CHAPTER III

RESEARCH METHODOLOGY

This chapter outlines the methods used in this research to explore the use level of digital literacy, how the teachers integrate their digital literacy skills in their teaching practice, and the challenges they face. It describes the research design, site, participants, data collection methods, and data analysis technique. A case study was chosen to describe the research methodology. This study was conducted in primary and secondary school and involved two EFL novice teachers, and data was collected through questionnaires, classroom observation, and interviews.

3.1 Research Design

This study was conducted through a qualitative research approach, especially a case study, allowing the researcher to retain real-life events' holistic and meaningful characteristics such as individual life cycles, small group behavior, organizational and managerial processes, neighborhood changes, and school performance (Yin, 2009). The case of this study is an investigation of how two EFL novice teachers integrate their digital literacy skills into classroom teaching practices, focusing on how digital tools are integrated into teaching and learning activities, experiences, and challenges in utilizing digital tools for educational purposes. Hence, the qualitative approach is suitable for this study because it analyzes a specific phenomenon related to a person, group, community, and other social matters (Bassey, 1999).

Qualitative research is particularly suitable for exploring the digital literacy of EFL novice teachers because it provides rich, contextual insights into their experiences with digital tools, and qualitative research focuses on the lived experiences of individuals, providing a deeper understanding of how novice teachers interact with digital tools and environments. Through interviews, questionnaires and observations, qualitative research allows for exploring contextual elements such as socioeconomic status, institutional support, and

personal background. It offers a comprehensive view of novice teachers' barriers in real-life teaching practice and strategies for developing digital skills.

This case study was chosen in this study because it aligns with the statements of various scholars (Creswell, 2009; Creswell & Poth, 2018; Yin, 2016) who argue that a qualitative approach, including a case study, is well-suited for understanding the natural setting of human life and social interactions. The participants of this study were two EFL novice teachers' who were experienced in digital literacy practice in the classroom, and the natural setting context in this study refers to how teachers use digital tools in classroom activities. Furthermore, it employs "multiple sources of evidence" (Yin, 2003; p.32) the case study is not limited to a single source of data. Therefore, the study design is characterized by data collected from multiple sources (questionnaires, observations, and interviews).

This research is based on Creswell's (2014) principles of qualitative research. First, it was conducted in a real-world setting, meaning data was collected directly in classrooms where teachers and students engaged with digital literacy in their teaching and learning activities. This ensured that the study captured authentic interactions in a natural environment. Second, the researcher served as the main instrument for data collection, actively engaging with participants and gathering information firsthand. Third, the study relied on multiple sources of data to provide a comprehensive understanding of the topic. These sources included questionnaires, classroom observations, and interviews with teachers, allowing for data triangulation. Fourth, the research prioritized participants' perspectives, focusing on their experiences and interpretations of digital literacy in education rather than the researcher's own assumptions. Fifth, the study followed an emergent design, meaning the data collection process remained flexible, allowing for necessary adjustments based on new insights or findings. Lastly, the researcher engaged in reflexivity, continuously reflecting on their role in the study and considering how their position, background, and perspectives might influence the interpretation of the data.

3.2 Site and Participants

This study explores how teachers integrate digital literacy into their teaching. This is critical to preparing students for the digital age, improving teaching and learning, and addressing challenges such as the digital divide and limited resources. It provides insights into teachers' needs, informs professional development, and ensures alignment with 21st-century education goals. Understanding these helps identify best practices and growth areas, ultimately fostering a more effective and future-ready education system.

The researcher conducted the study at the primary and secondary level schools in Bandung City, West Java, Indonesia. According to Hamied (2017), the selection of the research setting in qualitative research should be done purposively. There were two reasons for the selection of the research setting. They were the suitability and accessibility. These schools were chosen because of their unique bilingual school systems and habituation classes, which provide a rich environment for studying language learning. In bilingual school systems, students use two languages daily, allowing us to see firsthand how they develop language skills and use digital tools in a multilingual setting. Bilingualism is plurilingualism for speaking more than two languages (Myers, 2006: 02). Then, the habituation class is a program of bilingual class as reinforcement of language learning outside of regular English class, which focuses on consistent language practice, gives insight into how regular routines can boost engagement and language development. These unique features make the school ideal for exploring effective, real-world language teaching strategies. Lastly, the accessibility means the schools were easy to access since they were located in Bandung City. They were also supportive and allowed the researcher to conduct the study.

As for the participants, the study involved two English teachers—one from a primary school and the other from a secondary school—who taught during the 2023/2024 academic year. In qualitative research, the selection of cases is suggested to be “no more than four cases” (Creswell, 2007, p.76). Likewise, the researcher considered only one case with two two teachers as the participants of this study to see the specific cases of digital literacy practiced by the teachers at two levels of

education. Even though the term case study may be extended to include the study of just two or three cases for comparative purposes (Bryman, 2008), working on two or more cases can significantly add to the complexity of a study and can prevent the researcher from examining the experiences of participants in detail. These EFL novice teachers were selected through purposive sampling, as they are considered potential sources of relevant and rich data for the study.

This strategic selection aimed to ensure that the participants would provide sufficient and insightful information, thus facilitating reasonable data interpretation (Duff, 2008). These teachers were selected based on the study's goal: the novice teachers with experience teaching varied years of service, three to four years, and the willingness to use digital tools in classroom activity. Considering the research setting and participants might help the researcher have rich data about the studied issue.

The data collection process was conducted over two months, from November to December, during which the two English teachers actively engaged in exploring digital literacy practices in their classrooms. To uphold ethical research standards, the researcher sought formal approval from key school authorities, including the headmaster, head of curriculum, homeroom teacher, and English teacher, ensuring transparency and respect for institutional policies. Additionally, an official research permission letter from the Faculty of Language and Literature at Universitas Pendidikan Indonesia (UPI) was submitted to the school to formalize the study.

To protect the participants' identities and privacy, pseudonyms were assigned when presenting the data. This approach ensured confidentiality and allowed teachers to share their experiences openly without concerns about personal exposure. By following these ethical procedures, the study aimed to create a respectful and secure research environment while maintaining the integrity of the data collected. It is a fictitious name or alias an individual uses to conceal their true identity.

3.3 Data Collections

This study employs multiple data collection methods, as one typical characteristic of a case study is employing “multiple sources of evidence” (Yin, 2003, p.32). Referring to the feature, this research employed multiple data collection methods, including questionnaires, observations, and interviews.

3.3.1. Questionnaire

The questionnaire was used as an additional method to collect data efficiently from participants. It provided a simple and quick way to gather relevant information while also supporting and validating data obtained through other methods. This ensured a more comprehensive understanding of the research topic. The questionnaire was presented in the form of a structured document containing a series of questions designed to align with the study’s objectives and research questions (Gilham, 2007). By using this method, the researcher could gain insights into participants’ perspectives in a standardized and systematic manner, making it a valuable tool for data collection.

Information regarding the level of digital literacy competence was obtained by distributing questionnaires at the first stage of the study. The questionnaire consists of questions about the participants' level of digital literacy. The digital literacy questionnaire used in the study was adapted from Vuorikari et al. (2022) digital competence framework.

The rationale for using the DigComp framework as a questionnaire instrument is rooted in its alignment with Hobbs' digital and media literacy framework, as noted by Schmitz et al. (2024). Hobbs emphasizes critical dimensions such as making responsible choices, accessing information, analyzing messages, creating content and engaging in social action collaboratively. These elements align with the DigComp 2.2 framework, which outlines essential digital competencies, including information and data literacy, communication and collaboration, digital content creation, security, and problem-solving (Vuorikari et al., 2022). Both frameworks

aim to promote effective digital engagement and critical thinking skills among citizens.

For example, Hobbs's focus on analyzing messages and creating content mirrors DigComp's emphasis on digital content creation and effective communication. Additionally, the ethical considerations in Hobbs' framework relate to the safety and responsible use highlighted in DigComp 2.2. The relevance of these theories supports researchers in developing assessment instruments for digital literacy skills. Vuorikari et al. (2022) introduced competencies for someone to be digitally literate by DigComp 2.2.

This questionnaire was designed to provide an overview of EFL novice teachers' digital literacy skills. The questionnaire consisted of 18 carefully structured questions to gather comprehensive information on various aspects of digital literacy. The questionnaire was distributed to the participants, who were asked to respond based on their experiences and classroom practices. After the questionnaires were distributed to the participants, the data collected was analyzed using descriptive statistics, allowing for a clear summary and interpretation of the findings. This method was chosen to summarize the findings and present them clearly and organized, providing insight into the participant's overall level of digital literacy.

The questionnaire sheets were divided into five sections:

1) Information and data literacy

Information and data literacy consists of how people identify and find how to access this data, information, and content and navigate between them in search. It also involves the skill to detect the credibility and reliability of familiar data and digital content sources and evaluate data, information, and digital content, including possible outcomes, before clicking a link. For example, in this section, "I can identify and find how to access this data, information, and content in this dimension and navigate between them. such as how to access EFL/ESL websites, choose search

engines, blogs, YouTube, can use the information presented as hyperlinks and digital databases, information, and content and navigate between" (1,2,3).

2) Communication and collaboration

The questionnaire items for communication and collaboration were about the skills to interact through digital technologies, such as the use and collaboration with students or colleagues using a commonly used chat on my smartphone or video conferencing. Sharing through digital technologies, such as using digital tools and technologies in a remote working context to generate ideas and co-create digital content (e.g., shared mind maps and whiteboards, polling tools). An example of this section is "I can use and collaborate with students or colleagues using a commonly used chat on my smartphone (e.g., Facebook, Line, Google Doc, Messenger, WhatsApp, or Social Media) to talk to my colleagues, students, and classmates and organize group work or use video conferencing". (4,5,6,7)

3) Digital content creation

The questionnaire items for developing digital content refer to the ability to use the internet, create and select appropriate digital content or games or quizzes on open platforms for materials delivery (e.g., Microsoft Office (Word, Excel, PowerPoint, and Canva), create reading text, and share it via doc or pdf format, copyright and licenses such as able to identify and select digital content for downloading or uploading legally. For example, in this section, "I know how to use the internet and create digital games or quizzes to assess students (e.g., Kahoot, Pool Everywhere, Quizlet, Quizezz, Mentimeter)" (8, 9, 10).

4) Safety

The questionnaire consists of instructions on protecting devices (to protect devices and digital content, understand risks and threats in digital environments, know about safety and security measures, and regard reliability and privacy). How to install and activate protection software and services to keep digital content and personal data safe and the ability to

distinguish between appropriate and inappropriate digital content to share it on my school's digital platform so that my privacy and that of my colleague are not damaged. An example of the items "I know how to apply efficient low-tech strategies for protecting the environment, e.g. shutting down devices and switching off Wi-fi, not printing out documents, and repairing and replace component to avoid the unnecessary replacement of digital devices" (11,12,13,14)

5) Problem-solving

The questionnaire items include several skills, attitudes, and knowledge to identify technical problems when operating devices and using digital environments and to solve them (from troubleshooting to more complex problems). The ability to independently solve problems with digital resources that are available both online and offline and how to find solutions on the internet when facing a technical problem. The items within this dimension are structured as follows; "I can learn independently with digital resources that are available both online and offline (e.g., I can learn all about Excel from YouTube videos by him/herself)" "I know how to find solutions on the internet when facing a technical problem (e.g., I know how to identify and solve a camera and/or a microphone issue when in an online meeting, or how to connect a PC to a projector" (15,16,17,18).

3.3.2. Classroom Observation

Two classes, one from the sixth grade and another from the seventh grade, each consisting of twenty students enrolled in the learning year of 2023/2024, were observed to gain a comprehensive understanding of how effectively English teachers integrate technology into their teaching practices. The observation focused on how teachers adapt to the use of digital tools in the classroom. Observation is a key method of data collection because it occurs in the natural settings where the phenomenon happens, allowing the researcher to engage directly with the situation (Merriam & Tisdell, 2015).

The purpose of the observation session was to record what English teachers do, as opposed to what they claim to be doing, which has the potential to be a rich source of knowledge (Dornyei, 2007). The researchers conducted observations in two classes to collect more representative data. Each observation session lasted 60 minutes. Observations were conducted four times to ensure a more comprehensive understanding of how teachers adapt to the use of digital tools in the classroom. By observing across multiple sessions, the researchers were able to capture a wide variety of teaching practices and interactions involving digital tools, providing a more accurate picture of how these tools are integrated into classroom activity.

A habituation class for sixth graders was observed, consisting of six weekly sessions (JP) scheduled from Tuesday to Thursday. This structure allowed students to engage with the material over three consecutive days, providing multiple opportunities for reinforcement and practice. In contrast, the seventh-grade habituation class was structured differently, with only two sessions on Tuesday and Wednesday.

Before conducting the observation, the researcher held a pre-observation meeting with the teacher, either a day before or just before the session. This meeting aimed to prepare for the observation, address any concerns, and complete the consent form. The researcher also discussed confidentiality protocols outlined in the consent form, ensuring that the teacher understood the ethical guidelines. It was important to reassure the teacher that the observation was solely for research purposes and not an evaluation of their teaching performance. The researcher clarified that the collected data would remain confidential and would not be shared with school administrators or district personnel. Additionally, the researcher provided details on logistical aspects, such as where the observer would sit, whether the observer's presence should be explained to students, and how the observation process, including note-taking or recording methods, would be conducted. This preparatory discussion helped create a comfortable

environment for both the teacher and students, ensuring that the observation process was smooth and non-disruptive.

The study used two observation forms: the observation checklist and the observation sheet. The first one was the observation checklist (see Appendix I). The researcher adapted the observation checklist from Hobbs's (2010) framework. The observation checklist was used to determine the digital literacy practice done by the teachers in their classroom teaching practice. Furthermore, a version of the observation sheet was taken from Nguyen (2014) (see Appendix II). The observation sheet was used to record more details and descriptive information. This sheet allowed the researcher to record details or context that a checklist cannot represent. Two observation forms were used consistently across the four observations conducted in this study.

3.3.3. Interview

Interviews, a standard method for obtaining information through direct communication with information sources, were also conducted. The interview can be characterized as significant cooperation between a specialist and members who consent to partake in research to collect profound data (Hamied, 2017). In this context, the specialist refers to the researcher or interviewer conducting the interview, and the member generally refers to participants who agree to participate in this study. Practically, it guaranteed a potentially high response rate since answers were given directly by the respondents in person (Duff, 2008). The interviews were conducted individually with each participant and lasted approximately 40-50 minutes. Before conducting the interview, the researcher will provide the participants with the interview protocol to give them an understanding of the topics discussed.

The interviews were designed based on research questions asking the EFL teachers' self-assessment of the level of digital literacy, questions about technology integration or use in teaching practice in line with how they manage digital information, how they analyze and evaluate online

resources, etc., and the challenges and strategy that they face also was explored in the interviews (see appendix III). This study follows semi-structured interviews, which allowed the participants to gain deeper data by improvising conversation and keeping with the outlined goal of the interviews (Brinkmann, 2014). The researcher conducted face-to-face interviews with two EFL teachers at different times and places, and the interviews were technically conducted individually. This was intended to make participants feel comfortable sharing comprehensive information and guiding the conversation based on the purpose of the interview (Brinkmann, 2014). The interview was conducted in Bahasa Indonesia, so the interviewee will be more flexible in answering the interviewer's questions. Before the interview began, the researcher paused and explained to the interviewee that the researcher would like to record the session to preserve the conversation's accuracy and depth.

3.4 Data Analysis

This research was carried out in various steps based on the data mentioned above in the collection instrument.

3.4.1 Questionnaire

After the questionnaire was distributed, the data was analyzed using descriptive statistics to predict the digital literacy level of English teachers. The digital literacy score is obtained by calculating the raw score divided by the maximum score multiplied by the constant (1%). To determine the level of digital literacy, the researcher uses five different levels and a score range from Bayrakci (2021).

Table 3. 1 *The Competencies of Digital Literacy Level (Bayrakci, 2022)*

Digital Literacy Scale Score Ranges	Level	Competence
1.62-3.07	Low/Poor	They can perform basic and routine digital tasks at a basic level. This is the entry-level stage, and they often need guidance from others.

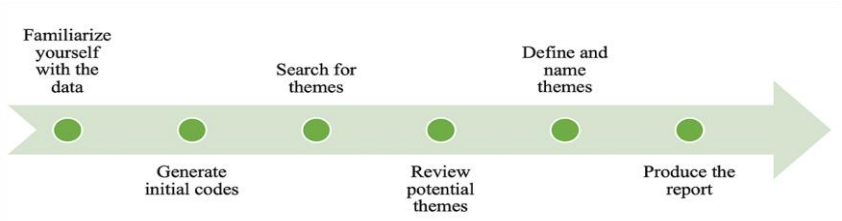
3.08-3.62	Below Average/Weak	They can complete simple routine tasks and understand problems clearly independently.
3.63-4.17	Average	They can solve non-routine, but uncomplicated problems independently. They are at an intermediate level in adapting to the digital age and continue to learn.
4.18-4.72	Above Average/Good	They are digitally literate, able to solve complex situations independently and help others with routine tasks. They can use and understand digital technologies in their lives.
4..73-5.00	High/Perfect	They are expertise to help others solve problems in their professional lives and suggest or create new ideas and processes related to work.

3.4.2 Classroom Observation and Interview

In the qualitative study, the researcher used thematic analysis with a deductive approach. The deductive approach was explicitly theory-driven, allowing the researchers to analyze the data and their theoretical, existing concepts of interest in the investigated issues (Braun & Clarke, 2006). The researcher usually began the analysis with the themes identified through a literature review. The data from observation was identified based on Hobbs's digital and media literacy framework (2010). The observation aimed to answer the research question, identifying the activities of English teachers in integrating their digital literacy skills into teaching practice. How teachers access, analyze, evaluate, create, reflect, and act content using information technologies and the internet.

Thematic analysis has six steps and is a standard analytical method in qualitative research. Specifically, these competencies encompass 1) Familiarization with the Data, 2) Generating initial codes, 3) searching for Themes, 4) Reviewing themes, 5) Defining and naming themes, and 6) writing reports (Brown & Clarke, 2006).

Figure 3. 1 *The step of thematic analysis (Braun and Clarke (2006)*



As its name suggests, the first phase (familiarization with the data) begins with researchers' interest in familiarizing themselves with their data. This phase helps them figure out the type (and number) of themes that might emerge through the data. Suppose the first phase of the data analysis (i.e., familiarization with the data) allowed the richness of the initial findings to emerge. However, the importance of rereading the transcripts before creating codes was considered. Therefore, the transcripts were reread carefully, and all the data was coded.

Braun and Clarke (2006) suggested that the third phase began with a long list of codes identified across the data set. The primary purpose of this phase was to find patterns and relationships between and across the entire data set (Chamberlain, 2015). In four phases, all the themes (master themes, main themes, and sub-themes) were intentionally brought together as the aim was to refine those initially grouped themes and present those themes more systematically. The five phases began with the aim of further refining and defining the themes, that is, "identifying the essence of what each theme is about (as well as the themes overall), and determining what aspect of the data each theme captures" (Braun & Clarke, 2006, p.92). The final phase of the analysis was to write down the findings report. The research questions and theoretical framework typically guided the initial

codes or themes expected in qualitative research. For a study focusing on digital literacy and novice teachers' integration of digital tools into classroom teaching and the challenges and strategy, some potential initial codes or themes, including challenges in integrating digital literacy such as limited access to technology or resources, lack of training or professional development, time and constraints. The strategy to hinder the challenge is creative methods for integrating digital resources and collaboration with peers or mentors for digital literacy support. Teachers practice digital literacy through the competencies of accessing, analyzing, evaluating, creating, reflecting, and acting.

Triangulation in research means using multiple methods to explore a question. Its goal is to enhance the validity of the results by confirming findings through two or more independent sources or approaches (Heale & Forbes, 2013). Combining findings from two or more reliable methods gives a more complete understanding of the results than any single approach could provide (Erzberger & Teddlie, 2003). In this study, data from questionnaires, classroom observations, and interviews were triangulated to enhance validity by cross-verifying the results obtained from each source. Questionnaires provided quantitative and qualitative insights into teachers' perceptions, attitudes, and self-reported practices regarding digital literacy. These responses were analyzed alongside data from classroom observations, which offered a real-time, contextual view of how teachers integrated digital tools into their teaching. Observations captured behaviors, interactions, and practices that participants might not explicitly mention in their questionnaires or interviews, offering an objective perspective. Interviews allowed for a deeper exploration of teachers' perspectives, challenges, and reflections on their digital literacy practices. These multiple data collection methods give data that complemented the structured information from questionnaires and the real-time insights from observations.

Furthermore, for the data from the interview, the researcher analyzed the interview results based on the interview coding. Several codes were generated based on the interview responses. The data was also analyzed under the five dimensions of digital and media literacy by Hobbs (2010), along with the challenge and the strategies the teacher faced during teaching practice integrating digital literacy skills. Organizing the information into themes included re-reading it, coding, and grouping it into relevant themes. The organization process is essential to deliver presentable findings of the study; hence, the readers can easily read and find related information about the study. Besides observational data, interview data is included to add, support, and clarify the observational data in answering the research question. After collecting the data, the researcher analyzes the data using six steps (Brown & Clarke, 2006).

After conducting an in-depth data analysis, the researcher conducted a coding process to identify key themes and codes relevant to this study.

Table 3. 2 *The List of Data Codes and Theme of Interview and Classroom Observation*

Data collected	Code		Theme
Interview	In Acc1 Y	In Acc1 H	Access
	In An1 Y, In An2 Y, In An3 Y	In An2 H, In An3 H, In An4 H	Analyze and evaluate
	In C2 Y, In C3 Y, In C4 Y	In C1 H, In C2 H, In C3 H, In C4 H	Create
	In R1 Y	In R1 H	Reflect
	In Act 1 Y, In Act5 Y	In Act1 H, In Act2 H, In Act5 H	Act
	In Cc Y	In Cc H	Communication and collaboration
	In C1 Y, In C3 Y	In C3 H	Creation
	In At1 Y, In At2 Y, In At3 Y		Access to technology
	In Lt Y	In Lt H	Limited Time
	In It Y	In It H	Inadequate training
	In Pa Y	In Pa H	Positive attitude
	In Ps1 Y	In Ps H, In Ps2 H	Problem Solving
	In IL Y	In IL H	Independent learning

	In W1 Y, In W2 Y	In W H	Workshop
	In Pt1 Y, In Pt2 Y	In Pt H	Peer teaching
Classroom Observation	Co4 Acc1 Y	Co3 Acc1 H	Access
	Co4 An4 Y	Co1 An4 H	Analyze and evaluate
	Co1 R1 Y	Co3 R2 H	Reflect
	Co2 Act5 Y	Co3 Act5 H	Act
	Co4 Act5 Y		
		Co3 At H	Access to technology

An example of the table above is an example of each code and what each code means.

In Acc1 Y:

- Acc refers to the Access dimension or theme
- 1 refers to the first item under that theme
- Y indicates the participant's name is Yunita

Example: This code refers to data collected from an interview with Yunita related to Access, focusing on the first item in the access list

Co3 Acc1 H:

- Co refers to Classroom Observation
- 3 refers to the third observation session
- Acc1 points to the Access dimension, precisely the first item under that dimension
- H means the participant is Haikal

Example: This code indicates data gathered from the third classroom observation with Haikal, focusing on the first item under the Access dimension.

3.5 Ethical Consideration

Similar to quantitative research, qualitative research emphasizes the validity of its inquiries. In qualitative studies, the quality standards triangulation must be addressed to ensure the accuracy of the findings. Triangulation involves using multiple methods and data sources to study the same phenomenon, thus providing a more comprehensive and valid understanding (Denzin, 2015). This study

followed this principle by using multiple methods and sources of data collection, including classroom observations, interviews, and questionnaires. Multiple collection methods allowed for cross-verification of the findings, thereby increasing the depth and reliability of the research conclusions. These practices ensure that the research results were credible and provide a well-rounded perspective on the phenomenon under study.

Ethical considerations are central to qualitative research, ensuring that the study is conducted responsibly and respects the rights of participants. To address research ethics, the researcher first asked permission from the headmaster, head of curriculum, home teacher, and English language teacher to conduct research there. A letter of research permission from the faculty of language and literature UPI was also officially sent to the school. Informed consent is critical, requiring researchers to provide participants with clear, comprehensive information about the study's purpose, scope, and potential implications.

Before the observation, the day before or right before it starts, the researcher had a pre-observation meeting with the teacher to set the scene for the observation, clarify issues, and fill out the consent form. The researcher explained the protocols regarding confidentiality as explained in the consent form. The teacher needs to be assured that the observations are being conducted solely for the purpose of research, that the observers were not there to evaluate them, and that the observations would not be shared with the school or district personnel. The researcher also explained where the observer was to sit, whether or not the observer's presence was to be explained to students, and how the observation would be recorded during the session.

Moreover, to maintain confidence, a pseudonym was employed to present data from each participant. An individual uses a fictitious name or alias to conceal their true identity. Voluntary participation is another cornerstone of ethical research, emphasizing that participants should join the study without coercion and have the right to withdraw at any time without repercussions. Transparency about how the data will be used and sharing findings that could benefit participants further reinforce ethical integrity and build trust between researchers and participants. The

researcher also asked for the student's permission to be recorded on video. This was done to ensure that the students were aware of the recording and gave their consent to be part of the study. The permission request helped maintain ethical standards and ensured that the students were comfortable with being observed and recorded during the sessions.