GEN Z DIGITAL COMMUNICATION PATTERNS IN USING LEARNING MANAGEMENT SYSTEM

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Article Info	Abstract
	Digital communication patterns are increasingly being applied, especially in the field of education. This has several impacts on students who are accustomed to offline or face-to-face lectures. The purpose of this research is to apply communication patterns in the context of online education through the e-learning Learning management system (LMS) at the Institute of Management Wiyata Indonesia to gen z students, lecturers act as a source of information, the media or technology used acts as a sender, students as recipients, and the goal is student understanding of the messages conveyed, and what are the impacts caused. The research method used is qualitative research method. With a case study approach, this research is field research because the data is obtained directly from the sources, which are five gen z students and one communication science lecturer. The results showed that the communication pattern was categorised as a communication pattern by applying 4 communication patterns, some of these stages were only carried out only during the online learning process. By applying a computer-based communication method through the Learning Management platform, the communication pattern is categorised as a communication pattern by applying 4 communication patterns. **Keywords**: *Communication Pattern, Digital, Learning Management System.*

INTRODUCTION

The development of digital information and communication technology (Koh & Kan, 2021) that develops in the learning process has a very significant impact, especially, (Hernandez-de-Menendez et al., 2020).Teaching and learning activities involve communication, which is basically the transmission of messages from sender to receiver through channels or media (Koh & Kan, 2021). The information conveyed in teaching and learning activities comes from lecturers or experts senders and affects the learning process of students receivers (González et al., 2022).

In order for the learning process to be systematic and deductive, the learning system must follow a certain sequence and include all the necessary components Usually, (Nugraheni et al., 2022) teaching and learning activities take place in classrooms with direct interaction and are facilitated by teachers or lecturers (Hernandez-de-Menendez et al., 2020). This traditional approach to teaching is usually referred to as a conventional learning pattern that mainly involves face-to-face lecture activities (Koh & Kan, 2021).

According (Rahmawati & Sujono, 2021) learning usually focuses on the traditional approach to learning as an effective method for conducting educational activities. This is supported by the views of a number of educators and academics who argue that direct interaction can effectively convey information and its meaning to students. In contrast, the face-to-face learning approach (Yu, 2020) prioritises memorisation with limited time for students to reflect on the material and relate it to their existing knowledge, let alone apply it in their future work (González et al. 2022).

Information and communication technology (Koh & Kan, 2021) plays a significant role in reshaping education and face-to-face learning methods, despite various opinions about it. Today, innovative learning approaches are emerging through the utilisation of digital platforms, which facilitate interaction between educators and learners, commonly known as online learning. Online learning, also referred to as e-learning, is an educational platform conducted through the internet. However, online learning is (Yildirim & Usluel, 2022) just one aspect of 'distance learning', a broad term that encompasses all educational processes involving teachers and learners at a distance, who are not necessarily in a conventional classroom (Roman & Plopeanu, 2021).

Online education offers unique benefits

by catering for students who may face challenges in attending face-to-face classes, whether due to geographical distance, personal barriers, or time constraints (Rahmawati & Sujono, 2021). Moreover, the inherent flexibility of online learning allows students to take control of their schedules and effectively overcome time constraints when applying the learnt material into workplace scenarios (Hwang et al., 2021).

In the world of online education, the learning process can take place synchronously, asynchronously, or a combination of both. Synchronous learning happens in real-time, while asynchronous learning does not. In the late 20th century, synchronous learning was dominant in online education and involved live video, chat rooms, instant messaging and SMS. Through synchronous chat rooms and instant messaging, users have the ability to organise participation in chat rooms (Roman & Plopeanu, 2021). The use of technology also includes the integration of communication and collaboration elements in digital literacy, which includes individual competence components such as usage skills, critical understanding, and communicative ability (González et al., 2022).

Digital learning process described above utilises digital communication as a means of transmission. Digital communication involves the transfer of data through a system of communication channels, either Point-To-Point or Point-To-Multipoint. In contemporary society, digital communication plays an important role in various aspects of life, providing significant time, cost and energy savings (Rahmawati & Sujono, 2021). Shannon and Weaver in (Adanlawo et al., 2021) developed a communication model in 1949, which describes the transmission of a message from an information source to a transmitter. The transmitter then sends a signal to convey the message to the receiver. An important component of this communication model is noise, which refers to unwanted interference that can interfere with the delivery of a message from its source. Subsequently, the message is reconstructed from the signal and sent to the receiver, ultimately reaching its destination with the goal of understanding how the brain processes the message (Koh & Kan, 2021).

This research aims to apply Effendy's communication patterns in (Nurhaliza et al., 2023) in the context of online education through the e-learning Learning management system (LMS) at the Wiyata Indonesia Institute of Management to gen z students majoring in communication science, the lecturer acts

as a source of information, the media or technology used acts as a sender, students as recipients, and the goal is student understanding of the messages conveyed. With Indonesia's diverse demographics and psychographics, it is important to consider sources of noise. In digital communication (Rahmawati & Sujono, 2021) noise noise is characterised as unwanted signals that can interfere with message delivery. Noise can manifest as technical glitches such as signal interruptions, issues with technological infrastructure, and device incompetence: as well as social factors such as the challenges faced by individuals in remote communities who are unfamiliar with technology and their socioeconomic status. In addition, noise can also result from the absence of social presence, which can significantly affect the online learning environment (González et al., 2022).

The effectiveness of online learning (González et al., 2022) has grown significantly in recent times, offering a potential substitute for face-to-face interaction through the use of e-learning platforms or so-called learning management systems (LMS). This approach utilises digital communication methods that are already frequently used in daily routines, including social media and websites that can be accessed via mobile phones or laptops (Hernandez-de-Menendez et al., 2020). While these methods can be very effective with the right resources, they can also pose challenges for both senders and receivers, especially when learning occurs unexpectedly and without prior preparation (Rahmawati & Sujono, 2021).

A personalised e-learning learning management system (LMS) (Kozlova & Pikhart, 2021) that adapts to each gen z student can improve the learning process by identifying their strengths and weaknesses (Nugraheni et al., 2022). This system (Yu, 2020) has the ability to dynamically adjust lessons, customise communication and adapt teaching strategies. Artificial Intelligence (AI) provides an effective tool for developing adaptive systems, with various intelligence techniques being explored. AI techniques focus on representing pedagogical knowledge, building knowledge bases for subject matter and teaching strategies, and creating student models based on explicit knowledge of gen z student behaviour or analysis of errors and misconceptions. Through the use of AI, Computer-Assisted Instruction systems can be personalised to suit the unique characteristics, personalities and learning abilities of gen z students (Kacprzyk, 2014).

Key issues lie in the difference between the concept of learning management system (LMS)

e-learning system users (Rahmawati & Sujono, 2021) and the concept of students. In a typical web system, users have the freedom to navigate while the system attempts to anticipate their next actions by utilising user models to improve interaction. In contrast, in e-learning systems (Yildirim & Usluel, 2022), modelling should enhance the educational process by adapting it to unique lesson models. Therefore, it becomes very important to monitor and evaluate 'student exploration': gen z students (Hernandez-de-Menendez et al., 2020) should not have unfettered freedom to act at will (Mok et al., 2021), but rather should be guided through a specific educational path and experience continuous assessment of their performance towards specific educational goals. Currently, evaluations in e-learning systems, such as ongoing verification of the results of training in the use of e-learning systems, are mostly conducted through multiple-choice questionnaires (Kozlova & Pikhart, 2021).

LMS (Learning Management System) is a digital platform specifically designed to support the learning process. LMS serves as a center to manage, distribute, and track learning activities(Kozlova & Pikhart, 2021). Simply put, an LMS is like a virtual classroom for lecturers. Creating and uploading course materials, assigning tasks, and monitoring student progress, participants in the LMS access course materials, work on assignments, interact with teachers and fellow students, and take exams or quizzes (Yildirim & Usluel, 2022).

Uploading various types of content such as text, images, videos, presentations, and quizzes, Monitoring student activities (Mok et al., 2021), such as time spent studying, exam scores, and progress in completing assignments. Communication allows interaction between teachers and students through discussion forums, private messages, or video conferencing. provides various tools to create and manage assessments, such as quizzes, exams, and assignments. The LMS used in this lesson takes the form of moodle, one of the most widely used open-source LMS (Ahmad et al., 2023).

Models of learning through (Ahmad et al., 2023) students' LMS, which are often built based on an assessment of individual learning gains when using the system and student characteristics, remain prototypes because of the challenge of articulating, in terms of explicit knowledge rules, the diverse behaviours exhibited by all students using an e-learning system or learning management system (LMS) (Ou et al., 2024).

Learning management system (LMS) of Institut Manajemen Wiyata Indonesia already has educational content services for students to access on the web lmsimwi.mandiribelajar.co.id various menus are easy to use from the LMS such as access to learning materials, quizzes for each meeting, attendance, collecting assignments in the drop box, etc.

Figure 1. Main Page of External Public Relations Course (Material, Drop Box, Attendance)
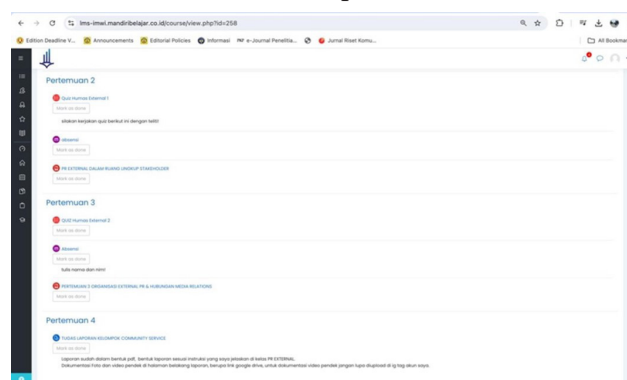
source: lms-imwi.mandiribelajar.co.id/mod/quiz/attempt.php?attempt=9257&cmid=8218

Figure 2. External Public Relations quiz menu
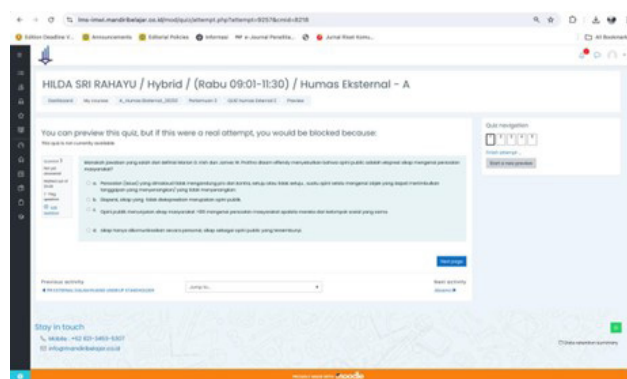
source: lms-imwi.mandiribelajar.co.id/mod/quiz/attempt.php?attempt=9257&cmid=8218

Humans are essentially social beings who engage in educational activities and collaborate in a group (Pichler et al., 2021). This (Rahmawati & Sujono, 2021) research explores digital media communication in Indonesia, focusing on Ruangguru, the largest online learning platform in Indonesia. This research uses a descriptive qualitative approach with a case study method to analyse communication patterns in Ruangguru using social presence theory. The findings of this study highlight the benefits of online learning but also show that online learning cannot fully replace traditional learning due to the limitations of social context. Technical issues in online communication,

such as technological infrastructure and teacher/student readiness, remain a challenge in Indonesia (Hernandez-de-Menendez et al., 2020)

Research conducted (Ahmad et al., 2023) Online learning and technology acceptance are very important things in the field of information technology. The challenges of e-learning acceptance and adoption in higher education are complex and diverse. It is important to carefully consider the environmental, social, and economic implications of e-Learning implementation (Ou et al., 2024) and strive to ensure that eLearning programmes are accessible, equitable, and sustainable in the long term. Various theories and models have been put forward over the years to explain individual usage and behaviour, as well as to measure acceptance and satisfaction levels regarding technology acceptance and online learning (Hernandez-de-Menendez et al., 2020). This research studies the barriers and constraints to acceptance and adoption of online learning over the past decade (2012-2022) (Ahmad et al., 2023).

Issues (Ou et al., 2024) such as lack of technical support, awareness, institutional readiness, quality of online course content, and inadequate information technology skills of institutions at the initial stage are significant challenges. In addition, self-efficacy, financial and technological considerations, pedagogical learning, socio-economic advancement, digital proficiency and compatibility, and inadequate technological infrastructure have significantly impacted the adoption of eLearning in higher education institutions in recent times (Ahmad et al., 2023).

The uniqueness of this research is that after the impact of the covid 19 pandemic which requires 100% online learning, Institut Manajemen Wiyata Indonesia has implemented a hybrid learning system from 2023 where students conduct face-to-face and online lectures through zoom according to a predetermined schedule as a strengthening of communication patterns. This research was conducted on the focus of informants, namely gen z students of the IMWI communication science study programme.

Communication Patterns

Communication patterns according to Effendy in (Nurhaliza et al., 2023) refer to the ways individuals or groups interact and exchange information. These patterns are complex structures involving various interconnected elements that work together to provide a comprehensive picture of the ongoing communication process. These patterns (Hidayati & Saputra, 2020) essentially outline the shape or framework of the relationship between the various parties involved in sending and receiving messages effectively to ensure the intended message is understood (Nguyen et al., 2020). In essence, communication patterns can be understood as methods used by individuals or groups to communicate. There are four main categories of communication patterns outlined by Effendi in (Nurhaliza et al., 2023).

1. Primary Communication Pattern

Effendy's primary communication pattern in (Nurhaliza et al., 2023) involves the use of symbols to transmit ideas from sender to receiver. This pattern includes two types of symbols: verbal and nonverbal symbols. Verbal symbols consist of language, which serves as a key element in verbal communication. Language is (Kaufmann & Vallade, 2022) often used because of its ability to effectively articulate the sender's ideas. On the other hand, nonverbal symbols include communication elements beyond language, such as body movements (Ou et al., 2024).

2. Secondary Communication Patterns

Effendy's secondary communication pattern in (Nurhaliza et al., 2023) involves the use of tools as a second medium after the use of symbols to convey messages from communicators to communicants (Thoma et al., 2019). This second medium is used to reach communicators who are at a distance from the communicator, as well as in situations where there are many audiences (Seo et al., 2021).

3. Linear Communication Pattern

This Effendy linear communication pattern in (Nurhaliza et al., 2023) usually appears in face-to-face interactions, although it can also appear in media communication. The presence of a pre-communication planner can increase the effectiveness of message delivery in this pattern (Seo et al., 2021).

4. Circular Communication Pattern

Effendy's concept of circular communication patterns in (Nurhaliza et al., 2023) is characterised by the continuous delivery of messages, which leads to a reciprocal relationship between communicators and communicants. This mutual interaction is critical to the success of the communication process, as it fosters a continuous pattern of exchange between the parties involved.

Online learning, also referred to as e-learning, involves the utilisation of technology to facilitate distance education (Kozlova & Pikhart, 2021). In the context of online learning, secondary communication patterns are often employed, using alternative tools as secondary communication media (Wong et al., 2021). These tools include online platforms such as Learning management system (LMS), Zoom, Google Meet, WhatsApp groups, The flexibility of online learning allows educators and learners to engage in learning activities anytime and from anywhere (Agboola et al., 2023).

The rise of online learning can be attributed to the outbreak of the Covid-19 pandemic in Indonesia in 2020-2022 (Matete et al., 2023), which prompted educational institutions at all levels to shift from traditional face-to-face classroom settings to online learning environments to curb the spread of the virus (Escorcia Guzman et al., 2021).

Diagram 1: Theoretical Review of Communication Patterns

Learning management system (LMS)

The use of e-learning (Nguyen et al., 2022) at Institut Manajemen Wiyata Indonesia focuses on integrating digital technology-based approaches and digital communication reasoning. The concept of Learning management system (LMS) learning (involving a clear distinction between teachers and learners, utilising various media to facilitate the educational process and overcome physical separation (Potter et al., 2022).

(Ahmad et al., 2023) further outlines six key characteristics of distance learning systems, which include: (1) Physical and instructional separation between teachers and learners; (2) Involvement of educational institutions, which distinguishes it from self-directed learning; (3) Integration of technological

devices; (4) Facilitation of interactive communication channels; (5) Limited potential for face-to-face interaction; and (6) Involvement in education industry activities. Providing flexible learning services through IMWI's Learning management system (LMS), as well as being able to implement education costs that are more affordable for all levels of society (Yustinus Budi Hermanto, 2021).

There are advantages and disadvantages associated with the utilisation of online learning. According (Susilo et al., 2020), Virtual Learning conceptually has the potential to significantly improve the quality of education (Seo et al., 2021).

This includes the ability to facilitate communication among participants, as well as access to learning materials without being restricted by physical location or time constraints (Szymkowiak et al., 2021). Therefore, online-based learning promotes the idea of flexible learning opportunities that can be done at any location and time. On the other hand, one of the disadvantages of online learning is the considerable cost of implementation (Kozlova & Pikhart, 2021).

It is interesting to investigate the utilisation of e-learning in distance education (Szymkowiak et al., 2021),, given the many features that can enhance the online learning process. However, the question arises whether e-learning can fully replace lecturers' presence in the classroom to maximise academic achievement levels (Mheidly et al., 2020). This research focuses on analysing the communication patterns of the interviewees regarding the use of e-learning.

METHOD

This research uses qualitative methodology as described by (Rashid et al., 2019) with a case study approach where case studies function as in-depth descriptions and interpretations of various aspects of individuals, groups, organizations (communities), programs, or social settings. Researchers who conduct case studies aim to collect various kinds of data about the subject being studied. The methodologies used in case studies are diverse, including observation, interviews, document analysis, and other relevant data to provide a comprehensive picture of the case.

According to Lincolin and Guba (Creswell 2018) Case studies serve as the primary method for emic research by presenting the perspective of the subject under study. Case studies offer comprehensive descriptions that reflect the real-life experiences of the readers. According to (Creswell 2018), case studies allow readers to identify internal consistency,

which includes stylistic and factual coherence, as well as trustworthiness. In addition, case studies offer detailed descriptions that are important for assessing transferability, and case studies are also conducive to evaluating the contextual factors that shape the meaning of the phenomenon under study (Cole, 2023).

This research examines Gen Z student informants from the IMWI communication science study programme who have used the Learning Management System (LMS) for one year. Data collection for this study was conducted through observation and interviews with informants 5 students and one communication science lecturer. The term 'case study' usually involves a detailed and thorough investigation of an individual or organisation. However, in this context, 'case' can also refer to multiple instances, indicating that case studies can involve the use of multiple cases for analysis. It is important to note that case studies are distinct entities and comprehensive(Creswell 2018).

The interviews were conducted using the FGD (Focus Group Discussion) technique with the FGD interview technique focusing on 6 interviewees as listed in table 1 who have used the learning management system (LMS) for 1 year. As said by (Creswell 2018) this interview technique is suitable when you want to get in depth information from individuals, especially if the topics discussed are sensitive or personal.

Data processing in qualitative is commonly called triangulation to strengthen the credibility of research, (Cole, 2023) explains that triangulation is a technique used in qualitative research to increase the credibility and validity of research findings. This concept refers to the use of various data sources, methods, or researchers to verify and enrich the data that has been collected. In other words, triangulation aims to get a more comprehensive and accurate picture of the phenomenon being studied.

In this journal, the data obtained from FGD interviews, in the form of voice recordings from the interviewees, is processed by triangulation, the data obtained is obtained to be able to answer research questions that focus on gen z communication patterns, namely students in learning learning management systems.

Through interviews obtained from sources, researchers use coding in qualitative research methods as said by (Morgan & Nica, 2020)Researchers employ coding in qualitative research methods, as indicated by interviews gathered from various sources (Eakin & Gladstone,2020).

Table 1. Matrix of Research Informants

Informant	Class	Semester
AA	B	6
CA	B	6
EA	B	6
NA	B	6
YI	B	6
IMWI (Lecturer)	-	1

Through interviews obtained from sources, researchers use coding in qualitative research methods as said by (Morgan & Nica, 2020)Researchers employ coding in qualitative research methods, as indicated by interviews gathered from various sources (Eakin & Gladstone, 2020).

In the realm of coding (Eakin & Gladstone, 2020), researchers engage in the practice of "symbolically assigning a summative, salient, essence-capturing and/or evocative attribute" to specific data segments, which can also be relevant to other segments. Commonly, this process is likened to categorizing similar data segments into "buckets." More precisely, coding encompasses a variety of actions that facilitate interaction with data throughout the research process, wherein labels establish connections between data segments and underlying concepts(Mezmir, 2020).

The process of coding involves the careful examination, contemplation, and arrangement of gathered data, linking these observations to theoretically significant abstract concepts, potential correlations, and research inquiries (Mezmir, 2020). This method is applicable in both deductive and inductive research frameworks. Coding can exhibit a high degree of dynamism and adaptability or may be more structured and sequential. It is important to note that coding is merely one analytical approach among many and is not without its controversies. For instance, some researchers have critiqued coding as a "quasi-statistical analytic practice. (Morgan & Nica, 2020), arguing that it relies on a "naïve model of the natural sciences to interpret human phenomena".

Confidentiality of sources represents a fundamental ethical principle in qualitative research (Taquette & Borges da Matta Souza, 2022) . This principle ensures that the identities and personal details of participants gathered during the study remain undisclosed to external parties unless explicit consent is provided. Its primary objective is to safeguard participants from any potential harm or adverse consequences that could result from their

participation in the research. The informant table shown in table 1, in this study shows that the informant is used with confidentiality because the informant is a student.

RESULTS AND DISCUSSION

1. Primary Communication Pattern

Effendy's communication pattern theory, it was said that primary communication pattern in (Nurhaliza et al., 2023) involves the use of symbols to transmit ideas from sender to receiver. This pattern includes two types of symbols: verbal and nonverbal symbols. Verbal symbols consist of language, which serves as a key element in verbal communication. Language is (Kaufmann & Vallade, 2022) often used because of its ability to effectively articulate the sender's ideas. On the other hand, nonverbal symbols include communication elements beyond language, such as body movements (Ou et al., 2024).

In every interaction between individuals, there are different communication patterns, ranging from interpersonal communication to group communication and mass communication (Gandasari, 2020). Communication between teachers and gen z students is included in group communication, each of which has a unique communication pattern.(Qodriani & Wijana, 2021). To find out whether there is a shift in communication patterns during lectures with a hybrid system, researchers collected data from various gen z students and teachers. The following findings are the results of interviews conducted by researchers.

This change has an impact on students who are used to traditional classroom learning, it is imperative for students and lecturers to engage in effective communication to facilitate information exchange and ensure mutual understanding. This is critical to achieving shared educational goals and improving understanding of the learning materials presented by lecturers.

AA who is one of the students of the communication science study program, in the interview he argued as follows:

Questions asked with AA students: What do you think is the experience between online learning and traditional learning?

> "From my point of view, I do not find a striking difference between verbal and non-verbal symbols in online and offline lectures because both only involve a shift in the tools used. In face-to-face lectures, projectors are used to assist the learning process, while online lectures rely on smartphones or laptops, supported by a reliable signal connection.

Both methods use electronic media, although in different forms. The communication patterns carried out by lecturers also often ask students, providing effective communication, while in non-verbal communication most students in online classes are off camera." (S1W1J1)

The change in communication patterns between students and lecturers during online courses has been a subject of debate among students. Some students reported that they had difficulty in following online lectures due to the perceived changes.

They stated that online lectures felt shorter than face-to-face lectures, with fewer discussion sessions, which led to a decrease in enthusiasm and understanding of the material. A resource person, when interviewed by researchers, confirmed that the changes in communication patterns from online learning in 2020-2022 Covid-19, still have a very significant impact on the learning process, namely the many changes in primary communication patterns, some students experience problems due to these changes, but others do not feel a significant impact on the online learning process.

This difference of opinion is caused by the way of thinking and reasoning of each student in responding to the phenomena that occur. In offline lectures, primary communication patterns involve the exchange of thoughts, feelings and information using verbal and non-verbal language. Immediate feedback is a characteristic of this primary communication pattern, where the response from the communicant can be known immediately Effendy (Nurhaliza et al., 2023)

During the learning process, face-to-face communication can be classified as small group communication, which allows each member to express their respective opinions while still following the rules set by the group.

Questions asked by the researcher: how are the communication patterns formed in the learning process? Are there any obstacles experienced?

CA who is one of the students of the communication science study program, in the interview he argued as follows:

> "Until now, I believe that the communication between the lecturer and me has been effective, although there have been some instances where I may have misunderstood the message conveyed, and vice versa." (S1W2J2)

In a separate question, a lecturer and a group of students expressed similar viewpoints. This suggests that the delivery of information through lectures, even when conducted by knowledgeable lecturers and

utilizing advanced technology, can still be interpreted variously by students.

The dissemination of lecture materials can include both verbal and nonverbal forms of communication, which are often facilitated through digital platforms. Each student has a unique ability to understand and interpret the information presented, not all messages conveyed to students can be received 100% perfectly. The delivery of lecture material can be in the form of verbal or nonverbal language and delivered through computer media, namely the Learning Management System (LMS) media, Human cognition and responses to external stimuli vary among individuals.

The exchange of information between lecturers and students in an online environment tends to be more protracted than face-to-face interactions. Research shows that students often interact with lecturers through messaging applications such as WhatsApp outside of scheduled online sessions, causing potential delays in the communication process.

Each student has a unique ability to understand the communicated message. Each individual has different cognitive abilities. The interaction between lecturers and students in virtual lectures is more time-consuming compared to face-to-face lectures. Research has revealed that outside the virtual classroom, students often use WhatsApp to communicate with lecturers. This form of communication often results in delays in processing information.

2. Secondary Communication Patterns

Effendy's secondary communication pattern in (Nurhaliza et al., 2023) involves the use of tools as a second medium after the use of symbols to convey messages from communicators to communicants (Thoma et al., 2019). This second medium is used to reach communicators who are at a distance from the communicator, as well as in situations where there are many audiences (Seo et al., 2021).

Therefore, the secondary communication pattern focuses on the use of the Learning Management System (LMS), each member in this small group can communicate with each other member, without having to go through intermediaries first like other types of patterns. Another case if you switch to online lectures that require using electronic media such as smartphones or laptops and then supported by the internet network. The communication pattern that occurs during the learning process is the secondary communication pattern through the Learning Management System (LMS) tool.

In this secondary communication pattern, the focus on the use of media for learning dynamics changes when switching to online lectures, where electronic devices such as smartphones or laptops, as well as internet connectivity, become very important. The communication pattern then transitions to a secondary form through the Learning Management System (LMS) during the learning process.

Secondary communication patterns involve the use of computer-based communication tools and internet networks to facilitate long-distance communication. According to the interviewees, this communication pattern is evident in the online class setting where students fill in their attendance on the Learning Management System (LMS) site.

https://lms-imwi.mandiribelajar.co.id https://lms-imwi.mandiribelajar.co.id IMWI as a way to show their presence during the learning process. Next, proceed to access supporting apps such as Zoom Cloud Meetings or Google Meet. Typically, classes are initiated by education personnel who create a class in the app and share the link in the group chat for student access. Alternatively, it is not uncommon for lecturers to create classes and distribute links in group chats for other students and lecturers to join.

The main purpose of the secondary communication pattern is that students can understand during the learning process by the way lecturers convey learning material to students properly and students can understand the material provided by lecturers.

Questions asked with students: Based on your experience as a student who has been doing online learning since 2020, do you understand traditional learning or online learning better?

The following is a statement given by a student resource person of the communication science study program Class of 2022 EA:

> "I think that my understanding of the course material is better when I attend face-to-face classes, compared to online classes. Despite not understanding the material as thoroughly as I do in face-to-face classes, I can still understand the material presented by the instructor during online classes." (S1W3J3)

According to Effendy's theory of secondary pattern communication, media serves as a crucial symbol that facilitates interaction between the communicator and the communicant. In the context of this study, the focus is on learning management systems (LMS) as a pivotal medium for communication between lecturers and students.

The intriguing aspect arises from the

author's discussions with students specializing in communication science.it is evident that some students find offline lectures more convenient and conducive to understanding the material. They feel that there are fewer barriers to understanding the message, and they can easily ask questions in person. On the other hand, online classes sometimes present challenges in understanding the material provided by the lecturer, despite the use of computer technology through the Learning Management System LMS platform. However, researchers found that some students actually felt that they understood the learning material better in online classes compared to face-to-face classes. YI, a Communication Science student, highlighted the ease of understanding lecture materials during online learning, because students can simultaneously listen to explanations and read materials distributed by lecturers in PDF learning file format.

In offline class settings, lecturers rarely distribute lecture materials in the form of pdf files or printed notes. In an effort to improve students' understanding of the course material, assignments are given in both written and practical formats. According to the researcher's findings, the majority of students find the assignments very useful.

This is especially true for practical assignments. The Communication Studies program has a practicum course, making it one of the study programs that have such assignments. In addition, teachers also expressed difficulties in interacting with students during online learning. Despite their efforts to provide detailed and clear explanations of the course materials, some students still struggle to understand the content. This may be due to students' lack of attention during online lectures, as well as individual differences in reasoning.

3. Linear Communication Pattern

This Effendy linear communication pattern in (Nurhaliza et al., 2023) usually appears in face-to-face interactions, although it can also appear in media communication. The presence of a pre-communication planner can increase the effectiveness of message delivery in this pattern (Seo et al., 2021).

Based on the comparison between theory and field data, it proves that, Linear communication patterns, a lecturer resource person from the Communication Studies program, stated that the challenge during the online learning process is not the students themselves, but rather the laptop screen that displays less than 10 students who do not turn on their cameras. Despite efforts to interact with students

by calling their names and greeting them in a friendly manner, it seems that most students are indifferent to the lecturer.

This behavior is not in accordance with the expected behavior of a student, because students are expected to uphold good ethics and show respect to others, especially in the case of communication science students who are expected to show respect to their interlocutors. After the manual attendance process to ensure student attendance in online classes, the next step involves lecturers delivering lecture material as communicators and students as communicants.

Lecturers will distribute course materials to students in the form of pdf files to facilitate learning materials. Another approach is to explain the material and display it through a slideshow, using applications such as Zoom Cloud Meeting. The Zoom application is often used for online lectures because of its benefits. Q&A sessions aim to maintain student interaction during online classes. However, according to the communication science lecturer who became the researcher's resource person, only a few students are actively involved in the question and answer session during the online learning process.

During online classes, it is expected that students will engage in interactive question and answer sessions. However, according to a communication science lecturer who was a resource person for the researcher, only a small percentage of students actively participate in these sessions during the online learning process. Although the lecturers have tried to be interactive, it cannot be assumed that students will reciprocate with the same level of engagement. A communication science student mentioned that lecturers occasionally share additional information after completing course materials in the online learning process.

The subjects covered were related to the lectures, including discussions on thesis title selection and other relevant topics. As per the students, it is common for the lecturers involved in these discussions to have a close relationship with the students. Therefore, not all lecturers engage in sharing sessions with students at the end of class. Following a series of activities in the online learning process, before ending the class, it is common for lecturers and students to document the session by taking screenshots of their laptop or smartphone screens, showing the faces of all participants.

After completing the documentation, lecturers and students start to exit the online learning room one by one. Then, the online learning session ends. During the online learning session, the communication pattern

between lecturers and students is two-way and utilizes electronic media supported by internet connectivity. The communication framework that occurs during online learning session can be categorized as linear communication pattern.

Linear communication patterns in this context include engagement between fellow students as well as engagement between students and lecturers during online lectures. Interactions that occur in the educational environment, namely online learning, have the potential to influence the success of the teaching and learning process.

Questions asked by the researcher: how is the linear communication pattern formed in the learning process? Are there any challenges faced by fellow students?

Communication Science student resource person class of 2022, YI, revealed:

> "I faced challenges in maintaining interactivity during online courses. I am usually engaged in face-to-face classes, enjoying the opportunity to engage in discussions and present arguments in front of my peers. However, my enthusiasm wanes slightly in the online learning environment." (S1W5J4)

Successful communication depends on the mutual desire of both parties involved in the communication process. The shift to online learning due to the Covid-19 pandemic in 2020-2022 has required students and lecturers to engage in remote lectures, leading to a decrease in interaction among students and between students and lecturers

4. Circular Communication Pattern

Effendy's concept of circular communication patterns in (Nurhaliza et al., 2023) is characterised by the continuous delivery of messages, which leads to a reciprocal relationship between communicators and communicants. This mutual interaction is critical to the success of the communication process, as it fosters a continuous pattern of exchange between the parties involved.

Online learning, also referred to as e-learning, involves the utilisation of technology to facilitate distance education (Kozlova & Pikhart, 2021). In the context of online learning, secondary communication patterns are often employed, using alternative tools as secondary communication media (Wong et al., 2021). These tools include online platforms such as Learning management system (LMS), Zoom, Google Meet, WhatsApp groups, The flexibility of online learning allows educators and learners to engage in learning activities anytime and from anywhere (Agboola et al., 2023).

The rise of online learning can be attributed to the outbreak of the Covid-19 pandemic in Indonesia in 2020-2022 (Matete et al., 2023), which prompted educational institutions at all levels to shift from traditional face-to-face classroom settings to online learning environments to curb the spread of the virus (Escorcia Guzman et al., 2021).

The analysis of the relationship between theoretical frameworks and empirical data demonstrates that.in circular communication patterns classifies communication into circular communication patterns, which indicates that communication is facilitated by computers and requires the use of media for message delivery.

This media mainly consists of new media, such as laptops, smartphones, E-Learning web platform applications as learning media. Communication during online lectures requires the use of media such as smartphones and laptops and a stable signal.

Practically speaking, communication between lecturers and students, even when using smartphone or laptop media (through platforms such as WhatsApp, Zoom, and other apps), results in instant feedback. However, distractions on the part of students and lecturers, as well as other unexpected interruptions, can prevent the communication process from running perfectly. Therefore, changes in communication patterns demand increased engagement from both students and lecturers during online lectures to achieve a common goal. This includes lecturers delivering course material effectively and students understanding and assimilating the information delivered (S1W5J6).

Table 2. Structure processed by researchers
Traditional Learning VS Online Learning

Feature	Traditional Learning	Online Learning
Study environment	Physical classroom	Platform digital (LMS)
Communication Patterns	Face-to face with lecturers and classmates	Interaction through discussion forum, chat, video conference
Time and Location	Bound by the class schedule and location	Flexible, you can study anytime and anywhere.

Feature	Traditional Learning	Online Learning
Lesson Content	Textbooks, modules, and other learning media	Various digital formats (text, video, audio, simulation)
Assess-ments	Written exams, assignments, and in-class presentations	Online quizzes, independent assign-ments, online group projects
Focus	Specific knowl-edge and skills	Development of in-dependent, prob-lem-solving, and collaboration skills

The transition of learning from face-to-face classroom meetings to online learning methods has undoubtedly caused negative impacts on communication patterns for both students and lecturers leading to a suboptimal learning experience.

Questions asked with students: In the circular communication pattern, the learning process used is the learning management system, do you think the feedback given by lecturers in online learning is effective when compared to traditional learning?

NA, a student of Communication Studies program at IMWI, said:

> "communication patterns that occur during online learning, especially related to circular communication patterns. The interviewee revealed that signal limitations often made her late for online classes due to difficulties in getting a stable connection. In addition, Nisrina noted that the shift to online learning had reduced her enthusiasm for learning, and attributed this to the different atmosphere at home compared to the face-to-face classroom atmosphere." (S1W4J7)

Communication patterns in traditional learning are generally one-way and hierarchical. Lecturers, as the main source of knowledge, deliver information directly to students. Students, in turn, are expected to receive and understand the information. Lecturers are in full control of the learning process. They determine the subject matter, teaching methods, and evaluation.

Students' opportunities to interact with teachers and classmates tend to be limited. Students act more as recipients of information rather than decision makers, assessments put more emphasis on students' ability to memorize facts and theoretical concepts. students are less trained to think critically, analyze information, and solve problems.

Digital communication patterns in this case the learning management system helps students to be able to access learning materials more easily, as well as the delivery of material that can be directly absorbed by students through features in the LMS in the form of quizzes, learning materials can be applied through discussion forums, and assignments based on project learning which emphasizes students to think critically and creatively, not fixated on the theories taught in class.

The findings of this research are that the informants stated that they prefer face-to-face or traditional learning because of the lack of support sometimes in signal learning for online lecture meetings, but on the other hand, the informants like hybrid blended learning where students are required to come to class, and there are also several online meetings.

Digital Communication Pattern strategies in online learning, creating active discussion forums to encourage students to interact, ask questions, and share opinions. As well as designing group assignments that require communication and cooperation between students. Lecturers provide clear, specific, and timely feedback for each student task or activity. Use a wide variety of supporting media for online learning such as video tutorials, presentations, or recorded discussions to enrich learning materials, as well as using podcasts or voice recordings to deliver materials or provide additional explanations. Visualize complex information into a more understandable form.

Regular communication patterns conduct regular virtual meetings to discuss materials, answer questions, and provide motivation, use notification features to remind students about assignments, deadlines, or important announcements. Allow ample time for students to ask questions or request help.

Adjust Communication Style Understand students' learning styles and communication preferences, use simple and clear language, provide emotional intelligence learning such as making students feel comfortable to ask questions and participate Evaluate each semester students provide feedback on their learning experience, adjust communication strategies based on evaluation results.

CONCLUSION

Based on the findings from the interviews, it can be concluded that Gen Z IMWI students in the communication science study program face challenges in their digital communication patterns while attending online lectures through the LMS system. The main problem identified was signal

limitation due to the geographical distance of each student from the center of Sukabumi City. When interactions occur between individuals with different roles, interference is inevitable and can hinder the flow of communication.

In addition to signal constraints, other disruptions commonly experienced by students as recipients of messages are difficulties in receiving and interpreting messages as intended by lecturers. In addition, from the lecturer's point of view, students' apathy towards online lectures, which is often associated with laziness, is another obstacle. Some students reported that they felt sleepy during the online lectures, which may explain why they chose to turn off their cameras during the session.

Students' decreased motivation to learn will undoubtedly have an impact on their academic performance. Despite the challenges posed by limited internet connectivity, students should strive to maximize their online learning experience when provided with a stable network connection. Similarly, lecturers should actively engage with students to ensure that course materials are well received and understood.

The implication of this study is that online learning, which is increasingly popular especially after the COVID-19 pandemic, provides flexibility and ease of access for students. However, behind these benefits, there are challenges that can impact students' mental health. The lack of face-to-face interaction with classmates and lecturers can trigger feelings of loneliness and isolation. High assignment loads, tight deadlines and the need to be constantly connected to learning platforms can increase stress.

A less conducive learning environment at home, distractions from family or neighborhood, and the temptation to access the internet for other things can interfere with study focus. Students may find it difficult to get social support from classmates or lecturers as during face-to-face learning. Technical obstacles in using online learning platforms can cause frustration and hinder the learning process.

Communication pattern strategies maintain students' mental health, build online communities facilitate social interaction between students through discussion forums, group projects, or other virtual activities. Provide psychological support on campus provide counseling services or psychological support for students in need. provide flexibility in assignment deadlines and assessment methods to reduce student stress.

Encourage students to maintain a balance between study, work, and leisure. Provide relaxation activities to do activities that can reduce stress, such as exercise, meditation, or hobbies, helping students overcome technical problems they may face.

Based on the results of research conducted on the case study "Digital Communication Patterns in Learning Management System Learning" involving IMWI communication science students majoring in communication science that occurs between students and communication science study program lecturers during online learning can be classified into primary, secondary, linear, and circular communication patterns. These communication patterns are facilitated by the LMS platform that utilizes the internet network as a medium for delivering messages. The implementation of those communication patterns in online learning process through LMS has various impacts.

Some students may show a decrease in motivation and engagement in online classes despite the interactive teaching methods used by lecturers. In addition, some students may find it difficult to actively participate in the online class due to difficulties in understanding the course material. The diverse cognitive abilities and learning styles of students further complicate the online learning process, thus posing challenges for lecturers to interact effectively with students.

In this research, the research scope is limited to the Wiyata Management Institute campus located in Sukabumi City, the distribution of diverse sources from various regions around Sukabumi City, Sukabumi Regency, Bogor Regency, and Cianjur Regency.

Suggestions for research on communication patterns of digital learning management systems, research on digital communication can involve various disciplines, such as communication science, psychology, sociology, and computer science, Collaboration with researchers from various fields can produce more comprehensive and innovative research. Research on digital communication must consider the social impact of the technology used will continue to develop until now the industrial era has developed 5.0.

This part presents results/findings and analysis of the findings. Figures or graphs can also be presented here to support your findings. We suggest that you mention supporting instrument(s), in forms of illustration, figure, photograph, table, and graph. Each instrument must be orderly numbered and given a title, followed by source from which you make the citation. Should the instrument is the result from

the author's analysis, please write: 'source: author's analysis.'

In addition this part also contains reflection/discussion according to the research findings. In presenting the discussion, use a comprehensive explanation in order to elaborate the whole data found during the research. By doing so, you can fill gap of knowledge. Findings that rely on meaning construct tends to present a theoretical framework, so there will be an unnecessary repetition as it has been presented in the research methodology.

REFERENCES

Adanlawo, E. F., Reddy, M. M., & Rugbeer, H. (2021). Intercultural Business Communication: The Implications of Language Barriers. Article in Journal of Education & Psychology, 18(5), 6281–6290. www.psychologyandeducation.net

Agboola, O. P., Bashir, F. M., Dodo, Y. A., Mohamed, M. A. S., & Alsadun, I. S. R. (2023). The influence of information and communication technology (ICT) on stakeholders' involvement and smart urban sustainability. Environmental Advances, 13(September), 100431. https://doi.org/10.1016/j.envadv.2023.100431

Ahmad, S., Mohd Noor, A. S., Alwan, A. A., Gulzar, Y., Khan, W. Z., & Reegu, F. A. (2023). eLearning Acceptance and Adoption Challenges in Higher Education. Sustainability (Switzerland), 15(7). https://doi.org/10.3390/su15076190

Cole, R. (2023). Inter-Rater Reliability Methods in Qualitative Case Study Research. Sociological Methods and Research. https://doi.org/10.1177/00491241231156971

Creswell, J. W., & Creswell, J. D. (2018). Mixed Methods Procedures. In Research Defign: Qualitative, Quantitative, and Mixed M ethods Approaches.

Eakin, J. M., & Gladstone, B. (2020). "Value-adding" Analysis: Doing More With Qualitative Data. International Journal of Qualitative Methods, 19, 1–13. https://doi.org/10.1177/1609406920949333

Escorcia Guzman, J. H., Zuluaga-Ortiz, R. A., Barrios-Miranda, D. A., & Delahoz-Dominguez, E. J. (2021). Information and Communication Technologies (ICT) in the processes of distribution and use of knowledge in Higher Education Institutions (HEIs). Procedia Computer Science, 198(2021), 644–649. https://doi.org/10.1016/j.procs.2021.12.300

Gandasari, D. (2020). Evaluation of Online Learning with Digital Communication media during Abstract the COVID 19 Pandemic. Journal of the Social Sciences, 48(3), 3621–3628. http://www.apcjss.com/publication-show/2020/April/90/2825

González, C., López, D., Calle-Arango, L., Montenegro, H., & Clasing, P. (2022). Chilean University Students' Digital Learning Technology Usage Patterns and Approaches to Learning. ECNU Review of Education, 5(1), 37–64. https://doi.org/10.1177/20965311211073538

Hernandez-de-Menendez, M., Escobar Díaz, C. A., & Morales-Menendez, R. (2020). Educational experiences with Generation Z. International Journal on Interactive Design and Manufacturing, 14(3), 847–859. https://doi.org/10.1007/s12008-020-00674-9

Hidayati, D., & Saputra, W. A. (2020). Implementation of online learning during the covid-19 epidemic in Indonesia: Assessment of higher education students' use and implementation of online learning technology. Universal Journal of Educational Research, 8(10), 4514–4519. https://doi.org/10.13189/ujer.2020.081019

Hwang, G. J., Wang, S. Y., & Lai, C. L. (2021). Effects of a social regulation-based online learning framework on students' learning achievements and behaviors in mathematics. Computers and Education, 160, 104031. https://doi.org/10.1016/j.compedu.2020.104031

Kacprzyk, J. (2014). Studies in computational intelligence. In Studies in Computational Intelligence (Vol. 534). https://doi.org/10.1007/978-3-319-03419-5

Kaufmann, R., & Vallade, J. I. (2022). Exploring connections in the online learning environment: student perceptions of rapport, climate, and loneliness. Interactive Learning Environments, 30(10), 1794–1808. https://doi.org/10.1080/10494820.2020.1749670

Koh, J. H. L., & Kan, R. Y. P. (2021). Students' use of learning management systems and desired e-learning experiences: are they ready for next generation digital learning environments? Higher Education Research and Development, 40(5), 995–1010. https://doi.org/10.1080/07294360.2020.1799949

Kozlova, D., & Pikhart, M. (2021). The use of ICT in higher education from the perspective of the university students. Procedia Computer Science, 192, 2309–2317. https://doi.org/10.1016/j.procs.2021.08.221

Matete, R. E., Kimario, A. E., & Behera, N. P. (2023). Review on the use of eLearning in teacher education during the coronavirus disease (COVID-19) pandemic in Africa. Heliyon, 9(2), e13308. https://doi.org/10.1016/j.heliyon.2023.e13308

Mezmir, E. A. (2020). Qualitative Data Analysis: An Overview of Data Reduction, Data Display and Interpretation. Research on Humanities and Social Sciences, 10(21), 15–27. https://doi.org/10.7176/rhss/10-21-02

Mheidly, N., Fares, M. Y., & Fares, J. (2020). Coping With Stress and Burnout Associated With Telecommunication and Online Learning. Frontiers in Public Health, 8(November). https://doi.org/10.3389/fpubh.2020.574969

Mok, K. H., Xiong, W., & Bin Aedy Rahman, H. N.

(2021). COVID-19 pandemic's disruption on university teaching and learning and competence cultivation: Student evaluation of online learning experiences in Hong Kong. International Journal of Chinese Education, 10(1). https://doi.org/10.1177/22125868211007011

Morgan, D. L., & Nica, A. (2020). Iterative Thematic Inquiry: A New Method for Analyzing Qualitative Data. International Journal of Qualitative Methods, 19, 1–11. https://doi.org/10.1177/1609406920955118

Nguyen, M. H., Gruber, J., Fuchs, J., Marler, W., Hunsaker, A., & Hargittai, E. (2020). Changes in Digital Communication During the COVID-19 Global Pandemic: Implications for Digital Inequality and Future Research. Social Media and Society, 6(3). https://doi.org/10.1177/2056305120948255

Nguyen, M. H., Gruber, J., Marler, W., Hunsaker, A., Fuchs, J., & Hargittai, E. (2022). Staying connected while physically apart: Digital communication when face-to-face interactions are limited. New Media and Society, 24(9), 2046–2067. https://doi.org/10.1177/1461444820985442

Nugraheni, A. S., Dian, R., & Putri, P. (2022). Online Learning Patterns for Indonesian Lessons During the Covid-19 Pandemic. Curricula : Journal of Teaching and Learning, 6(3), 134–142. https://doi.org/10.22216/curricula.v6i3.765

Nurhaliza, S., Rinjani, N., & Firdaus, J. N. (2023). Pola Komunikasi Mahasiswa Dalam Pembelajaran Daring. Prosiding Seminar Nasional, 406–416.

Ou, A. W., Gu, M. M., & Lee, J. C. K. (2024). Learning and communication in online international higher education in Hong Kong: ICT-mediated translanguaging competence and virtually translocal identity. Journal of Multilingual and Multicultural Development, 45(5), 1732–1745. https://doi.org/10.1080/01434632.2021.2021210

Pichler, S., Kohli, C., & Granitz, N. (2021). DITTO for Gen Z: A framework for leveraging the uniqueness of the new generation. Business Horizons, 64(5), 599–610. https://doi.org/10.1016/j.bushor.2021.02.021

Potter, R. E., Dollard, M., Pignata, S., Zadow, A., & Lushington, K. (2022). Review of practice & policy strategies for managing digital communication and ICT use in Australian universities. Computers in Human Behavior Reports, 5, 100160. https://doi.org/10.1016/j.chbr.2021.100160

Qodriani, L. U., & Wijana, I. D. P. (2021). The 'New' Adjacency Pairs in Online Learning: Categories and Practices . Proceedings of the Ninth International Conference on Language and Arts (ICLA 2020), 539(Icla 2020), 121–125. https://doi.org/10.2991/assehr.k.210325.022

Rahmawati, A., & Sujono, F. K. (2021). Digital Communication through Online Learning in Indonesia: Challenges and Opportunities. Jurnal ASPIKOM, 6(1), 61. https://doi.org/10.24329/aspikom.v6i1.815

Rashid, Y., Rashid, A., Warraich, M. A., Sabir, S. S., & Waseem, A. (2019). Case Study Method: A Step-by-Step Guide for Business Researchers. International Journal of Qualitative Methods, 18, 1–13. https://doi.org/10.1177/1609406919862424

Roman, M., & Plopeanu, A. P. (2021). The effectiveness of the emergency eLearning during COVID-19 pandemic. The case of higher education in economics in Romania. International Review of Economics Education, 37(54), 100218. https://doi.org/10.1016/j.iree.2021.100218

Seo, K., Tang, J., Roll, I., Fels, S., & Yoon, D. (2021). The impact of artificial intelligence on learner–instructor interaction in online learning. International Journal of Educational Technology in Higher Education, 18(1). https://doi.org/10.1186/s41239-021-00292-9

Susilo, A., Darojat, O., & Suhardi, D. A. (2020). Survei Kesiapan Dan Kepuasan Mahasiswa Terhadap Layanan Proses Pembelajaran Dalam Jaringan Universitas Terbuka Saat Pandemic Covid 19. Jurnal Pendidikan Terbuka Dan Jarak Jauh, 20(2), 114–130. https://doi.org/10.33830/ptjj.v20i2.839.2019

Szymkowiak, A., Melović, B., Dabić, M., Jeganathan, K., & Kundi, G. S. (2021). Information technology and Gen Z: The role of teachers, the internet, and technology in the education of young people. Technology in Society, 65(December 2020). https://doi.org/10.1016/j.techsoc.2021.101565

Taquette, S. R., & Borges da Matta Souza, L. M. (2022). Ethical Dilemmas in Qualitative Research: A Critical Literature Review. International Journal of Qualitative Methods, 21, 1–15. https://doi.org/10.1177/16094069221078731

Thoma, B., Turnquist, A., Zaver, F., Hall, A. K., & Chan, T. M. (2019). Communication, learning and assessment: Exploring the dimensions of the digital learning environment. Medical Teacher, 41(4), 385–390. https://doi.org/10.1080/0142159X.2019.1567911

Wong, A., Ho, S., Olusanya, O., Antonini, M. V., & Lyness, D. (2021). The use of social media and online communications in times of pandemic COVID-19. Journal of the Intensive Care Society, 22(3), 255–260. https://doi.org/10.1177/1751143720966280

Yildirim, D., & Usluel, Y. (2022). Interrelated analysis of interaction, sequential patterns and academic achievement in online learning. Australasian Journal of Educational Technology, 38(2), 181–200. https://doi.org/10.14742/ajet.7360

Yu, E. (2020). Student-Inspired Optimal Design of Online. Journal of Educators Online, 17(1).

Yustinus Budi Hermanto, V. A. S. (2021). The Challenges of Online Learning During the Covid-19 Pandemic. ELearning and Software for Education Conference, 54, 176–181. https://doi.org/10.12753/2066-026X-21-023