

PAPER

Mediation Models for Online Learning and Perspectives for Open Innovation: Systematic Review of the Literature

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ABSTRACT

With the advent of information and communication technologies, the implementation of online learning has been accelerated. In addition, the impact of the COVID-19 pandemic has led to the incorporation of an online model in all institutions. The objective of this study is to conduct a review on mediation models in online environments and examine the publications from 2015 to 2021, encompassing 61 articles resulting from the integration of the terms “model,” “mediation,” and “online learning.” The methodology employed corresponds to a systematic literature review, using content analysis as the technique and applying filtering criteria of inclusion, exclusion, and quality to extract the most important data. Four research questions were formulated, aiming to uncover insights within the mediation models. The findings reveal information regarding (1) the prevalence of studies related to satisfaction, collaboration, and self-regulation; (2) theoretical and conceptual trends; (3) the purposes of the studies associated with pedagogical, technological, affective, and cognitive factors; and (4) the identified findings and types of innovation. This article contributes value to existing studies by determining the factors that a mediation model should consider when an online program emerges, thus serving as a reference for professionals, researchers, and those interested in the subject. Limitations arise from the selected databases and applied criteria, while implications pertain to the pedagogical, technological, and affective fields.

KEYWORDS

model, mediation, online learning, systematic literature review, educational innovation, higher education

1 INTRODUCTION

Virtual or online training has been gaining ground in recent years, especially as a result of the emergence of new technologies. This learning system is conceived as a tool that allows the teaching-learning process to be carried out; its characteristic is to be innovative, flexible, and student-centered, and it is developed synchronously or asynchronously thanks to the use of various devices [1]. It is also conceived as

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a teaching method whose characteristic is the physical separation between student and teacher, based on the premise that education is possible without face-to-face interaction [2]. Online learning involves three aspects to answer: in terms of the material, the means or devices used and the objective it pursues in increasing the student's knowledge [3]. [4] points out that in the face of resistance, distance and digital education are gaining an advantage and points out some characteristics of these advances, such as openness, flexibility, inclusion, democratization, motivation, interaction, and socialization. It should be noted that technological developments in recent years, such as 5G technology, information technology, and artificial intelligence, will revolutionize education, generating development [5]. The contribution that has been made by online education in recent years is extensive, especially the research that is aimed at demonstrating the validity of this modality, as well as detailing the quality criteria in terms of techniques, strategies, and resources that must be addressed to ensure effective education.

Within the quality referred to in online training, it is essential to study mediation, considering that the mediating act enables the training process to be effective. Mediation conceived from interaction thanks to technologies is considered a key element to understand learning processes [6]. It is worth highlighting the importance of mediation from a pedagogical perspective, since technology by itself does not generate knowledge, hence there is an interesting synergy between mediation and ICT for a significant learning experience [7]. We know that mediation is essential in the educational process, however, it is interesting to link it to a model to determine which elements are present in the mediation models. In this consideration and from its basic conception, model is an archetype or reference point to imitate or reproduce according to the [8]. According to [9] the model is what all reality tends to be what it is. A little more focused on the educational context, an educational model is specified from the pedagogical point of view, with its paradigms, values, vision, mission, philosophy and more [10]. From whichever angle you look at it, a model is conceived as the representation of something that constitutes a reference or starting point for the realization or realization of that something.

Having a mediation model is crucial because it serves as a guide for designing an educational program, considering the elements that should be observed. It is particularly valuable to have a reference for action. The purpose of the sustainable development goals (SDGs), specifically Goal 4, is to “ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.” In this context, educational practitioners are responsible for upholding this principle, which entails the commitment to provide quality and nurturing education to students, ensuring their formation and the acquisition of competencies through an appropriate educational process. Mediation, along with elements supported by the model, should respond to these challenges [11]. In Latin America, “young people should have the opportunity to engage in informal education activities with extensive technology inclusion to reduce access inequalities.” This depends on having a quality education [12], which can be achieved by implementing proposals that address the significant challenges beyond technology alone. It is crucial to consider quality from the integration of pedagogy and technology, supported by mediation models that guarantee improvement.

This study aims to discover the elements addressed by publications related to mediation models in online learning, to show which strategies, resources, techniques, and factors are characteristic of them and which in turn serve as a reference for developing this type of training. We analyzed publications between 2015 and 2021 on mediation models in online learning. In addition, we identified literature reviews in the Scopus and Web of Science (WoS) databases that address the

search terms of this writing and: Trends in educational research about e-Learning: A systematic literature review (2009–2018), [13] and challenges and possibilities of ICT-mediated assessment in virtual teaching and learning processes [14]. The Scopus database also contains the review Online learning: “In between” University studies and professional work [15], and from the base of WoS, additional information was identified: On the Use of Soft Computing Methods in Educational Data Mining and Learning Analytics Research: a Review of Years 2010–2018 [16]. Although these works integrate the consultation criteria, none of them focuses on a mediation model. The present systematic review of the literature will help the academic community, teachers, administrators, decision makers, and the general public to have a conceptual framework of the elements inherent in a mediation model.

2 LITERATURE REVIEW

Online education is gaining ground, not only in formal and higher education but also in informal learning processes or continuous training such as courses, seminars, and well-known massive open online courses (MOOCs), which are the result of the integration and evolution of information technology and education [17]. The need to examine and further strengthen the online educational process became evident with the pandemic, when a transition in education occurred and online tools became the solution for student continuity [18]. There was an imperative to substantially enhance the adoption of e-learning, particularly through online platforms and video conferencing tools as an educational response [19]. In a study conducted by [20], the theory of digital activism was shown to reinforce the support for the adoption and learning of technologies, tools, and electronic networks during the pandemic. Moreover, it has become essential to provide teachers with training to embrace the 21st-century changes and adapt to their new role in the global transformation [21]. Considering these elements, it is necessary to enhance processes for an education system that addresses changes and needs. Additionally, it is crucial to carefully assess how online offerings are being conducted and whether mediation is considered in a model that incorporates fundamental elements in its design.

2.1 Mediation models

We have thus far referred to the concept of the model from a general point of view; however, it deserves to be placed in an educational context. We will therefore focus on the pedagogical model approach. The term “model” is commonly used in educational institutions when discussing their philosophy and actions; thus, a model reflects the being, knowing, and doing of people with the intention of knowing, in addition to facilitating reflection on how teaching and learning should be made [22]. A model aims to answer questions that are inherent in the educational field such as: What do we teach? Why do we teach? How do we teach? With what resources? When and how do we evaluate? A model is also a theoretical construction that can describe a reality, in addition a model is subject to change and transformation but without losing its essence, which is the study of a reality [23]. In short, a model is the sum of factors or elements that make education act possible.

There are more elements that allow us to decipher not only what a pedagogical model is but also which ones have been observed throughout history. According to [24], “the pedagogical model is constituted by concepts, practices, intentions,

and school knowledge that, commonly, are explicit through the objectives, mission, vision and profiles of the being. social and individual in formation,” [25] point out that “a model constitutes a comprehensive and integrating approach to a certain phenomenon, and from a theoretical-practical point of view, it is to offer a reference framework to understand implications, scope, limitations and paradigmatic weaknesses that exist to explain it.” This same author refers to the pedagogical models that have been developed over the years:

Traditional pedagogical model: Its characteristics include character education as well as the discipline to educate; memorization the teacher-centered curriculum, and verbal teaching methodology predominate.

Behaviorist pedagogical model: It is based on the fact that the function of the school is to transmit socially accepted knowledge.

Progressive pedagogical model: This model proposes a total transformation of the school system under the concept that the student is the center of the educational system.

Cognitive pedagogical model: The process matters more than the result of the process; it is based on indicators that attest to the structures of knowledge and the mental processes that generate them.

Critical-radical pedagogical model: It is interested in a critique of social structures and it questions the use of texts in teaching.

Increasingly, technologies are incorporated into educational work. Models in which ICTs are used have implications for the curricular sphere, since there is an integration between technology and curriculum [26]. It is important that when talking about mediated education, basic elements such as content, learning processes, evaluation, roles, and communication are kept in mind. It is also important to highlight that a mediation model is envisioned by some dimensions in the institutional, pedagogical, communicative, and technological order [27], [28]. It is important to note that when approaching a model, there are factors that are inherent to it and that have to be explored to determine what they involve in each case of educational practice.

In the literature that deals with mediation models in recent years, some emerging models are studied, and it is necessary to explore them in order to determine what their characteristics are and their contribution specifically to the educational field.

Technology acceptance model (TAM). Developed by Davis in 1986, it is a model that arose in response to the use of technologies by users, and according to [29] it is perceived as a model that stands out in technological acceptance, as its constituent elements exert influence on users when utilizing a technology. Regarding the use of technology, Davis noted that it depends on the mediation of the perception of ease of use and the perception of usefulness as variables that influence attitude [30]. Perceived utility is defined as the level of belief that a person has that using the technology will improve their performance, and the of perceived ease of use, it is conceived. It is the measure of saved effort that a person thinks the use of the technology will bring [31]. Technology adoption models can be an excellent option for the study of technology acceptance, with the TAM model being the most popular [32]. This model is a reference when it comes to studying mediation.

Stimulus-organism-response (SOR) model. The SOR model is structured with three components—stimulus, organism and response—which decide the behavioral result of an event [33–34]. According to [35], regarding mediated stimulus, behaviorists consider only a stimulus-response model, while neobehaviorists argue for an

SOR model because it also involves the ability to react (respond), which determinism does not consider. The SOR model is used in various fields, such as health care, business, and education.

Although there are a series of models that have witnessed various experiences in education, it is important that whichever one is chosen, the model must be inclusive, flexible, and innovative.

2.2 Elements that converge in an online mediation model

For learning to be meaningful, it is necessary to address the training process in an integral way: and model should covers all the dimensions of an educational practice Meaningful learning arises when there is new information that can be learned significantly because it connects with existing information in the cognitive structure, in such a way that new ideas, concepts, and propositions are linked to existing information [36]. For his part, [37] when referring to the conditions for meaningful learning, [37] points out that there are two conditions to be taken into account: the predisposition for significant learning, i.e., the attitude or intrinsic motivation to learn, and the potentially significant material, which acts as a mediator and should serve as an anchor between the new knowledge and what is already known. Within meaningful learning, it is important to include the relationship between it and learning styles, since if the teacher knows the learning styles of the students, this information will allow adjustment of methodological processes to generate significant and transcendent learning [38].

Based on the theoretical background, it is important to consider mediation model elements when designing an online training course. The attitude of the participants is one of the factors to be taken into account. If a student is not comfortable with the learning system, the possibilities of continuing training are minimal; therefore, the training must be planned so that the student remains motivated and can achieve optimal performance [39]. Another factor is self-regulation, which refers to self-generated thoughts, feelings, and actions that are planned and adapted cyclically to achieve the proposed goals [40]. Self-regulation applied to an online process considers how students plan, monitor, and evaluate their learning in an online context [41]. [42] defines self-regulated learning as the process in which students adopt behaviors aimed at fulfilling the learning process and notes that in this type of learning, another crucial factor is the students' responsiveness and reflection that aids them in identifying ways to enhance their learning [43]. While there are many elements to analyze, from the perspective of significant learning and the factors analyzed, a valid reference and starting point of what should be conceived for a mediation model can be obtained.

3 METHODOLOGY

Systematic literature review (SLR) is the method employed for this study. According to [44], an SLR is a type of literature review that not only collects but also critically examines studies or research through a systematic process. A review is characterized by being systematic, comprehensive, explicit, and reproducible. The technique utilized is content analysis, a well-known hybrid technique that enables text analysis. Its validity should be assessed in light of the research purpose [45]. The SLR

method employed is suitable for this study since the objective is to determine the literature published within a specific time period on mediation models for online learning. The process involved formulating research questions; conducting a literature review by applying inclusion, exclusion, and quality criteria; and implementing an analysis protocol [46]. The SLR presents the results obtained from analyzing the selected articles for the study, focusing on the keywords used in the search. For this, the methodology recommended by [47–51] was followed. According to the review of the contribution of these authors, the process followed is presented in Figure 1.

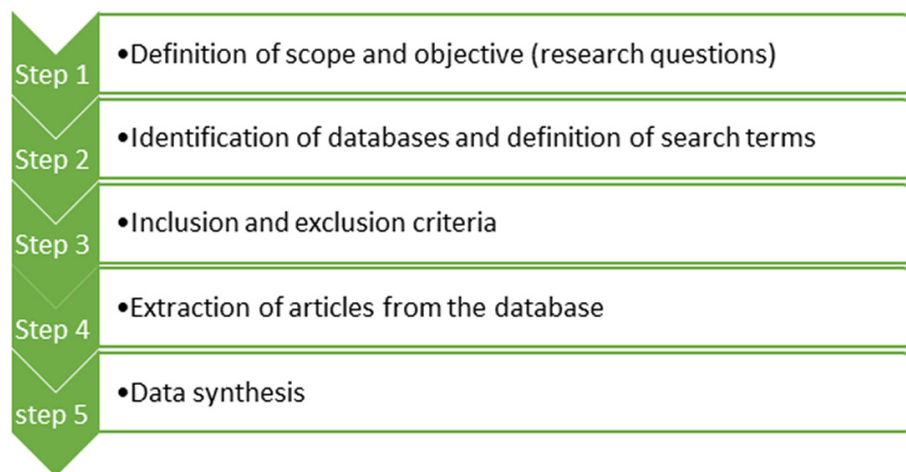


Fig. 1. The methodological process for the design of the systematic literature review

3.1 Step 1: Define the scope and objective (research questions)

Four research questions were raised to meet the interests of the research, which were answered by reading the selected publications during the 2015–2021 period. These questions arose from the interest of the researchers to detect in the field of mediation models in online learning: (1) What are the gaps in the literature? (2) What has been investigated on the subject, and (3) What contributions can be made in the future? (Table 1).

Table 1. Research topics and questions

Topics	Research Questions	Possible Answers
Trends, problems identified, knowledge in the area, innovations, recommendations, and limitations found in the studies	RQ1: What is the keyword of the reviewed articles?	Terms associated with model, mediation, online learning, and domains that motivate writing
	RQ2: What are the theoretical-conceptual trends addressed by articles on mediation models in online learning?	Theories, paradigms, models
	RQ3: What problems do the studies address, according to the purpose they pursue?	Difficulties, interests, research, in the learning process in the pedagogical, technological, or affective-emotional
	RQ4: What are the findings found in the research analyzed and what type of innovation does it contribute to the article?	Results used for decision making: New process New service New knowledge New product

3.2 Identification of databases and definition of search terms

The databases identified for the study were Scopus and WoS. Once the bases were chosen, the search string was defined based on the terms that were of interest, as follows: “model” “mediation” and “online learning.” To broaden the search for publications, additional related words were identified, including synonyms in the case of “mediation” and “online learning,” which were integrated through the use of boolean operators. Table 2 presents the search string for both databases.

Table 2. Search strings in Scopus and WoS

Scopus Search String	WoS Search String
(TITLE-ABS-KEY (model) AND TITLE-ABS-KEY (mediation) OR TITLE-ABS-KEY (“pedagogical mediation”) OR TITLE-ABS-KEY (“mediated learning”) OR TITLE-ABS-KEY (“ technological mediation”) AND TITLE-ABS-KEY (“online learning”) OR TITLE-ABS-KEY (“virtual education”) OR TITLE-ABS-KEY (“online education”) OR TITLE-ABS-KEY (“e- learning”)) AND (LIMIT-TO (PUBSTAGE , “final”)) AND (IT-TO (PUBYEAR , 2021) OR LIMIT-TO (PUBYEAR , 2020) OR LIMIT-TO (PUBYEAR , 2019) OR LIMIT-TO (PUBYEAR , 2018) OR LIMIT-TO (PUBYEAR , 2017) OR LIMIT-TO (PUBYEAR , 2016) OR LIMIT-TO (PUBYEAR , 2015)) AND (LIMIT-TO (DOCTYPE , “ ar “))	TS=(model) AND (TS=(mediation) OR TS =(“pedagogical mediation”) OR TS=(“mediated learning”) OR TS=(“technological mediation”)) AND (TS =(“online learning”) OR TS=(“virtual education”) OR TS=(“online education”) OR TS=(“e-learning”)) Refined By: Publication Years: 2021 or 2020 or 2019 or 2018 or 2017 or 2016 or 2015 Document Types: Articles

3.3 Criteria for inclusion and exclusion

Inclusion and exclusion criteria are all those elements that make it possible to better discriminate the selection of publications in order to identify only those that are relevant to our study. In this context, the first criterion was to identify the Scopus and WoS databases. Once the bases were chosen, the next step was to determine the years of search for publications, which were defined from January 2015 through December 2021. Articles published and only from journals were selected; we excluded books, conference proceedings, conferences reviews. According to [48], the inclusion and exclusion criteria were based on the research questions; therefore, there was a direct relationship between these elements.

3.4 Extraction of database articles

The number of articles located in the Scopus and WoS databases was 140. After duplicates were eliminated, which were 40, that left 100 documents. With this resulting number, it was verified that there were 2 literature reviews, 1 article that already had different data in the database, and 6 articles that could not be located. The next filter was to apply the quality criteria, which consisted of determining, through reading the title and the abstract, that although they contained the search terms, the topic of interest differed from the present investigation, or they studied areas other than education. In addition, in the process of data analysis, 9 articles were found that did not have a structure that allowed answering the research questions. The process carried out is shown in Figure 2 [52]:

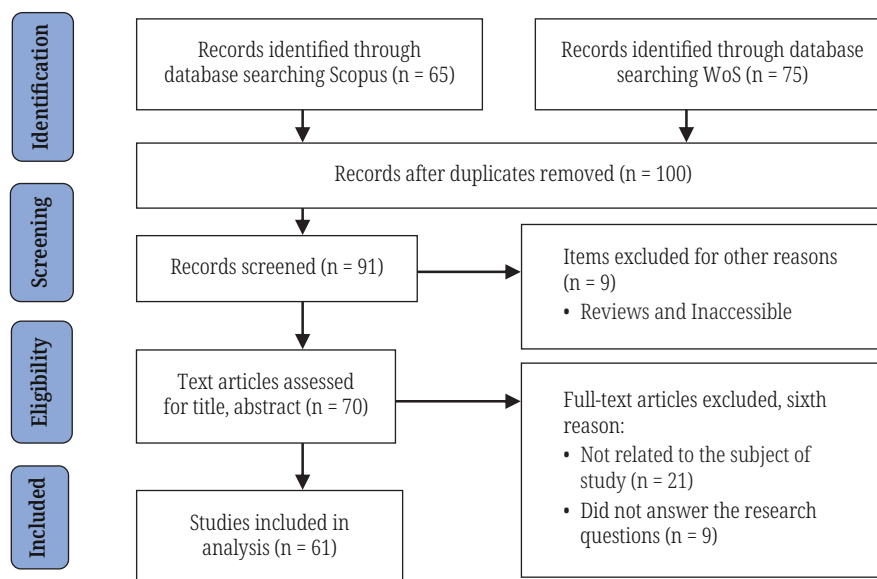


Fig. 2. Record selection procedure

3.5 Step 5: Data synthesis

The answers to the research questions were collected through the Excel program. The form with the processed information can be found at the following link: <https://doi.org/10.5281/zenodo.6993483>

4 RESULTS

This section shows the results obtained once the concerns raised were answered. The tool used for the graphs was R. An identifier was added to each article in the database and which are identified by square brackets.

4.1 RQ1: What are the keywords of the analyzed articles?

It was of interest to identify the word that has the greatest strength in the literatures, the one that stands out the most and that motivates the writing, so after reading the publications, the words with the most impact within the selected studies were determined. As can be seen in Figure 3, in this word cloud, the terms that were most identified are “COVID-19” and “satisfaction.” This is due to two fundamental reasons: (1) when generating the search query for the period 2015–2021, publications were considered that were generated precisely because of the pandemic that hit the world to a great extent during the years 2020 and 2021 and (2) by incorporating online teaching under the emergency circumstances of remote learning, the researchers chose to generate studies based on the needs, practices, tests, strengths, and weaknesses observed. Undoubtedly, the pandemic reinforced not only the necessity of utilizing technology but also the imperative to provide the conditions to sustain students’ interest and achieve the educational objectives set forth in the learning process [53].

The word “satisfaction,” which also stands out, might have done so because several publications have as their interest or goal the satisfaction of the public to which they are directed; hence, they incorporate strategies, essays, and technologies directed to investigate how to achieve student satisfaction.



Fig. 3. Words that stand out in the articles

It is important to realize that in the event of the pandemic, a niche was created to conduct studies on online training and rethink research aimed at meeting the main needs observed in the pandemic. There were several challenges to address in the technological, pedagogical, and social aspects: the technology associated with the internet connection, the lack of electronic pedagogical devices, the lack of digital skills of teachers and students with the content due to the high amount of online resources, problems with the interactivity and motivation of the students, the social and cognitive presence of the teacher, and finally, the social aspect through the lack of human interaction [54]. Although derived from pandemic research, these factors are closely linked to the interest of our study in the sense of evidencing important elements for a mediating model.

4.2 RQ2: What are the theoretical-conceptual trends addressed by articles on mediation models in online learning?

It was of interest to explore the conceptual theoretical trend in the literature. The literature review approached the knowledge of the subject and served to identify what is known and unknown about the investigated subject [55] and how the related articles could be grouped. Nineteen articles were found that, in their theoretical foundation, referred to a particular theory, although they may have also addressed other additional elements. The second grouping was of the articles that address their research from the perspective of a model, which represents something fundamental in this writing, since the research was precisely framed to explore search for mediation models. Fourteen articles were located. Finally, the third group focused on classifying those publications that had a type of learning as their center of interest. Here, 28 publications were located, as detailed in Table 3.

Table 3. Theoretical-conceptual trends in which the publications are framed

Focused on a Theory	Article
Social cognitive theory	[5], [48]
Cultural-historical activity theory	[30]
Self-determination theory	[45], [47]
Resource conservation theory	[26]
Critical didactics theory, didactic design, constructivism, and socio-cultural approach	[53]
Transactional distance theory	[12], [27], [31]
Instrumental genesis theory	[3], [4]
Motivation theory	[32]
Experiential learning theory	[13]
Regulatory approach theory and securities control	[58]
Learning style theory (Kolb)	[6]
Social exchange theory	[29]
Unified theory of acceptance and use of technology (UTAUT)	[8], [23], [37]
Approached from a Model	Article
Technology acceptance model (TAM)	[2], [11] [19], [20], [22], [24], [35] [59], [60]
Technology-mediated learning model	[36], [40], [50]
Stimulus-organism-response model (SOR)	[46], [57]
Approached from a Type of Learning	Article
Enhanced learning by surprise	[1]
Self-regulated learning	[3], [16], [18], [42], [43], [44], [52]
e-learning	[4], [10], [14], [17], [21], [25], [39], [54], [55], [56], [61]
Hypermedia learning	[7]
Collaborative learning	[9], [28], [38], [41], [51]
Peer learning	[15]
Mobile learning	[33]
Deep learning	[49]

According to the information, there is a variety of theories that are mentioned, as well as models and types of learning, and in the case of the latter, there is a close relationship between them; however, we considered those only exactly as identified in the publication.

4.3 RQ3: What problems do the studies address, according to the purpose they pursue?

In the logical sequence of the structure of an article, it was important to highlight the purpose of the research and what concerns the research addressed; in other words, what was the problem that it intended to investigate and that it also identified as the objective of the writing.

We categorized 26 articles whose purpose was to address pedagogical issues; that is, they were concerned with investigating the implementation, application, evaluation, relationship, or other elements of a pedagogical nature. In the second category, 11 articles dealt with issues related to technology and resources. Themes such as social networks, videos, YouTube, chat, forums, were grouped in this category, also from the point of view of their use and implementation. The third category corresponds to affective-emotional factors, that is, 16 publications whose interest was to deal with issues related to motivation, self-efficacy, attitude, self-regulation, satisfaction, interaction, emotions, influences on students, and more. Finally, the fourth category grouped the 8 publications that were interested in areas such as learning styles, prior knowledge, learning outcomes, and intelligence.

Table 4. Problems researched by the studies

	Related Issues	Article
1	Pedagogical factors	[1], [3], [4], [14], [15], [16], [17], [19], [21], [22], [28], [29], [32], [33], [38], [41], [43], [48], [49], [50], [53], [54], [55], [57], [58], [59]
2	Technological factors	[8], [9], [11], [18], [30], [31], [36], [42], [51], [56], [60]
3	Affective-emotional factors	[2], [5], [10], [12], [13], [20], [23], [25], [26], [27], [44], [45], [46], [47], [52], [61]
4	Cognitive factors	[6], [7], [24], [34], [35], [37], [39], [40]

As can be seen, the elements that are implicit in the detailed categories correspond to the factors that must be taken into account in the implementation of a mediation model, which is why its identification and approach are key.

4.4 RQ4: What are the findings found in the research analyzed, and what type of innovation does it contribute to the article?

It was also vital to know what the findings were as a result of the research carried out; thus, a diversity of results was identified that show the application, use, relationship, or evaluation of the object to be investigated. In order to process the information generated by the number of responses to this question, a preliminary review of the type of response was carried out, and it was concluded that the findings fit into one of four options: In the motivation and performance of students (23 publications), in the strategy or technique used (18 publications), in the consolidation or evaluation of a model or methodological process (11 publications), and in the technology and educational resources used (9 publications). In addition, these findings were linked to the type of innovation they provided according to the research carried out, which can be new knowledge, product, service, or process [56], where the “new knowledge” was in most findings.



Fig. 4. Findings found and type of innovation

These results allowed us to identify the inclination or interest of the authors; that is, where the research was focused. Within the category “In the motivation and performance of students,” there were findings that had to do with results associated with the influence of factors such as capacity, intention, satisfaction, support, influence, effects, relationships, perceptions, attitudes, commitment and more of the students (generally) about the cause or element that prompted the study. In the “strategy” or “technique used” category, the results associated with the pedagogical field were grouped, such as feedback, teamwork, social presence, game design, collaboration, skills, communication, and peer work

5 DISCUSSION

In the educational context, and especially in the online mode, it is common for research in recent years to be associated with types, styles, strategies, technologies, and learning outcomes, since they respond to the concern of investigating specific aspects that are characteristic of the online mode. Thus, in Figure 3, it is observed that the studies reviewed based on mediation models have as a point of interest topics that are on the rise and that are the product of current needs, as well as, for example, COVID-19, which was became a trend in the years 2020 and 2021. terms such as satisfaction, interaction, collaboration, self-regulation, self-efficacy, and MOOC also emerge—terms that are associated with strategies, techniques, or resources of a booming system. According to [39], educational institutions face an era of constant innovation, since the tools, teaching-learning methodologies, and virtual systems that allow students to achieve their goals are varied; thus, an area under study is the attitude that is related to motivation and satisfaction. Specifically, self-regulation is also

related to motivation itself, which focuses on socioeconomic aspects, professional improvement and development, and learning, which impacts self-regulation [41]. It is essential to approach these elements, which are important in themselves, but when dealing with online education, they acquire greater relevance.

One of the topics of special interest in this research was to know the conceptual theoretical field that serves as a reference or support for applied studies. For this, it was necessary to review the conceptual framework of the articles. In Table 3, it can be seen that there was a diversity of responses especially associated with theories and types of learning, which are mostly derived from, or even synonymous with, online learning; however, according to our point of interest, studies with the term “model” were also evidenced, highlighting the TAM model, to which the studies refer the most. Regarding these models that adopt technology, it is said that they represent an effective alternative for teachers, and in the case of the TAM model, it is a model designed to explain the process of accepting technology [32]. [31] points out that in TAM research, user acceptance is characterized by the triple combination of a positive attitude towards technology, the intention to use it, and the actual use of the system. In the case of the SOR model, although it can be applied to any training program, the results of the behavior imply internal and external processes; thus, within external processes, perception and contact stand out, and in learning online, stimuli are perceived to be from the external environment [34]. Regardless of the model used, it is important to reflect on the support that must be established for the online process, since it is the basis for the actions and strategies that must be applied.

Another of the aspects that allowed knowing the systematic review of literature was referring to the problem or purpose that motivated the investigated publications. According to Table 4, an exhaustive review of all the studies was made; however, a diverse and broad result was generated as a result of the interest of each investigation; thus, with the defined categorization, we found that a good part of the literature leaned toward investigating topics of a pedagogical nature, followed by affective, technological, and cognitive ones. This categorization responds to the criteria of the authors as well as simplifying and organizing the information. The criterion of pedagogical factors (the pedagogical dimension [27]) parts from the vision of identifying the theory for which it is inclined and refers to the teaching-learning styles that are mediated by the methodologies and contents. The technological factors are the issues derived from the platform, such as connectivity, and tools and resources (e.g., forums, chat, wikis, and questionnaires) [28]. The same authors point to a communication dimension, which includes mediation and interaction, and which according to our classification are identified within the affective-emotional category. As can be seen in our results, there are several reference points that researchers are interested in discovering and contributing to educational research.

We found that researchers interested in the fields associated with mediation and online learning learn about the practices carried out and identify the feasibility of applying them in a given context. Figure 4 shows two important findings: (1) they show motivation and performance as a primary goal, followed by the strategies and techniques used; and (2) they are categorized according to the type of innovation contributed; thus the majority of articles contribute with innovation in knowledge, followed by new products and new processes. The result associated with motivation and performance is key. The authors focus their attention on these aspects to generate a successful mediation process. A fundamental point about motivation [38] is that it is related to meaningful learning because it helps to affirm and appropriate knowledge. As a result of these findings about how the literature was focused, it

can be affirmed that they are undoubtedly part of a model that aims to include to a mediating process.

The four formulated research questions address a specific aspect that was the subject of analysis in this investigation: the research interest surrounding the presence and study of the term “COVID-19” during the investigated period. As [18] points out, following the emergence of the first case of the virus, education worldwide underwent an emergency transformation. It is evident that the studies resulting from the SLR are predominantly grounded in a theory, model, or type of learning. This finding is significant when considering the existing conceptual framework of interest in these studies. However, it is noteworthy that few cases were identified where the mediation and model were conceptualized comprehensively, representing a broader perspective on mediation as a model. Examples of such studies include [28] and [57], which contribute from an integral model perspective. A common finding in the majority of the literature is that while the mediating component was present, it was predominantly analyzed within specific educational contexts, focusing on its effects, relationships, or outcomes in a particular sector. For instance, [58] examined regulated learning as a mediator.

The contribution of this research has several aspects. First, it adds value to existing and ongoing research on the development of mediation models for online environments. It is of interest to determine the common elements found in the reviewed studies to construct a mediation model. Additionally, the authors have processed and categorized these elements into various factors, providing insight into the field’s research interests. An added value lies in the recommendations arising from the analyzed literature, which suggest the use of alternative techniques, variables, resources, strategies, and technology. They also advocate for expanding research to other contexts, cultures, regions, study modalities, and levels of investigation, as well as using different methodologies, instruments, and methodological designs. Lastly, an important observation is that the existence of similar investigations using the systematic literature review methodology was explored. Although a couple of cases were found, none directly addressed the objectives of this research. Therefore, this study’s contribution also lies in presenting an SLR that incorporates additional elements to achieve its aims.

5.1 Limitations

One of the limitations in this study may be the restriction of the databases, since there could be interesting material published in other databases besides WoS and Scopus. The selection criteria, included only articles, leaving out other types of research that are usually presented at conferences, as well as books or book chapters. Another aspect to consider is that the focus of this study was on online education; however, it could be interesting to explore relevant material pertaining to mediation models in other contexts. It is worth emphasizing that the studies encompass the literature published during the years of the pandemic’s greatest impact, which could have particularly influenced the addressed topics of interest. Finally, it is important to emphasize that the word model was the object of consultation and literature search, which could imply leaving aside other publications that respond to a good practice of mediation in online environments, where studies with other protocols were contemplated.

6 CONCLUSION

The study employed the methodology of SLR to establish the existing literature on mediation models in online learning within a specific time period. This followed a process based on the type of publication and conducting a review of 61 articles that highlight the theoretical foundations, issues, findings, and areas of interest for researchers in these subjects. The results provided insights into the most influential themes in the writings, such as satisfaction, collaboration, and self-regulation, as well as the conceptual framework and support for studies in terms of theories, models, and types of learning. The issues identified in the studies were categorized into four factors, and their respective outcomes associated with a particular type of innovation were determined.

It is evident that there are several elements that constitute a mediation model. However, the topic of mediation models in online environments has not been thoroughly explored. While valuable aspects linking to research exist, there is a lack of literature that integrates mediation in its various forms into a comprehensive virtual learning model, one that encompasses the entirety of what a training program should entail. The contribution of this study lies in the elements it provides for constructing a mediation model. Furthermore, the study indicates theoretical implications in terms of pedagogy and technology, as well as practical implications derived from the issues identified, results obtained, and their contribution to innovation.

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