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Research trends in meaningful learning in distance education environments: A review of articles published in Q1 to Q3 indexed journal from 2012 to 2022

Nita Lestari *, Murni Winarsih, Dwi Kusumawardani
Universitas Negeri Jakarta, Indonesia.
***** Corresponding Author. E-mail: NitaLestari_9902918012@mhs.unj.ac.id

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ABSTRACT

This study aims to investigate the idea that there is a functional and efficient mechanism for meaningful learning. This study is a literature review with various references to data sources. This study's essential focus is on the difficulties and possibilities of meaningful distant learning. An amount of 21 publications had released between 2012 and 2022. Use the SEforRA.com search engine to find information for research. Thematic Analysis to examine the results and show the findings. The research findings shed light on several topics related to meaningful learning, including perceptions, challenges for teachers and students on distance meaningful education, and learning practices. The findings also explain how meaningful learning is in distance learning. The Results show that meaningful learning activities incorporated into distance learning activities enable teachers and students will gain authentic and meaningful experiences that will benefit their education, such as adding teachers' insights for their future teaching practices. The outcomes of this exploratory study have several consequences for anyone involved in remote education, including administrators, teachers, instructional designers, and policymakers, who want to ensure that students have meaningful educational experiences.

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INTRODUCTION

The challenges of the times are not just present obstacles but also opportunities to innovate. The SARS-Cov2 spread has accelerated moving forward in education transformation, and traditional learning models have shifted to online and distance learning.

The governments should make decisions regarding councils regarding education. Researchers Al-Taweel et al. (2020) and Al-Hosan et al. (2020) found that educational institution stakeholders, including teachers and students, are among the most severely impacted groups. In light of this, “educational institutions are said to be conducting disruption challenges to their learning and behavioral patterns (Al-Hosan et al., 2020; Al-Taweel et al., 2020; Blankenberger & Williams, 2020; Brammer & Clark, 2020; Driessen et al., 2020; Mladenova et al., 2020; Pavlik &

Dennis, 2020; Raaper & Brown, 2020; Torda, 2020). Additional challenges include those related to technology, academics, and social support from previous students (Barton, 2020; Brammer & Clark, 2020; Driessen et al., 2020). As this learning model has spread worldwide, educational institutions have become less dependent on the traditional model, where content is passively conveyed to students present in class. On the contrary, learning delivery methods are adopted to involve students through various active learning formats, leaving behind a 'passive' learning model (Sandrone et al., 2019; Stockwell et al., 2015).

There is also a significant challenge for the curriculum in Indonesia, where ensuring everyone has equitable access to high-quality education and opportunity for lifelong learning is one of the UN's 17 global goals (Assembly, 2015). The distance learning process had several problems. One of them is the issue that some instructors feel is the disorganized graduation assessment procedure and the inefficiency of the approach adopted. A strong combination of enduring abilities, theoretical knowledge, and procedural skills are among graduates' benefits of quality education (Greiff et al., 2014). In the fourth industrial revolution era, lifelong learning is crucial for enhancing the workforce's abilities (Gleason, 2018). The Covid-19 pandemic and the implemented social segregation regulations highlight the urgent need to improve the caliber of distance education by converting instruction to immersive online learning (Schultz & DeMers, 2020). With distance learning, students need time to adapt, which also impacts student assimilation of learning (Purwanto et al., 2020, p. 5). Likewise, only a few schools made this transition smoothly. However, for some people, especially those from developing countries with insufficient infrastructure, it was challenging. (Pham & Nguyen, 2020; Simbulan, 2020).

According to the description above, the Covid-19 pandemic is a situation when a health issue, specifically the spread of the Covid-19 virus, very quickly displays a very high increase in deployment and is becoming more and more commonplace across the nation. According to the Republic of the Indonesia Ministry of Education and Culture circular letter No. 4 of 2020, the government of the Republic of Indonesia, acting through the Minister of Education and Culture, directed all academic departments to conduct online learning at their residences.

During the COVID-19 outbreak, moving the learning process from the classroom to the home will at least provide parents to return to controlling their children's education in a significantly more meaningful educational activity (Masrul et al., 2020). The previous cognitive structure's concepts will connect to new experiences as they are acquired. Parents' roles as role models in setting an example for their children to follow, allowing them to emulate the positive deeds of their parents, will help students achieve their educational objectives.

Meaningful learning, according to Ausubel (1961), formal education must incorporate this, and it is done so through engaging in ongoing critical conversation. When teaching strategies like inquiry and problem-solving are used, students gain meaningful learning constructs that enable them to recognize underlying patterns, analyze them, and connect them to new ideas (Jonassen, 2004; Mystakidis et al., 2019). Teachers are urged to consider and incorporate the following characteristics in their design for teaching and learning if they wish to give their students meaningful educational experiences: active, beneficial, deliberate, genuine, collaborative, or related (Howland et al., 2012; Mystakidis, 2019). The fundamental component of effective lesson plans for meaningful learning is integrating theory and practice through moving instances where both teachers and students are allowed to express their feelings, whether positive or negative (Kostiainen et al., 2018).

The learning process occurs when students can assimilate their knowledge with new knowledge. The learning process occurs with the stages of paying attention to the stimulus given and the concept of the meaning of the stimulus, storing and using the information they understand.

According to Ausubel (1978), students will learn well if the content of the lesson is defined and then presented properly and appropriately to students (advance organizer), thereby influencing the regulation of students' learning abilities. Advance organizer provides three benefits, namely: providing a conceptual framework for the material being studied, functioning as a bridge that connects what is being studied and what will be studied, and can help students to understand learning material more easily. Besides that, this theory also acknowledges that assimilation and accommodation processes between people and their environment result in ongoing interactions that

lead to learning. So the process of learning is given more importance in the human mind (Ausubel, 1978).

According to the summary above, it is clear that connecting new knowledge to pertinent concepts already present in students' cognitive structures during the teaching and learning process is meaningful education. Meaningful learning can occur when it is relevant to the needs of students and accompanied by a curriculum that is not stiff in terms of meaningful learning driven by students' curiosity in certain fields. In this connection, Rogers (Rogers & Freiberg, 1994) suggests that classroom climates learn independently. Learners try to find themselves without direct guidance from the teacher. In general, this learning mode is the development of receptive learning and learning with guided discovery. Based on the explanation of the definition above, it is clear that meaningful learning in question is the process of connecting new knowledge with related ideas that already exist in students' cognitive structures during the teaching and learning process.

Meaningful learning can occur when it is relevant to the needs of students and accompanied by discoveries learning takes place, namely:

1. Accept students as they are
2. Recognize and foster students through their discovery of themselves
3. Seek learning resources that students may be able to obtain to choose from and use them.
4. Use the inquiry discovery approach.
5. The importance of self-approach and letting students take responsibility for themselves to meet their learning goals.

METHOD

A Scoping Review for Mapping the Field

Search processes and research questions

The works of Jesson (2011) were referenced several times in this investigation. The search process is a search stage to find sources that match the research questions. All literature review measures used the seforra.com bibliometric management tool (Sidiq et al., 2020). During the Covid-19 epidemic, meaningful learning arose as a learning strategy in response to the need to encourage and support pupils so that they had the desire to learn. So, it is necessary to analyze whether research that proposes a meaningful learning approach can help and motivate students in distance learning. The initial research questions in this study arose from the researcher's curiosity about students' learning strategies in distance learning. These questions greatly assist this research in extracting various student strategies related to meaningful learning. These questions are:

RQ1: Can students' motivation for learning activities rise when they participate in meaningful learning through distance education? The inquiry aims to determine whether the chosen publications are consistent with the notion that a meaningful learning strategy in an online learning setting might boost student motivation.

RQ2: What are the primary objectives of developing a meaningful learning model in a distance learning environment? In particular, this research topic seeks to determine whether the study intends to motivate and aid students in their academic endeavors.

RQ3: What strategies are widely used for successful, meaningful learning in distance learning environments? This inquiry seeks to learn more about the methods and materials contributing to successful, meaningful learning. The method can involve web-based learning, e-learning, or mobile learning.

Search Strategy

According to Kitchenham (2004), choosing and adhering to a search strategy is essential while doing a systematic literature review. Defining keywords and the various combinations of those keywords is the first step. The following keywords are used: “meaningful learning,” “distance learning,” “e-learning,” and “m learning.”

Comprehensive Search

The inclusion and exclusion criteria

This stage is the stage in determining the criteria of the data found, and whether the data can be used as a data source for research. The research moves on to the following stage when the researcher reviews the introduction and takes into account the conclusion to assess the paper's applicability if they do not have enough evidence to eliminate it. See Table 1.

Table 1 Criteria for Selection

No.	Type	Description
1	Inclusion	Primary research
2	Inclusion	A study that recommends a deliberate learning approach for a distance learning environment
3	Inclusion	Research papers released between 2012 and 2022 (10 years)
4	Exclusion	Secondary research
5	Exclusion	Duplicate research
6	Exclusion	Grey literature

Quality Evaluation

The information discovered is assessed at this stage using the criteria listed below: (1) QA1: Did the journal article appear between 2012 and 2022? (2) QA2: Does the journal article describe the effective remote learning approach used? (3) QA3: Does the journal article address the rationale for implementing meaningful teaching in an online learning environment?

Depending on the questions mentioned above, each paper will receive a score. (1) Yes: for journal articles that correspond to the quality assessment's queries. (2) No: for journal articles that don't align with the quality assessment's questions.

Extraction of Data

Information gathering is required during this stage to support additional study and Analysis. The steps involved in data collection are as follows: (1) Check out SEforRA.com; (2) Enter the keywords "meaningful learning," "distance learning," "e-learning," and "m learning;" (3) Put 2012 in the first box under "custom range" and 2022 in the second box. To gather information pertinent to addressing our study questions, the authors, at this point, read the article in its entirety. All the fields from the report are displayed in Table 2.

Table 2 Data Extraction from the Fields

No.	Type	Description
1	Scimago JR Quartile	Journal rank
2	Year	Date of publication of the paper
3	Author	Writers of the article
4	Title	The paper's title
5	Country	The Initial author's home country
6	ID	An individual study identification number
7	Tools	The study's technology
8	Evaluation type	Case studies, experiments, and others
9	Academic level	Education at higher levels, secondary levels, and in primary levels
10	Main result	What is the main result of the paper?
11	Main finding	What is the main finding of the paper?
12	Impact on academic performance (RQ 1)	Evidence of an impact, whether positive or negative
13	The main objective (RQ 2)	What is the paper's main goal?
14	Learning strategy (RQ 3)	What strategy was

All search results by Scimago journal rank are in Table 3. All articles published by the country are in Table 4. Figure 1 shows how the articles were selected in three phases. In phase 1 articles needed is 2,599 from 10,000. In phase 2, there are 229 articles required. The last, There are 21 articles selected. Figure 2 shows the chosen studies' year of publication. The most appealing articles were in 2017.

Table 3. Search Results by Scimago Journal Rank

Year	Scimago Journal Rank						Number of Articles
	Q1	Q2	Q3	Q4	NQ	NI	
2012	192	45	31	16	70	300	654
2013	181	45	78	14	24	340	682
2014	225	52	44	19	11	391	742
2015	241	47	45	17	22	354	726
2016	219	54	57	11	10	396	747
2017	220	52	54	23	19	380	748
2018	203	125	57	11	18	455	869
2019	225	114	53	34	21	487	934
2020	229	133	74	36	21	663	1156
2021	300	138	89	18	10	879	1434
2022	306	129	98	27	30	718	1308
Total results							**10000**

Table 4. Articles Published by The Country

Country	Number of Articles
South Africa	3
Saudi Arabia	1
Brazil	1
China	2
Finland	1
Israel	1
Canada	1
Kansas	1
Malaysia	1
Philippines	1
Portuguese	1
New Zealand	2
Turkey	1
Taiwan	2
Texas	2
Total	**21**

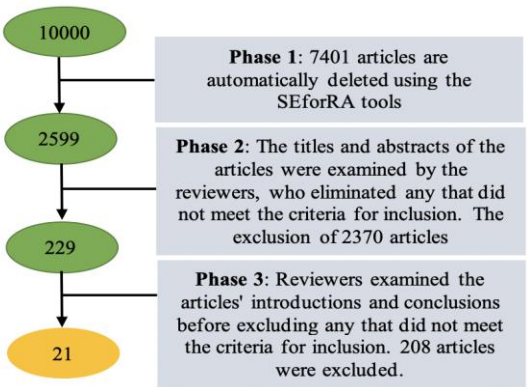

Figure 1. Article Selection Stages

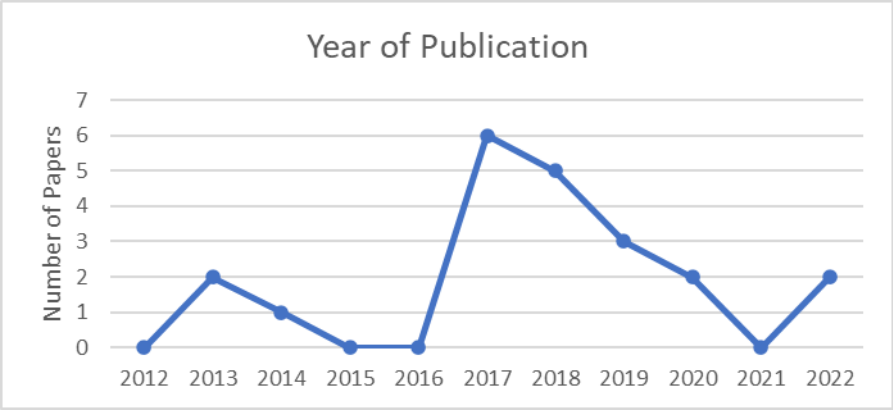

Figure 2. The Selected Studies' Year of Publication

The Synthesis

At this stage, a synthesis of the data collected in the previous phase had carried out. The results of the synthesis will answer the predetermined research questions.

Write up

This article serves as a log of all research activities, from the first stages to the final manuscriptized version of the findings that follows the guidelines.

RESULT AND DISCUSSION

Result

The results of the literature review, which was based on 21 papers that were chosen, are summarized in this stage. Table 2 displays the attributes taken from each study.

The publication year and country of issue

The year of publishing should be considered as the first characteristic. Figure 2 displays the distribution of papers by publication year. The years with the fewest publications throughout the studied period were 2012, 2015, 2016, and 2021 (n = 0), while 2017 (n = 6) had the most publications. An overall number of publications by the country is shown in Table 4, and the review also includes the article's first author's address. China, New Zealand, Taiwan, and South Africa had two publications each. South Africa had the most publications overall (n = 3)

Research subjects

To recommend meaningful distance learning in educational contexts for this study's goal, we looked at the practices and categorized them as shown in Table 5. Strategies using other technologies are the most widely used. Some technologies are more specifically classified as "other technologies." Among them are video, virtual reality, and digital storytelling tools.

Table 5. Strategy Used

Strategy	Number of Articles
e-learning	4
m-learning	2
Web-based learning	2
LMS	1
Other Technologies	12
Total	**21**

Research questions

First research questions

The first research question is, **"Does meaningful learning in a distance learning setting promote student motivation for learning activities?"** This question is the first research topic examining whether meaningful learning can increase student motivation. The author awards a code to each article based on two factors: (a) whether or not meaningful distance learning has a positive or negative effect, and (b) whether or not the article presents an empirical evaluation of meaningful learning outcomes. The authors also coded the article as "no evaluation" in cases where meaningful learning was explained without consistent evaluation. The results are shown in Table 6.

Table 6 Information about the Publications that Address Student Performance

Evaluation	Articles in total (%)
No evaluation	6 (29%)
Positive with evaluation	10 (48%)
Positive without evaluation	5 (24%)
Negatively with evaluated	0 (0%)
Negatively without evaluated	0 (0%)
Total	**21 (100%)**

As has been reported in other studies, the importance of encouraging meaningful learning in increasing student motivation (Huang & Chiu, 2015a; Kamal Afify, 2018; Mystakidis et al., 2019; Niknam & Thulasiraman, 2020). This report is also reflected in distance meaningful learning, with 72% positive results (48% with and 24% without evaluation). It proves that meaningful learning can be implemented traditionally and with technology (Huang & Chiu, 2015a; Kamal Afify, 2018; Mystakidis et al., 2019; Niknam & Thulasiraman, 2020). Employing digital concept maps in meaningful learning, as in Aşiksoy's (2019). According to the results of the post-test on the physics conception and problem-solving inventory, Aşiksoy (2019) concluded that meaningful learning through digital concept maps could boost student motivation also conducted semi-structured interviews were also performed with the experimental group and obtained positive results.

Second research questions

Regarding the second research question, **"What is the primary purpose of establishing a meaningful learning model in a distance learning environment?"**. Table 7 displays the outcomes. The articles' goals are clear. Based on the goal of the meaningful learning strategy, the authors divide the papers in this literature review into five categories.

Table 7 The Main Purposes of Using a Meaningful Learning Model

Purpose	Number of articles (%)
Using meaningful learning to help students understand concepts	5 (24%)
Using meaningful learning to support self-regulation	4 (19%)
Using meaningful learning to increase motivation	3 (14%)
Using meaningful learning for pedagogical improvement	3 (14%)
Using meaningful learning to help educators develop learning	6 (29%)
Total	**21 (100%)**

Articles that help educators (24%) are meaningful learning models developed to facilitate educators by integrating technology (George & Sanders, 2017; Huang & Chiu, 2015b; Kärki et al., 2018). To help teachers make better-informed choices regarding pedagogy to promote learning, Lee (2017) builds relevant learning components using technology. The

main goal of his research is to fill in these gaps by creating a technology-scale meaningful learning instrument (MeLTS), which was designed to evaluate high school students' understanding of increasing knowledge in evaluating meaningful learning (Ross & Underwood, 2013) and knowledge about online learning (Tsai et al., 2013).

Third research questions

The final question focuses on the strategies of meaningful learning. Table 5 shows the main strategies found in the article. The main strategies that are widely used are other technologies (12 articles).

Most studies (48%) show evidence in their findings about whether meaningful learning can motivate students to learn. These results are consistent with the existing research objectives (section 4.2), where 85% of research (articles that use meaningful learning for students in understanding concepts to support students in self-regulation and help increase motivation) is aimed at assisting a meaningful learning process for students. Learners. Only six studies (29%) were aimed at assisting educators (see Table 7).

Discussion

Torda (2020) shows how distant learning increases the efficacy of "Flipped Classroom" learning in medical research and makes it possible to use it as a more sophisticated and potent learning tool in one of these projects. Many other instances of distance learning have numerous pedagogical strategies that have been proven effective, including blended learning, independent learning, Massive Open Online Courses (MOOCs), social/peer-based approaches, simultaneous learning, or various combinations of these (Darling-Hammond & Hyler, 2020; Tømte et al., 2015).

Some studies (29%) claim that technology can help educators integrate meaningful learning. These studies show positive results that educators report regarding their knowledge of technology use and meaningful learning (George & Sanders, 2017; Kamal Afify, 2018; Kärki et al., 2018), development of assessment instruments in meaningful learning (Lee, 2017), and helps educators' knowledge in the integration of other learning objects (Koh, 2017).

CONCLUSION

This article overviews existing research on technology-integrated meaningful learning in blended learning environments from 2012 to 2022. The use of technology in meaningful learning is the main topic of this study, considering the most popular way and whether technology aids teachers in addition to learners. We conclude that technology-based meaningful learning models as evidenced to improve student performance in learning activities (48% of publications). Utilizing technology-based meaningful learning strategies is almost entirely done to help and encourage students throughout the lesson. Nearly 72% of studies in our evaluation (Table 6) concluded that meaningful learning with technology offers advantages for student performance. This study evaluates the potential benefits to teachers of relevant learning approaches based on this technology. The numerous papers included in this review indicate that this technology-based meaningful learning approach aims to give teachers the knowledge to enhance their pedagogy. Our findings support this statement by showing evidence that relevant learning models assist teachers in their pedagogical comprehension (29% of articles). Finally, we found that the key to effective learning models integrating technology is technological media, such as learning videos, learning tools, and learning audio. The literature review identified two significant flaws in research on technology-based meaningful learning models, particularly the shortage of academic studies on Ausubel's principles for these kinds of learning. The model emphasizes meaningful learning, that is to say: outlines the principles of consolidation, integrative reconciliation, progressive differentiation, advanced organizing, and the lack of development of educator-focused tools. Applying meaningful pedagogical ideas with the incorporation of technology can enhance teaching and learning. The teacher's involvement is still essential and crucial for effectively implementing technology in the classroom. The outcomes of this exploratory study have several consequences for anyone involved in remote education, including administrators, teachers, instructional designers,

and policymakers, who want to ensure that students have meaningful educational experiences. The contribution of this review can be very beneficial to society since they combine information from the primary studies examined in this study to provide knowledge about efficient learning strategies in distance learning environments. Table 8 contains details on the article selection.

Appendix A. Summary of selected papers

Table 8. Summary of All Papers Retrieved in This Review

Reference	RQ1	RQ2	RQ3	Study Overview
(Ross & Underwood, 2013)	Negative without evaluation	Using meaningful learning to help educators develop learning	Using ILT (Innovative Learning technology)	This paper presents technology as a tool to create meaningful learning opportunities.
(Tsai et al., 2013)	Positive without evaluation	Using meaningful learning to help educators develop learning	Using web-based learning	This paper outlines meaningful online learning that focuses on developing platforms for meaningful learning.
(Huang & Chiu, 2014)	Positive with evaluation	Using meaningful learning to help students understand concepts	Using mobile learning	This paper presents the idea of an evaluation model for CAML (Context-Aware Mobile Learning)
(George & Sanders, 2017)	Positive without evaluation	Using meaningful learning to help educators develop learning	Using TPACK	This paper outlines a basic sketch for setting up professional development to help teachers better use ICT in designing assignments.
(Lee, 2017)	Positive with evaluation	Using meaningful learning to help educators develop learning	Using MeLTS	This paper presents the idea of developing meaningful learning instruments with technology scale (MeLTS)
(Koh, 2017)	Positive with evaluation	Using meaningful learning to increase motivation	Using electronic learning	This paper proposes the idea of meaningful learning within the framework of e-learning technology.
(Luo & Kalman, 2017)	No evidence	Using meaningful learning to help students understand concepts	Using video	This paper presents ideas for designing meaningful learning using 12 step
(Nel, 2017)	Positive without evaluation	Using meaningful learning for pedagogical improvement	Using LMS	This paper reflects a collaborative approach to pedagogical transformation with LMS technology.
(Henry et al., 2017)	No evaluation	Using meaningful learning for pedagogical improvement	Using web-based learning	This study examines the effects of Cada Dia Welsh (CDW), a social learning strategy that is an online web platform, on students' learning outcomes.
(Kärki et al., 2018)	Positive with evaluation	Using meaningful learning to help educators develop learning	Using mobile learning	This paper presents an analysis of meaningful learning using ActionTrack in mobile learning.
(Kamal Afify, 2018)	Positive with evaluation	Using meaningful learning to help educators develop learning	Using digital concept maps	This paper presents an e-learning content design idea based on an interactive digital concept mapping.

(Lopes & Vieira, 2018)	Positive without evaluation	Using meaningful learning to increase motivation	Using didactic material and videotapes	This study describes a teaching and learning process where virtual environments and settings serve as learning spaces.
(Aguayo et al., 2018)	No evaluation	Using meaningful learning to support self-regulation	Using Virtual Reality	This article offers a first-passage virtual reality (VR) simulation for purposeful learning.
(McNaught, 2018)	No evaluation	Using meaningful learning for pedagogical improvement	Using video	This report presents evidence of significant learning occurring throughout Africa.
(Tsai et al., 2019)	Positive with evaluation	Using meaningful learning to support self-regulation	Using web-based learning	This research describes online learning that combines web-mediated meaningful learning (ML) and activity-based learning (ABL)
(Mystakidis et al., 2019)	Positive with evaluation	Using meaningful learning to help students understand concepts	Using electronic learning	This article describes the fundamentals and characteristics of in-depth, meaningful learning that may be applied in project management in real-world settings and incorporated into e-learning quality techniques.
(Asiksoy, 2019)	Positive with evaluation	Using meaningful learning to help students understand concepts	Using online learning	This article illustrates a Google Classroom setting with computer-based concept mapping (CBCM).
(Niknam & Thulasiraman, 2020)	Positive with evaluation	Using meaningful learning to increase motivation	Designing a learning pathway system (LPR)	This paper presents the idea of developing an educational program for staff perioperative.
(Peñalba et al., 2020)	No evaluation	Using meaningful learning to help students understand concepts	Using concept maps based on computer	This paper outlines the potential of digital storytelling to promote historical comprehension.
(Lidor et al., 2022)	Positive with evaluation	Using meaningful learning to support self-regulation	Using web-based learning	This paper outlines the findings of a review of school changes that involved change agents at both the frontal and virtual levels.
(Hsbollah et al., 2022)	Positive without evaluation	Using meaningful learning to support self-regulation	Using tool digital storytelling	This paper analyzes the problem-based learning (PBL) methodology to provide instructive learning.

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