaluation is an important process that allows discovering how people use and interpret artifacts such as products and services, enabling their improvement in an interactive way (GOODMAN; KUNIAVSKY, 2012). This assessment can be performed using numerous techniques, and the dimensions or assessment factors must be previously aligned and in accordance with the objective of the artifact. The definition of these dimensions is a process that can be based on several methods, such as exploring the literature, consulting professionals in the scope of evaluation, user surveys, empirical tests, among others.

3 Any information that the user provides regarding the company / products / services that helps to measure in some way the level of what they like or dislike (GOKCE, 2022).

3. Satisfaction

Satisfaction refers to "positive attitudes and absence of discomfort regarding the use of the product" (ISONORM, 2018). It is one of the usability dimensions, and can be seen as a UX requirement, considering usability as an integrated concept. User satisfaction is essential for the success of any service, including online education (WENGROWICZ, et al., 2018). In this context, it is a factor that refers to a range of feelings about a student's achievements and learning experiences (BRADFORD, 2011), and is also defined as a student's overall positive evaluation of their learning experience (RABIN; KALMAN ; KALZ, 2019). It thus plays an important role for the effectiveness of learning, as it is able to increase the synergy between users and the acceptance of technologies involved in e-learning (NAVIMIPOUR; ZAREIE, 2015). The individual impact felt by students is positively influenced by their satisfaction (APARICIO; BACAO; OLIVEIRA, 2016), having a strong correlation with learning and retention in online courses (SWART; WENGROWICZ; WUENSCH, 2015).

4. Quality

Quality is the degree and type of discrepancy between users' perceptions and expectations (PARAUSUMAN et al., 1985), or, according to ISO 9001 (ABNT, 2015), the degree to which the customer's needs and expectations were answered. Ehlers (2018) and Shraim (2020) state that there is no common understanding of the terminology or methodology of quality applied to education, as it can be seen from a variety of perspectives, such as the various stakeholders (academics, leaders, employers and society). , the methods used to measure it (commercial instruments, governmental, national and individual standards, structures that identify different quality criteria), in addition to other issues that may be linked to the curriculum, the educational project, the technological means used, the factors organizational, planning and context. This implies different definitions, such as the quality of the context, the quality of the structure, the quality of the process, the quality of the result or the quality of the personal/social impact, among others. The authors also point out that quality standards for conventional education are not identical to those of online education – in the case of the latter, the development must take into account different perspectives and meanings.

5. Success and Critical Success Factors

Success and Critical Success Factors (CSF) are defined as the resources necessary for an initiative to be sustained in the long term, allowing the identification of important management elements and the sharing of successful practices (REMATAL; BEHAR; MAÇADA, 2009). The CSF theory derives from the organizational strategy literature, and its application is essential for achieving the objectives that contribute to the success of an organization, provided that the indicators for control are correctly identified. Applied to the context of distance education, Cheawjindakarn, Suwannatthachote and Theeraroungchaisri (2012) described CSF as "the areas that must be critically addressed by institutions that need success", that is, they are the skills and resources that explain the values perceived by stakeholders of interest. Therefore, it is essential to identify, control and measure the CSF to verify the success of the whole system, in order to reach the quality standards of a sustainable e-learning service. Like quality, CSF vary according to the diverse needs and roles of stakeholders (students, administration/management, instructors, institutions, etc.).

6. Method and procedures

The study presented is exploratory and Quali-Quantitative, being divided into two stages. The first starts with a Systematic Literature Mapping (SLM), with the objective of exploring and analyzing the literature focused on the analysis of Satisfaction, Success and Quality in the area of online teaching. In the second

part, we seek to verify and discuss the data obtained and how they can be related to the UX discipline, responding to the research problems.

The Systematic Literature Mapping (SLM) makes it possible to identify, evaluate and interpret research relevant to a phenomenon of interest, being a more comprehensive type of review. Its use aimed to obtain a broader view on the "Dimensions / factors used to explore or evaluate the constructs of Satisfaction, Quality, Success / Critical Success Factors and their relationships with the UX approach in e-learning services.

According to Kitchenham and Charters (2007), the SL method is developed in the stages of a) Planning (raising the research questions and defining the review protocol); b) Conduction (select and review studies, present the results, discussions and conclusions; c) Report (write and format the final document).

To help answer the research problem, questions (to answer the relationship between the dimensions and the UX) and sub-questions (related to the origin and general aspects of the dimensions found) were elaborated, in order to structure an analysis script of the studies found (Chart 1, below).

Chart 1: Research questions and sub-questions.

Research problem: *Dimensions / factors used to explore or evaluate the constructs of Satisfaction, Quality or Success / Critical Success Factors in the scope of DE can be related to the UX approach?*
Q-1. What dimensions / factors related to the Satisfaction construct can be related to UX in e-learning? Q-1.1 What is the source of satisfaction dimensions? Q-1.2 What is the purpose of the study in relation to the dimensions of satisfaction? Q-1.3 What is the scope of the object of study analyzed by satisfaction?
Q-2. What dimensions / factors related to the Quality construct can be related to UX in e-learning? Q-2.1 What is the source of quality dimensions? Q-2.2 What is the purpose of the study in relation to the quality dimensions? Q-2.3 What is the scope of the object of study analyzed by quality?
Q-3. What dimensions / factors related to the Success or CSF construct can be related to UX in e-learning? Q-3.1 What is the source of the dimensions of Success or CSF? Q-3.2 What is the purpose of the study in relation to the dimensions of Success or CSF? Q-3.3 What is the scope of the object of study analyzed by Sucesso or CSF?

Source: Author.

As inclusion criteria, peer-reviewed studies were defined in the format of articles or proceedings, in Portuguese and English, open and free access; last 5 years, focused on evaluating or exploring the constructs of Satisfaction, Success / CSF or Quality of services of fully distance and digital formal education, considering that the constructs should be explored from the students' perspective. Studies focused on face-to-face teaching, analog distance education and studies on remote education (related to the COVID pandemic) were excluded.

The strings were (satisfaction OR success OR "critical success factors" OR quality) AND ("online teaching" OR "e-learning" OR ead OR "distance education") NOT "COVID" AND "PANDEMIA" and the English language version. The term "NOT COVID" sought to exclude research that explored the emergency remote / online teaching modality, considering that this question includes variables outside the scope of the study.

7. Results and discussion

Based on the definitions of the search strategy, a search was carried out on the platforms, which took place between June and July 2021 in the Scopus, Web of Science, Scielo, Eric and ScienceDirect databases (Chart 2, in the sequence).

Chart 2: Search results.

Data base	String	Results	Filter 1	Filter 2
Web of Science4	(satisfaction OR sucess OR "critical success factors" OR quality) AND ("on-line learning" OR "e-learning" OR "distance education") NOT COVID	1471	42	25
Scielo5	(satisfaction OR sucess OR "critical success factors" OR quality) AND ("on-line learning" OR "e-learning" OR "distance education")	259	1	1
Science Direct6	(satisfaction OR sucess OR "critical success factors" OR quality) AND ("on-line learning" OR "e-learning" OR "distance education") NOT COVID	1059	5	5
ERIC	(satisfaction OR sucess OR "critical success factors" OR quality) AND ("on-line learning" OR "e-learning" OR "distance education") NOT COVID	478	21	14
Total		3267	69	45

Source: Author

The selection of publications of interest was based on titles and keywords (filter 1); reading of the abstracts, moving on to the analysis of the main text (full-screening technique) (filter 2), discarding those in disagreement with the adopted criteria.

After filtering, they were exported to the Mendeley Desktop reference manager for better categorization and exclusion of possible duplicates, creating a spreadsheet for data extraction, containing coding, article name, year, authors, evaluated concept and described dimensions.

At the end of the process, 45 articles were selected, 21 (46.6%) referring to the Quality analysis, 12 (26.6%) to the Success / CSF factor and 12 (26.6%) to Satisfaction.

7.1. Origin and general aspects of the dimensions found

From the analysis of the studies, categorizations were defined to answer the research sub-questions (according to Chart 3, in the sequence)

Chart 3: Categorization defined according to the research questions.

Q-1.1, Q-2.1 and Q-3.1
Users: When the study sought to raise the dimensions using e-learning users. They were usually exploratory studies, using methods such as questionnaires or interviews, in order to obtain insights about the dimensions, focusing on empirical analysis or future analysis of a given object. Thus, some had as final objective to validate the dimensions found as representative of the concept, and others, in a second phase, sought to carry out the evaluation of the concept in an applied way.
Experts: When the dimensions used in the study came from experts in the field, using content validation techniques or judgment for final definition.
Literature: When the dimensions of the study were raised from the literature related to the concept in question. The literature, in this case, was specific to the e-learning area or adapted from other areas.

4 No results in Portuguese.

5 No results in Portuguese.

6 Advanced search: Strings in abstract.

Q-1.2, SQ-2.2 e Q-3.2
Explore the dimensions of the construct: When the study sought to explore the dimensions, with the aim of bringing new contributions to the literature of the concept. Generally related to bringing new approaches focused on the evaluation of specific objects within e-learning.
Confirm the dimensions of the construct: When the study already started with a list of dimensions (derived from the opinion of specialists or the literature), seeking to confirm the validity of the dimensions chosen for the evaluation of the construct in question. This category also included studies whose objective was the validation of evaluation tools and models based on one of the constructs.
Evaluate the construct: When the study already started from a consolidated theoretical basis, with the main objective being to empirically evaluate artifacts within the e-learning theme through one of the constructs.
Q-1.3, Q-2.3 e Q-3.3
Artifact / object of study: Distance education institution (focus on the institution); online higher education (single subjects, undergraduate and graduate courses); m-learning systems, motivation of trainees in technical courses; e-learning (generic, not focused on the type of course); open education (MOOCs); e-learning (business, focused on training); e-learning systems (platforms – technological focus) and e-learning service in the cloud.

Source: Authors.

From the sample of studies addressing Quality (22), literature was the most used source of dimensions (59.1%; 13 studies), followed by experts (27.3%, 6 studies) and users (13.6%, 3 studies).

Regarding the relationship between the use of dimensions and the general objective of studies based on Quality, the majority sought to confirm the Quality dimensions (50%; 11 studies), followed by those that sought to assess the Quality of a given object (36.4%, 8 studies) and explore/define Quality dimensions (13.6%, 3 studies).

The object of study explored had great variability, with online higher education being the most focused item (47.6, 10 studies), followed by Open education (14.2%, 3 studies) and learning management systems (9.5% each, 2 studies). With a single frequency (4.7% each), studies appear that focus on evaluating the concept of Quality in a distance education institution, m-learning system, motivation of interns in professional training in e-learning, generic e-learning, e-learning in the context of business training and cloud e-learning service.

From the sample of studies addressing Satisfaction (11 studies), literature was also the most used source of dimensions (63.6%, 7 studies), followed by specialists (36.4%, 4 studies). There were no studies using users to raise the dimensions of the construct.

Regarding the relationship between the use of dimensions and the general objective of the studies, most sought to evaluate the construct (63.6%, 7 studies), followed by those who sought to confirm the Satisfaction dimensions (27.2%, 3 studies). Only 1 (10.2%) aimed to explore / define dimensions to measure Satisfaction.

Online higher education was the most focused object (50%, 6 studies), followed by open education - MOOCs (25%, 3 studies) and 1 study addressing e-learning in a generic way.

From the sample of studies addressing Success or Critical Success Factors (12), literature was again the most used source of dimensions (75%, 9 studies), followed by users (16.6%, 2 studies). Only 1 study sought specialists as a source of dimensions.

Regarding the relationship between the use of dimensions and the general objective of the studies, 8 (66.6%) sought to confirm the dimensions of the construct and 4 (33.3%) sought to evaluate some artifact through the concept.

Online higher education was the most focused object (50%, 6 studies). With a single frequency and representing 8.3% of the sample each, generic e-learning, learning management system and open education emerged as research objects. (MOOCs[7]).

Analyzing data on methods and origin of studies, it is clear that the Quality factor seems to have attracted more scientific attention in recent years. This issue can be attributed to several factors, such as gaps in the literature within the context of distance education, in addition to Quality assessment being a clearer and more popular concept as an assessment approach, being an attribute already consolidated in the services marketing literature, therefore attracting greater interest. Quality seems to encompass a wide range of points of view (from the point of view of the student, teacher / tutor or manager), in addition to being an evaluation attribute most used to manage results by both governments and institutions.

Considering the sample as a whole, confirming the dimensions to assess the concepts was the main topic of 44.4% of the studies, showing that there are gaps or doubts about which dimensions can be used, especially when it comes to specific objects within the e-mail. learning. Empirical studies (33.3%) went directly to the evaluation of some object using already available theoretical bases.

Most studies (62.2%) were based on the literature to raise the dimensions of Quality, Satisfaction or CSF. This fact demonstrates the existence of literature related to the concepts and the possibility of their direct application in evaluations within the theme of distance education. In most cases, studies using specialists as a source (24%) were linked to the survey / analysis of dimensions aimed at building or validating new tools, or evaluating specific objects within the universe of e-learning.

E-learning applied in the context of higher education was the object of study in 48.8% of the studies in the sample, which is related to the importance that this teaching modality has gained in recent years, thanks to its exponential growth, especially in recent years. years. This is also an indication of the existence of more abundant literature on the subject, which enables empirical studies in a more practical way. Soon after, MOOCs appear, being the object of 15.5% of the studies, an interest that is also in line with its consolidation as a teaching modality.

7.1. Relationship between dimensions found

To relate the dimensions of Quality, CSF and Satisfaction and UX in e-learning, for questions SQ1, SQ2 and SQ3, a tabulation of the dimensions found was first performed, an equalization of similar items and finally the quantification and analysis. From this stage it was possible to verify that many were equivalent, even considering their use to evaluate different artifacts. The dimensions were listed and characterized, and finally a grouping was performed that resulted in 10 service dimensions and 3 user dimensions. The service dimensions group questions related to Quality, Satisfaction or CSF of the external variables / characteristics of the service, as shown in Chart 4 below.

7 Online courses, totally free, which aim at large-scale participation through the Internet. The main idea is to try to maintain the same quality as a higher level face-to-face course, but using the Internet to reach such a large number of people that the cost per student becomes negligible (RABIN, KALMAN e KALZ, 2019).

Chart 4: Service dimensions.

Dimension	Associated factors
Tutoring: Related to the personal characteristics of the teaching staff / tutors.	Experience; Quality; Training; Teaching Strategies / Methods; Materials; Resources; Skills; Student support; Empathy; Instructor delivery; effective communication.
Pedagogy: Related to the teaching and learning process.	Pedagogical approach; Goals; Ratings and feedback; Learning; Activity management; Didactic/Pedagogical Environment and Organization; Diversity in assessments.
Instructional design: Related to the course teaching project.	Instructional design and delivery; Planning, Structure and Organization of the course; Appropriate course design; Course flexibility.
Service: Related to the administrative support services provided by the institution, as well as its providing team.	Support services; Support / Helpdesk; Reliability; Communication conception; Student resources and services; Tangibility; Access; EaD Enrollment System; Accessibility; Help; Ethical issues; Legal issues; Administrative team: Competence; Kindness and promptness; Responsiveness / Availability; Commitment; Security; Empathy; fair understanding.
Interface design: Related to the aesthetic characteristics of VLE screens.	Attractiveness, Visual resources, Interface design, Page layout, User-friendly; Appropriate; Color; Multimedia elements; Text; Browser compatibility; lean interface.
Functionality: Related to the characteristics of the VLE, technological approach	Reliability; Ease of use; Actual use of the system; Creativity; Technical conception, Accessibility (fast loading, downloading files, uploading files, accessibility to wifi /3g/4g); Accessibility (Assistive); Aesthetics; Functions; System feedback; Availability; Performance and capacity; Security and privacy; Support; Navigability; Maintenance; Usability; Interactive features; Sympathy; Increased effectiveness; Productivity; Expectation of effort; Ease of interaction; Compatible devices; Customization / adaptation; Learning.
Content: Related to the curriculum didactic content	Content quality; Learning Resources; Timely; Relevance; Present; Multilingual, Variety of presentation; Accuracy; Reliability; Design; Concept; Delivery; Media and Interaction Design; Content design; Completeness; Availability; Usability; comprehensibility.
Institution: Related to e-learning provider management issues	Organizational Concept (institutional policy, institutional context, response and institutional help); Quality of the educational system; Top-level management support; Installations; Program management; Infrastructure Readiness; Financial Readiness.
Institutional communication: Related to issues of communication and image of the e-learning provider	Web site; Organization (Table of Contents, Navigation, Consistency, Links, Logo, Domain); Institutional image; Reputation of the Course and the Institution.

Source: Authors

The user dimensions, on the other hand, group factors linked to the user's internal variables, resulting from the process of using / interacting with e-learning, with 3 dimensions being listed, as shown in Chart 5, below.

Chart 5: User dimensions.

Dimension	Associated factors
Interaction between actors: Related to collaborative interactions between student-student, student-teacher	Interactions; Discussion with teachers; Discussion with students; Content sharing; Forum interaction.
Student Attributes: Related to the student's personal attitudes towards using e-learning	Skills; Motivation and communication; Social presence; Continuous learning intention; Participation; Access to technology, Technical skills; Attitude; Learning preferences; Behavior; Anxiety; Experience; Self-efficacy; Own effort; Commitment.
Student's personal perceptions: Related to student's personal perceptions	Perceived usefulness; Immediate professional utility; Future professional utility; Student satisfaction; Benefit; perceived pleasure.

Source: Authors

Within UX, the dimensions or factors allow measurements through metrics. Based on the literature that reviews dimensions and factors for UX assessment (LAW; VAN SCHAIK; ROTO, 2014), there are similarities and equivalences with the items used in studies focused on the assessment of Quality, CSF and Satisfaction.

The pragmatic and hedonic quality of the UX (HASSENZAHL, 2008) is a classification that can encompass the items listed in Tables 4 and 5. In the proposed context, the pragmatic quality is related to utility (it is centered on the service), to practical issues and the user's needs to achieve their goals (HASSENZAHL, 2008), indicating proximity to the listed dimensions. The hedonic quality, on the other hand, is related to the users' self-realization when interacting with the service, evaluating dimensions related to pleasure, expectations and needs during the experience (HASSENZAHL et al., 2015).

Another confluence of themes is the categorization within the holistic aspect of UX (attention to the entire journey of a user with the service) and temporal (experience before, during and after the interaction): Anticipated UX (Attributes of the student; Institution; Communication institutional; Service (in advance); Personal perceptions of the student); Momentary UX (Interaction between actors; Tutoring; Pedagogy; Instructional design; Service (during); Interface design; Functionality; Content; Student attributes) and Episodic UX (Personal perceptions of the student).

Considering the attributes measured by some of the dimensions, it is possible that they may be present at different time points related to the interaction with the service, depending on the objective of the experience analysis.

8. Final considerations

Distance education is an area that has gained great notoriety in recent years, both as a product and as an area of research - especially those that propose its evaluation. However, there is little literature that unites the vision of service and UX as an evaluation perspective – which also explains the absence of parameters that should be considered in this context.

Thus, this study sought to analyze processes and dimensions used in the evaluation of Quality, Satisfaction and CSF of distance education artifacts, and whether the results could be related to the UX discipline and its application in the evaluation of e-learning services.

It was possible to perceive that the application of the three constructs seems to be consolidated as an evaluative perspective of the aforementioned context. Even so, the greater predominance of studies approaching the concept of Quality seems to indicate a greater maturity of this evaluation parameter within the theme, using theoretical bases that already present models ready for measurement - generally coming from the areas of management and administration. Such predominance may be due to the fact that the concept is more popularly disseminated and used as a metric for measuring artifacts in general - it is even a parameter widely used by governments to evaluate distance education. In most cases, the literature was the source of the evaluation parameters for the 3 concepts, once again demonstrating that there is a well-founded theoretical basis to, at least, serve as a starting point for this type of analysis. The objective of confirming the dimensions shows that a large part of the studies are linked to basic research, in the sense of adapting the theoretical basis to the e-learning context or setting guidelines for the validation of theoretical models and tools for analysis/evaluation. A smaller part were empirical studies, whose objective was to evaluate some artifact in the context of e-learning, again being an indication that the literature on evaluation of concepts is mature. The predominance of focus on online higher education and MOOCs accompanies the popularization of the modalities, which, due to their great expansion, have attracted greater interest from researchers.

Regarding the dimensions, through the two proposed categorizations - Service (with 9 sub-dimensions) and User (with 3 sub-dimensions), it is clear that they can be the basis for building the UX objectives with the e-learning service. They can be used as a starting point for defining the desired interaction, being used as variables that allow the evaluation of the experience in a more specific and systematized way. This starting point is established from the definition of which perspective the UX should be evaluated. Contextualizing it, one can start from the objective of verifying the success in all stages of interaction with the e-learning service (evaluating all dimensions) or specific aspects, such as the experience when using the VLE (Interface Design and Functionality), experience with the institution's administrative sector (Service), or even specific groupings of dimensions, among other combinations. The dimensions and their resulting associated factors have characteristics that allow them to be classified according to the pragmatic or hedonic quality of the UX. Such qualities indicate that the experience of interacting with the e-learning service has aspects represented by dimensions / subfactors that need to be treated in different ways, leaving managers, in this case, to analyze from their perspective which are the most relevant aspects for evaluation, according to the objectives proposed for the service and its strategies. It is also verified that the dimensions can be aligned with the holistic aspect of UX, since they reach aspects that start even before the student thinks about joining the service until his actual exit, thus covering the entire period of experience. This implies the possibility of a more global evaluation of the interaction, citing Institutional Communication as an example (whose sub-dimensions indicate the student's first contact with the institution, raising the question of what(s) would be the objectives with this interaction). The temporal aspect of the UX can also be verified, since the dimensions found can be organized within a chronological axis - before, during and after the service, covering a course of sequential and well-defined steps throughout the interaction with the e-learning (especially in the case of formal courses). The evaluation of the dimensions considering their importance according to the time period, in which different stages of the service occur, is also a management strategy, and must be constantly checked in search of improvements. As an example, Tutoring may require different moments of evaluation of the experience during the course, since different actors tend to act over time in this dimension, while Functionality is a dimension that makes more sense to be evaluated at the beginning of the service, where the student's learning curve with the technologies employed in the service, or when such technologies undergo changes.

Taking into account that the choice and level of detail of UX measures depend on the objectives of the parties involved in their measurement and the relative importance of each dimension and factor, it appears that the dimensions raised in the research can be directly related to the their approach, as they manage to explore the experience encompassing important aspects of the user's interaction with the service, in a holistic, temporal way, also encompassing emotions and various relationships between user/system/context.

It is considered that the proposed method for the study allowed an integrated analysis of the literature, making it possible to weave the relationships between the themes involved, in addition to the visualization of a panorama of how UX has been used in the evaluation of educational artifacts, responding clearly to the research objectives.

Thus, the results can contribute as a starting point for the application of UX as an evaluative approach to e-learning services, enabling the development of models, tools or empirical application.

As future studies, we propose the use of new databases to increase the diversity of results.

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References

ABNT. Associação Brasileira de Normas Técnicas. **NBR ISO 9001:2015**. Sistemas de gestão da qualidade: Requisitos. 2015.

APARICIO, M.; BACAO, F.; OLIVEIRA, T. Cultural impacts on e-learning systems' success Internet High. **Education**, n.31, p.58–70, 2016.

BRADFORD, G. R. A relationship study of student satisfaction with learning on-line and cognitive load: Initial results. **The Internet and Higher Education**, vol. 14, n.4, p.217–226, 2011.

BRASIL. Ministério da Educação. **O que é educação a distância?** 2016. Available at: http://portal.mec.gov.br/escola-de-gestores-da-educacao-basica/355-perguntas-frequentes-911936531/educacao-a-distancia-1651636927/12823-o-que-e-educacao-a-distancia - Access in: Sep 2022.

CHEAWJINDAKARN, B.; SUWANNATTHACHOTE, P.; THEERAROUNGCHAISRI, A. Critical success factors for on-line distance learning in higher education: a review of the literature. **Creative Education**, Vol. 3, n.8, p.61-66, 2012.

EHLERS, U. Quality in e-Learning from a Learner's Perspective. **European Journal of Open, Distance and E-Learning**, n.23, outubro 2018. Oldenburg, Germany. 2018.

GOODMAN, E.; KUNIAVSKY, M.; MOED, A. **Observing the user experience:** a practitioner's guide to user research. 2nd ed. Amsterdam: Elsevier, Morgan Kaufmann, 2012.

GOKCE, S. **Um guia para o feedback dos usuários**: como coletar e usar. 2022. Available at: https://user-guiding.com/pt-br/blog/feedback-dos-usuarios - Access in: Oct 2022.

HASSENZAHL M. *et al.* Experience-oriented and product-oriented evaluation: psychological need fulfillment, positive affect, and product perception**. International Journal of Human Computer Interaction.** 2015, v.31, n.8, p. 530–544. 2015.

HASSENZAHL, M. **User Experience (UX):** Towards an experiential perspective on product quality. 2008. Não paginado. Available at: http://www.marc-hassenzahl.de/pdfs/hassenzahl-ihm08.pdf – Access in: Apr 2021.

INEP. Instituto Nacional de Estudos e Pesquisas Anísio Teixeira. **Censo da Educação Superior 2019.** Available at: https://www.gov.br/inep/pt-br/areas-de-atuacao/pesquisas-estatisticas-e-indicadores/censo-da-educacao-superior/resultados – Access in: Feb 2021.

ISONORM. International Organization for Standardization. **Ergonomics of human-system interaction**. Part 11: Usability: Definitions and concepts. 2018. Available at: https://www.iso.org/obp/ui/#iso:std:iso:9241:-11:ed-2:v1:en – Access in: Jul 2021.

KITCHENHAM, B.; CHARTERS, S. Guidelines for performing systematic literature reviews in software engineering. **Technical Report EBSE 2007-001**, Keele University and Durham University Joint Report, 2007.

KRIPPENDORFF, K. **The semantic turn:** a new foundation for design. Boca Raton: Taylor&Francis, 2006.

NAVIMIPOUR, N. J.; ZAREIE, B. A model for assessing the impact of e-learning systems on employees' satisfaction. **Computer Human Behavior,** n.53, p. 475-485, 2015.

NIELSEN, J.; NORMAN, D. **The Definition of User Experience.** In: Nielsen Norman Group. Evidence-Based User Experience Research, Training, and Consulting. [site]. Fremont, CA, 2014. Available at: https://www.nngroup.com/articles/definition-user-experience – Access in: Jan 2021.

PARASURAMAN, A. *et al.* A Conceptual Model of Service Quality and Its Implications for Future Research. **Journal of Marketing**, n.49, p. 41-50. 1985.

PRESS, M.; COOPER, R. **El diseño como experiência:** el papel del diseño y los diseñadores en el siglo XXI. Barcelona: Gustavo Gili, 2009.

RABIN, E.; KALMAN, Y.; KALZ, M. An empirical investigation of the antecedents of learner-centered outcome measures in MOOCs. **International Journal of Educational Technology in Higher Education.** 2019.

REMATAL, D. R. C.; BEHAR, P. A.; MAÇADA, A. C. G. Elementos de gestão para educação a distância: um estudo a partir dos fatores críticos de sucesso e da visão baseada em recursos. **Revista Renote - Novas tecnologias na educação.** Rio Grande do Sul, v. 7, n. 1, julho, 2009. Available at: http://seer.ufrgs.br/renote/article/view/13974 – Access in: Jul 2021.

RIVERO, L.; CONTE, T. **A systematic mapping study on research contributions on UX evaluation technologies**. In.: Proceedings of the 16th Brazilian Symposium on Human Factors in Computing Systems (IHC 2017), Joinville, Brazil. 2017.

SAFFER, D. **Designing for interaction:** creating smart application and clever devices. Berkeley: New Riders, 2007.

SCHIFFERSTEIN, H.; HEKKERT, P. **Product Experience.** London: Elsevier, 2008.

SHRAIM, K. Y. Quality Standards in On-line Education: The ISO/IEC 40180 Framework. **iJET**, vol. 15, n.19, 2020.

SWART, W.; WENGROWICZ, N.; WUENSCH, K. Using transactional distances to explore student satisfaction with group collaboration in the flipped classroom. **International Journal of Information and Operations Management Education**, vol.6, n.1, p. 24-48, 2015.

TULLIS T.; ALBERT B. **Measuring the User Experience.** Amsterdam: Morgan Kauffman, 2013.

VÄÄNÄNEN-VAINIO-MATTILA, K.; SEGERSTÅHL, K. **A Tool for Evaluating Service User eXperience (ServUX):** Development of a Modular Questionnaire. In.: Interact 2009 conference, User Experience Evaluation Methods in Product Development (UXEM'09), 2009. **Proceedings.** Workshop in Interact'09 conference, Uppsala, Sweden, 2009.

WENGROWICZ, N. *et al.* Students' Collaborative Learning Attitudes and Their Satisfaction with On-line Collaborative Case-Based Courses. **American Journal of Distance Education,** p. 283-300. 2018.

WOOD, D. J. *et al.* **Stakeholder Identification and Salience After 20 Years:** Progress, Problems, and Prospects. *Business & Society*, *60*(1), 196–245. 2021.