



Open Access Indonesia Journal of Social Sciences

Journal Homepage: <https://journalsocialsciences.com/index.php/OAIJSS>

Beyond the Digital Divide: A Systematic Literature Review Exploring the Relationship between E-Learning Communication, Student Engagement, and Academic Performance

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ARTICLE INFO

Keywords:

Digital communication
Interpersonal communication
Learning
Mediated communication
Student academic achievement

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The author has reviewed and approved the final version of the manuscript.

<https://doi.org/10.37275/oaijss.v8i1.282>

ABSTRACT

E-learning can support the creation of interpersonal communication for students, both students and lecturers. Even communication carried out in e-learning is considered to be one of the aspects that can affect student academic achievement. This study aims to explore themes in interpersonal communication and mediated communication in the context of e-learning. The method used in this study is Systematic Literature Review with the guidance of Preferred Reporting Items for Systematic reviews and Meta-Analyses/PRISMA 2020. Data was obtained from the Scopus research database by applying queries according to the research theme and 69 articles were obtained that will be further analyzed. The results of the study have succeeded in identifying 10 themes in interpersonal communication and 9 themes in mediated communication. Communication effectiveness, communication behavior, and social presence are things that need to be considered in interpersonal communication. As for mediated communication, it is necessary to consider the ease and comfort of communication, mediated communication behavior, and also the support of the online environment.

1. Introduction

Now e-learning it has become a popular learning mechanism adopted by various higher education institutions in the world. In 2019, at least 900 universities globally have launched 13,500 Massive Open Online Courses/MOOCs where 450 of them have offered 2,500 lessons (Bouchrika, 2024). The use of Moodle as one of the open-source Learning Management Systems/LMS popular for higher education institutions notes that they have 416,994,395 users from 240 countries (Elabnody, 2016; Moddle, 2024). Taking an example in Indonesia,

the Open University/UT has utilized technology e-learning massively to deliver online tutorials, web-based material supplements, self-training, and so on (Hartati, 2023). Meanwhile, in the odd semester of 2023/2034 UT, there are 550,050 students from various parts of the world who can use this technology (Open University, 2024). The high number of users is certainly inseparable from the various benefits that can be presented by the use of technology e-learning.

In general, e-learning itself refers to the concept of education that utilizes information and communication technology to deliver learning



materials and support distance learning (Suzianti, 2021). As for e-learning, the process of delivering education is easier by eliminating the need for physical presence through the internet (Rohit, 2021). Electronic learning allows asynchronous learning where students can learn anytime and anywhere so as to support comfort in learning (Rawat, 2020). According to Rohit (2021), there are various terms that can be used to define e-learning among others online learning, networked learning, distributed learning, virtual learning, internet learning, web-based learning, and distance learning. Through these various conceptualizations, e-learning It can be said to be a technology-supported learning mechanism to access learning materials anytime and anywhere without having to present a face-to-face teacher.

Utilization e-learning is a breakthrough that has been considered as an effort to improve academic achievement, especially in the scope of higher education. This technology can improve students' academic performance because it is able to combine textual material content with visuals, apply alternative learning approaches, and foster students to understand ICT literacy (Zolochevskaya, 2021). Firat et al. (2019) regarding the influence of the use of e-learning on one of the campuses in Turkey show that the longer engagement a student in using e-learning then the higher the academic achievement score will also be. More research on the platform e-learning GoKoan shows that the learning outcomes of students using e-learning It is better when compared to conventional learning outcomes because it is considered capable of providing learning materials anytime and anywhere, adjusting learning plans from students, and providing learning outcomes reports quickly (Nácher, 2021). Through the various benefits that can be conveyed, it is necessary to deepen the special role of technology in supporting students' academic achievements.

E-learning itself can basically be said to be a communication medium to support the learning

process between lecturers and students. Through his role, e-learning can support interactivity, independence, and accessibility so that students can learn and interact with various types of learning content anytime and anywhere easily and practically (Sari, 2023). There are various types of communication activities that can be carried out by students through the platform e-learning Among other things, attending a lecture Online, interacting with lesson content, asking and answering questions, sharing information, and expressing their thoughts or knowledge (Farhan, 2019). The research from Fernandez (2022) conveys that the efficiency provided by e-learning in providing convenience to communicate remotely is one of the determining factors in determining student academic achievement. Through its roles as a communication medium, it can be said that the use of e-learning has created a mediated communication process.

Mediated communication in general is a communication process that is not carried out face-to-face but through a tool, communication, and information technology, intermediary of certain people or techniques (Van Zoonen, 2022). Technological developments have provided various options for people to communicate or through email, telephone, instant messaging applications, and Video Conference. Mediated communication is one of the solutions to overcome the problem of long distances between the sender and the recipient of the message (Israfi, 2024). Currently, mediated communication has become part of the culture and habits of society at large because the daily communication process cannot be separated from digital technology (Masreel, 2018). The conceptualization of mediated communication gives an idea that e-learning is a tool that can be used to facilitate the communication process between lecturers and students, which in this case acts as the sender and receiver of messages, so that the teaching and learning process is no longer limited by the dimensions of space and time.



Departing from its role in facilitating the communication process between lecturers and students, technology e-learning, in the end, can also be said to be a communication medium used to facilitate interpersonal communication between lecturers and students or vice versa. Interpersonal communication itself is the process of delivering and receiving messages between the sender and the recipient either directly or mediated (Masreel, 2018). The process of interpersonal communication between students and lecturers can basically promote openness, empathy, equality, and academic achievement in students (Aisyah, 2024). Effective communication between students and lecturers and a positive classroom environment can encourage learning performance because it is able to create a sense of togetherness, foster positive relationships, and the emergence of enthusiasm for learning (Shan, 2014). Through the effectiveness of interpersonal communication, as much as possible e-learning maintains the relationship between students and lecturers.

Interpersonal communication itself is part of e-learning itself because it is able to facilitate various communication functions in a variety of ways. real-time and not simultaneously between its users (Yeh, 2014). As for the research Achuthan (2021) Media learning Management System/LMS is considered to be able to create a better interpersonal communication process because students will ask more questions to the teacher about the material being taught. Moreover Amsal (2021) conveying that technology e-learning can facilitate several aspects of interpersonal communication that cannot be raised in face-to-face mechanisms such as debating and negotiating intensely between students and lecturers. In addition, the mechanism of e-learning through Video Conference can facilitate teachers to conduct interpersonal communication both verbally and non-verbally (Govindaraju, 2021). Through its role in supporting interpersonal communication, various

subject matter provided by lecturers can be accepted by students quickly and practically it allows for an improvement in academic performance.

However, the communication process that occurs between teachers and students is carried out through the media e-learning. It turns out that it is not always effective. Raharjo, (2021) explain that the process of Coding and decoding in the process of interpersonal communication in e-learning will eliminate the context in the face-to-face communication process so that it is considered able to affect the essence of the message received. Likewise The Story, (2018) said that the higher education environment does not require technology for distance learning because it is not able to facilitate direct feedback, reduces verbal and non-verbal forms of communication, makes it difficult for students to translate intonation and gestures, and eliminates emotional connections that can be created face-to-face. Moreover, e-learning can cause information overload in students so that they cannot understand the learning material effectively and focus on learning a material (Borstorff, 2007). Improving academic achievement through e-learning not only improves the quality of their communication with others about the material they have learned (Zare et, 2016). The dynamics of ISU e-learning in facilitating the effectiveness of interpersonal communication is an interesting thing to research because students actually need to get a complete message so that they can understand the lessons conveyed.

This systematic literature review delves into the multifaceted nature of interpersonal and mediated communication within the context of e-learning. By exploring the themes that underscore these communication processes, this review aims to provide a comprehensive understanding of their influence on student engagement and academic performance.

2. Methods

This study uses a systematic literature review method/systematic literature review/SLR with a qualitative approach. The SLR will be carried out by



following the guidelines Preferred Reporting Items for Systematic Reviews and Meta-Analyses/PRISMA 2020 as a basis for identifying literature search criteria, literature database sources, literature search strategies, literature selection process according to criteria, and data collection process from literature provider databases (Page et al., 2021). The guide provides 27 elements as a technical guide to find,

analyze, and synthesize studies in five phases (Tawfik et al., 2019; Irwansyah, 2023). The approach used in this study is qualitative so it has the purpose of synthesizing research that has been published to understand and deepen a certain theory through narrative texts (Ugwu, 2017). Table 1 below presents the search strategy protocol and literature selection.

Table 1. Protocol for literature search and selection strategy.

Phase	Phase Name	Processes carried out
1	Drafting research questions	This research will answer research questions regarding the origin of research that analyzes the communication process from the use of e-learning, what methods were used in previous research, and what aspects are part of the interpersonal and mediated communication process of the use of e-learning.
2	Eligibility criteria and sources of information	<p>This research will take various literature published in English and Indonesian journals. Articles that contain keywords in the title, abstract, keywords, or key phrases. related to</p> <ol style="list-style-type: none"> 1. e-learning: "e-learning" or "distance learning" or "Learning Management Systems" or "Mobile Learning" or "Virtual Learning" 2. Communication: "Interpersonal Communication" or "Mediated Communication" 3. Academic Achievement: "Academic Achievement" or "Academic Performance" 4. Higher education: "higher education", "college", "university" <p>The research must analyze how the process of interpersonal communication and mediated communication affects academic achievement in the scope of higher education. The theoretical and empirical research with a quantitative or qualitative approach is the inclusion criteria. In addition, the article must be in English. The exclusion criteria applied are: 1) not explaining the method clearly, and 2) literature in the form of books.</p>
3	Search strategy	<p>The Scopus literature database will be used as a source of literature search. In this case, Scopus can provide literature with an international reputation.</p> <p>The query that will be used to search for articles in Scopus is as follows : ("e-learning" OR "distance * learning*" OR "Learning * Management * Systems*" OR "mobile * learning*" OR "virtual * learning*") AND ("communication" OR "interpersonal * communication*" OR "mediated * communication*") AND ("academic * achievement*" OR "academic * performance*") AND ("higher * education*" OR "college" OR "university")</p> <p>This research does not limit the year of publication of the article in the selection because it wants to get as much information as possible about the communication process in improving academic achievement through the use of e-learning.</p>
4	Literature selection process	Initial results in the Scopus search resulted in 168 articles. The stage from selection to selection of the article to be analyzed is presented in Figure 1.
5	Coding and synthesis	Mendeley's bibliography management application will be used for data collection. Literature synthesis will use coding sheets. As for conceptual network visualization, it will use VOS Viewer. The results of the research will be presented in themes that have been successfully synthesized based on literature that is included in the inclusion criteria.

Source: Tawfik et al. (2019).



Based on the 168 articles that have been obtained based on the literature search strategy, the next stage is to analyze these articles according to the inclusion

criteria, exclusion, and also the research locus. Figure 1 presents the stage of article selection.

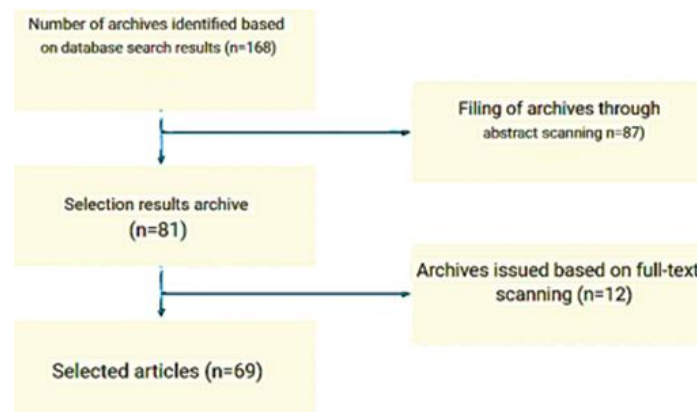


Figure 1. Article selection flow.

Through the selection flow that has been presented in Figure 1, it can be conveyed that the number of archives identified in the Scopus database is 168 articles. The first stage of selection is carried out by scanning abstracts from each archive. In the selection, there were 87 articles that did not meet the inclusion criteria. The next selection is to scan the 87 archives by reading the article full-text available. Through this selection, there are 69 articles in accordance with the inclusion criteria and will be continued for analysis.

learning", "students", "academic performance", "higher education", "social networking (online)" and other keywords in red. The second cluster contains the keywords "learning", "humans", "education distance", "academic achievement", "interpersonal communication", "social network" and other keywords in green. The third cluster in blue contains the keywords "education", "COVID-19", "university education" and so on. Figure 2 presents an illustration of the keyword network used by the article to be analyzed.

3. Results and Discussion

In general, there are three keyword clusters in the research data. The first cluster contains the terms "e-

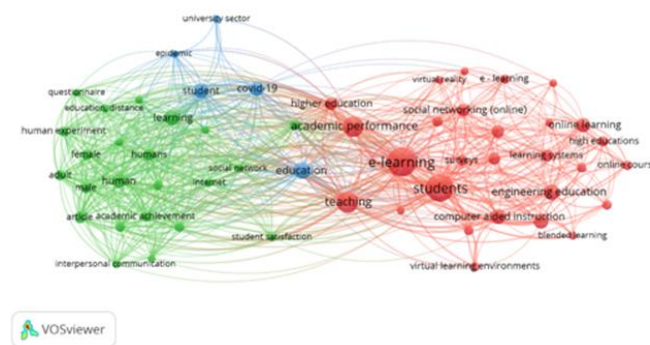


Figure 2. Illustration of the keyword network.



Based on the keyword network, cluster 1 explained articles that focus on the use of e-learning to support academic performance, especially in the higher education sector. Other concepts used in electronic learning in cluster 1 are blended learning, online learning and also virtual learning. Cluster 2, it contains articles that have the theme of distance learning in supporting academic achievement. As for cluster 2, there is a keyword for interpersonal communication so there is a communication process analyzed in this cluster. Cluster 3 specifically analyzes education during the COVID-19 pandemic where

distance learning is a method used by the education sector during that period.

The distribution of articles based on the year of publication is generally centralized between 2020-2024 or the last five years as presented in Figure 3. The earliest year of publication of articles was 2003 with a total of 2 articles. In addition, between 2003 – 2017, the average number of articles analyzed amounted to 1 to 3 articles. Figure 3 below explains the number of articles analyzed based on the year of publication.

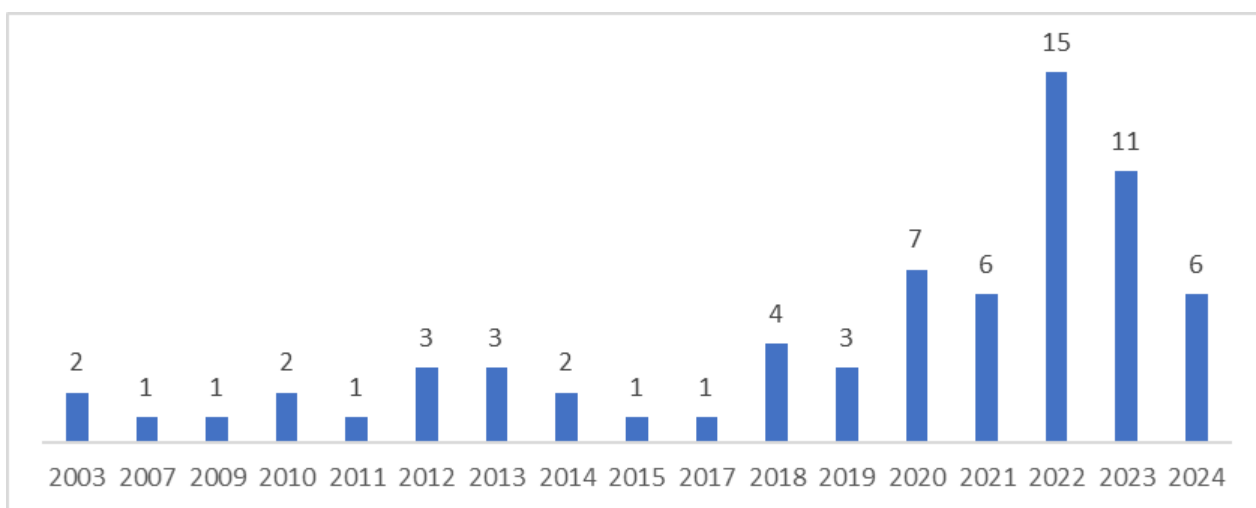


Figure 3. Distribution of a number of articles based on the year of publication.

Based on the analysis of the number of articles, it can be attributed to the COVID-19 Pandemic which has made the entire education sector carry out distance learning. This is important because it can be said that the pandemic has become a catalyst for various educational institutions to carry out digitalization in their learning systems. Asia is the most research location found in the analyzed articles,

which is 34 articles (49.3%). Followed by Europe with 21 articles (30.4%). The next ranking is occupied by America with 11 articles (15.9%). The research location in Africa was found in 2 articles (0.03%) and Australia as many as 1 article (0.01%). Figure 4 presents the distribution of articles based on research location.



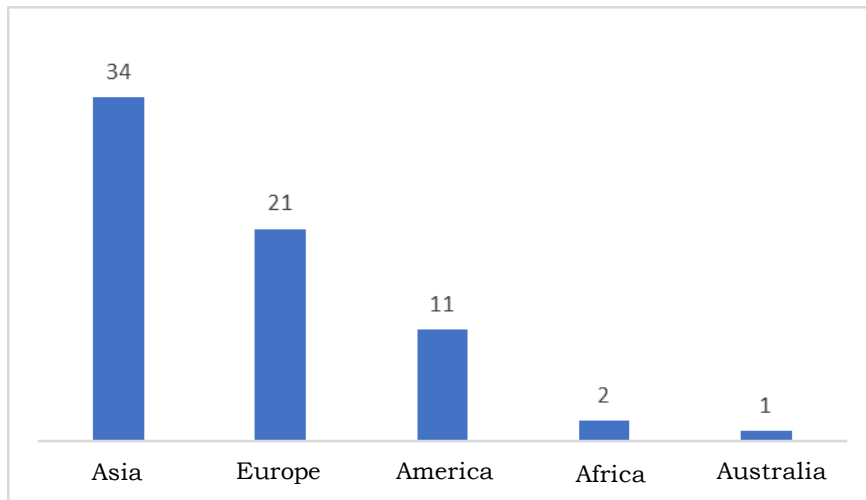


Figure 4. Distribution of a number of articles based on research location.

Research on e-learning in supporting academic achievement is quite a lot carried out in Asian regions. This can be a reference that many studies may have the same context as countries in Indonesia. The adjustment of the theory used cannot be separated from the context in which previous studies were carried out because it cannot be separated from the

cultures believed by the people. Based on the type of articles analyzed, 51 articles (73.91%) were journal articles, 16 articles (23.18%) were Proceedings and 2 articles (2.9%) were Book Chapters. Figure 5 below explains the distribution of the number of articles by type.

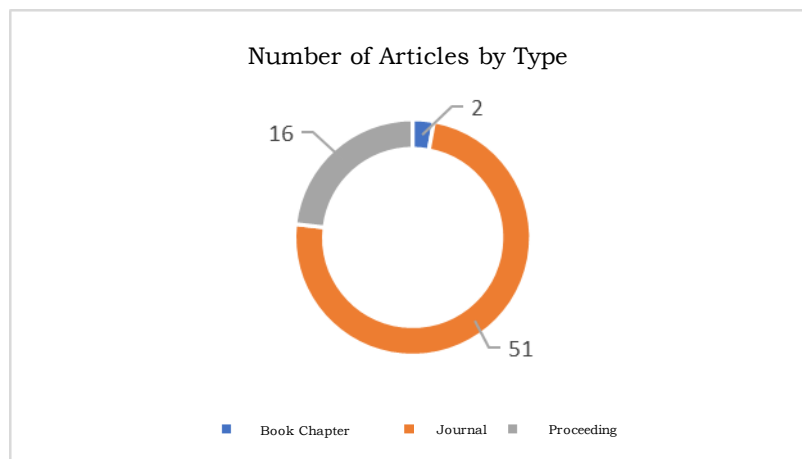


Figure 5. Distribution of number of articles by type.

Based on the 51 journal articles that have been identified, there are 31 articles (60.78%) that have a Q1 value, 9 articles (17.64%) with a Q3 value, 5 (9.8%)

articles with a Q2 value and 2 articles (3.4%) with a Q4 value. Figure 6 below presents the distribution of Quartile values in the analyzed journal article.



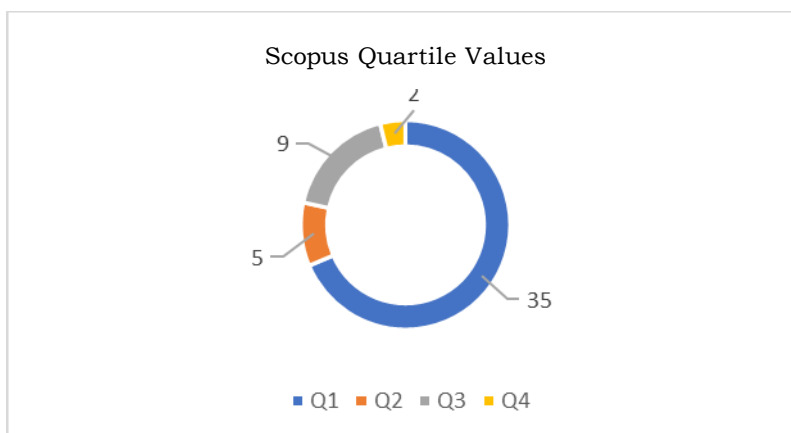


Figure 6. Distribution of number of articles based on quartile value.

There are several concepts of electronic learning in the article that will be analyzed. The most widely used concept is e-learning, which is 26 articles (37.68%). Followed by online learning as many as 16 articles (23.18%), distance learning (17.39%), and mobile learning 7 articles (10.14%). The other concepts used include blended learning, collaborative learning,

computer-assisted, interactive learning, and virtual learning. The diversity of concepts used needs to be a concern for future studies because it is possible that there is a limitation between one concept and another. Figure 7 below explains the distribution of articles based on the electronic learning concept used.

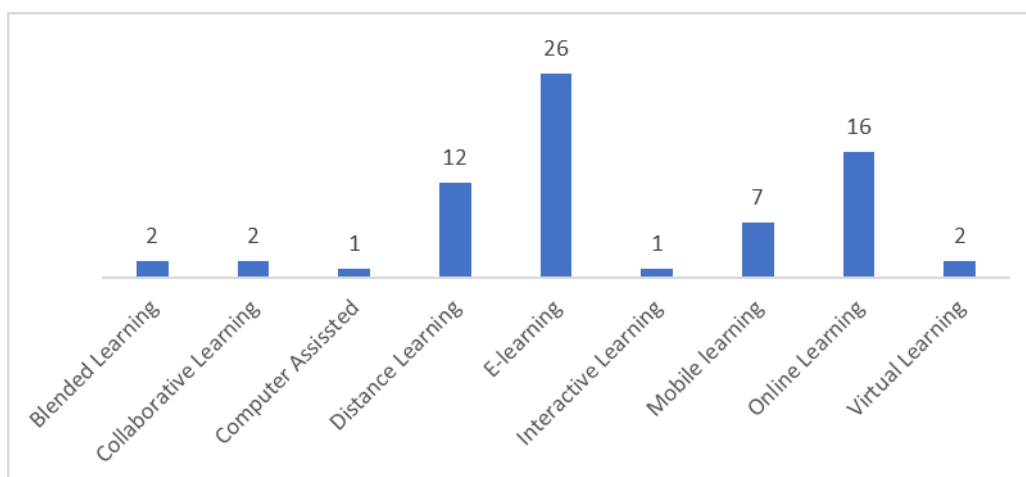


Figure 7. Distribution of e-learning concepts used.

Based on the analysis of 69 articles that fit the inclusion criteria, there are at least 10 themes related to interpersonal communication. In general,

interpersonal communication is the process of exchanging messages between two people. In the context of e-learning, interpersonal communication is



associated with the process of exchanging messages between users through electronic learning media. At least 10 themes that have relevance to the interpersonal communication process are considered

to be able to affect students' academic achievements. Table 2 below describes the themes that were successfully analyzed and identified from the selected articles.

Table 2. The themes regarding interpersonal communication.

No.	Theme	Explanation	Research study
1	Communication Effectiveness	Effective communication is a process where the message can be understood in its entirety by the recipient. The quality of the communication process with other users is considered to be an important thing in influencing student academic achievement.	(Jara-Troncoso et al., 2022)
2	Effectiveness of Assertive Communication	Good assertive communication using non-verbal and verbal aspects of lecturers can facilitate the development of competence. This theme explains how assertive the communication process that occurs in e-learning is.	(Vera-Monroy & Monsalve-Silva, 2022)
3	Effectiveness of Two-Way Communication	This theme explains how well the interactive dialogue process and activities give feedback to each other among e-learning users. The more often you exchange messages, the more knowledge you will receive.	(Alyouzbaky et al., 2022)
4	The Effectiveness of Face-to-Face Communication	There are several assumptions that offline/face-to-face communication is more effective when compared to online communication. This theme explains that the online communication process is not effective when compared to offline communication.	(Atlam et al., 2022)
5	Communication Ethics	In conducting interpersonal communication in digital media, there need to be ethics that need to be maintained. E-learning users need to pay attention to ethics when communicating through e-learning.	(Barzegar et al., 2024)
6	Social relationships	Communication cannot be separated from the sense of connection between the sender of the message and the recipient of the message. This theme explains that the formation of social relationships can create a better communication process.	(Mortazavi et al., 2020)
7	Social Presence	Communication with e-learning does not directly make the sender aware of the presence of the message recipient. This theme will assess the effectiveness of interpersonal communication despite the loss of the social presence of the message recipient.	(Cui & Wang, 2024)
8	Fear in Communication	Some people feel that they are afraid to communicate, including online communication in e-learning media. With this theme, it can be analyzed how brave a person is to convey a message in the media.	(Apridayani et al., 2023)
9	Quality of Communication between Students and Lecturers	One form of e-learning communication that can occur is communication between students and lecturers. Through this process, students can contact lecturers at any time and turn on the interaction between them. Each can provide feedback without any space and time constraints. This theme will analyze how the effectiveness of communication between students and lecturers is felt by e-learning users.	(Mojtahedzadeh et al., 2024)
10	Quality of Communication between Students and Students	In addition to being in contact with lecturers, communication in e-learning also facilitates the communication process between students. Communication that occurs with colleagues can be in the form of discussions or collaborations in working on a project. This theme wants to see how e-learning users perceive its effectiveness in facilitating communication between students.	(Calunsag & Calunsag, 2023)



Based on the analysis of 69 articles that fit the inclusion criteria, there are at least 9 themes related to mediated communication. In general, mediated communication is the process of exchanging messages through certain media. In the context of this study, e-learning itself is a medium used for its users to communicate with other users. As for now, mediated communication has become part of people's culture,

especially digital media, so it is necessary to see how they behave towards the use of these media in communicating. At least 9 themes that have relevance to the mediated communication process are considered to be able to affect students' academic achievements. Table 3 below describes the themes that were successfully analyzed and identified from the selected articles.

Table 3. Themes related to mediated communication and its influence on academic achievement.

No.	Theme	Explanation	Research study
1	Intensity of Media Usage	The more often you use e-learning media, the more time you will have to receive more messages from lecturers and colleagues. This theme explains the intensity of e-learning use by its users.	Atlam et al. (2022)
2	Media Interactivity	The theme of media interactivity explains that e-learning is a communication medium that can be accessed by anyone. All users can freely interact with content such as commenting, giving feedback, and so on.	Cevallos-Villacrés et al. (2015)
3	Ability to communicate online	The effectiveness of communicating in the media cannot be separated from a person's ability to operate the media. This theme measures how well e-learning users operate media to produce effective communication.	Suresh et al. (2022)
4	Ease of Communication	E-learning is considered to provide convenience in communicating and conveying information. E-learning users can access information quickly. This theme measures how easily users communicate in e-learning.	Omar et al. (2021)
5	Comfort of Communication	In addition to being easy, communication in e-learning also provides convenience for its users. E-learning supports asynchronous communication so that users can communicate anytime. However, there are several obstacles, such as anonymity, so the communication process is not as effective as face-to-face. This theme measures users' perception of comfort when communicating in e-learning.	Kemp & Grieve (2014)
6	Open Communication	This theme explains that e-learning provides the smallest possible barrier for its users to send messages to each other. The more open communication in e-learning, the more knowledge or knowledge the user will obtain.	Regueras et al. (2009)
7	Content Quality	The quality of the content is one aspect that supports the academic achievement of its users. This theme will assess a person's perception of the quality of content/messages conveyed through e-learning.	Vlachopoulos & Makri (2024)
8	Digital Communication Environment	E-learning also provides a unique experience in the communication process. A good learning environment in e-learning can support an effective communication process in learning. Through this theme, users' perceptions of the digital communication environment will be measured.	Bai et al. (2023)
9	Information Sharing Behavior	Information-sharing behavior is an activity where users consciously provide information or messages in e-learning. This behavior explains how effective the process of sharing information in e-learning media is. The more information conveyed, the richer a person's knowledge will be.	Tawafak et al. (2019)



Communication effectiveness is a topic that needs to be considered as part of improving the academic achievement of students. The communication that occurs does not only occur between students and lecturers but also between peers or between students (Calunsag, 2023; Mojtahedzadeh, 2024). Basically, e-learning is a medium for communication so it is expected to maintain the effectiveness of communication that is usually carried out in the classroom (Atlam, 2022). In addition, it is also necessary to consider whether communication with e-learning can present feedback activities between communication actors so that the communication that occurs is only one-way (Alyouzbaky, 2022). The effectiveness of this communication will ensure that a message is really conveyed to the recipient properly.

Interpersonal communication is basically communication that involves two people exchanging messages so that one person is aware that he is communicating with another person. A person tends to feel more motivated to communicate effectively when they feel the presence of the recipient of the message. e-learning then the presence can be ignored (Cui, 2024). With the absence of someone in a certain space and time, it is also necessary to question how the relationship between the two communication actors occurs (Mortazavi, 2020). The loss of social presence and also social relationships in interpersonal communication certainly needs to be questioned because a person will lose the social context in communicating.

In these interpersonal communication themes, there are also themes related to the way or style of communication from users e-learning. Ethics in communicating is also present in the digital media environment so that as much as possible students maintain their attitude when communicating with lecturers even through e-learning (Barzegar, 2024). Likewise, assertive communication from lecturers is a form of communication that is considered to be able to increase the competence of its students (Vera-Monroy,

2022). As for Apridayani (2023), she also explained that a person needs to have the courage to communicate digitally so that they can be involved in a discussion. In the end, the way of communicating digitally among students is considered to be able to be a predictor in determining their academic achievements.

Ease and comfort in communicating are features presented by the media e-learning. User e-learning can easily access communication messages and other learning content quickly (Omar, 2021). In terms of its own comfort, the communication carried out in e-learning gets asynchronous So communication does not have to happen at one specific time (Kemp, 2014). This certainly provides flexibility, especially for lecturers who may have to look for substitute classes. Online communication also provides a more comfortable feeling when compared to online communication offline for some people (Antoniadou, 2022). The ease and comfort of communicating ultimately makes users can easily carry out learning activities so that they can get higher academic achievements.

Various user behaviors are also conveyed in the themes of mediated communication through e-learning. Convenience provided by e-learning encourages users to share information and knowledge with each other and this behavior will increase information intake for other users (Tawafak, 2019). The users can do collaborative activities with other peers because e-learning own carrying the concept of open communication where all users can be involved in providing feedback on a content or project. (Cevallos-Villacrés, 2015). In addition, the intensity of a person in using e-learning is something that has continuity with students' understanding of a material because the more often they access e-learning then the learning process will be more frequent (Atlam, 2022). These themes ultimately explain that mediated communication is inseparable from how a person uses the media.



The quality of communication in digital media needs to be considered as part of improving academic achievement. Student perception of the communication process in the environment e-learning is part of an effective communication process (Bai, 2023). If they feel uncomfortable communicating digitally, there is a possibility that the communication process will not run effectively. The quality of learning content is one of the parts of supporting academic achievement. The more interesting the content, the more interested the students will be in learning about it. Just like communicating in the realm (Galarza, 2024) offline, the quality of communication in the realm online needs to be considered in improving academic achievement.

4. Conclusion

The results of this study explain that there are aspects in interpersonal communication and mediated communication that are considered to be able to improve student academic achievement. Based on the analysis of 69 articles that have been selected through inclusion and exclusion criteria, 10 themes in the aspect of interpersonal communication and 9 themes in mediated communication have been identified that are considered to be able to increase student academic achievement. In interpersonal communication, it is necessary to consider the effectiveness of communication, feelings related to social presence, and also the way of communication from students. As for mediated communication, it is necessary to consider how easy and comfortable it is to communicate, their behavior in using e-learning, and also whether the online environment can support effective communication. Further studies can combine the various themes obtained in this study as variables that will be tested for their significance. As for the qualitative realm, further studies can see how students' perspectives and experiences are based on the themes that have been identified.

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