Relationships Between Teacher Presence and Learning Outcomes, Learning Perceptions, and Visual Attention Distribution in Videotaped Lectures

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ABSTRACT

As the rampant pandemic witnessed significant growth in online learning, numerous studies focused on designing attractive videos to improve the quality of teaching. For an effective instructional video, whether a teacher should be present on the screen remained controversial. Therefore, the study conducted bibliometric analyses to review the previous evidence on the relationships between teacher presentation types and learning performance, attention distribution, and learning perceptions. The clustering results quantitatively proved that researchers paid more attention to the empirical studies on the effect of teacher presence. Both the positive and negative influence of teacher presence on learning outcomes and perceptions has also been presented. Additionally, eye-tracking results showed that teachers attracted relatively more attention in teacher-present videos. Future studies should resort to more objective methods to address the controversy and emphasize the value of the individual difference to avoid one-size-fits-all presentation types, thus enhancing the quality of videos.

KEYWORDS
Bibliometric Analysis, Learning, Teacher Presentation Types, Videotaped Lectures, Visual Attention Distribution

INTRODUCTION

Video is a popular educational format in settings like traditional classrooms, online classwork, or blended educational environments. The COVID-19 global pandemic and person-to-person viral transmission forced the use of social distancing measures to curb the dissemination of disease. Online learning attracted more attention due to its comfort, accessibility, and remote opportunities (Yu, 2021b). However, online learning’s distance between learner and instructor may reduce learners’ engagement and produce lower academic grades, satisfaction, and interest (van Wermeskerken et al., 2018). According to some studies, these dilemmas may be addressed through the addition of a “talking head” in video lectures. Other studies, however, show that the effects of teacher presence in videotaped lectures did not reach a general agreement (Wang et al., 2018; Wang et al., 2020; Wilson et al., 2018). Therefore, whether and how a teacher should be present on the screen has been an issue discussed by instructional video designers as they work to create more attractive and efficient videos.
This study will make it possible to analyze the relationships between teacher presence and learning as we aim to build a precise scenario for future design.

Advantages of teacher presence have been extolled by various theories. According to the social presence theory (Gunawardena, 1995), an instructor’s social cues could establish a closer social connection between the learners and instructor. The teacher-present format may induce a higher level of interest and satisfaction, as well as lower mental difficulty (Frechette & Moreno, 2010). Some researchers reported that the instructor’s voice served as the most crucial social cue. However, the instructor’s face on the screen seemed to be an inferior factor with insignificant effects on social presence (Colliot & Jamet, 2018). In addition, the social agency theory points out that teachers’ social signals (i.e., eye gaze, facial expression, and gestures) direct students’ attention toward important learning content or materials, activating deeper engagement and cognitive processing (Mayer & DaPra, 2012). Naturally, more meaningful efforts of students in videotaped lectures represented better learning performance (Wang et al., 2017, 2018; Yang, 2020).

Despite the effectiveness of videotaped lectures, some theories demonstrate problems with teacher presence. The cognitive theory of multimedia learning (CTML), proposed by Mayer and Moreno (2003), discussed the visual and verbal system channels in human working memory. Each system can process limited information when novel information is simultaneously input into the two tracks. For example, in videotaped lectures, the teacher’s face and other on-screen content can be construed as visual stimuli that compete with the limited capacity of working memory. This competition, in turn, can impair the learners’ performance. This theory was reflected in the increase of extraneous load. The three components of cognitive loads include:

1. **Intrinsic Load:** Subject to a learner’s prior knowledge and the complexity of tasks (Sweller, 2011)
2. **Extraneous Load:** Associated with the improper design and presentation of instructional activities (Yu et al., 2014)
3. **Germane Load:** The integration of schematic knowledge (Wiebe et al., 2010)

Instructor presence could induce additional extraneous load irrelevant to the task. This can hinder learning when the teacher’s image serves as redundant information.

In conclusion, the review generated visual knowledge maps of keywords, documents, and authors via VOSviewer. It was based on 317 publications and research findings via Web of Science. According to the clustering analysis, the researchers continued to locate related literature to elaborate on the emergent research trends and promising research directions. The researchers aimed to shed light on the following questions:

1. What overall bibliometric results are extracted from the previous literature on the effect of teacher presence?
2. What emergent research trends are related to the effect of teacher presence?
3. What promising research directions are proposed according to findings on instructional video design?

**METHODOLOGY**

**Research Design**

The authors’ research design used VOSviewer to review the evidence on the relationships between teacher presence and learning. Based on the research design framework by Zeng and Chini (2017), the sequence of research steps is presented in Figure 1. First, it uses a search term to look for for relevant articles from 2000 to 2021. Second, it harvests important publication information like
authors, keywords, abstracts, discipline, and references. Third, it applies VOSviewer to conduct keyword co-occurrence analysis to detect topics with high occurrence. Fourth, it uses bibliographic coupling and citation as the type of analysis to capture current research directions. Fifth, it performs a comprehensive analysis on hot topics and trends-based clustering results.

ARTICLE RETRIEVAL

An integrative online search was manipulated using the Web of Science Core Collection, one of the most reliable English citation indexes with extensive resources and multidisciplinary nature (Zancanaro et al., 2015). To capture literature more precisely, the researchers selected title and keywords as search terms by keying in instructor presence, teacher presence, (instruct*) AND (video learning), (teach*) AND (multimedia learning), etc. In the current review, the authors performed the research on a single day to address bias from daily database updates. Finally, the researchers obtained 1,893 papers (from 2000 to 2021) based on the search strategy.

DATA COLLECTION

To refine the bibliographic results from Web of Science, the writer removed irrelevant results by adopting the inclusion and exclusion criteria. The inclusion criteria stated the following:

1. The articles should compare presentation styles of instructors in video lectures.
2. The period of studies must range from January 2000 to December 2021.
3. The publications must provide qualitative, quantitative, or mixed analysis.
4. The type of documents should be journals because they provide a complete elaboration on the research process and results.

Papers were excluded if they applied the following criteria:

1. The articles did not focus on the topic of the current review.
2. The articles were before January 2000 and after December 2021.
3. The type of document was report, book chapter, letter, etc.
4. Research fields failed to fall into “Education and Educational Research.”

DATA ANALYSIS

According to the above filters, the researcher obtained a final set of 317 qualified and relevant results for the bibliometric analysis via VOSviewer. A bibliometric analysis makes it possible to retrieve specific publication information (i.e., author, journal, advanced coauthor, coauthorship, and co-occurrence
analyses) and form knowledge maps based on a large database (Zeng & Chini, 2017). VOSviewer, a useful bibliometric tool for visualized networks, indicates the relationships among frequently used keywords, the most authoritative researchers, and the most influential documents (Fan et al., 2020). The tool’s generated network maps include nodes and links. It can also locate a document, writer, or keywords represented by different nodes. In addition, VOSviewer supports cluster analysis by categorizing each node within a network into a specific cluster. This action provides insight into hot topics by detecting keywords with a high frequency of occurrence within a period. In the current review, the researchers conducted a clustering analysis of the publications by generating a keywords co-occurrence map, the citation map of documents, and the bibliographic coupling map of authors, respectively.

RESULTS

The authors elaborated on the VOSviewer results by generating a keyword co-occurrence map, bibliographic coupling map, and citation map with author, documents, and keywords. The bibliometric analysis quantitatively proved that researchers paid more attention to pursuing empirical evidence about the effects of presentation styles on learning outcomes and learning perceptions (i.e., cognitive load, social presence, satisfaction, and visual attention distribution). Thus, the current review continued to retrieve positive and negative empirical evidence about the effects of teacher presence on learning. Furthermore, pertinent recommendations are summarized in terms of missing links from previous empirical findings on the topic.

RESULTS OF BIBLIOMETRIC ANALYSIS

Cluster Mapping Based on Keywords

In the current review, the researchers conducted a clustering analysis of the publications in terms of keywords. They selected full counting as the counting method and co-occurrence as the type of analysis to analyze keywords (Yu et al., 2014). A total of 1,728 keywords were identified from the 317 selected articles. Figure 2 presents the map of keyword co-occurrence, including 98 keywords that appeared over five times. The larger node reflects a greater frequency in which keywords were used or co-occurred. A smaller distance between the two nodes means that their relationship is closer. Furthermore, different colored links and nodes represent different clusters. To be more specific, if two nodes can be associated with each other, they will be represented by the same color in the co-occurrence networks.

Figure 2. Cluster mapping based on keywords
The 98 items are classified into six clusters (see Figure 2). Cluster 1 includes 27 items (e.g., performance, motivation, teacher, students, education). Cluster 2 includes online learning, social presence, satisfaction, perceptions, instruction, and skills. Cluster 3 includes attention, cognitive load, eye-tracking, teacher presence, and instructional design. Cluster 4 includes technology, blending learning, community, online, and higher education. Cluster 5 includes engagement, pedagogy, strategies, student satisfaction, and student engagement. Cluster 6 includes teacher presence, e-learning, and MOOC.

Online learning has the top total link strength of 143. Items like social presence (178) or satisfaction (76) also have relatively muscular link strengths. The link strengths of attention, (60), cognitive load (55), and learning performance (55) are highly ranked. Thus, the cluster analysis indicates that satisfaction, learning performance, cognitive load, and attention have been important research topics for several decades.

Based on this information, the researchers classified those items into the following categories: (1) learning performance; (2) learning perceptions; and (3) visual attention distribution. Therefore, the investigation of empirical evidence about teachers’ presentation type must recognize and detail these hot topics.

Bibliographic Analysis Based on Documents

The researchers conducted a cluster analysis of documents by generating a citation map (see Figure 3) based on 317 qualified and relevant results from Web of Science. The author selected the full counting method and citation as the type of analysis to examine identified documents. Then, the researchers set “five” as the minimum number of keyword occurrences and calculated the total link strength. Finally, 145 of the 392 documents met the threshold for creating the bibliographic map.

According to Figure 3, a total of 145 related publications are cited at least five times. For the documents cited over five times, 145 items are categorized into 95 clusters. This indicates a diverse range of research themes among these papers. The highest link strengths are found in Cluster 1. It includes:

- **Link Strength = 9:** *The Instructor’s Face in Video Instruction: Evidence from Two Large-Scale Field Studies* (Kizilcec et al., 2014)
- **Link Strength = 5:** *Instructor Presence in Video Lectures: The Role of Dynamic Drawings, Eye Contact, and Instructor Visibility* (Fiorella et al., 2018)

Figure 3. Bibliometric analysis based on documents
A citation measurement indicates whether a document is influential in certain fields. It stands for the frequency with which the document is cited by others. In other words, the impact of a document could be reflected by its citation frequency. In addition, the clustering analysis of citations based on documents may enable researchers to obtain a common research focus from documents with high-frequency citations.

A further search revealed that most of the literature with link strength over five focused on empirical research on the effect of teachers’ presence on learning. The result of a bibliographic map could shed light on further discussions.

**Bibliographic Analysis Based on Authors**

Identified items were analyzed using a clustering analysis of authors and a bibliographic coupling map (see Figure 4). The authors selected a full counting method and bibliographic coupling analysis to check authors. There were 1,087 authors devoted to investigating the effects of teachers’ presence in videotaped lectures (identified based on 317 articles from Web of Science). Finally, the researchers created the bibliographic map based on identified authors via VOSviewer (see Figure 4).

Results of the bibliographic coupling analysis could provide visual access to the similarities and differences of researchers’ focus within a field (Yu, 2020). In addition, it could shed light on researchers active within a domain. Figure 4 demonstrates the relatedness among identified authors via VOSviewer. There are 1,087 authors categorized into 71 clusters. This indicates a close cooperation among authors. The authors rank all identified authors in reverse order according to publication volume. Pi ZL (N = 7), Yan JM (N = 6), and Fiorella (N = 4) rank high. Their commonality is that they are devoted to investigating empirical evidence about the effect of teachers’ presence on learning.
According to Figure 4, the researchers found that J Borup, Pi ZL, Wang, and JH were more active based on their higher publication volume.

The results of the clustering analysis provided insight into this study’s discussion. The keyword co-occurrence map indicated that learning performance, learning perception, and attention distribution have been important research topics for several decades. According to the citation map of documents and bibliographic coupling map of authors, the authors found that, in recent years, more influential authors pursued empirical evidence about the effect of teachers’ presence. Therefore, the researchers continued to summarize the empirical evidence from previous publications by adopting the following criteria to identify relevant articles:

1. The publications must provide quantitative or mixed analysis.
2. The study should compare presentation styles of instructors in video lectures.
3. According to the clustering outcome, the dependent variables should include learning performance, visual attention distribution, cognitive loads, satisfaction, and social presence.

Finally, the authors located 22 articles in their primary citation to analyze current research trends. The researchers elaborated on the results by classifying them into three categories: (1) learning performance; (2) learning perceptions; and (3) visual attention distribution.

**RESEARCH TRENDS ON THE EFFECT OF TEACHER PRESENCE**

**Effect of Teacher Presence on Learning Performance**

Recall, a typical measurement, has been used to test the basic comprehension and identification of key concepts in video lectures (Mayer, 2020). Teacher presence could significantly improve learners’ performance on recall tests (e.g., Colliot & Jamet, 2018; Li et al., 2019; Tian et al., 2018; Wang & Antonenko, 2017; Wang, 2019). For example, Colliot and Jamet (2018) asked 43 undergraduates to learn a pedagogical document about Ebola (with or without a teacher). The results showed that teacher presence could significantly improve learners’ recall performance in video lectures.

However, arguments still exist. Some studies challenge the benefits of teacher presence in videos (Fiorella et al., 2018; Homer et al., 2008; Kizilcec et al., 2014; Wang et al., 2020). Specifically, Homer et al. (2008) compared two versions (with and without the teacher) of video-based lectures. Their work explored whether adding the teacher to instructional videos could affect learners’ performance and social presence. The findings revealed no significant difference in students’ recall test scores in videotaped lectures.

Transfer, another advanced measurement, was designed to assess learners’ ability to apply novel knowledge to new fields (Mayer, 2020). Per a review of previous publications, there is limited and unconvincing substantial support for enhanced transfer scores in video-based lectures. Yang et al. (2020) investigated used eye-tracking technology to determine whether teachers’ eye gaze was associated with students’ learning performance and other perceptions. The results show that video lectures with teachers’ continuous guided gaze could produce better transfer performance than lectures without teachers’ eye gaze.

On the contrary, the positive effect of instructor presence on enhanced transfer scores could not be replicated in most findings (Colliot & Jamet, 2018; Homer et al., 2008; Wang & Antonenko, 2017; Wang et al., 2020). For example, participants were assigned to watch two versions of videos on organizational sociology. The first had an instructor; the second did not have an instructor. Although the groups self-reported more satisfaction for instructional videos with teacher presence than without teachers, the transfer scores did not differ between the two groups (Kizilcec et al., 2014).

In addition, some researchers measured learning performance by integrating transfer and recall measurements (Cao et al., 2017; Pi & Hong, 2016; Yu, 2021). For example, Cao et al. (2017)
investigated whether presentation type (without instructor or with a large-, medium-, and small-sized teacher’s image) had a significant effect on students’ social presence and learning outcomes. The results indicate that video lectures with an instructor could produce better learning performance than video lectures without instructors. The proportion of the teacher’s image played an important role in multimedia learning. In sum, more experiments reveal that teacher presence in video lectures or instructors’ presentation types had a more significant effect on students’ recall performance than on transfer outcomes. The reason for this discrepancy may be explained by CTML (Mayer, 2014), in which teacher face and learning materials on the screen must compete with limited mental resources in the visual channel. The transfer test asks for creative answers that were not explicitly included in video lectures. Thus, it could be more complicated and require a higher ability to integrate cognitive resources than the recall test. It is reasonable to explain why more experiments cannot find a significantly better transfer performance than recall tests when teachers appeared in video lectures.

Nevertheless, learning performance based on instructors’ presence in video lectures remains tentative and inconclusive. After further investigation of the previous studies, the authors found that these controversies could be addressed by reasons like learning materials, social cues, cultural background, and learning preference. For example, the nature of learning materials in different experiments may affect results. Wang et al. (2020) manipulated video lectures with various levels of difficulty as they examined the effect of teachers’ presence on students’ learning. Their study indicated that students who watched the teacher-present video with higher difficulty improved transfer performance. No significant difference was found for the video with an easier topic. Therefore, content difficulty in videos plays a critical role in empirical results. In addition, Wang et al. (2017) examined how teachers’ presence in video influenced the learning of mathematics. Their study reported that the difference in learning performance may be explained by distinct topics adopted by researchers in video lectures. Furthermore, cultural differences may result in varied learning styles (Pi, 2014). Compared with American students, Chinese students are more sensitive to teachers’ nonverbal cues; therefore, the continuous presence of teachers is more likely to distract students and increase their cognitive load (Kizilcec et al., 2014; Tian et al., 2018).

**EFFECT OF TEACHER PRESENCE ON LEARNERS’ PERCEPTIONS: SATISFACTION, COGNITIVE LOAD, AND SOCIAL PRESENCE**

**Cognitive Load**

The purpose of pedagogical design should be to decrease the level of unnecessary cognitive load in working memory. Cognitive load refers to the mental resources consumed by people to process information in performing tasks. Sweller (2011) applied cognitive load to the domain of cognitive psychology, establishing a systematic theoretical hypothesis to study cognitive load based on the mental capacity theory and schema theory. According to the cognitive load theory, learning materials must reduce extraneous load as much as possible or induce more mental resources to process germane load, which is conducive to taking full advantage of limited cognitive resources. In addition, researchers paid more attention to the measurement of cognitive load when referring to the effect of teachers’ images in video lectures.

Some studies have investigated the effects of teacher presentation types on cognitive load (Colliot & Jamet, 2018; Homer et al., 2008; Kizilcec et al., 2015; Tian et al., 2018; Wang & Antonenko, 2017; Yu, 2021a). The results remain inconclusive and contradictory. Positive evidence was provided by Colliot and Jamet (2018), who examined the effects of videotaped lectures (either with or without a teacher) on cognitive load through adapted tools (Leppink et al., 2014). The findings indicated no more significant cognitive load when inserting a teacher on the screen. Therefore, the results confirmed that the teacher’s presence did not impede learning. At the same time, other empirical evidence reported that inserting an instructor could lead to learners’ more significant cognitive load.
For example, Yu et al. (2021) compared the effect of three video types on linguistics, concluding that teacher presence leads to learners’ greater intrinsic cognitive load vs. without teacher presence and videos with teachers’ intermittent presence.

Some studies, more importantly, could shed light on the reasons underlying these controversies. Specifically, Homer et al. (2008) explored whether the characteristics of individual learners affect their learning and learning perceptions. No main effects were found for learning and learning perceptions. However, the study found a significant interaction between presentation styles and learning preference. Participants reported higher visual priority; therefore, the cognitive load is greater without videos. Individual differences should be considered when studying the effects of teachers’ presence in video lectures.

In addition, the instructor’s nonverbal cues were an instrumental explanation for decreasing the extraneous and intrinsic cognitive load of learning materials (Wang et al., 2020). Some social cues (i.e., eye gaze, gestures, and expressions) are introduced when inserting an instructor into the video. These, in fact, can help learners focus on the most critical information and minimize unnecessary cognitive load.

Further investigation can consider the interactive influence of multiple factors on students’ cognitive load in videotaped lectures. A few studies have explored the relationship between cognitive load and learning outcomes. Therefore, future research can bridge the gap by manipulating regression analysis or structural equation models.

Additionally, the measurement of cognitive load is a fundamental challenge for the cognitive load theory. Researchers have been looking for scientific measurement methods since the theory was put forward. Most studies retrieved in the current review used subjective scales to test learners’ overall cognitive load after learning via videotaped lectures (Homer et al., 2008; Tian et al., 2018; Wang & Antonenko, 2017). Paas and Van Merriënboer’s (1994) scale and the NASA TLX scale (Hart & Staveland, 1988) are typical scales with high reliability. However, the subjective scale results about learners’ feeling and the learning task may differ from the actual cognitive load. Physiological measurement could evaluate cognitive load based on learners’ physiological response to tasks. In doing so, the method can be more immediate and accurate in the measure of cognitive load. At the same time, continuous measurement makes it difficult for learners to control and adjust cognitive load, thus ensuring the objectivity of measurement. Future studies should focus on the mediation of social cues on different components of cognitive load. This will ensure the development of reliable, valid cognitive load scales to measure various cognitive components.

Social Presence

Many scholars have considered social presence in the design of videotaped lectures. Social presence refers to the degree to which people are perceived as “real people” in the media. This concept was proposed in the domain of communication (Parker et al., 1978) before researchers introduced it into the field of multimedia communications like mail and video conferencing. Social presence was regarded as an essential mediation that affected communication effectiveness (Gunawardena, 1995).

According to the social presence theory, the learner may engage in a deeper learning process if they perceive a closer distance between themselves and the instructor. This, in turn, may lead to an improved memory effect. Therefore, this concept was introduced in studies related to design and video to explore types of video presentation, as well as their impact on learners’ enhanced sense of existence. The goal was to engage students and promote participation in videotaped lectures.

So far, researchers have explored the effect of inserting an instructor’s image into video lectures on learners’ social presence. Most investigations did not find a significant difference in the perception of social presence by learners after watching different presentation types in videotaped lectures. However, Cao et al. (2017) studied the effect of teachers’ presentation types by comparing courses without an instructor and teaching videos with the small, medium, and large proportions of teachers’ images. Their findings indicated that social presence perceived by learners who watched teaching
videos with the teacher’s face in any proportion was lower than those without the teacher’s face in the videos. It is generally acknowledged that the appearance of teachers in teaching videos can bring teachers closer to learners; however, that conclusion diverged from the previous prediction. The controversy can be explained by the fact that the appearance of an instructor distracts the student as they fail to fully engage in the video lecture, which, in turn, decreases their social presence. Moreover, the teacher in the video (if influenced by implicit culture) may not show strong appeal and enthusiasm when recording their videos. This may lead learners to pay little attention to the teacher’s image.

After further inspection of previous research, the authors found that the influence of teacher presentation types on social presence was mediated by social cues of the instructor, such as gestures, voice, expressions, and eye gaze (Moreno et al., 2000; Wang et al., 2018; Yang et al., 2020). Yang et al. (2020) reported that the teaching video without eye gaze resulted in lower social presence perceived by learners than that with eye gaze. Furthermore, different eye gazes of the instructor in videotaped lectures have different effects on social presence. Specifically, video lectures with intermittent eye gaze were conducive to a higher social presence. Therefore, future research can continue to explore the effect of different presentation types from the perspective of instructors’ differences (i.e., teaching styles, cultural background, and personality). More importantly, the theoretical explanations about the relationship between students’ social presence and academic achievement in multimedia learning is absent in the social presence theory. Therefore, this needs to be supplemented. Future research can continue to enrich this hypothesis through empirical research.

**Satisfaction**

Satisfaction, an essential indicator of learning perceptions, refers to learners’ subjective judgment on whether the current learning process meets their expectations. Several investigations have concluded that inserting an instructor into videotaped lectures was conducive to higher satisfaction in comparison to videos without lecturers (Tian et al., 2018; Wang & Antonenko, 2017; Wang et al., 2018; Wang et al., 2020; Yang et al., 2020). Wang et al. (2020) could shed light on this analogous conclusion. Participants’ responses to the interview found that instructors’ nonverbal social cues are instrumental to closing the distance from learner to teacher by eliciting positive emotional responses (Bhat et al., 2015; Clark & Mayer, 2016; Cui et al., 2013). Therefore, learners who see the instructor in videos seem to be regulated in a physical classroom. The students will pay more attention and feel more satisfied with the instructor-present videos. However, the continuous teacher presence may be distracting and overload the learners’ visual channel. In fact, showing the teacher’s face in an irregular or intermittent way could relax watchers and engage learners in more profound cognitive activities (Yu, 2021a). However, the appropriate time when teachers appear and disappear remains to be discussed.

**Effect of Teacher Presence on Attention Distribution**

According to CTML, the teacher’s face and other information on the screen can be construed as visual stimuli. These features compete with limited cognitive resources in the visual channel. It is reasonable to believe that the instructor’s face may be distracting or even produce split attention (Ayres & Sweller, 2014). Learners must integrate the two information channels by switching their attention between two sources. However, only a few empirical studies have investigated the impact of instructor image on learners’ attention distribution. Future studies should also examine whether visual attention in online videos can predict subjunctive perception and learning performance. Furthermore, the upgraded eye-tracking technique was instrumental in exploring the underlying mechanism by which participants interacted with the teacher on the screen.

Specifically, an eye-tracking study reported that instructors’ faces in videos attracted learners’ primary visual attention. In fact, it accounted for a 41% average of learners’ time during instruction (Kizilcec et al., 2014). The result is aligned with findings by Zhang et al. (2018), who reported that learners paid more attention to the face of the instructor (75.66%). Wang and Antonenko (2017) examined whether teacher presence can positively or negatively influence students’ learning
perceptions and performance when watching video lectures that feature varying content and difficulty levels. As hypothesized, teachers attracted relatively more attention. The difficulty level of learning materials moderated visual distribution. For instance, learners experienced lower intrinsic load when they watched the video with an easy topic because it gave learners more room to focus on the instructor. In addition, Colliot and Jamet (2018) held that more attention to teacher presence did not produce any adverse effects because the students could regulate their attention distribution and avoid the interference of instructor presence in online lectures.

Empirical investigations have indicated how participants visually attended to the teacher in teacher-present lectures. Whether the amount of visual attention could contribute to predicting learning perceptions and achievements remains a knowledge gap. Having retrieved previous publications, the researchers found that most studies witnessed more attention on the instructor through eye-tracking technology (Colliot & Jamet, 2018; Wang & Antonenko, 2017; Wang et al., 2020; Yang et al., 2020). Wang et al. (2020) manipulated the visual distribution as the predictor variable and learning perceptions as outcome variables like learning performance, cognitive load, situational interest, and satisfaction. The amount of attention given to the teacher on the screen can only positively predict the degree of learners’ satisfaction with videotaped lectures. Regarding other learning perceptions, no significant effects have been observed. Future studies, therefore, need to provide more empirical evidence. It was reasonable to say that more attention to redundant or inferior information did not facilitate learning.

In conclusion, many studies in the current review adopted eye-tracking technology to explore learners’ visual distribution based on representative indicators relevant to fixation. Future studies could consider instrumental measures like pupil size. However, the study is sensitive to environmental factors out of their experimental control. Future researchers must attempt to control unrelated factors by their appropriate experimental design according to their purpose.

Nevertheless, eye-tracking technology allowed the current study to approximate the distribution of visual attention. Integrating it with other objective technology, such as electroencephalography, can observe the results more overtly. Furthermore, future work can focus on the moderative effect from the perspective of instructors and learners on visual attention distribution.

CONCLUSION

Over the past few years, there have been multifarious studies on the effect of teachers’ presence in videotaped lectures. Using VOSviewer, the authors examined and analyzed related papers via the Web of Science Core Collection, which ensured an extensive retrieval of information on this topic. The keyword co-occurrence map indicated that learning performance, learning perceptions (i.e., cognitive load, social presence, and satisfaction), and visual attention distribution have been important research topics. According to the citation map of documents and the bibliographic coupling map of authors, the researchers found that more influential authors gave priority to pursuing empirical evidence on the effect of teacher presence. Therefore, the current review paid more attention to retrieving the empirical evidence of relationships between teacher presentation types and learning, learning perceptions, and visual attention distribution.

Having retrieved the previous empirical evidence, the experimental results remain tentative and inconclusive. Some researchers indicated a positive impact of instructor-present videos. Still, others claimed no impact or a negative influence of teachers’ presence on learning. Therefore, future studies should resort to more objective methods to address the controversy. Studies should emphasize the value of the individual difference to avoid one-size-fits-all presentation types. This will, in turn, enhance the quality of videos.

Nevertheless, the literature within this scope may be limited because most of the references were searched on the Web of Science. Despite its global popularity, the researchers failed to retrieve all related literature in the current review. Future researchers could try to replicate this study in other databases. In addition, most of the publications in the review are written in English. It is inevitable that
the authors missed important articles from other languages. In the future, the authors will collaborate with researchers around the world.

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REFERENCES


