Research Article

Investigating Critical Thinking Skills and Microlearning Integration in English Learning Material Web-Based of Eighth Graders

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ABSTRACT

Microlearning has been widely popular in English language learning. It has some potentials; critical thinking, lowering cognitive load, focusing on learning, and bridging the theory-practice gap in the 21st century learning. This research aims to investigate how critical thinking skills and microlearning-based model are integrated in the English learning material web-based of eighth graders. Qualitative content analysis was utilized as the method for this research. An English learning material web-based was analyzed by using critical thinking skills descriptors from and microlearning descriptors. The findings reveal that the English learning material web-based consists of 7 out of 11 descriptors of critical thinking and includes of 6 out of 9 microlearning descriptors. However, it is indicated that the English learning material web-based of eighth graders are not fully incorporated with the critical thinking skills and microlearning-based model.

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INTRODUCTION

In 21st-century learning, there has been an increase in interest in microlearning and critical thinking skills. According to Junining (2016), one of the skills necessary to thrive in this globalized period is critical thinking skills (also known as CTS). Moreover, as a 21st century talent, it has grown in importance in the area of education over the past few years in an effort to help students become 21st century citizens (Talebinejad & Matou, 2012). In the current world, critical thinking is no longer seen as a luxury but rather as a basic skill for survival (Dabbagh, 2015). These support the idea that developing critical thinking abilities is important for creating learning materials. Mottola and Murphy (2001) conclude that analysis of an activity research, critical thinking is most likely to occur and persist when it is consistently practiced and encouraged by others.

A research by Bobkina and Stefanova (2016) examine how readers respond to a piece of literature using their critical thinking abilities. However, it is still difficult to locate English learning resources, particularly activities or exercises that are applicable to instructors and students' needs and incorporate critical thinking as a cross-curricular competency. In addition, Wallace and Jefferson (2015) conducted a research about developing critical thinking skills-infused workbook exercise for higher education students. The finding indicated that the exercise which was integrated with critical thinking skills workbook exercise was effective to improve their critical thinking skills ability. More studies conducted by Fahim and Haghighi (2014) explored at the academic self-regulation and critical

thinking skills of EFL learners. A strong and favorable link between the two notions was also discovered. Furthermore, Ghanizadeh and Moafian (2011) found out the connection between emotional intelligence as an affective trait and critical thinking skills in the affective domain. The findings of their research showed a substantial correlation between learners' emotional intelligence and their critical thinking skills.

As stated in The CambridgeLife Competencies Framework (2020), in order to think clearly and sensibly about what they want to accomplish and what they believe is the best action, students need to be able to think at higher levels of thinking, which is referred to as critical thinking skills. According to Ryan (2022), humans' beliefs and methods of thinking are influenced by the capacity of life, the choices taken, and the filters through which it is seen and understood. Critical thinking is necessary for selecting information sources and creating arguments. It is also assumed that a strong emphasis on using a logical, impartial, and self-aware methodology that can assist students in locating reliable sources and supporting their conclusions.

In addition, critical thinking can be used for more skills. It has more recently been defined as a wide range of lower and higher order skills,including interpreting, spotting logical fallacies, analyzing cause and effect, synthesizing claims, drawing conclusions and predictions, evaluating, and problem-solving (Bloom, 1984). This taxonomy has been employed as a way to represent qualitatively different types of thinking that are divided into low order thinking (remembering, understanding, and applying) and high order thinking (analyzing, evaluating, creating) (Muniroh, 2021).

The idea of asking questions is at the core of critical thinking, regardless of the age of the learners. Students should be taught to constantly challenge the knowledge they acquire and the conclusions they draw (The Cambridge Life Competencies Framework, 2020). Theteachers should push the students to deeper critical thinking by asking them questions,for instance; *why is that your answer?; How did you come to that answer?; Do you think there could be another answer?*. When receiving feedback from students, teachersshould pay attention to what they are saying and then appropriately evaluate their pointsof view. By doing this, they demonstrate to their students that they, too, are critical thinkers.

It has suggested the activities that can be conducted by the teachers based on the students' level, it is stated that young learners have a natural interest at the basic level. In order to actively cultivate this students' curiosity, it is crucial that they participate in learning activities. It's essential to promote a critical-thinking skill in the classroom in order

to do this. So that they may ask insightful questions and understand and evaluate the links between concepts, students must pay close attention to one another during speaking activities. Secondary school students are further inspired to learn when the subject matter is fascinating or pertinent to them. Customizing learning is vital as a result. The course material should be related to the students' real-world experiences or their educational environment, according to teachers. If the material being studied in the classroom has real significance for the students or if they are more familiar with the subject, they are far more likely to be able to understand the concepts and make connections between ideas. The capacity to think critically in academic and professional situations is especially important for learners of this age at the adult level.

Considering the importance of critical thinking skills in the 21st century learning, as the digital native learners, microlearning plays important roles for the them, including the eighth graders. According to Colman (2020), microlearning is incredibly popular with learners because it gives them instant access to foundational information and skills. The reason instructional designers like it is because it makes it possible for them to provide high-quality training quickly and economically. Microlearning provides students with quick, asynchronous lesson material that they can access anywhere and whenever it's convenient for them, all without needing a significant time commitment to complete (Rizal, Sulistyaningrum, & Iskandar, 2022).

Additionally, one emerging paradigm made feasible by technology is microlearning, which is essentially characterized as the delivery of learning sessions or activities of shorter duration than traditional instruction delivery (Hug, 2010). The prevalent consensus is that the younger generation will be more focused on technology than the older ones. Hug (2014) also claimed that there are versions that are produced by various interpretations of specific microlearning variables, including time, content, curriculum, form, process, mediality, and learning type. In addition, De Gagne, Chang, Park, Hall, Woodward, and Kim (2019) noted that there are five components to microlearning. They are: (1) the learning context and the amount of time spent learning; (2) the kind and development of material; (3) the aggregation and retrieval of content; (4) the structure of the learning cycle and the target audience; and (5) the role and involvement of the learner. Furthermore, microlearning is the distribution of knowledge in-depth and in discrete pieces at the precise time it is required.

A study implemented by Erradi, Almerekhi, Nahia, and Sajeda (2013) found that empirical testing results from students who used LingoSnacks, considered as mobile microlearning, show that the participants were able to increase their rate of vocabulary acquisition as the number

of new words they can recognize, recall, and retain was significantly higher than participants who just used conventional lessons in a classroom. Furthermore, Meng and Li (2016) conducted a research which examined the learning environments of students from four angles, including the technical support of mobile devices, mobile microlearning materials, student initiatives, and technical and emotional assistance provided to students. The results indicated that mobile microlearning is a viable option for college English teaching and learning because of its ease, adaptability, and interaction. In addition, through the use of microlearning approaches, Mohammed, Wakil, and Nawroly (2018) examined how to increase learning's efficacy and efficiency while extending the time that knowledge is retained in the mind.

Additionally, Allela (2021) also asserted that microlearning refers to the employment of concise, carefully thought-out modules and that quick-hit learning exercises can make use of everyday technological items. Short text passages, interactive and non-interactive infographics, PDFs, presentations, brief interactive and non-interactive videos, eBooks, flipbooks, audiobooks, brief podcasts, recorded webinars, mobile apps, brief HTML pages, QR codes, learner-generated blog posts, gamification, serious games, virtual reality, augmented reality, step-by-step checklists, and quizzes are some of the formats that can be used.

As the one of the microlearning dimensions, the use of technology cannot be separated from the students' lives. It is recently stated that one of the microlearning objective materials is HTML pages. According to Mafulah (2017), it is possible to enhance the learning process and boost students' interest and motivation by incorporating technology, such as the internet, as a medium in the process of teaching and learning. Moreover, Tabatabaei and Gui (2011) argued that the teaching and learning of second and foreign languages have been significantly impacted by the development of computer technology, particularly the internet.

The most prevalent educational outcome of recent innovations is web-based educational platforms. It has a significant influence on education, particularly in the area of distant learning (Hamidi & Chavoshi, 2018; The Institute for Higher Education Policy, 2000). Digital tools and web applications play a crucial role in the educational environment due to their ability to create new spaces for teaching and learning (Pasa, 2016; Tsai, 2015). Additionally, the web is a teaching and learning tool that may encourage the development of resources that are well-designed. Web-based instructional materials can provide teachers and students with a broad range of new and exciting experiences that sometimes are impossible to duplicate in a traditional classroom.

Talenta and Pavita (2022) asserted that the learning materials created today are competency-based and intended to inspire students to engage in more active communication, critical thinking, and cooperative learning. In order to integrate the 21st century skills to the digital native learners, learning materials are needed with those integration. It is generally accepted that as the fundamental aspect in teaching and learning it should be inserted with the fundamental aspects, critical thinking skills and microlearning, too. Therefore, the learning objectives can be achieved.

This research aims to investigate the amount of critical thinking skills and microlearning-based learning materials web-based for eighth grade students. Therefore, the research question is formulated, namely: To what extent are the critical thinking skills and microlearning integrated in English learning material web-based of eighth graders?

METHOD

This research employed qualitative content analysis. As long as the research aims to investigate the integration of critical thinking skills and microlearning in English learning material web-based, content analysis known as document analysis was suitable. Schreier (2012) stated that one of the many qualitative techniques now accessible for assessing data and interpreting its significance is qualitative content analysis. Additionally, Stemler (2021) argued that examining trends and patterns in documents can be advantage of content analysis.

The data were the phrase/words/sentences/dictions of the instructions which cover critical thinking skills and microlearning descriptors. The researcher did the preliminary analysis on some English web-based learning materials. Therefore, a purposive data source which has implemented the Indonesian national curriculum, 2013 curriculum has been chosen. The data source was the English learning material web-based called *myenglishstep.com*. Furthermore, the data were analysed by using descriptors of critical thinking skills descriptors adopted from The Cambridge Life Competencies Framework (2020) and using the microlearning descriptors from Allela (2021), De Gagne et al. (2019), and Hug 2010. Each descriptors of critical thinking skills and microlearning are coded to make easier in investigating. They are illustrated in these tables below.

Table 1. Critical Thinking Skills Descriptors (The Cambridge Life Competencies Framework, 2020)

Core Areas	Components	Codes
Understanding and analysing ideas and arguments	Identifying and classifying information	CTS 1
	Recognising patterns and relationship	CTS 2
	Interpreting and drawing inferences from arguments and data	CTS 3
Evaluating ideas and arguments	Evaluating specific information or points in an argument	CTS 4
	Evaluating arguments as a whole	CTS 5
	Drawing appropriate conclusions	CTS 6
Solving problems and making decisions	Identifying and understanding problems	CTS 7
	Identifying, gathering, and organizing relevant information	CTS 8
	Evaluating options and recommendations to come to a decision	CTS 9
	Justifying decisions and solutions	CTS 10
	Evaluating the effectiveness of implemented solutions	CTS 11

The first core is understanding and analyzing ideas and arguments which refers to a learner's ability to identify and analyze information in order to recognize patterns and relationships. This helps students to gain a deeper understanding of ideas and arguments, as well as to interpret and draw inferences about the information they are presented with. Evaluating ideas and arguments are related to learners' ability to judge which arguments or ideas they can rely on and which they should be skeptical about. It can help students draw appropriate conclusions and construct strong arguments themselves. Meanwhile, solving problems and making decisions involves many skills such as identifying and analyzing problems, gathering appropriate information, evaluating a range of options, making decisions about which options to implement and evaluating those decisions to further refine solutions (The Cambridge Life Competencies Framework, 2020).

Meanwhile, the following table describes the microlearning descriptors which were adopted from Allela (2021), De Gagne et al. (2019), and Hug (2010).

Table 2. Microlearning Descriptors adopted from Allela (2021), De Gagne et al. (2019), and Hug (2010)

Microlearning Aspects	Descriptors	Codes
Learning Materials	1. The materials are separated into one theme (small unit)	ML 1
	2. The materials are intended to last just temporarily (2-5 minutes,	ML 2

Allela, 2021; few second to 15 minutes, De Gagne, 2019)

	3. The materials contents are provided at the moment of need	ML 3
	4. The materials are based on the curriculum of the school	ML 4
	5. The materials are divided into certain skill categories	ML 5
	6. The materials make use of technology	ML 6
	7. The materials are incorporated with varieties of media	ML 7
Learning Style	8. Students participate in the learning process	ML 8
	9. Students spend little time to learn the materials	ML 9

RESULTS AND DISCUSSION

By utilizing the codes in the tables above, it can be found the integrations of critical thinking skills and microlearning in the English learning material web-based. The findings are illustrated in the following tables. Table 3 serves the findings of critical thinking skills descriptors found and table 4 presents the microlearning.

Table 3. An Overview of Critical Thinking Skills Integration in myenglishstep.com

Book Units	Code of CTS Descriptors Found	Phrases / Word / Sentences / Activities	Justification
1	CTS 1		The data claims the indicator of identifying and classifying information that instructs the students to listen to the audio and arrange the text.
	CTS 2		The instructions are identified as the aspect of recognizing pattern

			and relationship that promotes students to categorize the expressions.
	CTS 6		The data found belongs to the component of evaluating ideas and arguments as drawing appropriate conclusions which is asking students to make a short dialog about the topics.
2	CTS 1		From the diction "arrange" shows that the descriptor shown is classifying and analyzing information.
	CTS 2		The data is claimed as recognizing patterns and relationship that instruct the students to do some interviews and then do the following exercise.
	CTS 9		This data falls under the aspect of "solving problems and making decisions" which requires the students to reflect themselves what they have understood about the topics.
3	CTS 1		This data falls under components of identifying and analyzing information by using diction of "match".
	CTS 2		Students are urged to arrange the words into complete sentence to describe the pictures which is indicated as the components of recognizing patterns and relationship.
	CTS 4		This data is indicated as core areas of evaluating ideas and arguments in the component of evaluating specific information or points in an argument.
4	CTS 1		The data is identified as identifying and

			classifying information from the instruction which requires students to read the story and answer the following questions.
	CTS 2		Students are required to complete the steps by analyzing the previous steps which is claimed as recognizing patterns and relationship.
	CTS 1		The students are instructed to answer the questions after paying attention to the previous greeting card. Therefore, it is claimed as the components of identifying and classifying information.
5	CTS 2		From the instruction, it can identify that the component falls under recognizing pattern and relationship.
	CTS 3		The data claims that the aspect being shown is interpreting and drawing inference form data from the instruction which requires the students to fill in the table by using data, the previous greeting card.
	CTS 1		The data identifies that the students are required to mention the things from the pictures which claims the indicator of identifying and classifying information.
6	CTS 2		The instructions are identified as the aspect of recognizing pattern and relationship that instructs students to match the word to the pictures.
	CTS 3		This data is claimed as component of interpreting and drawing inferences

No	CTS	Image	Description
			from arguments and data which is shown by the diction of ask the students' friends about pictures identification.
	CTS 1		The data identifies that the students are instructed to read and then write down number for indication which claims the descriptor of identifying and classifying information.
7	CTS 2		Referring to the previous activity, in this instruction is claimed as component recognizing pattern and relationship.
	CTS 4		Based on the instruction shown which instructs the students to work in group, it is claimed that it belongs to component evaluating specific information or points in an argument
	CTS 1		In this data, the students are required to put the right order which claims the indicator of identifying and classifying information.
8	CTS 2		The instructions are identified as the component of recognizing pattern and relationship that instructs students to complete the dialogs. In this case, the data are the pictures.
	CTS 9		This data falls under the component of solving problems and making decisions which requires the students to reflect themselves what they have understood about the topics.
9	CTS 1		From the instruction which get the students to write true or false based on the dialog
			provided, it is identified that it belongs to identifying and classifying information.
	CTS 2		The instructions are identified as the aspect of recognizing pattern and relationship that instructs students to complete the table.
	CTS 4		Based on the instruction shown it is claimed that it belongs to component evaluating specific information or points in an argument.
	CTS 1		The data identifies that the students are required fill the blanks which claims the indicator of identifying and classifying information.
10	CTS 2		From the instruction which get the students to read the sentences and arrange them, it is identified that it belongs to identifying and classifying information.
	CTS 6		The data found belongs to the component of evaluating ideas and arguments as drawing appropriate conclusions which asks students to read and fill the blanks by choosing the best options.
	CTS 1		The data is identified as identifying and classifying information from the instruction.
11	CTS 2		The instructions are identified as the aspect of recognizing pattern and relationship that instructs students to match the paragraph
	CTS 8		The aspect found in this activity belong to identifying, gathering and organizing relevant

			information which requires the students to study the pictures and then write a story based on the pictures they studied.
12	CTS 1		The instruction which is stated "Let's Identify" is clearly represented the component of identifying and classifying information.
	CTS 2		The instructions are identified as the aspect of recognizing pattern and relationship that instructs students to classify the notices.
13	CTS 1		The data is identified as identifying and classifying information from the instruction which get the students to answer the question based on their experience.
	CTS 2		The instructions are identified as the aspect of recognizing pattern and relationship that instructs students to discuss the problems.

The table 3 above illustrates the integration of critical thinking skills in the existing Learning material which is website-based. It can be indicated that only some aspects of critical thinking skills descriptors integrated in the learning material. From the 11 descriptors, only CTS 5, CTS 7, CTS 10 and CTS 11 are not indicated. The remaining descriptors are found in almost each book unit.

The first descriptor (CTS 1) is averagely integrated in each unit. As the basic skill of critical thinking skill, this learning material web-based infuse differently in almost every structural element. CTS 1 which falls under the core areas of understanding and analyzing ideas and arguments, is about identifying and classifying information. One of the dictions is "Let's identify".

Moreover, the another most aspects found in the learning materials web-based is CTS 2. Similar to CTS 1, CTS 2 is still under the core areas of understanding and analyzing ideas and arguments which indicates the ability of recognizing patterns and relationship. This aspect is indicated in all book units. The amounts of CTS 1 and CTS 2 are similar.

Meanwhile, CTS 3 that still falls under the core areas of understanding and analyzing ideas and arguments, in the components of interpreting and drawing inferences from arguments and data only presents in book units 5 and 6. Since the keywords on the instructions of the existing English learning material web-based are persistent with the descriptors, it is indicated that the data come within the descriptors of CTS 3.

In addition, the descriptors of CTS 4 only can be found in book units 3, 7 and 9. It refers to the core areas of evaluating ideas and arguments which component is evaluating specific information or points in an argument. One of the data found, the instruction being served is "Discuss it with a group and present it in front of the class" which means as the students are expected in assessing certain data or points in an argument. Further findings indicated that the other component of evaluating ideas and arguments (CTS 5) is not claimed in any book units. In CTS 4, the students are required to evaluate their idea specifically, but in CTS 5 the ideas or arguments should be in the whole.

Furthermore, other components of evaluating ideas and arguments, CTS 6 only presents in book units 1 and 10. From evaluating ideas and arguments in the descriptors of CTS 4 and CTS 5, CTS 6 is the next ability after evaluating. It promotes the students to draw appropriate conclusion of evaluated ideas and arguments.

For the next areas, the critical thinking descriptors stated by The CambridgeLife Competencies Framework (2020), it is solving problems and making decisions. There are five more components fall under this core area. One of them is CTS 7 that indicates the component of identifying and understanding problems. None of the data found presents CTS 7. Hence, the CTS 7 component is not indicated in the existing English learning materials web-based. The next component in area of problem solving, CTS 8, is only claimed in the book unit 11. They are instructed to write a story based on the provided pictures. The instruction is consistent with the instruction stated in web-based learning material. Additionally, the CTS 9 which refers to element of evaluating options and recommendations to come to a decision is indicated in the unit 2 and unit 8.

However, the last two critical thinking skills descriptors, CTS 10, and CTS 11 which belongs to the problem solving skills, are not indicated in the 13 book units of the existing English learning material. CTS 10 indicates justifying decisions and solutions. Meanwhile, CTS 11 which is more comprehensive, is evaluating the effectiveness of implemented solutions. To get better comprehension of the findings, the graph 1 may help.
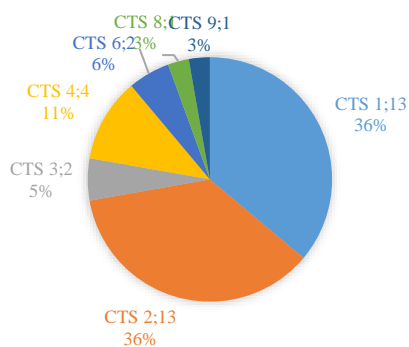
Figure 1. Critical Thinking Skills Descriptors Found Percentage

From the figure 1 above, we can see that the descriptors of CTS 1 and CTS 2 which colors are orange and middle blue got the most percentage among the descriptors (36 % for each). Followed by the light orange colors which refers to CTS 4, the chart shows it 11 % was found under the descriptor of evaluating specific information or points in an argument. The least frequency belongs to two descriptors of CTS 8 and CTS 9 which are 3% for each. Moreover, since the descriptors of CTS 5, CTS 7, CTS 9, CTS 10 and CTS 11 are not shown in the figure, it means there are no indication that the web-based learning material consists of those critical thinking skills components.

Meanwhile, the table 4 below indicates the descriptors of microlearning found in myenglishstep.com.

Table 4. Descriptors of microlearning found in myenglishstep.com.

ML Aspects	Descriptors	Codes	Data Found
Learning Materials	The materials are separated into one theme (small unit)	ML 1	
	The materials are intended to last just temporarily (2-5 minutes, Allela, 2021; few second to 15 minutes, De Gagne, 2019)	ML 2	No data found
	The materials contents are provided at the moment of need	ML 3	No data found
	The materials are based on the curriculum of the school	ML 4	
	The materials are divided into certain skill categories	ML 5	No data found
	The materials make use of technology	ML 6	
	The materials are incorporated with varieties of media	ML 7	
Learning Style	Students participate in the learning process	ML 8	
	Students spend little time to learn the materials	ML 9	No data found

The findings of this analysis show that the existing English learning material web-based incorporates with various descriptors of microlearning. The descriptors found are the materials are separated into one theme (small unit), the materials are based on the school curriculum, the materials make use of technology, the materials are incorporated with varieties of media. In terms of the learning style, the descriptors found is students participate in the learning process.

The first descriptor that is indicated appears is the material is separated into one theme (small unit) from the table of contents which are written based on the topics. There are thirteen units classified by the topics. Moreover, the next descriptor found is ML 4 which refers to material is based on the school curriculum. From the data, it is claimed that the learning material web-based provides learning objectives that derived from basic competences of 2013 curriculum on each unit. Additionally, since the learning material is website based which students can access with connecting to the internet, it means the material makes use of technology (ML 6). Moreover, the representative data claimed that there are some varieties of media integrated in the learning materials by providing videos, audios, and other linked websites which indicates ML 7. Furthermore, the next descriptor found is students participate in the learning process which is presented by the diction use in

each activity (ML 8). However, the analysis's conclusions show that only five aspects of microlearning are fully covered by the available materials.

CONCLUSION

This research focuses on investigating the integrations of critical thinking skills and microlearning in English learning material web-based of grade 8 students. The current material was accessed from myenglishstep.com based on purposive data source. In analyzing the learning material, descriptors of critical thinking skills and microlearning are implemented.

The findings suggest that in general the learning materials are still inadequate and not fully integrated with the descriptors of critical thinking skills and microlearning. Only 7 of 11 critical thinking skills descriptors were indicated. Moreover, more significant findings to emerge from this study is that 5 microlearning descriptors were found. The web-based English learning material is based on the national curriculum, which consists of 13 units. From the table of contents, it is proven that the learning material is broken down into small units. In addition, since it is provided as web-based learning material, it makes use of technology.

This new understanding should help to improve predictions of the impact of integration of specifically critical thinking skills and microlearning, generally the other 21st century skills in English learning materials to be more fully integrated of the descriptors. As a result, the researcher advices other future researchers to do more study into other courses relating to these areas.

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