Mind-Mapping Technique and *Writeabout* Application Integration in an Online Writing Class: An Indonesian Vocational University Context

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Abstract

While writing has evolved away from the conventional method of using pens and paper in favor of digital tools (Li et al., 2019), English teachers continue to face difficulties in teaching writing. This study shows how mind-mapping and the program, Writeabout, can be merged for online writing classes in English for Specific Purposes (ESP) clasrooms. It reports on a classroom-based research with a qualitative research design which includes class observations and essay analysis of first-year undergraduate students enrolled in the Railway Mechanical Technology program in Indonesia during the academic year 2020/2021. The analysis of students' essays via TOEIC-adopted writing criteria showed that the students lacked competence in vocabulary (range: 2-5), grammar (range: 2-5), and sentence quality (range: 2-5). However, their text organization skills were a bit higher (range: 3-7), which was likely due to the course instructions's incorporation of mind-mapping techniques. The findings revealed that incorporating the mind-mapping technique and the Writeabout application into online writing lessons can have a positive effect on students' writing.

Keywords: mind-mapping; vocational college; writeabout; writing class; writing technique

Many EFL students at the university level in the Southeast Asia context do not have good writing skills (Kumar & Sultana, 2016) because their efforts to learn writing are limited to preparing for examinations (Li et al., 2020). As such, some Indonesian university students find it difficult to come up with the ideas needed to complete writing tasks efficiently, making them struggle during the writing process (Pratiwi & Ubaedillah, 2021). Vijayavalsalan (2016) argued that writing is a difficult process in general because it necessitates not only planning, arrangement, composition, and alteration, but also the placing of linguistic units. Therefore, it is critical to provide students with proper approaches for text construction in order to help them enhance their writing skills, especially the capacity to convey ideas clearly and concisely (Çelik, 2020). Several empirical studies have proposed the mind-mapping technique as an effective writing strategy which aids in the organization of ideas and the development of students' writing skills (Al-Zyoud et al., 2017; Ubaedillah et al., 2021; Vijayavalsalan, 2016). This technique also provides an active role for students and creates autonomous learning (Buran & Filyukov, 2015; Wilson et al., 2016). Moreover, it causes students to focus more on the topics and enhances creativity and idealization while constructing ideas into a meaningful text (Pratiwi, et al., 2021; Rezapour-Nasrabad, 2019). Thus, it is assumed that implementing the mind-mapping technique in writing classes can help students to organize their thoughts and gain the ability to transfer those thoughts into writing.

EFL classes have recently shifted to online learning during COVID-19 outbreak (Yeh et al., 2019), and integrating proper teaching approaches and Information and Communication Technology (ICT) tools that are appropriate for students' needs has become necessary (Chiu, 2015; Nguyen, 2020). The selection of proper ICT tools can also improve students' attention and motivation (Li et al., 2018; Seyyedrezaie et al., 2016), expand the scope of teaching techniques (Li et al., 2019), and offer innovative platforms for digital learning (Ngui et al., 2020; Ubaedillah & Pratiwi, 2021). This is also true of EFL writing classes, which has caused more attention to be given to ICT tools for writing, such as *Writeabout,* a free web tool that allows teachers to create their own classroom writing community. However, much is still unknown about the impact of such tools in areas where ICT tools are still widely under-used, such as Indonesia (Ariyanti, 2016). Therefore, this study examines the effect of the use of Writeabout as a platform for the mind-mapping technique in the Indonesian EFL classroom.

Literature Review

Mind-Mapping Technique

The mind-mapping technique is a note-taking method that helps writers to summarize and maximize idea output using a visual tool by combining ideas, words, and images into a single concept (Wilson et al., 2016). The meaning in the concept of mind-mapping is associated with information through graphic reconstruction and representation visualized in a hierarchical process of an outline as shown in Figure 1 (Zipp & Maher, 2013).
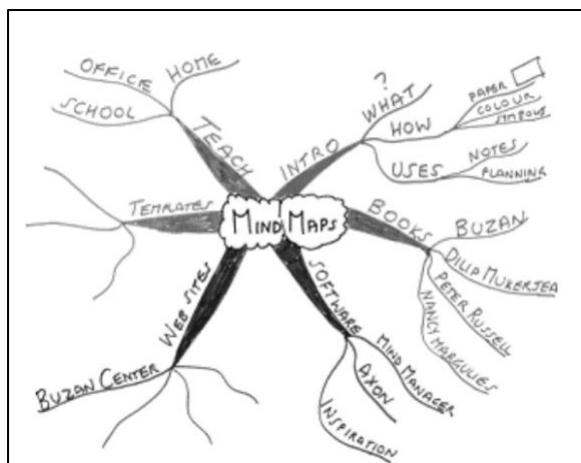
Figure 1. Example of Mind-Mapping

Numerous previous studies have reported benefits from implementing mind-mapping techniques in EFL classrooms in a variety of contexts. For example, Wilson et al. (2016) reported that using the mind-mapping technique in the learning process made note-taking and absorbing knowledge easier for students. Rezapour-Nasrabad (2019) showed that the mind-mapping learning technique promoted active learning and assited learners in recalling knowledge autonomously in Iranian universities. In a Russian vocational college, this technique assisted students in the decision-making process and allowed them to see important factors missed with traditional analysis (Buran & Filyukov, 2015). The technique was also found to have positive influences on students in the United Arab Emirates (Wilson et al., 2016). Particularly in Indonesian contexts, several empirical studies have also demonstrated that the mind-mapping technique was beneficial in improving students' wiriting scores and received positive feedback from the students during its implementation in learning activities (Budiono et al., 2016; Pratiwi et al., 2022; Riswanto & Putra, 2012). It also stimulated students' interest and engagement because it gave them freedom to express ideas and creativity, which allowed diverse learning styles within the classroom.

Other studies have shown the effectiveness of mind-mapping by comparing it to traditional strategies in EFL wiriting classes (Al- Zyoud et al., 2017; Bukhari, 2016; Vijayavalsalan, 2016). In such experimental studies, traditional strategies such as listing ideas and note-taking are used in control groups, while mind-mapping is used as the treatment in experimental groups. The findings of many of these studies concur that the mind-mapping technique helped students to write more effectively compare to traditional strategies, enhanced their ability to organize their thoughts, and improved creativity. Furthermore, the technique facilitated the development of students' writing skills – structure, chohesion and coherence, and made the writing process more enjoyable. On the other hand, students using traditional strategies showed moderate improvement in their writing skills, but they were left insecure about their writing abilities and still became self-conscious about expressing themselves.

Integrating Writeabout and Mind-mapping in the Writing Classroom

CALL (Computer-Assisted Language Learning) and MALL (Mobile-Assisted Language Learning) through web-based programs and virtual learning environments have brought about interesting teaching and learning writing as effective tools related to grammar checking, vocabulary, spelling checking, and corrective feedback (Pollard, 2018). Utilizing CALL and

MALL in writing classroom has been shown to provide opportunities for learners to develop writing skills (Alharbi, 2018), improve student motivation and learner autonomy (Hamamorad, 2016), and lower student anxiety in English writing classes than traditional pen and paper methods (Yavuz et al., 2020). Furthermore, such technology-infused teaching tools have encompassed several aspects of the writing process, such as the development of paragraph and essay-level structure, analysis of whole essay logic and progression, highlighting lexical sets, and providing feedback procedures (Dahlström, 2019; Pratiwi & Waluyo, 2022; Purcell et al., 2013). A review of the technological tools to support writing instruction showed that ICT tools can facilitate student expressiveness and creativity in writing classes and have become helpful for teaching writing as they broaden the scope of written material, provide various formats, develop teaching techniques, and assist students' monitoring progress (Strobl et al., 2019). Specifically, technological tools supported teachers in developing efficient writing courses that promote students' writing competence in online writing classes in Finland (Carolan & Kyppö, 2015) and provide a unique opportunity to extend the writing space's reach in ways that will be linguistically, culturally, and educationally relevant to students in U.S. setting (Paiz, 2018). A survey in the Iranian university context showed that both teachers and students had a positive attitude toward CALL and MALL integration for teaching writing (Amirsheibani & Iraji, 2014). In China, this integration benefited learners significantly in employing the writing skills process (Xu & Li, 2018). Meanwhile in Indonesian university context, employing writing strategies in web-based platform improved students' writing scores. and denoted a pedagogical shift from teacher-centered to more multipurpose and student-centered (Kim, 2017).

In vocational colleges, writing skills need special attention as they are often used to assess students' ability to apply English practically (Liang, 2016). Furthermore, Mahbub (2018) argued that teachers have to equip students with professional writing skills in a specific field to make them ready for the workplace (Mahbub, 2018). However, the English language teaching and learning process in vocational colleges is still plagued by monotonous teaching methods, techniques, and tools (Zhang, 2014). Most students have no real language-using experiences, training and practice opportunities in the actual context, whether in daily life or the workplace. Consequently, teachers have dominated the teaching and learning process through theory and explanation without focusing on students' understanding and their needs for having communicative competence (Muliyah & Aminatun, 2020). Thus, finding appropriate methods, techniques, and tools for teaching English in vocational colleges is an ongoing challenge. Here, advanced writing techniques such as mind-mapping and digital tools, may help vocational students improve their writing skills and impact their English abilities in other positive ways.

During the COVID-19 outbreak, all classes in Indonesia had to be conducted online, including EFL classess in vocational colleges, which caused teachers to move from face-to-face teching to face-to-screen teaching. Therefore, digital tools have become essential assisting learning activities. Teachers had to adapt to this new situation by enhancing their own technological competence (Khan et al., 2020) and developing resources for their students (Listyani, 2019). Many digital tools are available to be integrated into writing class, one of which is the *Writeabout* application. This application is a digital writing platform for classrooms which promotes writing, and is fun and easy to support the development of writing abilities and digital literacy. This platform is equipped to share students' written texts with just the teacher or with the whole class. Moreover, it also facilitates the regular monitoring of student progress by helping teachers to give feedback and allowing them to send direct messages to students.

The *Writeabout* application is still in its infancy in Indonesia, as only a few teachers are familiar with it, although the few studies that do report on this topic generally frame it favorably. For example, Safda and Refnaldi (2019) conducted a study on the deployment of *Writeabout* in senior high school writing class and discovered that it enhanced students' interest in writing and improved their writing skills (Safda & Refnaldi, 2019). Other studies found that new technological tools elevated writing teaching to a new and interesting level (Bikowski & Vithange, 2016), empowering students to develop their own content (Bird & Edwards, 2014) and enhancing students' writing abilities (Mueller & Jacobsen, 2015). However, no study has been published on *Writeabout* integration at the vocational school or university level in the Indonesian context which offers insight about how such tools influence specific aspects of writing skills, i.e., vocabulary, grammar, quality of the sentences and organization of the text. Further, there are no studies about integrating *Writeabout* and mind-mapping strategies in writing classes at vocational colleges. As *Writeabout* and mind-mapping have been shown separately to benefit students and teachers in writing classes, integrating the two could theoretically boost these learners' writing skills. Thus, this study investigates whether mind-mapping and *Writeabout* can be integrated into an online vocational school EFL writing class in Indonesia, and specifically poses the following research questions:

1. Can the mind-mapping technique be effectively implemented via the *Writeabout* application in online Indonesian EFL writing classes?

2. What impacts do the mind-mapping technique and the Writeabout application have on students' writing?

Method

Research Design

The present study used a classroom-based qualitative research design. Class observation was used to describe how the mind-mapping approach and *Writeabout* program were used in an online writing class conducted at a vocational college in Indonesia, following Creswell (2012). Further, the study examined the impacts of these techniques on students' writing performance by analysing student essays. According to Creswell (2018), document analysis is necessary in qualitative research design in order to make sense of a text and generate empirical information. Triangulation was implemented by conducting a student survey to collect their opinions of learning writing through the integration of mind-mapping and *Writeabout*. It was adapted from a Pew Research Center questionnaire about the impact of digital tools on students' writing (Purcell et al., 2013).

The documents analyzed were the final essays of students enrolled in online writing classes. The analysis was based on an adaption of TOEIC writing criteria which were then customized and broke down into 4 categories based on writing competencies for Indonesian vocational colleges students. According to the Educational Testing Service (2019), the TOEIC writing test is designed to measure the ability to use written English to perform communication tasks typical to daily life and the international workplace. This criteria was used in this study because it is in line with the requirements for writing competence in English for vocational college, which aims to prepare students to enter the workplace. In this study, the writing evaluation criteria used included vocabulary, grammar, sentence quality, and organization. The score ranges from 0 to 9 for each criterion (See Table 1).

Table 1. Writing Criteria

Score	Vocabulary	Grammar	Quality of Sentences	Organization
1	unanswered			
2	limited ability to express an opinion and give straightforward information.	serious and frequent grammatical mistakes	little or detail or irrelevant specifics	serious disorganization or underdevelopment of ideas
3	incorrect word choices	many grammatical mistakes, inconsistent	missing information	missing connections between sentences
4	not providing enough examples to support the opinion	have some ability to produce grammatically correct sentences but inconsistent	limited development ideas	inadequate organization or connection of ideas
5	partially successful when giving straightforward information	serious grammatical mistakes	when supporting an opinion with examples, they are mostly unsuccessful	inadequate organization with partly unintelligible information
6	the message omits important information	noticeable grammatical mistakes	unclear connections between the points	not providing enough specific support
7	effectively give straightforward information	noticeable minor grammatical mistakes	partially unsuccessful when giving reasons, examples to support opinion	not providing enough specific support for the main points
8	appropriate use of vocabulary	minor grammatical mistakes	occasionally unnecessary repetition of ideas	the writing is generally good
9	communicate effectively	grammatically accurate	the use of English is natural	well-organized and well-developed

Participants

This study involved 24 first-year students (ages 18-19 years old) from a class of Indonesian Railway Polytechnic students enrolled in the Diploma-III Railway Mechanical Technology program of the 2020/2021 academic year. Based on preliminary study, there were 20 students in beginner level (around A1 level in CEFR), and 4 students in intermediate level (around A2).

In accordance with ethical guidelines, all participants were informed prior to the commencement of the study that the outcomes of their projects would be published and would have no effect on their class score. However, according to university regulations, their names are withheld from being published. They were given an informed consent form and instructed to submit their responses via the *Google Forms*.

Research Procedures

All first-year students in Indonesian Railway Polytechnic have to take an English for Specific Purposes course in the first and second semester. Each class consists of 16 meetings per semester divided into two major skills: speaking in the first half of each semester and writing in the second half of each semester. Students learned each skill in eight meetings with 100 minutes of online class per weekly meeting. The writing skills in the first semester class (ESP1) are designed to facilitate the students' written communicative competence for daily life. The theme of this teaching and learning process was telling experiences. Specifically, in this course, students learned how to construct meaningful texts based on a given theme by utilizing the mind-mapping technique and *Writeabout* application. The students created essays twice: (1) telling about an unforgettable experience and (2) telling about their experience in learning English. The first essay was used as writing practice, while their second essay was analyzed as the primary data of this study. At the end of the meeting, the survey for data triangulation was conducted. The details of the research schedule are described in Table 2.

Table 2. Research Schedule

Meeting	Topic	Activities
Meeting 1	Telling Unforgettable Experience	Explaining the mind-mapping concept and Practicing making mind-mapping
Meeting 2	Telling Unforgettable Experience	Creating *Writeabout* account and start practicing writing
Meeting 3	Telling Unforgettable Experience	Practicing on writing in *Writeabout*
Meeting 4	Telling Unforgettable Experience	Feedback session
Meeting 5	Telling Unforgettable Experience	Revising the text
Meeting 6	Telling Unforgettable Experience	Discussing the writing result
Meeting 7	Telling Experience in Learning English	Creating mind-mapping for 2nd topic
Meeting	Telling Experience in Learning English	Practicing on writing in *Writeabout*
		Survey

Data Analysis

The classroom teacher assigned grades to the 24 students essays based on the writing criteria listed in Table 1. After getting students' writing scores in 4 criteria – vocabulary, grammar, quality of sentences and organization, averages and standard deviations were calculated to draw general conclusions. Further, a Friedman Test was conducted to check for significant differences in the four areas of writing criteria. This test was chosen due to the results being ordinal data. The last analysis is on students' questionnaire results which are analyzed both descriptively and with a Spearman's correlation test to see if there was any correlation between specific questions and the types of scores that they are associated with.

Results

Teaching Online Writing Class for Vocational College

The online writing class had eight meetings that used the mind-mapping technique and the *Writeabout* application. The online classess were taught via *Zoom* by a teacher who was one of the researchers. Each activity was planned in accordance with the schedule shown in Table 2. During the first meeting, the teacher described mind-mapping concept as an efficient system of note-taking that makes revising an enjoyable activity for students (Tee et al., 2014). This graphic method was used to capture ideas and concepts. The visual representation for the mind-mapping approach was shown by the teacher on the *Zoom* sharing screen, as seen in Figure 2.
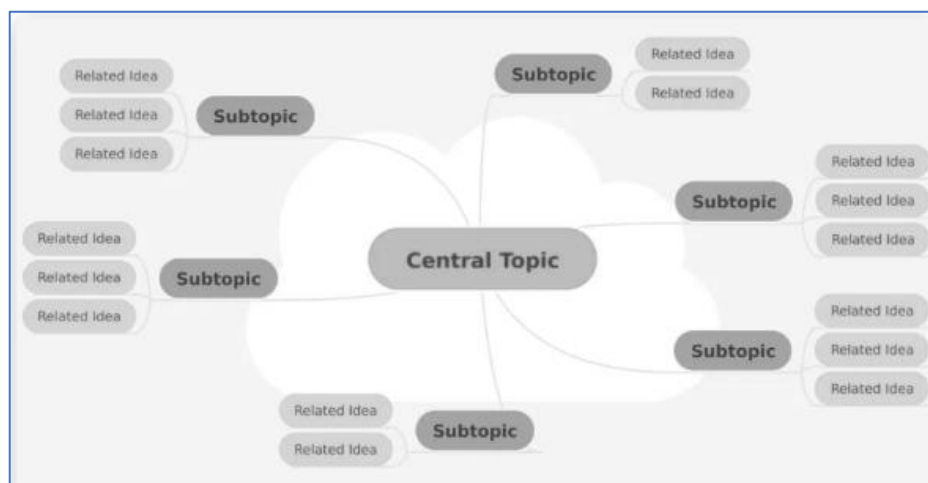

Figure 2. Mind-Mapping Concept

Following the explanation of the concept, an example of a mind-mapping was provided. At this point, the students were instructed to create their mind-maps based on their unforgettable experience as the topic. During the meeting, the teacher instructed everyone who had completed the graph to show their mind-mapping graph to the everyone and discuss it with the class. In addition to peer comments offered to their classmates, teacher feedback was given during discussion time. This aided the students' grasp of the process of establishing a systematic framework for the text. Figure 3 depicts an example of a mind-mapping graph created by a student.

Figure 3. Example of Student's Mind-Mapping Graph on the First Topic

During the second meeting, the teacher explained how to create an account on the *Writeabout* application, which involves students creating accounts and entering teacher codes for their class. During account creation, the teacher did not allow students to sign into Writeabout with other personal accounts such as Google or Facebook, and made separate codes for each class to avoid confusion. The teacher instructed the class to start writing on the application by creating a new post. The teacher asked them to write based on the mind-mapping graph they had created in the previous meeting. They were told to develop each subtopic on their mind-mapping graphs into separate paragraphs and to use the related ideas as supporting details. At this stage, they were instructed to develop the ideas into sentences. Figure 4 shows what the *Writeabout* application looks like.
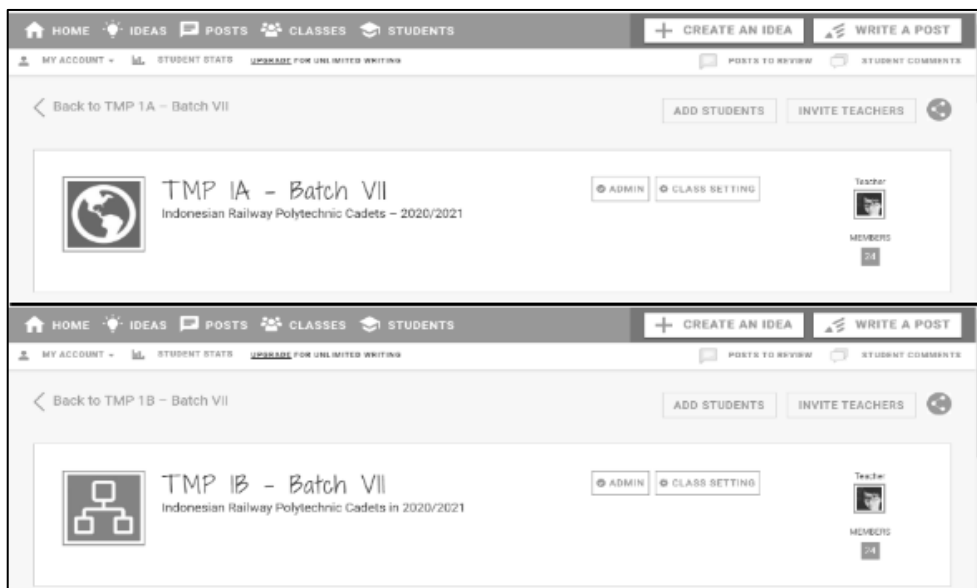

Figure 4. *Writeabout* **Classes**

The students continued their writing using the *Writeabout* app during the third meeting, after which, all students were required to finish their first writing task and submit it to the teacher

via the application, since the teacher would give feedback via it. At this stage, the students had been able to develop their ideas into sentences and paragrapghs, which meant that using the mind-map technique before writing a text would help them produce more thoughts. Next, the teacher provided input on students' essays during the next meeting by utilizing feedback and comment tools in the *Writeabout* application. The teacher could highlight incorrect sentences and write comments on them, which may have helped them realize which areas they had written poorly, and facilitate a more in-depth understanding.

During the fifth meeting, students were instructed to revise their work based on the comments provided. The revision was done online during *Zoom* meetings in order to track students' progress and monitor how they repaired their essays. When students finished editing their work, there were no more notification comments on the *Writeabout* application, and they could proceed to send their work to their teacher. After that, a discussion session regarding their revisions was held during the sixth meeting to present students with a more in-depth understanding of generating writing concepts utilizing the mind-mapping technique. This allowed them to potentially learn from their own mistakes and study the work of their classmates.

In the remaining two meetings, the students' understanding of the mind-mapping technique implementation for writing skills, which was integrated into the *Writeabout a*pplication, was evaluated through essay analysis based on the writing criteria. Then, the second topic was assigned to the students in this meeting. The topic was about their experience in learning English, and it had to be developed into a meaningful text. To arrange their ideas, they were expected to create a mind-mapping graph before writing. Figure 5 shows one example of a student's mind-mapping graph for the second topic. During the last meeting, the students were required to convert their mind-mapping graph into a written text using the *Writeabou*t application. The results of these essays were used as the document data in this study.
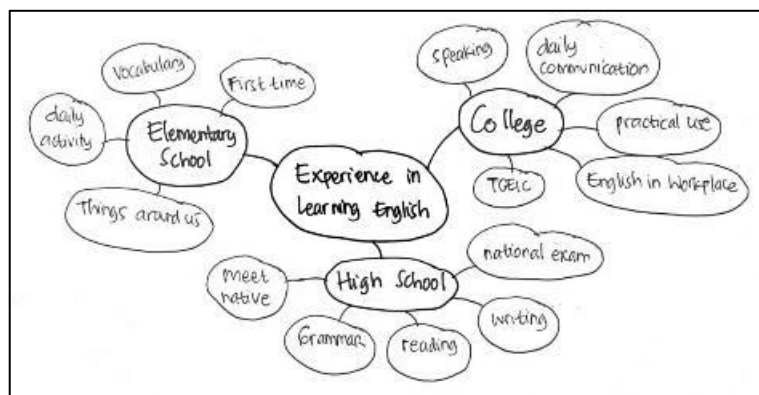

Figure 5. Example of Student's Mind-Mapping Graph for the Second Topic

Analysis of Students' Essays

Table 3 shows the scores for each students' writing essay given by the classroom teacher based on the writing criteria.

Table 3. Result of Students' Essays

Participant	Vocabulary	Grammar	Quality of the Sentences	Organization
A	3	3	4	5
B	2	3	3	4
C	4	4	4	5
D	2	2	2	3
E	3	4	3	5
F	4	3	4	6
G	5	4	5	7
H	3	2	3	3
I	5	3	4	6
J	3	4	3	5
K	4	5	4	6
L	3	3	3	4
M	2	3	3	4
N	3	3	4	5
O	4	4	3	5
P	4	5	3	6
Q	5	4	5	7
R	4	3	3	4
S	3	4	3	3
T	2	3	2	3
U	2	2	3	4
V	3	2	3	3
W	4	3	2	5
X	5	4	5	7
Average (SD)	3.4 (1.0)	3.3 (0.9)	3.4 (0.9)	4.8 (1.3)

The result of the Friedman test showed that there is a significant difference in the score types of students' essays; $X^2{}_r = 32.14$, $p<.001$. Specifically, the organization skill was found to be significantly higher than the other skills.

Vocabulary. Students' range of vocabulary usage scores was from 2 to 5. A score of 2 means that the students could not give straightforward information since their vocabulary knowledge was very limited. It was difficult for such students to express opinions due to a lack of voabulary. Meanwhile, a score of 3 implies that students tended to lack the vocabulary required to give straightforward information to explain their opinion. They also chose words incorrectly while writing their texts. In contrast, students with a score of 4 had some ability to express opinions and give straightforward information, yet their communication was still limited by their vocabulary knowledge. There was a significant weakness that interfered with the communication in creating a meaningful text. Students with a score of 5 were at least partially successful when giving straightforward information, but their supporting opinions were mostly unsuccessful. The opinions omitted important information, which was partly unintelligible.

Table 4. Students' Essays Analysis on Vocabulary

	2-score	3-score	4-score	5-score
Number of Students	5	8	7	4
Percentage	20.83%	33.33%	29.16%	16.67%

Table 4 shows that most of the students are at a vocabulary score of 3 (33.33%), which means many could not complete the task of writing a meaningful text based on the writing criteria description. However, a small portions of students (16.67%) showed partial success in giving information, though supporting details were still omitted resulting in a score of 5. At the same point, 5 students (20.83%) had a very limited ability to explain their opinions as they got a score of 2. The rest of the students possessed a limited ability to express their ideas in writing (7 students, 29.16%) as they got 4-score. This result indicates that many of the students in the sample need to improve their vocabulary knowledge to complete writing tasks.

Grammar. Students' written grammatical ablities ranged from 2 to 5 as well. A score of 2 means that the students were unable to produce grammatically correct sentences, making serious and frequent grammatical mistakes. Meanwhile, a score of 3 means that the students had a little improvement compared to those with a score of 2. They still made serious and frequent grammatical mistakes at this level, but their ability to produce grammatically correct sentences improved slightly, although at this level there were still consistent mistakes. Students at a score of 4 still made serious grammatical mistakes, but not as frequently as the lower two levels. However, they were still inconsistent in producing grammatically correct sentences. Students with a score of 5 made serious grammatical mistakes, but these were more infrequent and largely due to incorrect word choices.

Table 5. Students' Essays Analysis on Grammar

	2-score	3-score	4-score	5-score
Number of Students	4	10	8	2
Percentage	16.67%	41.67%	33.33%	8.33%

Table 5 shows that a small percentage of students made serious grammatical mistakes infrequently (score of 5; 8.33%, 2 students), one-third were inconsistent in producing grammatically correct sentences (score of 4; 33.33%, 8 students), but most still made serious and frequent grammatical mistakes when constructing sentences (score of 3; 41.67%, 10 students). Additionally, a few students were unable to produce grammatically correct sentences (score of 2; 16.67%, 4 students). Based on the writing criteria descriptor, this body of students' grammatical ability should be further improved in order to increase their writing skills.

Quality of Sentences. The quality of the sentences in the students' essays ranged from 2 to 5 – the same as the previous criteria. Students with a score of 2 did not include important information about the given task, so they almost failed to complete it. Comparatively, students with a score of 3 skipped information causing sentences with incomplete details to support ideas, and students with a score of 4 did better, but still lacked information when giving examples or details when presenting ideas. Students with a score of 5 provided examples and detailed ideas, although their presentation still had some problems.

Table 6. Students' Essays Analysis on Quality of the Sentence

	2-score	3-score	4-score	5-score
Number of Students	3	12	6	3

Percentage	12.5%	50%	25%	12.5%

Table 6 shows that most studenst scored either a 3 (25%, 6 students) or a 4 (50%, 12 students), and that there were 3 students (12.5%) each who scored 2 and 5, respectively. This means that though a few students made sentences that provided appropriate supporting details, most did not give proper supporting ideas, especially in giving examples, when completing the task. The reason for this is likely a lack of grammatical ability and vocabulary knowledge, as these are required to give proper details in a sentence (Solikhah, 2017).

Organization. Students' achievement on this criterion was significantly better compared to the other criteria. The average score of organization skill was the highest of all (4.8) and significantly different from the other criteria. There were five levels of scores achieved: from 3 to 7. A score of 3 means that the students had serious disorganization or underdeveloped ideas when constructing their text, misisng or obscuring connections between sentences. Students with a score of 4 had limited development of ideas and inadequate organization caused by unconnected sentences. Students with a score of 5 were had limited development of ideas and inadequate information due to unconnected sentences, but this happened less throughout the whole text than students with a score of 4. Students who scored 6 and 7, students did not provide enough specific support and development for the main point and gave unclear connections between their points, but this happened much less frequently than at previous levels. Students who scored a 6 were partially successful in giving information, and those who scored a 7 were generally effective at providing opinions.

Table 7. Students' Essays Analysis on Organization

	3-score	**4-score**	**5-score**	**6-score**	**7-score**
Number of Students	5	5	7	4	3
Percentage	20.83%	20.83%	29.16%	16.67%	12.5%

Table 7 shows that there was a more even spread of scores, and that there were about 10 (41.66%) students who had difficulty organizing sentences into a text due to missing connections between sentences that resulted in inadequate textual organization (i.e., a score of 3 or 4). 7 students (29.16%) had limited development of ideas, which happened infrequently within the text (i.e., a score of 5). 7 students (19.17%) developed their ideas well, but some did not provide enough supporting ideas causing the text to be unclear in some parts (i.e., a score of 6), while otherseffectively provided information throughout the text (i.e., a score of 7).

Students' Opinions

Table 8 presents the findings of the survey conducted at the end of the course to find out student perceptions of the mind-mapping activity and its integration via the *Writeabout* application for learning writing. In general, students were positive towards this particular combination. The results of the survey seem to suggest that students felt that the integration method facilitated peer interaction and engagement, promoted critical thinking and allowed students to practice in technology. None of the students strongly disagreed with any of the suggested benefits and most either agreed or strongly agreed with them.

Table 8. Survey Results

No	Integrating Mind-mapping and *Writeabout…*	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1	Allows learning and using new vocabulary	50%	25%	16.67%	8.33%	-
2	Facilitates grammar practice	33.33%	54.16%	8.33%	4.16%	-
3	Synthesize content into a cohesive work	66.67%	29.16%	4.16%	-	-
4	Effectively organize and structure writing	62.5%	37.5%	-	-	-
5	Help to construct ideas better	54.16%	45.83%	-	-	-
6	Promotes freedom to express and share one's feelings, ideas, and opinions	25%	50%	20.83%	4.16%	-
7	Improves writing skills and digital literacy	37.5%	58.33%	4.16%	-	-
8	Facilitate online interaction between teachers and students and peer interaction	58.33%	41.67%	-	-	-
9	Promotes autonomous learning	37.5%	33.33%	29.16%	-	-
10	Increase motivation in writing	41.67%	66.67%	-	-	-

Spearman correlation analyses showed that there was no significant correlation between whether or not students felt they had improved at particular skills and their final learning outcomes: question 1 and vocabulary scores $r_s = 0.00$, $p = 0.98$; question 2 and grammar scores $r_s = 0.07$, $p = 0.73$; question 3 and sentence quality scores $r_s = 0.11$, $p = 0.61$. Similarly, there was no significant correlation found between 4 and organization scores; $r_s = 0.24$, $p = 0.26$. However, the effect size was noticeably larger for this question as compared to the others. This result either signifies that students were simply not very good at noticing their own improvement (Spring et al., 2019) or that students did not actually improve very much via the instruction, and the students who scored higher simply started with higher ability.

Discussion

The significant difference in students' writing results were in organization skills than the other skills – vocabulary, grammar, and quality of the sentences. The results suggest that the mind-mapping technique and *Writeabout* likely aided students in their written organizational skills. First, though there is no pretest data for the students, it is reasonable to believe that their scores for the various skills were likely similar before the course, because the students had not had much writing instruction up to that point. Therefore, finding a significant difference between organizational skills and other skills in the posttest suggests that students likely improved this skill above others. Second, though there was no significant correlation between students' opinions about having improved this skill and final achievement, the effect size between this

survey question and skill as compared to others, and thus, a larger sample size could very well return significant results, especially considering the fact that survey results are an imperfect way to measure student improvement. This finding supports previous studies which argue that the mind-mapping technique helped students organize their texts better (Liu et al., 2014; Mohaidat, 2018; Pratiwi & Ubaedillah, 2021). Furthermore, the results of this study support the idea that integrating digital platforms into writing teaching benefits both students and teachers (e.g., Alharbi, 2018; Amirsheibani & Iraji, 2014; Pollard, 2018; Waluyo & Bucol, 2021; Xu & Li, 2018; Yavuz et al., 2020). Therefore, the integration of mind-mapping technique and *Writeabout* application in an online writing class seems to be one way to create more communicative writing goals.

Third, the survey result suggest that most students said that they can learn and use new vocabulary and practice grammar through the integration technique. However, the scores analysis suggest that they made little improvement in these areas. Therefore, students must continue to improve their grammatical skills to support the quality of the sentences they make. CALL or MALL might offer solutions here as well (Hashim et al., 2018; Waluyo & Bakoko, 2021). Further, the survey revealed that *Writeabout* application facilitated the interaction between teachers and students and among students during the online classes. Students used the mind-mapping technique to develop a framework for their writings. The *Writeabout* program facilitated communication between teachers and students participating in online writing session. This program facilitated the process of reviewing students' essays, providing feedback, and discussing the results in class, in addition to tracking students' progress through revision activities developed on the platform.

This study has some limitations to be acknowledged. First, the participants represent an ESP class of the Railway Mechanical Technology study program, and their experienced cannot be applied to all ESP classes or general English classes. Furthermore, the essay analysis was based on writing TOEIC standards, so in the future other writing criteria should also be considered. Finally, this study did not employ a pre- posttest design, and therefore it is difficult to know exactly how much actual change there was in students' writing ability. Future studies should employ an experimental research design to elicit additional discussion in this field of study, notably the effectiveness of mind-mapping and *Writeabout* integration. Additionally, quantitative analysis may deepen our understanding of analyzing students' learning outcomes and provide additional context for integrating the mind-mapping technique and *Writeabout* application into an online writing class.

Conclusion

The mind-mapping technique and *Writeabout* application were combined in a class to help students create relevant texts. The results of this study suggest that the two can be seamlessly integrated in an online setting, and seem to help students with their organizational skills. I believe that this is due to the combination of these two to assist students to deconstruct their thoughts and convey their ideas without relying on teacher evaluation. This is borne out by the observed differences in various student writing scores and the survey. Therefore, we believe that integrating the mind-mapping technique and *Writebout* can bring positive impacts to students' writing abilities at the vocational institution level, so we recommend this model as an approach to teaching writing that specifically focuses on organization.

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