THE INFUSION OF CRITICAL THINKING SKILLS INDICATORS AND MICROLEARNING PRINCIPLES IN THE ENGLISH READING MATERIALS FOR VOCATIONAL SCHOOL STUDENTS: A CONTENT ANALYSIS

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Abstract: This study aims to reveal the critical thinking skills indicators and microlearning features integrated in the English reading materials for vocational school students in Indonesia. A content analysis was employed to examine reading materials available in the English Coursebook Work in Progress for SMA/SMK/MA Grade X published by the Ministry of Education, Culture, Research, and Technology of the Republic of Indonesia 2022. The critical thinking skills analysis was meant to capture to what extend do the reading materials coverage signify to the lifelong learning, while the microlearning features investigation was meant to portray how the reading materials are presented to support self-directed learning. 8 critical thinking skills indicators proposed by Anderson and Krathwohl. (2001) were hired as the parameters in determining the integration of the critical thinking skills. Microlearning framework proposed by Allela (2021) were used to determine the reading lesson sequences, with which instructional methods associating each sequence. The results revealed that the reading materials for grade X are presented in 8 printed texts covered descriptive, recount, procedures, expository and narrative. These texts have potentially carried critical thinking skills indicators. The contexts are all pictures and instructions that have potentially presented 3 critical thinking skill indicators. The activities cover 15 comprehension activities and 4 beyond the comprehension activities; 7 Critical thinking indicators are potentially embedded in this part. The reading materials presentation, one set are clearly sequenced in the framework of microlearning covers pre-text, text, and post-text. While the other 7 sets sequenced text and post-text. The analysis indicated most of the critical thinking indicators integrated in the reading materials are under analysis and evaluation.
Keywords: *critical thinking skills; English reading materials; vocational school; microlearning characteristics.*

INTRODUCTION

Critical thinking is the skill to think critically in analysing, categorizing, selecting, judging, and evaluating information to make effective decision. The Indonesian education curriculum highlights the great importance of developing such skills among learners (Gunawan *et al*., 2022). Concerns on the need of enhancing critical thinking skills via English language education in Indonesia have been addressed by many researchers (Sulistiyo *et al*., 2021; Erdiana & Panjaitan, 2023; Abkary & Purnawarman, 2020; Agustina *et al*., 2022).

Microlearning has widely transformed human's way of live recently especially during the existence of generation Z (Gen-Z). Initially, micro-learning was proposed to overcome cognitive overload and stress due to the overwhelming volume of course materials that decrease motivation and confidence to engage in learning in traditional learning (Kossen & Ooi, 2021).

Current studies, report that developing a micro-course is challenging due to the need to deconstruct major and complex topics into comprehensive small chunks. The concept of

microlearning is based on psychological studies that suggest arranging knowledge into smaller, meaningful groupings for improved retention, also known as "chunking," which improves learning (Fountain & Doyle, 2012). Kirschner (2002) further reported that organizing learning concisely and compactly will help learners in memory encodings since generally learners have short-term memory limits. Furthermore, Díaz Redondo *et al*. (2021) revealed that microlearning has been adapted due to the shrinking of human capacity to focus on single item, distraction, and inattention especially in learning.

Micro-learning as an educational technique has been shown to improve health professions students' knowledge and confidence in completing procedures, retaining knowledge, researching, and participating in collaborative learning (de Gagne *et al*., 2019). Microlearning are frequently used in the company to train workers and the result showed that employees are more confident to make the task done after the training (Hesse *et al*., 2019).

Microlearning was used to learn mathematics and it improved communication skills and developed autonomously (Mateus-Nieves; Moreno, 2021). In addition, 78% of employees of dairy personnel training felt more confident to handle and complete tasks after training (Hesse *et al*., 2019). Using micro learning through Web 2.0 tools achieved effectiveness (according to Black equation) in developing students' skills of multimedia designing and production (Abu Sarah, 2021).

Furthermore, the application of microlearning is also shown in the field of language studies. Hosseini *et al*. (2020) stated that there were positive impacts of using flipped learning for Iranian EFL learners to enhance self-regulation and learning autonomy by the increased awareness of the learning process itself, active participation in the learning process in the classroom, enjoyment of learning, and increased involvement in the learning process.

Ayu *et al*. (2022) described the processes of designing and formulating Learning Object Materials of English materials for senior high school through content analysis,. Lastly, Fedorova *et al*. (2022) describe the idea of micro-learning as a modern educational technique and point out its primary tools for helping students improve their English language skills.

The potential of microlearning can benefit today's young generation or commonly called Generation Z (Gen-Z) or I Generation that they are fast decision-makers and highly connected or simply said difficult to perform without internet and smartphones (Demir & Sonmez, 2021). Based on Google's survey, in 2023, 40% of Gen-Z rely on TikTok, YouTube, and other social media to find information that it is relatively short and demandable. Furthermore, most of vocational school students are Gen-Z. Therefore, vocational school teachers challenge the situation where the students are active internet users that find traditional learning is less attractive and stressful. Teachers must adjust the teaching strategies that is suitable for them, microlearning is undoubtedly one of the way.

METHOD

The main data for this study are the reading materials presented in the *Bahasa Inggris: Work in Progress untuk SMA/SMK/MA kelas X* published by the Ministry of Education, Culture, Research, and Technology of the Republic of Indonesia 2022. The reading materials cover the texts, contexts and activities accompanying the texts and contexts. Since the purpose of the study is to reveal the critical thinking skills indicators embedded in the reading materials and to reveal the microlearning characteristics in the reading materials presentations, so in-depth study guided by content analysis are employed in the data collecting procedures and the data analysis.

The data collection was done by examining thoroughly the texts available to find out the topics and the genre types, to identify the forms of the texts (printed, digital or multimodal), to identify the contexts related to each text (pictures, videos and or other medias) and to examine the activities accompanying each text (focus on the comprehension or beyond the comprehension).

The data analysis procedure was presenting the classification of the texts into the genre types, text forms and topics to reveal the potential where critical thinking skills indicators carried by those three dimensions of the texts. Next was the presentation of contexts classification into the digital illustration (videos, infographics) non-digital illustration (pictures, photos), and instruction to reveal that critical thinking skills indicators are embedded. Then, the presentation of the activities add-on the texts that was classified into the comprehension activities (questions and instructions related to understanding the content of the text) and the beyond comprehension activities (questions and instructions for related tasks such as to write an interview protocol, to write a reflection, to state

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an argument etc.). Finally, the presentation of the identification of the reading materials sequences or stages as called in the pre-text, text and post text to be related with the microlearning framework proposed by Alella (2021) to identify the presence of microlearning characteristics in the reading materials.

RESULTS AND DISCUSSION

The content analysis of "*Buku Bahasa Inggris*: Work in Progress" has revealed the presence of six chapters within the book. Initially, the researcher conducted a comprehensive analysis of the reading text, context, and learning activities associated with the text. The examination of the reading text within each of the six chapters revealed the presence of diverse text genres. Specifically, a total of eight reading texts were identified across these chapters. Additionally, it was observed that each chapter incorporated eight distinct contexts, which added depth and richness to the reading experience. Furthermore, the chapters featured a total of 18 learning activities, all intricately linked to the reading texts. In the subsequent paragraphs, we will delve into a more detailed discussion of these components, exploring how the various text genres, contexts, and learning activities contribute to the overall learning experience presented in "*Buku Bahasa Inggris*: Work in Progress." For a detailed breakdown of these findings, please refer to following tables, which provides a comprehensive presentation of the analysis results.

Text dimension and the presence of critical thinking skills indicator

Table 1. *Text dimension and the presence of critical thinking skills indicators*

Genre	Text Form			Topic	The Potential of Critical Thinking Skills Indicators Presence
	Printed	Digital	Multimodal		
Descriptive Text	✓	-	-	Great Athletes	-
Personal Recount Text	✓	-	-	Sport Events	-
Procedure Text	-	✓	-	Sports and Health	✓
Procedure Text	✓	-	-	Healthy Food	✓
Expository Text	✓	-	-	Graffiti	✓
Narrative Text	✓	-	-	Fractured Stories	✓

In the coursebook, a total of eight texts have been identified, encompassing five distinct text genres, namely descriptive text, personal recount text, procedure text, expository text, and narrative text.

Each chapter within the coursebook revolves around a distinct topic or thematic focus. In Chapter 1, the central theme is descriptive text, which delves into the realm of remarkable athletes, with a particular emphasis on the iconic figure of Cristiano Ronaldo. Chapter 2 maintains a thematic connection with the preceding chapter, as it continues to explore sports-related subjects. Here, the chosen text genre is personal recount, allowing students to engage with firsthand accounts of sporting events and experiences. Chapter 3 shifts its focus to the vital intersection of sports and health, a theme explored through the medium of procedure text. This chapter serves as a comprehensive guide to various health-related sports practices. Chapter 4 features procedure text once more, this time addressing a distinct topic: healthy foods. The repeated use of procedure text in this chapter underscores its versatility in conveying practical knowledge. Chapter 5 introduces the theme of expository text, probing the contentious issue of graffiti and its classification as either vandalism or art. This chapter encourages critical thinking and analysis. Lastly, Chapter 6 ventures into the realm of narrative text, featuring a fractured story. Here, students engage in the art of storytelling, fostering their narrative comprehension and creative skills.

Presentation of context classification

Table 2. *Presentation of context classification*

Text	Context					The Potential of Critical Thinking Skills Indicators Presence
	Digital		Non-Digital			
	Video	Infographic	Picture	Photo	Instruction	

Text 1. Christiano Ronaldo	-	-	-	✓	✓	✓
Text 2. Experience of watching a football match	-	-	-	-	-	-
Text 3. Tips for Taking Care of Your Mental Health	-	✓	-	-	✓	✓
Text 4. 7 Healthy Habits for Weight Loss	-	✓	-	-	✓	✓
Text 5. Simple Tips for Healthy Eating	-	-	-	-	-	-
Text 6. Why Should Graffiti be Considered Art?	-	-	✓	-	-	-
Text 7. Graffiti is Always Vandalism	-	-	✓	-	-	-
Text 8. Little Red Riding Hood	-	-	✓	-	-	-

The concept of "context" bears a profound connection to its linguistic origins. The prefix "con," originally signifying unity or togetherness, has, over the course of centuries, undergone a transformative evolution. It now serves to encapsulate the multifaceted elements that coexist with and envelop a text, thereby contributing to a more profound comprehension of its meaning and significance. Within the coursebook, we have identified a total of eight distinct contexts that are intricately interwoven with the text. These contexts primarily manifest in the form of visual representations, often in the form of pictures. Each of these images serves a dual purpose within the text. Firstly, they are directly associated with instructional elements, providing visual cues that complement the textual instructions. Additionally, these images also function to fortify and enhance the statements made within the reading text, thereby enriching the overall learning experience.

The presentation of the activities add-on the texts

Table 3. *Activities accompanying the texts*

Activities	Comprehension Activities	Beyond Comprehension Activities	Critical Thinking Skills Indicators
1. What is the main idea of the text? 2. What makes Cristiano Ronaldo different from other players in scoring a goal? 3. How did he get known as a rocket man? 4. How does the text organize its idea about Ronaldo? 5. "Ronaldo's G-force is five times higher than that of a cheetah." What can you infer from the sentence above? 6. What is the function of the picture in relation to the verbal text?	✓		
Match the topics about Cristiano Ronaldo below with the information from each paragraph in the text.	✓		
Did you learn new words from the text? Add them to your Vocabulary Box in Task 1.		✓	
Rearrange the paragraph into a meaningful text	✓		
Without using a dictionary, guess the meaning of these words/phrases from the text using context clues.	✓		
1. Are there any parts of the writer's experience in watching the game that are similar to yours? 2. Why do you think the writer stated that the winner was unpredictable?	✓		

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3. Could you feel the same excitement of watching the game by just reading the text? 4. How do you think the writer's can help you to do active reading using your five senses?		
Decide true or false statement based on infographics	✓	
Complete the sentences based on infographic	✓	
Match each statement with the correct tips, A-F based on the reading text.	✓	
Answer the questions based on the information you get from the text. 1. Who will find the information in the text useful? 2. In what kind of reading section will you likely find this type of text? 3. In Rule number 5, "Eat at the Dining Table, not in Your Car or at Your Desk," the word 'this' in the sentence 'Following this rule also reduces the chances of eating when you are bored,' refers to .... 4. "Stop Eating Before You Are Full," the word 'satiated' in the sentence '...stop eating before you feel completely satiated,' can be best replaced by what word? 7. Which tip/s that is easiest for you to follow? Why?	✓	
Read the statements and decide if they are found/ discussed in either Expository Text 1 or Expository Text 2. Tick the appropriate box.	✓	
Compare Expository Text 1 and Expository Text 2 by completing the table.	✓	
Questions following the social media status 1. Why do you think they write the posts? 2. Which writer do you agree with? Explain your answer. Refer to what is written on the posts. 3. How would you feel if somebody painted graffiti on your property? 4. Who owns the graffiti? If somebody paints on your property, can you legally claim the artwork as your own? 5. In your opinion, what would the world be like without graffiti?	✓	
List in the table below reasons why people think graffiti is art or an act of vandalism.		✓
People always have different opinion about something, including Graffiti. Some people think that graffiti is art. Others think it is an act of vandalism. With your classmates, list in the table below reasons why people think graffiti is art or an act of vandalism.		✓
Think about your position regarding graffiti. Explain your stance on graffiti. Consult the list you have made in Task 5 to help you write your idea. Write your draft in the expository writing organizer below.		✓
Questions of Reading Comprehension 1. Who told the story? 2. What made the girl scream an ear piercing scream? 3. How could the world find out Grandma's	✓	

place? 4. What made the girl realize that it was not her grandma who take the goodies? 5. What is meant by "cat got your tongue? In "Cat got your tongue?" The dwarf said, and pulled out a cat" 6. What would happen if the grandma did not jump into the wolf's mouth?		
Fill in the table below to compare the traditional story in Task A and fractured story in Task 3 point B.	✓	
Use the following Venn diagram to decide which part of the stories are the same or different.	✓	

The learning activities integrated into the coursebook are intrinsically linked to the reading text, encompassing a diverse range of questions and exercises that directly pertain to the text under consideration. In total, the researchers have identified a comprehensive set of eighteen learning activities distributed across the reading skills sections of the six chapters.

These meticulously designed learning activities serve as a bridge to the subsequent discussions centered on the cultivation of critical thinking skills. The overarching objective is to equip students with the capacity for analytical thinking and effective problem-solving. By engaging with these learning activities, students are encouraged to scrutinize, evaluate, and synthesize information from the reading text. This process not only enhances their comprehension but also fosters their ability to think critically, enabling them to approach complex challenges with a problem-solving mindset. Thus, the learning activities in the reading skills sections play a pivotal role in nurturing the development of critical thinking skills among students.

Critical thinking skills in the English reading materials

The critical thinking analysis of the English reading materials encompasses an examination of three key components: text, context, and learning activities. The primary focus is on ascertaining whether the texts, the contexts, and the learning activities embedded within the English reading materials effectively facilitate the development of critical thinking skills, thereby enhancing students' problem-solving abilities.

In conducting the analysis, we utilized a framework consisting of eight indicators, as originally proposed by Anderson and Krathwohl. It's important to note that this framework has been widely adopted and employed by teachers in Indonesia, making it a common choice for research in the region.

The indicators of Anderson and Krathwohl's framework form the foundation for three overarching skills: analysis, evaluation, and creation. The framework can be seen in the table 4.

Table 4. *Critical thinking skills framework adapted by Anderson and Krathwohl (2001)*

Categories	Cognitive Processes	Indicator
Analyse: Break material into its constituent parts and determine how the parts relate to one another and to an overall structure or purpose	Differentiating	Distinguishing relevant or important from irrelevant or unimportant parts of presented material
	Organizing	Determining how elements fit or function within a structure
	Attributing	Determine a point of view, bias, values, or interest underlying presented material
Evaluate: Make judgments based on criteria and standards	Checking	Detecting inconsistencies within a process or product; detecting the effectiveness of a procedure as it is being implemented
	Critiquing	Detecting inconsistencies between a product and external criteria; detecting the appropriateness of a procedure for a given problem
Create: Put elements together to form a coherent or functional whole;	Generating	Coming up with alternative hypotheses based on criteria

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recognize elements into a new pattern or structure	Planning	Devising a procedure for accomplishing some task
	Producing	Inventing a product

Microlearning to organize English reading materials

Microlearning is a method of learning using small chunks and bite-sized materials (Allela, 2021; Jahnke *et al*., 2020; Khurgin, 2015; Mohammed *et al*., 2018; Singh *et al*., 2019; Skalka & Drlík, 2018; Zhang & Cristol, 2019), well-planned modules (Allela, 2021; Khurgin, 2015), and short-term learning activities (Allela, 2021; Jahnke *et al*., 2020).

Recent studies (Jahnke *et al*.,(2020), Lee etal.,(2021)) formulated the principles of microlearning as theways in design an educational programs. Those are producing content that fits mobile devices' small screens; providing learners with the knowledge they need promptly at the time; following a specific set of instructions that allows the learners to grasp the significance of the subject, interactive materials, short activities, and immediate automatic feedback; and recommending the students to connect with the knowledge through practical gamified activities.

The principle of short steps, the principle of immediate confirmation, the principle of self-pacing, and the principle of student testing may be considered essential microlearning principles in implementing microlearning (Tolstikh *et al*., (2021),Allela (2021)). In addition to those principles researchers also have formulated microlearning frameworks which are also termed as the microlearning elements as the way to organize the lesson (Allela, 2021; Skalka & Drlík, 2018). Skalka and Drlik claimed that the framework activities of microlearning correspond to the six stages of Bloom's taxonomy. This research uses the microlearning framework to analyze the presentation of the reading materials in the textbook. Table 6 shows the framework of microlearning proposed by Allela (2021).

Table 5. *Microlearning framework proposed by Allela (2021)*

What Structural Element	How Instructional Method	Medium Microlearning Object
Welcome to the Lesson	• Structured overview	• Video
Awaken Prior Knowledge	• Inquiry • Drill and practice	• Survey on Moodle • Quiz
Review Key Points	• Mental modelling • Discovery learning	• Infographic
Content	• Direct instruction • Lecture • Drill and practice	• Video • Animation • Infographic • Interactive PDFs
Discussion	• Reflective discussions • Group discussion • Debate	• Discussion forum • Social-media posts
Review Key Points	• Question and answer • Inquiry	
Assessment	• Quiz • Inquiry	• Moodle • Quiz

Table 6. *Materials organization*

Teaching Reading Stages	Microlearning Structural Elements	Existing Reading Materials					
		Chapter 1	Chapter 2	Chapter 3	Chapter 4	Chapter 5	Chapter 6
Pre-Reading	Welcome to the Lesson	-	-	-	-	-	-
	Awaken Prior Knowledge	✓	-	-	-	-	-
	Review Key Points	-	-	-	-	-	-
Whilst Reading	Content	✓	-	✓	✓	✓	✓
	Discussion	-	✓	-	-	-	-
Post-Reading	Review Key Points	-	-	-	-	-	-

Assessment	✓	✓	✓	✓	✓	✓

The presentation of the identification of the reading materials sequences

Sequencing reading materials into pre-reading, whilst-reading, and post-reading stages is a well-established pedagogical approach supported by various scholars (Hood *et al*, 2005; Gibbon, 2002; Brown, 2001 as cited in Mene *et al*., 2021). However, the analysis findings suggest that the materials somewhat apply this strategy, with pre-reading being evident only in Chapter 1, while whilst-reading and post-reading elements are present in all chapters.

Despite this, the identified sequencing may lack certain engaging elements that actively involve students in the learning process and cater to their self-directed learning needs. To address these shortcomings and align with contemporary teaching approaches, the researcher proposes the incorporation of a microlearning instructional design. Microlearning offers a highly adaptable and engaging way to deliver content, particularly suitable for today's students. By breaking down information into bite-sized, easily digestible modules, microlearning accommodates shorter attention spans and supports on-the-go learning. It encourages active engagement and allows students to take control of their learning pace.

Integrating microlearning into the existing sequencing strategy can enhance the learning experience, providing students with more opportunities for self-directed, interactive, and focused learning. This approach ensures that the material remains engaging and aligns with modern students' preferences and learning styles.

Medium microlearning objects

The analysis of the English reading materials has revealed the presence of various medium microlearning objects. These objects serve as small, concise learning resources or modules delivered through specific mediums or platforms. Some examples of these medium microlearning objects include 1) Infographics; 2) Interactive Infographics; 3) PDFs; 4) PDF *Interactive*; 5) eBooks and Flipbooks; 6) Animated Videos Format; 7) Whiteboard Animation; 8) Kinetic Text-Based Animation; 9) Explainer Videos; 10) *Interactive Video*; 11) Interactive Parallax-Based Scrolling; 12) Webcast/Podcasts; 13) Expert Videos, Webinars/Recorded Webinar; 14) Mobile Apps; 15) Complex Branching Scenarios (Allela, 2021; ATD, 2018). These diverse microlearning formats cater to different learning preferences and styles, offering educators and learners a rich array of tools to engage with and absorb content effectively. The utilization of these medium microlearning objects can enhance the overall learning experience by providing accessible, engaging, and targeted learning resources.

The analysis has revealed the presence of two specific medium microlearning objects within the English reading materials: infographics and social media elements. Infographics were found in the chapter three presented procedure text about tips for taking care of your mental and 7 healthy habits for weight loss. While social media use was found in the expository text. Furthermore, QR codes were employed to facilitate the display of worksheets. It's worth noting that these worksheets serve a multifaceted purpose, extending beyond just reading. They encompass various language skills, reflecting the interconnected nature of language skills. Language skills, including reading, writing, listening, and speaking, are interrelated and often reinforce one another. Therefore, these worksheets likely encompass exercises that promote a holistic language development approach by incorporating multiple language skills. This integrated approach can enhance the effectiveness of the learning materials, ensuring that students develop a well-rounded set of language skills and can apply them in various contexts.

CONCLUSION

The results revealed that the reading materials for grade X are presented in 8 printed texts covered descriptive, recount, procedures, expository and narrative. These texts have potentially carried critical thinking skills indicators. The contexts accompanying the texts are all pictures and instructions that have potentially presented 3 critical thinking skill indicators. The activities attending each text cover 15 comprehension activities and 4 beyond the comprehension activities; 7 Critical thinking indicators are potentially embedded in this part. Regarding to the reading materials presentation, one set are clearly sequenced in the framework of microlearning which covers pre-text, text, and post-text. While the other 7 sets sequenced text and post-text. The analysis indicated most of the critical thinking indicators integrated in the reading materials are under analysis and evaluation. This means that further development for the materials is needed especially for the pre-text and post-text activities so that more critical

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thinking skills enhancement can be provided. In addition, the researchers found out, the reading materials presentations need to adopt more the microlearning framework in detail in order to support students' autonomous learning.

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