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ChatGPT: Empowering Self-Directed Writing Through Mind Mapping and Ai-Assisted Composition

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ABSTRACT

Since the beginning of 2020, the pandemic has prompted senior high school students to embark on a self-directed learning journey, adapting to the demands of remote education. In contrast to traditional learning environments, where teachers use an autocratic manner in the classroom, learners play an autonomous role in self-directed learning. This condition has revealed serious problems with English writing skills. This research described the process of mind mapping and ChatGPT for self-directed writing for senior high school students. The method of analyzing data in this research is by using three steps of qualitative analysis including data reduction, data display, and conclusion. Based on the research design, the researcher conducted the research by employing preliminary research and data collection followed by identifying recurring themes in observation, depth-in interviews, and survey responses. The researcher categorized themes related to self-monitoring, self-management, and motivational variables. Finally, it was followed by interpretation data It revealed that when properly taught, mind mapping provided a visual framework that motivated students to combine concepts and recognize connections. Combining these technologies may enable students to improve their compositions' coherence and writing skill quality. The combination of pedagogical techniques with AI technology has the potential to improve students' capacity for independent thought organization and effective communication, which is in line with the objectives of the changing educational landscape.

Keywords: Self-directed writing, mind mapping, Chat GPT

Introduction

In the wake of the unprecedented COVID-19 pandemic, the educational landscape has undergone a profound transformation. Classes were interrupted due to the worldwide spread of infectious diseases, requiring online learning (WHO, 2020). The school has changed its way of delivering its service from offline to online one. With schools transitioning to online platforms and new curricula being implemented, senior high school students in Indonesia have found themselves navigating uncharted waters. Online learning is becoming a new challenge for both students and teachers (Cao et al., 2020). This situation certainly forces students to be able to navigate themselves and become independent learners.

It has been discovered that many students struggle with technology use (Kandati & Tatipang, 2021; Efriana, 2021). Most students are aware of online education's importance and try to adapt to the Covid-19 circumstances' particular technological demands. Based on what happened during that year, teachers as well as students have adapted to the

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online teaching-learning process under the Covid-19 settings and the use of technology to capture the learning process.

Since the beginning of 2020, the pandemic has prompted senior high school students to embark on a self-directed learning journey, adapting to the demands of remote education. The transition to online learning has not only redefined the roles of educators and students but has also highlighted the need for self-motivated, resourceful learners capable of managing their own educational journey. This transformation aligns with the essence of "Merdeka Belajar," the Ministry of Education and Culture's curriculum emphasizing independent learning, which seeks to equip students with the skills essential for their future endeavors.

Knowles (1975) stated that self-directed learning empowers students' leadership abilities, bilingualism, and cognitive abilities, such as critical thinking, reasoning, creativity, and innovation, to become competitive global citizens. Furthermore, it also allows students to explore knowledge and learning experiences beyond examination purposes. Another point of view of self-directed learning stated by Lounsbury et al. (2009) framed that self-directed learning is a way to involve students in learning activities on their own, at their own speed, and with their own accountability in the twenty-first century. In contrast to traditional learning environments, where teachers use an autocratic manner in the classroom, learners play an autonomous role in self-directed learning.

Teacher as well as students encounter the idea of "self-directed learning" in relation to the requirement that individuals control their own learning processes. Students are expected to identify their own learning objectives to achieve their own self-directed learning. During the process, self-directed students create plans. They arrange how to get to educational materials. du Toit-Brits and van Zyl (2017) revealed that they are also self-driven, curious, open to learning, and open to take on new challenges. In doing so, students make their own experience in learning.

This condition has revealed serious problem with English learning. As students work to improve their writing abilities, they must know that a key factor in the lack of initiative and practice in English writing skills among learners is their reliance on teacher direction for writing assignments. The confluence of the pandemic and the introduction of the new curriculum has absence of in-person instruction has accentuated the importance of self-directed learning, where students harness various resources to comprehend complex subjects. Yet, the lack of teacher guidance has posed challenges, leading to a pressing need for effective tools and strategies that foster independent learning while addressing students' writing limitations. In schools, students deal with shortcomings in writing skills and the ability to craft well-structured compositions.

The majority of research showed that instead of learning new concepts, students were more concerned with counting their words and pages written. Instead of promoting challenging opinions and arguments, they applied them in writing to general grammar standards (Putra, 2012; Rahmatunisa, 2014; Murtadho, 2021). It is argued that they followed specific writing models rather than learning to write creatively. Another research conducted by (Indah & Kusuma, 2016) also revealed that students' critical thinking reflection is is still low. Their level is still elementary because the majority of the student's arguments on the assigned topic are elementary-level arguments that aren't adequately supported by logic. Another finding also shows that the ability to convey critical thought clearly is significantly influenced by linguistic proficiency. As the students

should learn how to improve their linguistic proficiency which leads them into critical thinking in writing, providing students with several opportunities to practice writing is crucial. This practice help students to develop their self-directed writing system.

One of the instructional tools that can be used by teachers is mind mapping. Mind mapping not only display information, but also a subject's overall organization and the relative importance of its various components. Students benefit from being able to integrate disparate ideas, think creatively, and associate concepts (Buzan, 2018). Further explanation, mind maps are effective because of their visual design, which helps students perceive the connections among ideas and motivates them to group related ideas as they work. Because group conversation helps generate ideas and makes the activity more engaging and fun, mind maps work exceptionally well when done in groups. The mind mapping technique can be used to investigate virtually any subject (Alamsyah, 2009). As writing abilities can be developed by writing key ideas, then mind mapping helps students to be more easily converted into a draft, whereas in brainstorming, the random recording of ideas might lead to problem on how to write it structured.

The other instructional tool that is used is ChatbotGPT. Several studies have proven the use of chatbots as learning media, especially in learning English (Afrianto et al., 2019; Fitria, 2023). As part of AI technology, ChatGPT is employed for both serious and lighthearted purposes, as well as to improve daily lives. It is employed in a variety of entertaining and engaging ways, though. It also serves to find solutions to cognitive issues that are typically associated with human intellect, such as learning, problem-solving, and pattern recognition.

In response to the lack of writing proficiency and compositional organization among students, this research proposes a compelling solution that capitalizes on innovative technology and pedagogical insights entitled "ChatGPT: Empowering Self-Directed Writing through Mind Mapping and AI-Assisted Composition".

Methods

Research design

The method of analyzing data in this research is by using three steps of qualitative analysis as proposed by Miles et al. (2018) including data reduction, data display, and conclusion. The research was conducted at one of high school in Bandar Lampung. Active classroom observation served as the data's primary sources. In-depth interviews with students and document analysis were used to gather the data. To get the information she required, the researcher built strong relationships with the students throughout the investigation. In the reduction stage, the researcher removes unnecessary data so that the data could produce appropriate information. At the display stage, the researcher presented data in the form of pictures or narrative text to make it easy to understand. Next, the researcher looked for the meaning of the data collected by looking for relationships, similarities, or differences to conclude answers to existing problems.

Based on the research design, the researcher conducted the research by employing preliminary research. In this stage, the reseacher selected the topics based on the students' individual preferences, The topics were free to choose however the composition would be categorized into description. Topic choices and structure explanation would be followed by the concepts explanation of self-directed learning, writing skills enhancement, AI-assisted education, and the implementation of the new curriculum in Indonesia. Those stages provided a solid theoretical foundation and identified gaps in current research.

The second stage is Data Collection. This stage required tool selection. In this stage the students designed the mind mapping based on the topic each students had. Then they discussed the mind mapping with other students as well as teacher. Once they had revised the mind mapping

design, they used it to write their essays. When they had finished the essay, they could apply ChatGPT to see the version that it offered. The last step was to compare and made their understanding of what they wrote and what they saw from ChatGPT. The researchers gathered students' perceptions of using mind mapping and ChatGPT. The researcher categorized themes related to self-monitoring, self-management, and motivational variables. In doing this, in-depth interviews with a subset of students and educators to explore their insights on the impact of the intervention, effectiveness of ChatGPT, and integration of technology in the learning process.

The last stage is to identify recurring themes in observation, depth-in interviews and in survey responses. The researcher categorizes themes related to students' experiences, challenges, benefits, and perceptions of the intervention. Finally, interpretation is needed to to provide a comprehensive overview of the effectiveness of mind mapping and ChatGPT for self-directed writing in the Indonesian educational context.

Figure 1. Research design

Results and Discussion

As writing is a skill that students learn to improve during the process of learning, the research showed how the students empowered their self-directed writing during the process. Garrison (1997) presents a model that focuses on self-monitoring which requires cognitive capacities, self-management which requires contextual control, and motivational variables which necessitate the act of engaging in a task. To observe the process, the researcher applied the process of writing comprising prewriting, drafting, revising as proposed by Graves (1983). As students developed their self-directed writing skill, they also improved their writing aspects.

Table 1. Self-directed elements before and after research

	Self-Monitoring		Self-Management		Motivational Variables	
	Before	After	Before	After	Before	After
Mind-Mapping	-	+	-	+	-	+
ChatGPT	-	+	-	+	-	+

Mind-mapping

The use of mind mapping showed that students needed to be trained for self-directed writing of the elements. Although students were given training on what and how at preliminary research, they still needed time to apply the elements. As this research observed the elements of self-directed writing, it was found out that at the beginning students were not aware of what and how to apply it.

Pre writing

Many students struggled to organize their ideas in a coherent and logical sequence, resulting in fragmented and disjointed compositions. This deficiency suggested that the fundamental skill of structuring content remained a barrier, impacting the clarity and overall quality of their writing.

This aspect showed that self-monitoring which requires cognitive capacities, and self-management which requires contextual control were not employed.

In the beginning, the mind map was individually designed. Some students were not able to add sub-branches and needed more discussion from the teacher to continue. A few students were able to add sub-branches to a core notion and quickly perceived interconnections and connections. The initial step was to get the thoughts out of their heads and onto the screen; organization was always something that came later. Each text or image was placed on a separate line. Starting with the main image, the lines were joined. As they extended outward from the center, the lines and connections were not clear.

During the intervention phase, it became evident that a considerable portion of students faced difficulties in generating relevant and interconnected ideas for their writing assignments. Their mind maps often exhibited disjointed nodes with limited connections, indicating a struggle to identify and link concepts cohesively. This pattern was consistent across various subjects, indicating a broader issue in conceptualizing and organizing thoughts.

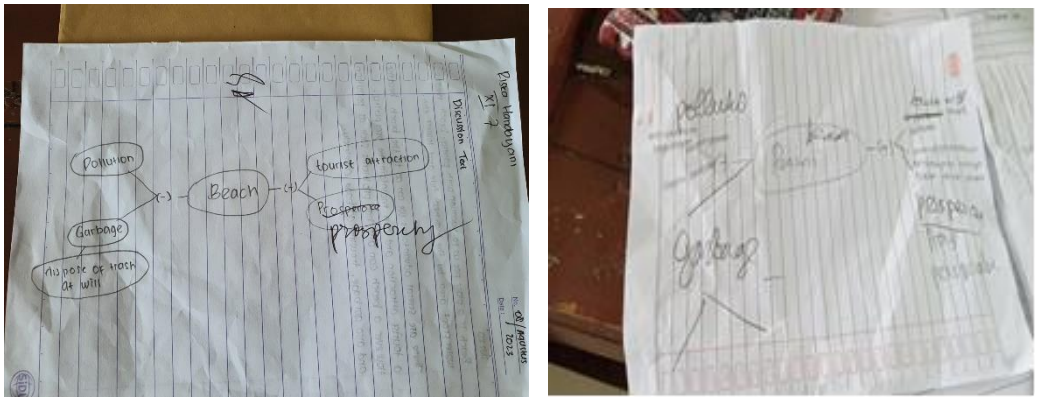

Figure 2. 1st mind-mapping

It was notified that students needed more time to complete the map on their own. Therefore, a group in class or out of class would lead to greater engagement as the students cooperated during the work. The concepts on lines deviating from the main topic were put in one- or two-word summaries. Ideas grew outside of themselves into branches and sub-branches. Group work facilitated how ideas were put into branches and sub-branches structurally organized. It was found that incorrect connection placement in mind mapping mostly happened. Some ideas were put into different branches to be classified into similar branches.

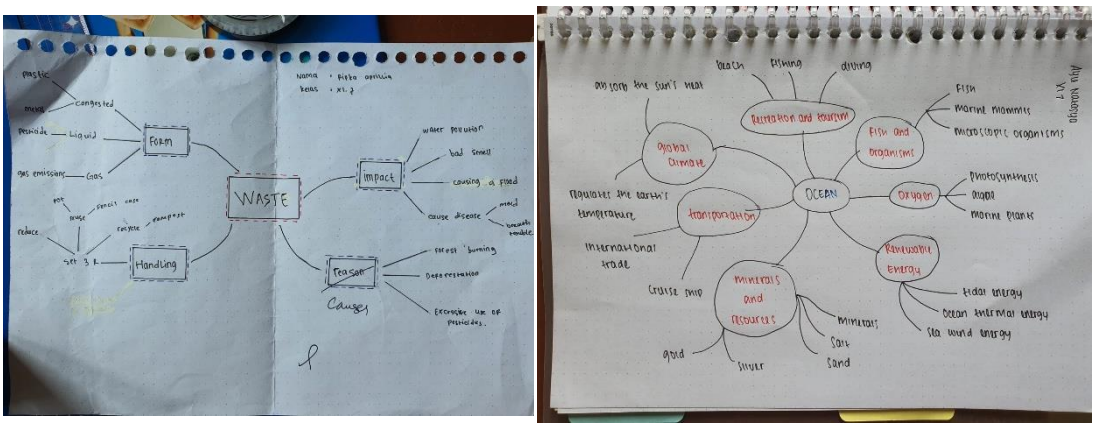

Figure 3. Final mind-mapping

The mind mapping is a great tool for organizing and developing students' ideas and thoughts (Buzan, 2018). It turned out that students improved their cognition and facilitated examination and reflection. When students were put into group work, they were able to produce some ideas. When generating their mind mapping, students were trained to quickly create and assess ideas. They were able to access and recollect their prior knowledge on a variety of subjects, which helped create mind maps.

Mind mapping is a suitable media to assist students in preparing their writing since the method encourages students to get an understanding of their audience (Naibaho, 2022). He further clarifies mind mapping makes learning more engaging and provides students a chance to participate actively.

Drafting

In this process, students were expected to use their mind mapping to start their writing. The process included how to engage the hook to grab the reader's attention, provide thesis statements to be elaborated, and check aspects of writing. It turned out that the last element of self-directed writing in the form of creativity was missing as students were not engaged in the task.

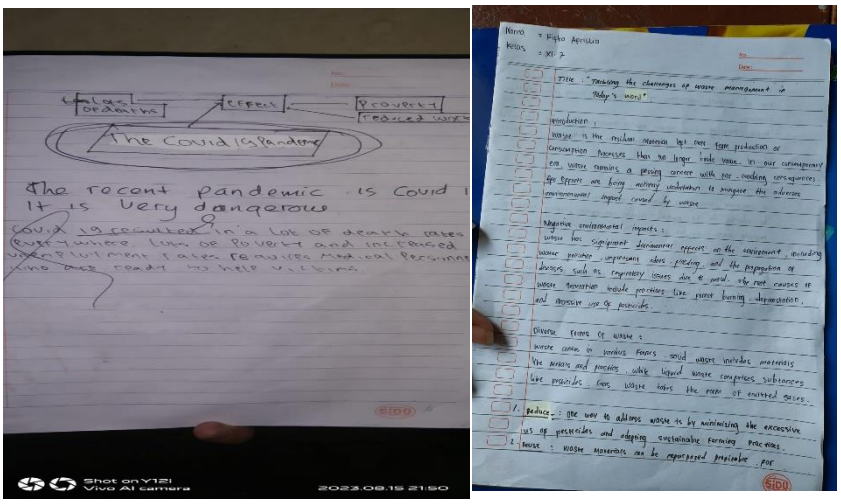

Figure 3. Drafting

Weigle (2002) stated that rubrics and criteria for good writing skills cover content, organization, vocabulary, language use, and mechanics. As students created their mind mapping, they composed their basic outline for writing. However, students still found difficulties in writing because they still struggled with content, organization, vocabulary, language use, and mechanics. As writing was an iterative process, multiple drafts were needed to refine the work.

Table 2. Rubrics and criteria for a good writing skill

Aspect	Before	Percentage of Rubrics Achieve-ment	After	Percentage of Rubrics Achieve-ment
Content	Very Poor: does not show knowledge of the subject, non-substantive, not pertinent, or not	20 %	Good to Aver-age: some knowledge of the subject, ade-quate, Range, limited develop-ment of thesis,	60%

To be continued…

	enough to evaluate.		mostly relevant to the topic but lack detail.	
Organization	Fair to Poor non-fluent, ideas confused or disconnected. Lack of logical sequencing and development.	10 %	Good to Average: somewhat choppy, loosely organized, but main ideas stand out, limited support, logical but incomplete sequencing.	60%
Vocabulary	Very Poor: essentially translation, little knowledge of English vocabulary, idioms, word form or not enough to evaluate.	20%	Good to Average: adequate range, effective word/idiom choice, word/idiom, choice, usage but meaning not obscured.	80%
Language Use	Very Poor: virtually no mastery of sentence construction rules, dominated by errors, does not communicate, or not enough to evaluate.	10%	Good to Average: effective but simple constructions, minor problems in complex construction, several errors of agreement, tense, number word/function, articles, pronouns, preposition, meaning seldom obscured.	70%
Mechanics	Fair to Poor: frequent error of spelling, punctuation, capitalization, paragraphing, meaning confused or obscured.	10%	Good to Average: occasional errors of spelling, punctuation, capitalization, paragraphing but meaning not obscured	70%

ChatGPT

Throughout this writing journey, students often encountered challenges in employing self-direct writing. Students needed more time to employ self-monitoring which requires cognitive capacities, self-management which requires contextual control, and motivational variables which

necessitate the act of engaging in a task. Here are some comments of what students thought as they were asked to do revision and edit phases.

"Saya tidak memahami cara merevisi dan mengedit."
"I don't understand how to revise and edit"

"Saya bingung memperbaiki kalimat saya sendiri."
"I am confused on how to fix my own sentence."

"Kosa-kata saya kurang."
"I lack of vocabulary"

Revising and editing

As ChatGPT was expected to help students to revise their ideas, they needed to learn how to communicate with this Artificial intelligence tool. However, it was found out that students needed to be trained on how to make conversational format to have better revision and editing for their writing. Most students directly typed their original writing version without giving context. What happened was what they wrote was produced back by ChatGPT. After several trials, they found out simple sentences to put context so that ChatGPT was able to revise and edit their writing essays. Here are some contexts that they put before they copied and pasted their essays to be revised and edited.

"Hi, ChatGPT. Help me to revise my essay"
"Hello.. help me to improve my essay."
"Good morning...Can you help to revise and edit my writing?"

This process is in line with what Fitria (2023) found in her research that ChatGPT responded based on the instructions and context given. It was found out that students had individual experiences as each student had text differently. Each student had a different revised text as the output and each student communicated to find out what or why they got revision.

The research showed that ChatGPT could help students develop their English writing abilities. Students can use revised vocabulary, grammar, and sentence construction as well as to get feedback on their writing. This finding is in line with what Dao (2023) revealed in his research that ChatGPT provided writing support. It assisted students in producing more accurate and coherent English documents as well as better written expressions.

Lack of self-direction elements

During the research, many students exhibited a deficiency in self-directed learning, where they struggled to independently manage their learning process. To address this issue, the researcher took the initiative to interview students who displayed low scores in self-directed learning indicators. These interviews aimed to identify specific areas in which students require in terms of self-monitoring, self-management, and self-motivation.

During the in-depth interview, students pointed to self-assessment as the most important element to develop the elements. Furthermore, a few students argued on how to control their learning process (internal locus of control). Self-assessment could be directly described as learning responsibility. On the other hand, students described their weakness in language elements as having led them into uncertain learning goals which lowered their motivation and responsibility.

The self-direction of the learner centers on the want or inclination of the learner, or in other words, learning responsibility. He emphasized that self-direction is not just about following a set curriculum or completing assignments, but about the learner's genuine interest and curiosity in

the subject matter. Learners with a high degree of self-direction take initiative, set their own learning goals, and proactively explore topics that capture their attention. This intrinsic motivation leads to a more meaningful and effective learning experience, as the learner is actively invested in their own educational journey. What happened in the research shows that part of the self-direction is students' active initiative to experience meaningful learning.

Self-directed writing

The difficulties students encountered in generating related ideas and constructing coherent mind maps underscore the multifaceted nature of self-directed writing. In an environment characterized by reduced teacher guidance and increased reliance on individual resourcefulness, students face a higher demand for creative and critical thinking. The incorrect placement of connections within mind maps reveals a potential disconnect between students' conceptual understanding and their ability to visually represent these connections. It was found that students' collaboration has resulted in better understanding and generated better ideas. This finding is in line with Laksmi (2006) who stated that students who built idea maps collectively produced considerably better concept maps than those who built them independently, demonstrating a stronger conceptual understanding.

Another research by Kwon and Cifuentes (2009) also stated that students who generated idea maps collectively produced much better concept maps than those who did it independently, showing a stronger conceptual understanding. During the research, students admitted that it was a helpful and interesting tool and that after figuring it out, they enjoyed using the method. This finding was supported by Abd Karim et al. (2022) who found out in their research that students reported having a variety of experiences, which encouraged them to keep utilizing this method. They had favorable sentiments toward this method. They admitted that it was a helpful and interesting tool and that after figuring it out, they enjoyed using the method.

Drafting

The challenge of deficient self-directed writing started from the first phase of writing. Based on the findings, it might be assumed that students needed more self-assessment to develop sub-topics and to connect some words to the explanation to compose writing. This finding is supported by Moradi (2018) who reveals that one of the most significant elements of self-directed writing is self-assessment. He further explains that in the process students employ cognitive perception and self-evaluation thus process, thus it would appear necessary to help and direct them as they define learning objectives, prepare and implement practical learning tactics, and then analyze their learning outcomes and progress. Language learners gained their knowledge and recognized learning needs by reflecting on their progress and knowledge. As a result, they could identify the most effective learning strategies.

Revising and editing

This part needed a cycling process of self-directed writing elements. As chatGPT helps students to do this part, it became a valuable tool to assist students in generating ideas for vocabulary, grammar, and sentence construction as well as to get feedback on their writing. Besides, they worked at their own pace and adjusted themselves to develop their skills, This can improve students' writing expression and help them create more accurate and cohesive English texts. This is in line with what Dao (2023) has revealed in his research stating that AI could be used to experience language practice, personalized learning, language comprehension, writing support and language resources. However, students needed to practice on how to generate more accurate responses from Artificial intelligence tools (Javier & Moorhouse, 2023). This finding is also supported by Kohnke et al (2023) finding who stated that ChatGPT's responses might not be accurate and offered the option for criticism (a thumbs-up or thumbs-down. This finding needed self-awareness of users who took responsibility of the responses provided by ChatGPT.

Lack of self-direction writing

The low awareness of self-directed writing hindered the independent writing process. Students needed explicit training on how to focus on two important elements namely ability to write and the willingness to write. This finding is supported by Hedge (2005) who categorized writing quality into two categories: "authoring," which refers to the writing process skills, and "crafting," which refers to the language choices that are acceptable and accurate.

The research showed that support and mentoring were needed to improve self-directed writing. Students needed time to achieve learning goals, prepare and implement effective learning strategies, and assess their learning outcomes and progress. This finding is in line with Peen and Arshad (2017) and Adnan & Sayadi (2021) who state students need help if they are to succeed in planning, implementing, monitoring, and evaluating their learning.

Conclusion

In light of these difficulties, the potential for combining ChatGPT and mind mapping as teaching tools becomes increasingly pertinent. Students may find it easier to start writing after using ChatGPT, which can offer real-time assistance with idea generation. When properly taught, mind mapping provides a visual framework that motivates pupils to combine concepts and recognize connections. Combining these technologies may enable students to improve the coherence of their compositions and the quality of their outline production.

The difficulties with outlining, coming up with ideas, and mind mapping indicate the value of focused interventions in the context of self-directed writing. The combination of pedagogical techniques with AI technology has the potential to improve students' capacity for independent thought organization and effective communication, which is in line with the objectives of the changing educational landscape. Future research might look at students' writing essays to see the improvement of their writing skills.

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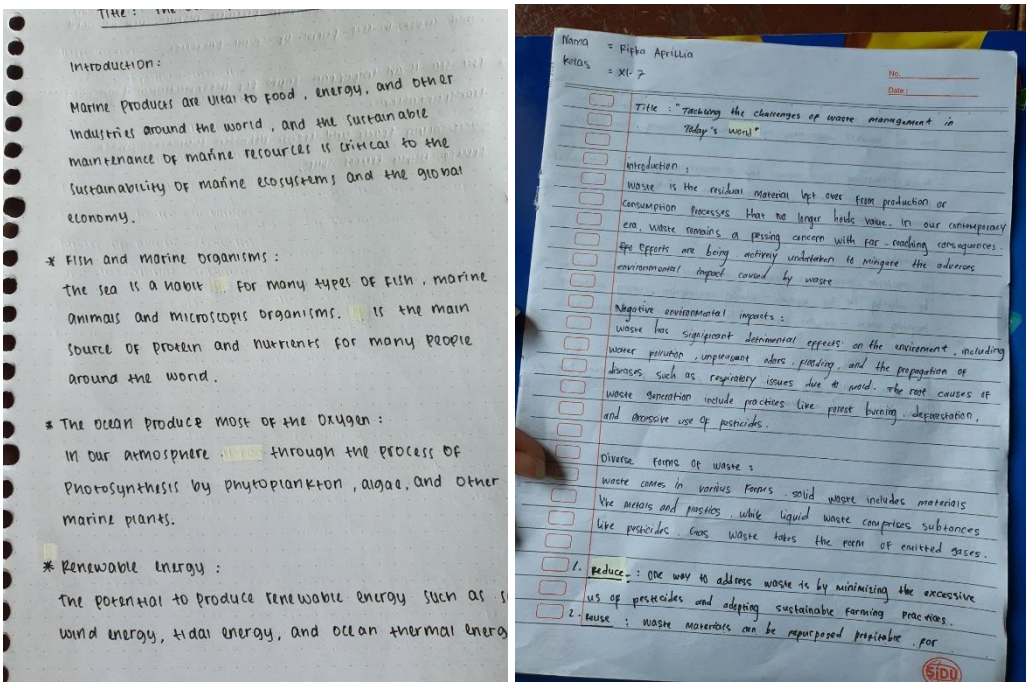
APPENDICES

Appendix 1

Time Table

Week	Activities	Points To Explain
1-2	Orientation	Topic choices Concept of mind-mapping structure concepts of self-directed learning concept of writing skills enhancement concept of AI-assisted education the implementation of the new curriculum in Indonesia.
3-5	Mind Mapping Practice	Generating Ideas Idea Organization Finalizing outline
6-8	Writing Practice	Draft 1 Revision Draft 2 Revision
7-8	Chat GPT Practice	Comparing and Concluding

Appendix 2 Sample of student's work



Title :

Introduction :

Marine Products are vital to food, energy, and other industries around the world, and the sustainable maintenance of marine resources is critical to the sustainability of marine ecosystems and the global economy.

* Fish and marine organisms :
the sea is a habit for many types of fish, marine animals and microscopic organisms. is the main source of protein and nutrients for many people around the world.

* The ocean produce most of the Oxygen :
In our atmosphere through the process of photosynthesis by phytoplankton, algae, and other marine plants.

* Renewable energy :
The potential to produce renewable energy such as
wind energy, tidal energy, and ocean thermal energy

Nama = Pitka Aprillia
Kelas = XI-7

No.
Date :

Title : "Tackling the challenges of waste management in Today's world"

Introduction :
Waste is the residual material left over from production or consumption processes that no longer holds value. In our contemporary era, waste remains a pressing concern with far-reaching consequences. Efforts are being actively undertaken to mitigate the adverse environmental impact caused by waste

Negative environmental impacts :
Waste has significant detrimental effects on the environment, including water pollution, unpleasant odors, breeding, and the propagation of diseases such as respiratory issues due to mold. the root causes of waste generation include practices like forest burning, deforestation, and excessive use of pesticides.

Diverse forms of waste :
Waste comes in various forms, solid waste includes materials like metals and plastics, while liquid waste comprises substances like pesticides. Gas waste takes the form of emitted gases.

1. Reduce : one way to address waste is by minimizing the excessive us of pesticides and adopting sustainable farming practices.
2. Reuse : waste materials can be repurposed profitable, for

Appendix 3
Result of their comparison