The Presentation of Students' Critical Thinking Skill in Writing Essays with Microlearning Strategy and E-portfolios Integration

Ratih Laily Nurjanah

English Literature, Universitas Ngudi Waluyo, Indonesia
ratihlaily@unw.ac.id

Abstract

The microlearning strategy aims to overcome the decrease in students' span of focus, presenting learning materials in small portions due to technology exposure. E-portfolio aims to support students' needs of involving technology in learning progress while developing critical thinking skills. This study aims to present the learning activities in writing essays based on the principles of microlearning while utilizing e-portfolios and describes the students' critical thinking skills involved. The research was conducted as a case study involving a research diary observing the learning activities and critical thinking, and interview questions to gather students' perceptions on their experiences utilizing microlearning and e-portfolio. The data were collected by performing observation in an Academic Writing class involving 80 students, and note-taking while learning happened in the classroom. Ten students were selected as respondents for further interview, and the responses were analysed with the thematic analysis technique. The findings showed that students took numerous small steps, starting from exploring a topic, elaborating a paragraph, and revising an essay before finally producing an essay. The students showed positive perceptions of the use of microlearning strategy and e-portfolios, saying that both were enjoyable and flexible. Various critical thinking skills shown by students during the process of essay writing were open-mindedness, communication, problem-solving, creativity, and analysis. It is important to view students' small process and ensure students' deep understanding of a topic instead of focusing on the final results.

Keywords: e-portfolios, English language teaching, microlearning, writing skill

1. Introduction

Learning process in this digital era is influenced by many possibilities of distractions compared to the previous era. The short span of attention becomes a thing that should be considered. Many students are affected by this condition related to various distractions coming from the surrounding especially when they work with digital media, for instance, they tend to get distracted by social media while they browse the learning materials in the internet. As stated by Ghafar et al. (2023), after long period of online learning during COVID-19, students experienced decrease in ability to stay focus on lessons. This leads to the needs of learning media that accommodate the students' needs of mastering the skill and knowledge delivered by the lecturer while maximizing the use of technology in the learning process. Microlearning is proposed to be learning strategy that worth to implement to help students build focus on learning. It is implemented by presenting single learning objective in each session equipped with short lecturing videos, texts, images or other learning media continued to assessment to ensure the effectiveness and engagement in the learning process (Prasittichok & Smithsarakarn, 2024). The effectiveness and the students' engagement in the learning process need to be monitored both by the students and the lecturer. Integrating e-portfolios as a media to enable both parties monitor and track their progress is considered applicable. The implementation of e-portfolios, as proposed by Davis (2014), involves 5 aspects; collection of evidence of learning steps, reflection, evaluation on the evidences, defence of the evidences, and assessment of the decision. This engagement in learning is expected to significantly affect students' critical thinking which nowadays are mentioned to be the focus of teaching and learning besides cognitive skills. Critical thinking skill is mentioned as one of promoted 4Cs; communication, collaboration, critical thinking & creativity. It combines skills, attitude, and comprehension about how someone learns. In terms of language learning, it is related to the ability to analyse, judge, present arguments, and comprehend the materials (Jamil et al., 2024). It also involves the ability to interpret, evaluate, inference which are reflected in the attitude of being inquisitive, open-minded, flexible, and honest. It is considered as a broad spectrum of abilities ranging from identifying to synthetizing and problem-solving or evaluation (Darwin et al., 2024). Some factors may influence students' critical thinking skill, especially in learning, including social pressure, and low assessment (Aston, 2023).

The research questions are presented as: 1) How was the microlearning strategy implemented in learning activities supported with e-portfolios? 2) What critical thinking skills were involved in the use of the microlearning strategy? and 3) How did students perceive the use of the microlearning strategy in writing activities? This research presents the insights on how microlearning strategy can be implemented in reality to achieve the goals of learning itself by looking at the learning activities involved with the integration of e-portfolios as a digital learning media in the process of implementing the microlearning strategy in developing students' critical thinking skills. This research presents the urgency to address some issues related to the students' needs of learning a concept from a small concept to bigger ones by using e-portfolios while developing their soft skills in learning a language. In the future, this integration is expected to give insights to educators and students about the importance of soft skills and how to build them. The gap that is attempted to answer by this paper is related to the integration of microlearning strategy with e-portfolios as the digital learning media that has become necessary in this era.

2. Literature Review

2.1 Microlearning in language learning

Microlearning is defined as a learning strategy presenting contents in small portions through texts, images, or even learning management. As proposed by Slivnaya et al. (2023), microlearning

delivers materials in micro-content or micro-tasks to achieve learning goals though nowadays, it is related to the integration with digital or mobile learning. According to Mcneill & Fitch (2023), microlearning strategy is designed to present materials in brief portions, focused, interactive, and flexible while possible to be integrated in various curricula. The information is delivered in chunks continuously in 2 to 15 minutes which makes it different from other learning strategies. This strategy allows both lecturer and students to keep engaged in the learning activities. The implementation is considered effective when it comes to e-learning since the materials will be presented quickly resulting in simple and easy-to-catch information. Moreover, it promotes the chances for students to work in groups leading to more collaborative learning environment. Microlearning strategy also may reduce the time spent on learning on big topic which helps students more focus since they are required to learn small details in flexible time with easy access to the learning materials and sources (Ghafar, 2023).

The implementation of this strategy is strongly related to the cognitive load theory (CLT). CLT works based on the comprehension that human cognitive capacity has a limited space resulting the needs of regulating the learning environment to accommodate the careful distribution of cognitive load (Kala & Ayas, 2023). This fact influences how students absorb the information given while retaining new information leading to the needs of presenting the ideas on how actually the strategy can be presented in the classroom with the students according to the instructional design and e-learning era. The study is also supported by de Jong (2010) stating that a task which demands too much cognitive capacity will hamper the learning process. It is recommended the involvement of a learning strategy which preventing students from overload capacity. A previous study presented by Lopez (2024) revealed how microlearning is an efficient and effective learning approach since it helps students acquire and use their knowledge in a learning cycle that works with their cognitive load capacity by allowing students work with microlearning instructional design which minimizes the load itself.

In terms of teaching and learning, microlearning has been a popular choice for lecturers and researchers. In a study conducted by Marinskaya (2020), it contributes in improving language acquisition and students' retention and engagement. It is also related to their accessibility, feasibility, and improvement of students' potential. Since it employs learner-oriented approach, it focuses on students' needs especially those millennial students in case of training vocabulary, grammar, and pronunciation though the efficiency needs more validation related to the development of soft-skill including creativity as a part of critical thinking. This brings another research analysing students' experiences when using this strategy. The results showed students' improvement on academic performances, especially when they had to show the ability to apply knowledge (Gherman et al., 2021).

The implementation of microlearning does not only brings insights on the academic achievement but also the development of soft-skills. Prasittichok & Smithsarakarn (2024) highlighted the use of microlearning as a means of increasing students' confidence, self-esteem while learning listening comprehension. It helps students build strong foundation related to their motivation in learning English skills. They proposed the use of the strategy in other skill-learning activities by integrating it with any digital learning media. Although any forms of soft-skills are expected to occur independently, there are always chances to support students grow it while learning in the classroom, especially in this digital era where learning can happen everywhere (Romanenko et al., 2023). It is proven that though students, who learnt used microlearning and those who did not, they received same amount of information, they showed the ability to apply it in different ways. Students who used microlearning showed their ability in better quality related to self-confidence and the depth of understanding.

The previous studies show that there is a gap related to how microlearning can be related to the development of soft-skills. Critical thinking as one of the skills is considered the easiest to be identified in the process of learning since it can be measured from students' outcome. This skill reflects the students' ability to not only learn about any materials required but also how they manage the learning process and make use of the knowledge for long period of time. Microlearning, in this study, plays important role to make sure students internalize the knowledge by building a big concept from the smaller ones.

2.2 E-portfolios

A portfolio in learning is defined as collection of learning evidences either in forms of products such as, reports, paper, or in forms of processes, such as, websites, notes, showing the learning process been through by a student. The development of a portfolio is considered as personal process causing differences in a student's portfolio with another student's portfolio. A portfolio may also contain students' assessment or grades on a project or students' reflection that all of the parts mentioned above collected in a binder or even computer-based system (Davis, 2014). This principle is based on the personalized e-learning method as proposed by Imran et al.(2024) revealing that personalized e-learning offers chances and benefits compared to the traditional e-learning. It allows each student to experience unique learning experiences and environment which are different from one another. In the era where there are many possibilities of diversity, personalized e-learning; such as e-portfolios, becomes important to meet the needs of individual choices, competencies, learning capacity, and learning styles related to students' engagement resulting boosted learning outcomes. E-portfolios, in this study, allows students to take different steps from their peers in studying or completing their projects based on their needs, preferences, and strategies.

The use of e-portfolios to record students' progress in learning is considered relevant to the constructivism learning theory. As what presented by Imran, Almusharraf, Abdellatif, et al. (2024), constructive learning encourages students and lecturers in various active learning activities, especially the ones aimed to build knowledge by allowing students to be in a dynamic learning environment supported by unlimited learning sources, learning media, and learning experiences. It presents the facts of how students process the information through mental development by creating models and interpretation from learning experiences. The use of digital learning media is mentioned to be essential and effective in motivating students in developing their self-regulation in learning through learning experiences, processing information and producing knowledge.

In the field of learning language, portfolio has been widely used either in form of physical ones or computer-based ones. Jaidamrong & Mahapoonyanot (2024) presented the idea of developing e-portfolio platform used in teaching and learning for undergraduate students. This platform helps students in terms of documenting the academic activities showing the improvement on their individual growth, especially in soft-skills. E-portfolio successfully assists students to improve their self- reflection, readiness of working environment, and digital literacy which are mentioned to be essential keys in this era. This research is supported by Khoa and Thuạ (2024), stating that e-portfolio influences each student' character when it comes to cognitive, cultural and even institutional. It also contributes in shaping students' critical thinking related to self-awareness and self-evaluation ability instead of focusing only on students' cognitive comprehension as EFL learners. The development of technology also allows the students to get feedback easily from the lecturer. As what also stated by Dewi (2016), e-portfolios give students deeper understanding on the concept of learning by showing the flexibility of learning. From the previous studies, it can be

concluded that e-portfolio is effective in supporting students' learning process by giving the chances to develop critical thinking while being active language learners.

The implementation of e-portfolios has also been proven helpful when it comes to building students' resilience in learning through the process of deep and continuous learning though it comes with various challenges. Chang & Kabilan (2024) mentioned curriculum changes including assessment adjustment as ones of them as well as academic motivation and integrity that influence students' progress of learning. It brings the needs of new instructional design and roadmap to support the use of e-portfolios as a learning media involving not only teachers and students but also the readiness of the system, and the stakeholders (Yang & Wong, 2024).

The limitation presented by the previous studies can be inferred as the needs of implementation of e-portfolios with proper learning strategy to maximize the advantages offered by the system. Microlearning strategy is considered fulfilling the need since it requires students to learn materials in small chunks leading to the needs of media to record their progress of learning. The integration of the strategy with e-portfolios is considered significant related to the principles of cognitive load theory by requiring students to deal with some small tasks to produce a big one instead of requiring students to work with a big task at a time. The integration is closely related to the constructivism learning theory focusing on building knowledge in a way that based on personal preferences of students.

2.3 Critical Thinking Skill

Critical thinking is defined as the intelligence of doing self-regulation reflected in the activities of analysing, conceptualizing, applying, processing, and evaluating or assessing information collected from various sources; experiences, reflection, as foundation of belief and acting. As stated by Shakil et al. (2021), it is a way of thinking about any content or situation presented shown by the quality of thinking. This leads to the importance of developing this skill to support students' process of learning besides focusing on the academic achievement related to hard-skill competencies.

Critical thinking skill is closely related to students' academic achievement as what proposed by various researches. Various researches were conducted to show the correlation between critical thinking and academic performances. As stated by Gandimathi & Zarei (2018), Huang et al. (2023), critical thinking positively influence students' attitude and performance in the process of language learning. It also gives positive impacts on students' enjoyment so the process can run and be accepted by better.

Critical thinking occurs in various forms of skill in students, varied from creativity to open-mindedness which all of them take part in the process of developing hard-skill on students. A review from Park et al. (2023) reveals that creativity reflects students' ability on critical thinking especially on university students. Some factors are involved in these findings related to students' characteristics and the programs offered by the lecturer in the classroom though each factor showed different number on the significance. It can be concluded that creativity is important in the process of developing critical thinking. Another skill mentioned as a critical thinking skill is reflection skill which is related to the ability to be aware of any situations and use assumptions to face new challenges (Bar-Tal et al., 2021). Students are expected to evaluate the course and conflicts that may occur when they are learning in forms of giving criticism, responding, and handling the situations as a resolution of a conflict.

Critical thinking skill is reflected in the ability to recognize any patterns. As presented by Ling and Loh (2020), this ability is related to students' competency in connecting ideas, making sequences by matching information given with the previous knowledge saved in the memory. The previous study presented students with high ability of pattern recognition performed better in

academic performances, especially when it came to the problem-solving skill by building connections from a topic to another even from a subject to others. This leads to a conclusion that recognizing-patterns skill supports the students in terms of developing critical thinking skill to improve academic achievement. This skill is connected to problem-solving skill proposed by Amanda et al. (2024) as a skill to use knowledge by utilizing data and knowledge to effectively solve a problem or difficulty occurs in a problem of learning. Learning activities that shift from face-to-face learning to hybrid or even online learning requires more attention to the development of students' characters or soft-skills rather than just cognitive aspect based on the fact that students have low-ability on producing solutions and or persistence in learning.

The other aspect of critical thinking is presented in form of self-regulation as the ability to judge and assess someone's actions or process of thinking by using self-assessment and self-awareness guided by lecturers, teachers or any professionals via instructions given to set individual learning goals, create learning plans, monitor their progress, evaluate their ideas, and assess their own progress. As stated by Heydarnejad et al. (2021), to build students' self-regulation is plausible by involving students in collaborative working, projects-based learning while focusing on individual needs, uniqueness, and affective aspects. Students with high self-regulation skill are also proven to perform better in academic as presented by Net & Kusmaryono (2023) due to their ability to think critically, control themselves, and be responsible for their goals without depending on others. This shows that self-regulation should be one of lecturer's focus on learning activities.

The focus on students' open-mindedness as a critical-thinker characteristic should also be deepened. It is prominent for them to be able to adapt to any cases or situations shown by generating solutions from various perspectives. This ability comes from students' knowledge on various strategies and the ability to decide which one to be implemented. In a study conducted by Karakuş (2024), this open-mindedness is proven to significantly influence students' academic performance as a reflection of critical thinking skill.

The previous studies mentioned presenting critical thinking skill in various forms of skill resulting to the urge of identifying the students' skill while learning a topic. This present study attempts to identify which skill of critical thinking skill reflected in students' learning activities as the effort to complete an essay by incorporating the discipline-specific instructions as proposed by Ahmad et al. (2024). The specific instructions in the academic writing were presented in this study in the form of microlearning activities supported with e-portfolios as the learning media to help students develop their critical thinking while producing an essay. As critical thinking in learning can be reflected in various behaviour of students, this present study observed and then analysed the students' behaviour indicating certain skill of critical thinking.

3. Research Methods

3.1 Research Design

The research was conducted as a case study involving direct observation in the classroom during the course, observation of the students' projects in portfolios, and in-depth interviews with the respondents. A case study was employed since this method allows researchers to achieve rich descriptions about a phenomenon by using various methods to explore the data by focusing on understanding the case presented instead of generalizing it (Somekh & Lewin, 2005). In research conducted by Al Maktoum & Al Kaabi (2024), a case study was implemented to explore the lecturer's experience in the evaluation process by describing the steps and gathering the lecturer's perceptions. Another research was published by Kirkpatrick et al. (2024), by conducting interviews

to perceive students' motivation. Both researchers used case studies mainly to explore the qualitative data by observing the case presented.

3.2 Participants

The study involved 80 students as the respondents, consisting of 33 male students and 47 female students. They were selected using a typical case sampling technique. This technique chooses samples by identifying the typical samples Shaheen et al. (2019) . In this case, the samples were selected as a whole unit where the students were taking the Academic Writing Course. The focal subjects in the present study were 10 students of the Academic Writing Course, consisting of 6 female students and four male students. The focal students were selected with a purposive sampling technique, which was based on the criteria of the students' willingness to participate and the students' speaking skill competency, aimed to get as much information as possible by selecting students with the best responses during the discussion session in the classroom. The deep and clear students' responses helped the research reach data saturation since the interview did not become shallow and short.

The interview items were shown to the focal students so they could decide whether they wanted to participate in further interviews. The interview was conducted for a maximum of 15 minutes to avoid students from being bored and giving responses beyond what they should.

3.3 Instruments

The instruments employed were observer's research diary and a set of interview questions. The research diary was utilized to take notes on how the lecturer used e-portfolios in a microlearning strategy during the learning process. These two types of instruments were commonly used by researchers to get deeper insights into a phenomenon by observing and exploring through interviews, such as Yi (2008) which used a research diary to investigate teachers' perceptions. A research presented by Alamri (2019) also showed the effectiveness of research diaries and interviews in supporting qualitative research.

Table 1: Research diary

Date	Learning Objectives	Microlearning Activities	Critical Thinking Skill

Another instrument employed was a set of interview questions distributed to the students to ask them to describe the learning strategy involving critical thinking development. The questions were adapted from a previous research conducted by Khairuddin et al. (2021).

Table 2: Interview questions

Interview Questions
What difficulty did you face during the preparation process of writing an essay?
How did you overcome the difficulty in preparing your essay?
How did microlearning support you in the process of preparing your essay?
What difficulty did you face during the process of writing an essay?
How did you overcome the difficulty in writing your essay?
How did microlearning support you to write your essay?
What difficulty did you face during the finishing process of writing an essay?
How did you overcome the difficulty in the finishing process of writing your essay?
How did microlearning support you in finishing your essay?
How did e-portfolios help you in your essay writing?

The research was conducted by first obtaining permission to conduct research from the lecturers and the institution. Second, the researcher, as the observer, attended the course where students were expected to produce an essay. Third, the observer took notes in the research diary about learning activities that happened in the classroom. Fourth, the observer identified the learning activities to categorize them into microlearning activities. Fifth, the observer conducted an interview with the students to gather their perspectives on using microlearning and e-portfolios. Sixth, the responses of the interview were then categorized using thematic analysis to get the keywords of students' perspectives on microlearning and e-portfolios in writing essays. Seventh, their responses were then analysed to get the critical thinking skill developed in the process of implementing the microlearning strategy.

3.4 Data Analysis

The analysis of findings on the research diary and interview responses used thematic analysis to categorize keywords so they are presentable as results of an interview. It includes data familiarisation, code generation, theme selection, theme review, theme definition, and report writing (Dawadi, 2021). Data familiarization includes the process of transcribing the interview responses and highlighting the points of interest found in the transcription. In the code-generating step, the points of interest were then categorized or grouped based on the meaning or intention given by the respondents. The analysis was then proceeded to theme selection, in which the various codes were then grouped into bigger themes covering some similar codes. The themes were then reviewed to present them in more systematic ways. The next step was defining the themes to ensure that they covered the topic of the research question. The last step was reporting the data by presenting it in the form of a table.

The themes analysis was then processed with a triangulation process, especially analyst triangulation, which involved some experts to review findings, or in this case, the themes found. The triangulation process was involved in this research as the process of validating the results of observation related to microlearning activities in the classroom. The process is aimed at increasing the overall validity and credibility of the sets of data (Johnson, 2017). The analyst was selected based on the interest of research and expertise in the field of English language teaching (ELT), especially learning strategies and learning media. This was aimed at ensuring the data gathered could successfully answer the research questions. The expert triangulation was conducted with an interview to confirm the findings and the conclusion derived from the findings.

4. Results

4.1 The Implementation of Microlearning in Learning Activities

The results of the observation related to microlearning activities conducted in the classroom were presented as follows;

Table 3: Microlearning activities in the essay writing

Learning Objectives	Microlearning Activities	Meeting
Students are able to produce an essay about personal-selection topics	Students were introduced to the concept of a microlearning strategy	Meeting 1 (2x50minutes)
	Students learnt about Essay by lectures and browsing on the internet	Meeting 1 (2x50minutes)
	Students tried to identify parts of an essay from an example given	Meeting 1 (2x50minutes)

	Students browsed trending topics from the internet	Meeting 1 (2x50minutes)
	Students chose a topic catching their attention uploaded to e—portfolios	Take-home assignment
	Students compiled materials related to the topic to the e-portfolios	Take-home assignment
	Students highlighted the parts of the materials that were useful for their essays	Take-home assignment
	Students summarized the selected materials to be used to support their essays and uploaded to e-portfolios	Meeting 2 (2x50minutes)
	Students made outline of an essay guided by the lecturer uploaded to e-portfolios	Meeting 2 (2x50minutes)
	Students linked the outline with the summarized materials they had made	Take-home assignment
	Students browsed the examples of introduction paragraph of an essay and uploaded to e-portfolios	Meeting 3 (2x50minutes)
	Students identified the characteristics of the introduction paragraph	Meeting 3 (2x50minutes)
	Students wrote an introduction paragraph uploaded to e-portfolio	Meeting 3 (2x50minutes)
	Students wrote topic sentence (s) for their bodies of essay uploaded to e-portfolios	take-home assignment
	Students revised their topic sentences based on the advice from the lecturer (if needed)	Meeting 4 (2x50minutes)
	Students developed their supporting sentences from their summarized materials according to the topic sentence	Meeting 4, take home assignment, meeting 5
	Students wrote a conclusion paragraph guided by the lecturer and uploaded to e-portfolios	Meeting 6 (2x50minutes)
	Students consulted their essays to the lecturer	Meeting 6 (2x50minutes)
	Students revised their essays based on the advice uploaded to e-portfolios	Take-home assignment
	Students presenting their essays to the lecturer	Meeting 7 (2x50minutes)

The table shows that to reach a big goal of producing an essay, students can be guided to get through some small steps, including choosing topics based on their selection, exploring materials, and even consulting with peers or the lecturer. All those steps were conducted in 7 meetings before finally the students could submit their essays as a project for the mid-term test.

4.2 Students' Critical Thinking Skill with Microlearning and E-Portfolios

After identifying the learning activities completed by the students, the researcher focused on the critical thinking skills involved in the activities based on how they completed the tasks or solved any difficulties that occurred.

Table 4: Microlearning activities in the essay writing

Microlearning Activities	Presentation of Critical Thinking Skill
Students were introduced to the concept of microlearning strategy	Analysis, Interpretation
Students learnt about Essay by lectures and browsing on the internet	Analysis, Interpretation
Students tried to identify parts of an essay from an example given	Analysis, Identification
Students browsed trending topics from the internet	Inference, Identification
Students chose a topic catching their attention uploaded to e—portfolios	Decision Making
Students compiled materials related to the topic to the e-portfolios	Identification, Inference
Students highlighted the parts of the materials that were useful for their essays	Identification, analysis
Students summarized the selected materials to be used to support their essays and uploaded to e-portfolios	Inference
Students made outline of an essay guided by the lecturer uploaded to e-portfolios	Analysis
Students linked the outline with the summarized materials they had made	Inference
Students browsed the examples of introduction paragraph of an essay and uploaded to e-portfolios	Identification
Students identified the characteristics of the introduction paragraph	Identification, Inference
Students wrote an introduction paragraph uploaded to e-portfolios	Creativity, Inference
Students wrote topic sentence (s) for their bodies of essay uploaded to e-portfolios	Creativity, Inference
Students revised their topic sentences based on the advice from the lecturer (if needed)	Communication, Problem solving, Open-mindedness
Students developed their supporting sentences from their summarized materials according to the topic sentence	Creativity
Students wrote a conclusion paragraph guided by the lecturer and uploaded to e-portfolios	Communication, Problem solving, Open-mindedness
Students consulted their essays to the lecturer	Problem solving, Open-mindedness
Students revised their essays based on the advice uploaded to e-portfolios	Inference, Problem-solving, Creativity
Students presenting their essays to the lecturer	Communication

The findings showed that students presented various aspects of critical thinking skill. The inference skill presented by students showed that they were able to draw a conclusion based on the information presented to them when they tried to choose a topic after exploring many sources, or when they could finally revise their essays based on the suggestions or corrections provided by the lecturer. The communication skill is also important so students can develop and deliver a good essay. Problem-solving skills occurred when students had difficulties or problems with their writing process, and they needed to take action to solve the problems, either by exploring more information on various sources, such as the internet, or by asking peers or their lecturer. The process of developing an essay based on their knowledge or information also involved students' creativity, starting from writing a catchy topic sentence to building a paragraph with strong

supporting sentences to defend their arguments in the essay. Those skills supported students from the early process of writing to the last stage of presenting the essay.

4.3 Students' Perceptions on Microlearning and E-Portfolios

Based on the thematic analysis conducted on the responses from students, most answers given by students were their difficulties in finding topics considered interesting, important, or mastered by the students and their difficulties in collecting relevant materials to support their writing. Based on their responses, the critical thinking students experienced in this phase was related to inference, where they were expected to be able to conclude an idea based on the information they gathered. It led to the need to use problem-solving skills.

Table 5: Students' perceptions of the microlearning strategy

Questions	Themes
What difficulty did you face during the preparation process of writing an essay?	Finding topic, collecting materials
How did you overcome the difficulty in preparing your essay?	Spent leisure time to read, more exploration
How did microlearning support you in the process of preparing your essay?	Giving more flexible time, giving more chances to understand the materials
What difficulty did you face during the process of writing an essay?	Elaborating the topic, elaborating paragraphs
How did you overcome the difficulty in writing your essay?	Wrote it little by little
How did microlearning support you to write your essay?	Giving more flexible time, giving chances to work with deeper understanding
What difficulty did you face during the finishing process of writing an essay?	Integrating the advice to the essay
How did you overcome the difficulty in the finishing process of writing your essay?	Consulted a lot with the lecturer
How did microlearning support you in finishing your essay?	Giving more time to process the materials
How did you see the use of e-portfolios in your writing?	Helping track the progress, giving time to learn in small portions of materials

Some answers were transcribed as;

"I did not know what to write at the beginning"
"I can't decide any topics."
"Too many topics to choose for my essay."
"The topic is okay but the literature is hard to find."
"It is difficult to find the sources even in the internet."

For the second question, students revealed that whether they liked it or not, they had to spend more time browsing literature to support the content of their essay. They even willingly spent time visiting the library to get more materials that they could not access on the internet. These responses were analysed as skill of analysis and interpretation. Analysis skill and interpretation are related to their ability in breaking down information into smaller parts and examining the correlation and using it to solve problems. Some excerpts of the interview were;

"No more scrolling social media. I need to browse articles from journal."
"I read a lot so I can get inspiration to write my essay."

"I go to library so maybe I can get more ideas."

For the third question, students revealed that by using a microlearning strategy, which presents the materials in small chunks, students had more time to process the information given by the lecturer, leading to the flexibility of time; moreover, when they were given time to complete the assignment at home. The assignment was given in small topics also, so the students did not need to spend too much time on an assignment. The flexibility in this session reflected the critical thinking skill where students are able to be aware on different situations and options to cope with stressful or demanding condition, to adapt to any situations, and show self-efficacy. Some excerpts of the interview were;

"I understand the materials better. The topic is not too long."
"I got more time to digest the materials from the lecturer."
"The materials are not too much. It's easy to understand bit by bit."

For the fourth question, in the process of completing their essay, it was difficult for students to elaborate the topic into paragraphs to build the content of their essay. The critical thinking skill involved in the process was creativity which is related to their ability to produce or create products from ideas. Some excerpts of the interview were;

"Sometimes I got stuck."
"I run out of ideas at most of the time."
"I need to take a break from writing sometimes because I'm stuck."
"It is hard sometimes to write a lot."

For the fifth question, in the process of overcoming their difficulties in writing essay, they tended to finish it little by little since they thought that they had enough time to complete small materials given by the lecturer. It shows that students activated their problem-solving skill as a critical thinking skill reflecting their ability to employ knowledge or data to solve problems by thinking, assessing problems, finding solutions. Some excerpts of the interview were;

"Sometimes I got stuck."
"I run out of ideas at most of the time."
"I need to take a break from writing sometimes because I'm stuck."
"It is hard sometimes to write a lot.

For the sixth question, students stated that microlearning was considered helpful in the process of writing the essay in terms of providing small chunks materials so it was easier for them to process the information given. They considered working with microlearning strategy was more flexible. It shows a skill involved mentioned as predicting patterns which works with the ability to recognize or identify structures to get insights from information and use it effectively. Some excerpts of the interview were;

"It helps me more focus."
"It is easier to work with."
"The materials are easier to process because not too much."

For the seventh question, while finishing their essays after getting advice from the lecturer, the students faced difficulties in terms of processing the advice and including the advice to their essays. This may take more time and processes since they dealt with the ideas coming from other people, even their lecturer. This step requires analysis skill to help students work with the advice from the lecturer. Some excerpts of the interview were;

"I sometimes cannot understand the advice."

"The advice is just out of my understanding."
"....mmm.... because the advice is not from myself, I have to make sure over and over again to my lecturer the meaning of the advice."
"I have to check my understanding with my lecturer"

For the eighth question, students revealed their strategy to overcome their difficulties while facing the advice given by the lecturer. They tended to consult with the lecturer about the advice, to clarify or confirm their understanding to make sure there was no gap between their comprehension and the lecturer advice. This shows that students involved their communication skill as a part of critical thinking showing their ability to communicate and negotiate ideas with others. Some excerpts of the interview were;

"It takes some time but I prefer asking to my lecturer."
"Well, I usually browse but first, I ask my lecturer so it matches."
"Ask my lecturer. It is easier. He usually will give me some sources to visit."
"Ask my lecturer. I can ask the websites or links or materials that support."

For the ninth question, students shared about their experiences with microlearning while completing their essay. Most of them revealed that microlearning was helpful because it presented materials in small portions, step by step so they had enough time to learn about the materials deeper and slowly. Again, students' flexibility skill was used in this step. They required the skill to help them adapt with the time given by the lecturer. Some excerpts of the interview were;

"It was fun and helpful."
"I like that the instructions always short, the assignment is not too long so I have much time."
"It was useful and I feel the materials were easier to understand because at first, I think essay is difficult."
"I have much time to really really try to understand the materials."

For the tenth question, students shared their experiences in using e-portfolios during their process of writing an essay. Most of them said that e-portfolios helped them to be more organized by keeping their projects, even their literature, in one place. It is easier than completing a learning journal. They just needed to upload everything there and it was easy to track and to find everything in the e-portfolios. Self-regulation skill was needed in this step to help students understand and control their learning environments by analysing and setting goals, choosing learning strategies and using them, monitoring their progress to achieve their goals. Some excerpts of the interview were;

"It's helpful. Just upload all the selected articles there and I can read them later"
"It's easy. No need to learn using complicated application."
"It helps me to learn everything little by little because I can track every little progress I make in my portfolio."
"It helps me to not losing my articles, my projects, the advice from my lecturer. All in one place."

All the responses from the students reflected how the students viewed their process of writing an essay supported by a microlearning strategy and e-portfolios. By looking at these responses, students develop their critical thinking skill by using microlearning in their process of producing an essay.

5. Discussion

The results of the observation show that the lecturer taught the students to write an essay by starting from the basic step of exploring a topic to finally produce a whole essay by going through

the process of revising the essay as feedback from the lecturer. The lecturer also gave students take-home assignment as a way of building continuous learning in small topics instead of asking students to work on a big topic at one time. This goes along with what proposed by Slivnaya et al. (2023) where microlearning delivers materials in micro-content or micro-tasks to help students get deeper understanding as what also reveals from the responses of interview. By learning from step by step continuously, students can be more focus and feel learning enjoyment since they are free to explore any materials from various sources at any time without being pressured to complete a big task at one time. This is in line with Mcneill & Fitch (2023) though the students did not mention the time given to complete their assignment, but they implied that the assignment given by the lecturer did not consume their time so they have more time to focus on the comprehension instead of only on completing the tasks as what stated by Ghafar (2023) leading to the possibility to better knowledge application Gherman et al. (2021). This chance of comprehending the materials deeper is resulting in the chance of supporting what revealed by Marinskaya (2020) about academic performances.

Based on the students' response on the interview, microlearning gives them the feeling of confidence and learning enjoyment. It gives them relaxing feeling so they can process the information and the materials provided by the lecturer. It is in line with what proposed by Prasittichok & Smithsarakarn (2024) highlighting microlearning as a means of improving students engagement in learning process by building the students' confidence. This confidence supports the learning process gone through by the students related to their motivation. This can be connected to the development of students' critical thinking skill in learning while using microlearning since Romanenko et al. (2023) revealed that microlearning is closely related to students' soft-skills such as confidence and motivation in learning though there are various skills also developed during learning process. It is also in line with what presented by de Jong (2010) and Lopez (2024) related to the ability of students to process too much cognitive capacity, resulting in a hampered learning process. The microlearning strategy was stated to effectively overcome the issue by allowing students to learn based on their individual cognitive capacity.

When it comes to integrating microlearning with digital learning media, an e-portfolio is recommended in this study. The e-portfolio was implemented by Jaidamrong & Mahapoonyanot (2024) to teach undergraduate students effectively. It is also related to what was proven by Khoa & Thuậ (2024), that it helps students in developing their soft-skills, such as self-reflection. In this present study, the E-portfolio saves all the progress made by students; exploring the phenomena to choose as the topic of the essay, collecting all sources of literature study, and also collecting the progress they made from identifying paragraphs, developing sentences, building paragraphs, to revising their essay. By organizing those steps into an e-portfolio, students can visit it anytime to review how far they have gone during the process of writing, what they have missed, what they have to revise, and perform self-assessment on their strengths and weaknesses in learning. It is more than just building academic achievement, but also self-awareness. These activities were based on the principle of personalized learning as presented by Imran et al.(2024), which offered unique learning experiences for each student, influencing the learning outcomes. The flexibility offered by the e-portfolio was also mentioned by the respondents in this present study as their favourite. They can visit their e-portfolio anytime they want which is in line with Dewi (2016) when it comes to flexibility in learning. This implementation needs to be supported by proper assessment which focuses on students' progress in attempt to reach the goal of a course instead of only focusing on the results shown by students Chang & Kabilan (2024). This is considered relevant with what presented by Imran, Almusharraf, Abdellatif, et al. (2024), related to constructive learning which encourages students and lecturers in various active learning activities, especially the ones aimed to build knowledge by allowing students to be in a dynamic learning environment supported by

unlimited learning sources, learning media, and learning experiences. The use of digital media such as e-portfolios is also considered relevant to the students' familiarity with technology nowadays where they tend to work better when their learning environment allows them to work with digital media.

While observing the development of critical thinking skills performed by the students, problem-solving skill becomes one of the most-used skill. In the observation, this skill shown when students tried to find a topic for the essay. Browsing the internet to observe popular or interesting phenomena became the action they took as the attempt to solve the problems of finding topic. This skill also occurred when they tried to overcome more difficulties while writing their essay. Choosing to write it little by little instead of ignoring the problems was considered as the development of problem-solving skill. Being this effortful to face their difficulties by using all the data or sources they have can be considered as problem-solving skill as what stated by Amanda et al. (2024) defining this skill as the ability to use knowledge and data to solve problems effectively.

The process of utilizing the data or information while developing an essay is mentioned as critical thinking skill that is related students' abilities to connect ideas, make sequences and relate new information to their previous knowledge or known as predicting patterns skill. It was shown when they utilized microlearning strategy in learning by re-reading and observing the sources they had collected during the preparation step of writing an essay. This is related to what performed by Ling and Loh (2020) in their research that this skill is needed when we expect students to build deeper understanding in learning by making the progress meaningful to them. Consequently, this understanding led to the use of other skill in processing new information.

Being open-minded in learning, as shown by students when they were processing their lecturer's advice on their essay, was also considered an important skill in learning. This helps them view an issue from different perspectives, which may improve the quality of their essay. By developing this skill, it will be easier for students to analyze the suggestions coming from their lecturer, which, in this present study, is also shown by students by integrating the advice into their essay. As what stated by Karakuş (2024), this open-mindedness influences students' performance as a form of critical thinking skill which mentioned by Park et al. (2023) as a part of creativity. This skill was shown by students when they tried to elaborate the topic they had chosen into paragraphs that built their essay which also reflected in their ability to reflect or learn from their previous errors or mistakes. This reflection skill helps them to be aware on the challenges occurred during their learning (Bar-Tal et al., 2021) which is related to their ability to perform self-regulation Heydarnejad et al. (2021). This self-regulation involves the acts of self-assessment or self-reflection, meaning that students can decide when they need to seek help from peers or the lecturer. This decision requires another critical thinking skill that helps them to articulate or depict the problems and the solutions expected from various perspectives. Communication skill that performed by the students while they consulted their essay to the lecturer is a form of their attempts to present their ideas confidently (Dias-Oliveira et al., 2024).

6. Conclusion

The results of this study show that microlearning in writing skills, especially in essay writing, can be implemented through the process of involving students in gathering information to conclude a topic, writing a topic sentence, and developing it into a paragraph, continuing to elaborate and arrange the paragraphs into a whole text. These steps should be conducted in small portions, such as teaching a topic in one meeting. Requiring students to work on a take-home assignment is also recommended while paying attention to the time allotment to complete the assignment, since the assignment should not be time-consuming and stress students out. Involving students in the

activities of discussion and receiving feedback for improvement is also suggested. The focus of learning activities in the classroom should always consider students' critical thinking development by giving students activities supporting the possibilities of growing the skill. This present study fills the gap of previous studies by integrating the digital learning media of e-portfolios with a microlearning strategy to accommodate students' needs of learning in this digital era while facing the problems of short attention spans and the demands of critical thinking development. The novelty lies in the focus of this study itself, which presents concrete forms of learning activities based on a microlearning strategy to support students' critical thinking.

Pedagogically, it gives insights into lecturers or teachers on how microlearning strategy can be implemented in the classroom and the importance of observing students' critical thinking process in teaching and learning activities involving not only in-classroom learning but also at-home learning ones. In the larger area, it is possible to implement the principles of a microlearning strategy and integrate it with any learning media in various language-skill learning or courses. Theoretically, this study becomes a strong foundation for educators to involve technology in the classroom and allows students to work at their own pace. This also supports the lecturers or educators to design their learning activities to help students build deeper critical thinking.

The limitation of this study was identified as the short period of research. The essay was becoming a topic in the academic course, together with the Scientific Writing topic. There were only 7 weeks for students to develop and complete their essays. Another limitation was related to the responses of interview given by the students. They tended to give almost similar responses to their peers, which may affect the validity of the responses. This study is considered significant in terms of presenting the applicable learning activities based on the principle of the microlearning strategy and the needs of personalized e-learning media of students.

References

Ahmad, M., Mahmood, M. A., Siddique, A. R., Imran, M., & Almusharraf, N. (2024). Variation in academic writing: A corpus-based investigation on the use of syntactic features by advanced L2 academic writers. *Journal of Language and Education, 10*(3), 25–39. https://doi.org/10.17323/jle.2024.21618

Al Maktoum, S. B., & Al Kaabi, A. M. (2024). Exploring teachers' experiences within the teacher evaluation process: A qualitative multi-case study. *Cogent Education, 11*(1). https://doi.org/10.1080/2331186X.2023.2287931

Alamri, W. A. (2019). Effectiveness of qualitative research methods: Interviews and diaries. *International Journal of English and Cultural Studies, 2*(1), 65–70. https://doi.org/10.11114/ijecs.v2i1.4302

Amanda, F. F., Sumitro, S. B., Lestari, S. R., & Ibrohim. (2024). Enhancing critical thinking and problem solving skills by complexity science-problem based learning model. *Multidisciplinary Journal of Educational Research, 14*(1), 96–114. https://doi.org/10.17583/remie.9409

Aston, K. J. (2023). 'Why is this hard, to have critical thinking?' Exploring the factors affecting critical thinking with international higher education students. *Active Learning in Higher Education, 25*(3), 537–550. https://doi.org/10.1177/14697874231168341

Bar-Tal, D., Vered, S., & Fuxman, S. (2021). Between open-minded critical thinking and closed-minded allegiance: Educational tensions in societies involved in intractable conflict. *Advances in Political Psychology, 42*(1), 3–28. https://doi.org/10.1111/pops.12687

Chang, S. L., & Kabilan, M. K. (2024). Using social media as e-Portfolios to support learning in higher education: a literature analysis. *Journal of Computing in Higher Education, 36*(1), 1–

28. https://doi.org/10.1007/s12528-022-09344-z

Darwin, Rusdin, D., Mukminatien, N., Suryati, N., Laksmi, E. D., & Marzuki. (2024). Critical thinking in the AI era: An exploration of efl students' perceptions, benefits, and limitations. *Cogent Education, 11*(1). https://doi.org/10.1080/2331186X.2023.2290342

Davis, M. H. (2014). *Portfolio Assessment. June.* https://doi.org/10.3138/jvme.32.3.279

Dawadi, S. (2021). Thematic analysis approach: A step by step guide for elt research practitioners. *Journal of NELTA, 25*(1–2), 62–71.

de Jong, T. (2010). Cognitive load theory, educational research, and instructional design: Some food for thought. *Instructional Science, 38*(2), 105–134. https://doi.org/10.1007/s11251-009-9110-0

Dewi, D. K. (2016). Improving critical thinking in academic writing through portfolio in higher education. *1st UPI International Conference on Sociology Education (UPI ICSE 2015).* https://doi.org/10.2991/icse-15.2016.89

Dias-Oliveira, E., Pasion, R., Vieira da Cunha, R., & Lima Coelho, S. (2024). The development of critical thinking, team working, and communication skills in a business school–A project-based learning approach. *Thinking Skills and Creativity, 54*(November), 101680. https://doi.org/10.1016/j.tsc.2024.101680

Gandimathi, A., & Zarei, N. (2018). The impact of critical thinking on learning english language. *Asian Journal of Social Science Research, 1*(2), 1–10.

Ghafar, Z. N. (2023). *Microlearning As a Learning Tool for Teaching and Learning in Acquiring Language : Applications , Advantages , And Influences on the Language Microlearning As a Learning Tool for Teaching and Learning in Acquiring Language : Applications , Advantages , An. March.* https://doi.org/10.53103/cjess.v3i2.127

Ghafar, Z. N., Abdullkarim, S. T., Mhamad, L. M., Kareem, R. A., & Mahmud, T. I. (2023). Microlearning as a learning tool for teaching and learning in acquiring language : applications , advantages , and influences on the language. *Canadian Journal of Educational and Social Studies, 3*(2), 45–62. https://doi.org/10.53103/cjess.v3i2.127

Gherman, O., Turcu, C. E., & Turcu, C. O. (2021). An approach to adaptive microlearning in higher education. *INTED2021 Proceedings.*

Heydarnejad, T., Fatemi, A. H., & Ghonsooly, B. (2021). The relationship between critical thinking, self-regulation, and teaching style preferences among EFL teachers: A path analysis approach. *Journal of Language and Education, 7*(1), 96–108. https://doi.org/10.17323/jle.2021.11103

Huang, Q., Muhamad, M. M., Che Nawi, N. R. binti, & Li, W. (2023). A study on the impact of critical thinking skills and foreign language enjoyment on foreign language performance. *International Journal of Academic Research in Progressive Education and Development, 12*(3), 700–710. https://doi.org/10.6007/ijarped/v12-i3/18077

Imran, M., Almusharraf, N., Abdellatif, M. S., & Abbasova, M. Y. (2024). Artificial intelligence in higher education: enhancing learning systems and transforming educational paradigms. *International Journal of Interactive Mobile Technologies, 18*(18), 34–48. https://doi.org/10.3991/ijim.v18i18.49143

Imran, M., Almusharraf, N., Ahmed, S., & Mansoor, M. I. (2024). Personalization of e-learning: future trends, opportunities, and challenges. *International Journal of Interactive Mobile Technologies, 18*(10), 4–18. https://doi.org/10.3991/ijim.v18i10.47053

Jaidamrong, N., & Mahapoonyanot, N. (2024). View of the development of an e-portfolio platform for undergraduate students of the educational faculty, thaksin university. *Library Progress International, 44*(3).

Jamil, M., Anwar, M., & Ali, J. M. (2024). Developing critical thinking skills in english classroom at the secondary level: Teachers' perspective. *Journal of Social Sciences Development, 03*(01),

76–85.

Johnson, H. (2017). Understanding the role of triangulation in research. *Scholary Researh Journal for Interdiscipinary Studies*, *6*(177), 91–95. http://www.srjis.com/pages/pdfFiles/149544238718. HONORENO JOHNSON.pdf

Kala, N., & Ayas, A. (2023). Effect of instructional design based on cognitive load theory on students' performances and the indicators of element interactivity. *Journal of Turkish Science Education*, *20*(3), 468–489. https://doi.org/10.36681/tused.2023.027

Karakuş, İ. (2024). University students' cognitive flexibility and critical thinking dispositions. *Frontiers in Psychology*, *15*(September), 1–12. https://doi.org/10.3389/fpsyg.2024.1420272

Khairuddin, Z., Ismayatim, W. F. A., Ismail, O., Rahmat, N. H., & Zamri, N. A. (2021). Exploring critical thinking in writing. *Advances in Social Science, Education and Humanities Research*, *626*, 67–72. https://doi.org/10.2991/assehr.k.211227.012

Khoa, Đ., & Thuậ, Đ. (2024). *E- Portfolio Assessment on EFL Learners ' Writing Performance at Tertiary Education Article Info Received : 12-09-2024 Accepted : 15-10-2024 Page No : 171-174*. 171–174.

Kirkpatrick, R., Kirkpatrick, J., & Derakhshan, A. (2024). An investigation into the motivation and attitudes of Japanese students toward learning English: A case of elementary and junior high school students. *Asian-Pacific Journal of Second and Foreign Language Education*, *9*(1). https://doi.org/10.1186/s40862-023-00243-z

Ling, M. K. D., & Loh, S. C. (2020). Relationship of creativity and critical thinking to pattern recognition among Singapore private school students. *Journal of Educational Research*, *113*(1), 59–76. https://doi.org/10.1080/00220671.2020.1716203

Lopez, S. (2024). Impact of cognitive load theory on the effectiveness of microlearning modules. *European Journal of Education and Pedagogy*, *5*(2), 29–35. https://doi.org/10.24018/ejedu.2024.5.2.799

Marinskaya, A. (2020). Micro-learning efficiency for foreign language teaching. *European Proceedings of Social and Behavioural Sciences EpSBS*. https://doi.org/10.15405/epsbs.2020.12.02.85

Mcneill, L., & Fitch, D. (2023). Microlearning through the lens of gagne ' s nine events of instruction: A qualitative study. *TechTrends*, *67*(3), 521–533. https://doi.org/10.1007/s11528-022-00805-x

Net, W. W. W. P., & Kusmaryono, I. (2023). How are critical thinking skills related to students' self-regulation and independent learning? *Pegem Journal of Education and Instruction*, *13*(4), 85–92. https://doi.org/10.47750/pegegog.13.04.10

Park, J. H., Li, Y., & Niu, W. (2023). Revisiting creativity and critical thinking through content analysis. *Journal of Creativity*, *33*(2). https://doi.org/10.1016/j.yjoc.2023.100056

Prasittichok, P., & Smithsarakarn, P. (2024). The Effects of Microlearning on EFL Students ' English Speaking : A Systematic Review and. *International Journal of Learning, Teaching and Educational Research*, *23*(4), 525–546. https://doi.org/https://doi.org/10.26803/ijlter.23.4.27

Romanenko, Y. N., Solodovnikova, E., & Maksimenko, N. (2023). Microlearning as a new method of teaching soft skills to university students. *Frontiers in Education*, *May*. https://doi.org/10.3389/feduc.2023.1177516

Shaheen, M., Pradhan, S., & Ranajee. (2019). Sampling in Qualitative Research. In *Qualitative Techniques for Workplace Data Analysis* (Issue January, pp. 25–51). https://doi.org/10.4018/978-1-5225-5366-3.ch002

Shakil, A. F., Karim, R. A., Niazi, S., Aslam, M., & Khan, S. C. (2021). Critical thinking skills for english language classrooms at the university level. *Humanities & Social Sciences Reviews*, *9*(2), 659–665. https://doi.org/10.18510/hssr.2021.9262

Slivnaya, E. M., Borisenko, V. A., & Samofalova, M. V. (2023). Micro-learning principles in teaching EFL in the structure of supplementary and further education : Andragogical aspect. *Training, Language, and Culture*, *7*(4), 46–53. https://doi.org/10.22363/2521

Somekh, B., & Lewin, C. (2005). *Methods in the Social in the Social Sciences*.

Yang, H., & Wong, R. (2024). An in-depth literature review of e-portfolio implementation in higher education: Processes, barriers, and strategies. *Issues and Trends in Learning Technologies*, *12*(1), 65–101. https://doi.org/10.2458/itlt.5809

Yi, J. (2008). The Use of Diaries as a Qualitative Research Method to Investigate Teachers' Perception and Use of Rating Schemes. *Journal of Pan-Pacific Association of Applied Linguistics*, *12*(1), 1–10.