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# Exploring Tertiary Learners' Perceptions, Activities and Experiences of Using Digital Mind Map via Mobile Application

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**Abstract**

A promising digital visual aid that encourages learners to think critically and creatively is digital mind mapping. This digital tool takes a conceptual approach to teaching and learning, assisting students in visualizing a subject and comprehending how various ideas are interconnected in both theoretical and practical contexts. However, many students are not exposed and are not proficient in using digital mind maps. Students still need a lot of guidance in the use of this technique. Furthermore, mobile technologies are also a relatively flexible gadget trend that is widely used by students. These two mediums when combined can assist students in learning process. Thus, this paper explored three major aspects (i) learners' perceptions (ii)learners' activities and (iii) learners' experiences of using digital mind map via mobile application. The study used a quantitative method. The questionnaire was distributed to 23 tertiary learners from a selected public university in Malaysia. The data was analysed using the SPSS version 26. The results were presented in percentages. Findings of the study showed that the tertiary learners had positive perceptions om the use of digital mind map via mobile application, used a lot of beneficial activities through the technique, and experienced an exciting and useful technique in using digital mind map via mobile application. Therefore, the results of the study revealed that the use of digital mind map via mobile application apparently encourages the tertiary learners in supporting the learning process of writing. More research is needed to determine the effectiveness of the technique in teaching and learning among the tertiary learners.

**Keywords**: Activities, Perceptions, Experiences, Digital Mind Map, Mobile Application

## Introduction

Learning to write is a difficult task for many students. The learners have some difficulty coming up with ideas, especially second or foreign language learners (author(s)). In Malaysia,

all ESL students began to learn writing at a young age, but their writing performance was still uninspiring. Therefore, Ministry of Education had emphasized in Malaysian English Language curriculum that all students must acquire writing skills and they also need to be expert in this skill. The idea that writing is only a skill that students learn has been seriously questioned by research and theory in academic literacy, genre analysis, and social practise theory. The writers must also gather information and reflect it in their writing. As a result, it can be inferred that writing should now be considered a problem-solving skill rather than just a passive activity of stuffing paper with words. To bring a writer's ideas to existence on paper, writing requires originality and imagination (author(s)). Brainstorming is a technique for coming up with new ideas. Students, for example, can brainstorm ideas for thinking about a topic, understanding a topic, and deciding on solutions. This method can be used to help students solve learning problems. Students can use this method to solve problems in their writing essays. Buzan & Buzan (1996) introduced the mind map that is recognized as a learning instrument that can help learners to use their radiant thinking. Buzan (2005) suggested that the main idea is placed in the middle of the paper to start a mind map, and the supporting concepts are arranged around it. Then, the relationships between ideas are denoted by various connection arrows.

A digital mind map is one that is created using appropriate software on a computer, mobile device, or other electronic device. Progressively, digital mind maps have gained popularity, increasing interest in mind mapping among students (Elzaaby, 2013). Digital mind maps are effective tools for understanding and communicating ideas because people can quickly analyse visual information. Some of the benefits highlighted by (Bhattacharya & Mohalik, 2020) are such as the technique helps knowledge to be described or viewed as being easier to understand and it enables students to actively participate in the learning process by letting them create digital mind maps. The online map could be extensively utilised in businesses and educational institutions (author(s)). When mind mapping and mobile-assisted learning are used together as a learning strategy, students actively create concept maps to get the most out of their study. The use of mind maps in group projects is recognised as a successful collaborative teaching strategy, especially when combined with digital methods. (author(s)) found that mind mapping is a very successful approach because both teachers and students who are taking writing classes can benefit from this approach. The students will also enjoy and appreciate their writing class. Digital mind mapping is a yet another technique that boosts productivity by assisting in the development and analysis of ideas, as well as in the organisation and retrieval of information. Different types of software can be used by educators and students to create digital mind maps for teaching and learning. Although digital mind maps are simple to use at the university level, using them with students who are younger maybe unsettling (Debagg et al., 2021). Therefore, this technique is something that should be highlighted and encouraged to use it among students as it helps to stimulate writing performance among tertiary students.

**Purpose of the Study**

The purpose of the study is to explore the tertiary learners' perceptions, activities and experiences of using digital mind map via mobile application for improving writing performance. The following are the questions that this study attempts to answer:

How do tertiary learners perceive the use of digital mind map through mobile application?

How do tertiary learners perceive about digital mind map activities carried out through mobile application?
How do tertiary learners perceive about their experiences using digital mind through mobile application?

## Methodology

The study used a quantitative method. The study employed a questionnaire for data collection. They were 23 tertiary students from Universiti Teknologi MARA Perak, Malaysia involved in this study. The students were Semester 3 diploma students. The questionnaires were distributed to the students after they completed the writing course to explore their perceptions, activities and experiences of using digital mind map using mobile application for improving writing performance. The questionnaire consisted of 36 items. The questionnaire was classified into four parts: (i) learners' background profile (ii) learners' perceptions (iii) learners' activities and (iv) learners' experiences. To answer the research questions, data was analysed using the SPSS version 26.0. Data was presented in form of tables and percentages.

## Results and Discussion

*Learners' Background Profile*

The learner background profile data in Table 1 displayed the gender, age, mobile for learning and mind map for learning. The number of male respondents (8.7%) and female (91.3%) who answered the questionnaire. The age group for 17-19 years old were 91.3 % and the age group of 20-22 years old were 8.7%. All respondents answered that they use mobile for learning (100%). In terms of the use mind map for learning, the respondents answered that they use for learning (73.9%) and only 26.1% said they do not use mobile for learning.

Table 1
*Learners' Background Profile*

| Characteristics | Frequency | % |
|---|---|---|
| **Gender** | | |
| Male | 2 | 8.7 |
| Female | 21 | 91.3 |
| **Age** | | |
| 17-19 years | 21 | 91.3 |
| 20- 22 years | 2 | 8.7 |
| **Mobile for Learning** | | |
| Yes | 23 | 100 |
| No | 0 | 0 |
| **Mind map for Learning** | | |
| Yes | 17 | 73.9 |
| No | 6 | 26.1 |

*Learners' Perceptions*

The findings regarding learners' perceptions of using the digital mind map via a mobile application on 11 survey items are presented in Table 2. These findings demonstrated their opinions on the technique, which significantly improved students' writing abilities. 39.1% of respondents indicated a strong agreement with item 1, while 52.2% of respondents said they agreed. Only 4.3 % of the respondents answered uncertain and disagreed with this statement.

In other words, the majority of the respondents agreed that using the technique really aided them in creating mind maps as opposed to just handwritten ones. The respondents expressed agreement (26.1%) with the findings for item 2 and 65.2% of them agreed that they really liked the technique as it provided an innovative tool to improve the writing performance. Only 4.3 % of respondents expressed uncertainty, while 4.3 % of respondents disagreed. As a result, most of respondents (91.3 %) had favourable attitudes about the application of this technique.

For item 3, the respondents expressed disagreement (17.4%) and 56.5 % were uncertain, however 8.7% of the respondents said they agreed and 17.4% of the respondents said they strongly agreed. It can be shown that the majority of them (56.5 %) were uncertain because they were possibly unclear of how difficult the technique was to use. The personal aspect of mobile phones and their portability, which are in line with earlier studies, indicate that the use of mobile devices for learning may have even more potential than e-learning (Vogel et al., 2010). Yedla (2013) claims that MALL could improve self-learning and it may also encourage students to continue the learning process on their own in English language for the future. This is in addition to the usage of mobile technology in language learning. 69.6 % of respondents agreed that this technique would help them become more skillful at using mobile learning, and a significant percentage of respondents (21.7 %) indicated their strong agreement (item 4). Only 8.7% of the respondents expressed uncertainty toward this item. Item 4 demonstrated that the majority of respondents (91.3 %) had favourable attitudes toward the usage of the technique because they believed that it would improve their ability to use mobile-based learning technologies.

In response to item 5, the respondents strongly disagreed (34.8%) and 39.1% of the respondents disagreed. Meanwhile, 13.0% of the respondents were uncertain. However, 8.7% of the respondents said they agreed, and 4.3% of the respondents said they strongly agreed. As a result, most of them (73.9 %) had positive attitudes toward the technique as they stated that, given the option, they would employ it for writing. Therefore, most respondents said they would rather write using this technique. According to the results of the current study, the respondents (39.1%) preferred individual work over group work while using mobile applications to generate digital mind maps, so they gave item 6 a positive response. Only 8.7% of respondents and 30.4 % of respondents, respectively, expressed strong agreement and agreement. Only 26.1% of the respondents expressed uncertainty. Likewise, 26.1% of the respondents disagreed, while only 8.7 % did not.

Table 2
*Learners' Perceptions*

| No | Items | Percentage (%) | | | | |
|---|---|---|---|---|---|---|
| | | SD | D | U | A | SA |
| 1 | I found that there are a lot of benefits in designing a mind map using digital mind via mobile application | 0 | 4.3 | 4.3 | 52.2 | 39.1 |
| 2 | I really like the digital mind map technique as it provides an innovative tool to improve my writing | 0 | 4.3 | 4.3 | 65.2 | 26.1 |
| 3 | I think that digital mind map technique using mobile application is complicated to use | 0 | 17.4 | 56.5 | 8.7 | 17.4 |
| 4 | Using digital mind map via mobile application would help me to become more skilful for mobile learning | 0 | 0 | 8.7 | 69.6 | 21.7 |
| 5 | If I were given the choice, I would not use digital mind map technique via mobile application for writing | 34.8 | 39.1 | 13.0 | 8.7 | 4.3 |
| 6 | I prefer individual work rather than group work to create digital mind maps via mobile application | 8.7 | 26.1 | 26.1 | 30.4 | 8.7 |
| 7 | I advise my friends in other classes to use the digital mind via mobile application | 0 | 8.7 | 17.4 | 65.2 | 8.7 |
| 8 | It makes no difference whether I use the digital mind map technique via mobile application or not for writing | 21.7 | 47.8 | 13.0 | 17.4 | 0 |
| 9 | I need a good support and training prior to using the digital mind map via mobile application | 0 | 8.7 | 26.1 | 47.8 | 17.4 |
| 10 | I will use the digital mind map via mobile application in my everyday plan outside the class | 0 | 4.3 | 26.1 | 60.9 | 8.7 |
| 11 | Creating a digital mind map using the mobile application is a time-consuming task | 8.7 | 43.5 | 21.7 | 26.1 | 0 |

Additionally, when it comes to recommending this technique to their friends, 65.2% of respondents agreed and 8.7% of respondents strongly agreed (item 7). 8.7% of respondents disagreed, while 17.4 % of the respondents were uncertain. As a result, the majority of students (73.9 %) had favourable attitudes toward the technique's utilisation since they suggested it to their classmates who were in different classes. 47.8 % of respondents disagreed, with 21.7 % of respondents strongly disagreed that the technique makes no difference whether they use the digital mind map technique via mobile application or not for writing (item 8). 17.4% of respondents said they strongly agreed, while 13.0 % were uncertain. The respondents believed that this technique need a good support and training (item 9). As a result, the majority of them (47.8 %) agreed that before using a mobile application to create a digital mind map, they needed appropriate support and training. 17.4% of respondents indicated that they strongly agreed. 26.1 % of respondents were uncertain, and 8.7 % disagreed. Evidently, the respondents believed that using this technique would help them

write better. They did, however, agree that to use the technique for their work effectively, they needed adequate guidance and training.

For item 10, the majority of students generally agreed that they planned to use the mobile application for the digital mind map outside of class time every day. The results showed that 60.9 % of respondents said they agreed and 8.7% of respondents said they strongly agreed with the item. 26.1% of respondents were uncertain, whereas only 4.3% of respondents disagreed. 69.6% of respondents said they would apply the technique to their regular learning outside of the classroom shows that the majority of respondents had positive attitudes. Item 11 revealed that the majority of respondents (52.2%) had favourable attitudes of this technique because it was a quick process. Only 8.7% of respondents strongly disagreed and 43.5% of respondents disagreed. Only 26.1% of respondents said they agreed that applying the technique to create a digital mind map was a time-consuming process, while 21.7% were uncertain. Therefore, the majority of the respondents believed that the technique offered many benefits for enhancing their writing, and they also had favourable attitudes regarding the usage of this technique.

*Learners' Activities*

The respondents to this study used the technique in a variety of tasks. The findings for respondents' perceptions of the activities they had engaged in outside of writing were thus briefly provided in this part. Table 3 presents the findings regarding learners' activities in applying the technique. The activities that the respondents engaged in the study demonstrated how such activities directly influenced the development of their writing. Table 3 showed eight items for this part of the questionnaire. Table 3 reveals that 56.5% of respondents and 34.8% of respondents, respectively, expressed agreement with the statement (item 12). Only 8.7% of respondents were uncertain about this item. This demonstrated that most of respondents (91.3%) had good attitudes toward using the technique because they believed it would enable them to strengthen their prewriting stage.

Table 3
*Learners' Activities*

| No | Items | Percentage (%) | | | | |
|---|---|---|---|---|---|---|
| | | SD | D | U | A | SA |
| 12 | I found the use of digital mind map through mobile application help me in reinforcing my prewriting stage | 0 | 0 | 8.7 | 56.5 | 34.8 |
| 13 | I found the use of digital mind map via mobile application encourages me to write my own ideas down without talking about them first | 0 | 4.3 | 13.0 | 60.9 | 21.7 |
| 14 | I found that the use of digital mind map via mobile application help me to improve the content of my writing | 0 | 0 | 8.7 | 47.8 | 43.5 |
| 15 | The digital mind maps I created by using the technique my critical thinking | 0 | 0 | 8.7 | 69.6 | 21.7 |
| 16 | Creating digital mind maps using the mobile application makes me think of many ideas and then organizing thoughts easily | 0 | 0 | 0 | 73.9 | 26.1 |
| 17 | Editing my ideas using the technique is easy as it gives more space than paper and enables me to design easily | 0 | 4.3 | 8.7 | 56.5 | 30.4 |
| 18 | I felt the time pass very fast because I enjoyed using this technique | 4.3 | 0 | 13.0 | 52.2 | 30.4 |
| 19 | Using the technique improve my memory in learning writing | 4.3 | 0 | 13.0 | 52.2 | 30.4 |

Writing is one of the hardest language skills to learn since people struggle to communicate their thoughts and ideas and influence others, according to (White and Bruning, 2005). The results of item 13 showed that 82.6% of respondents had favourable attitudes regarding using the technique because they believed that it enabled them to write their own ideas without first discussing about them. According to the table, 21.7% of respondents indicated a strong agreement, and 60.9% of respondents agreed. While this was occurring, only 4.3% of respondents disagreed, and 13.0% of respondents were uncertain. The respondents agreed that the technique enabled them to generate ideas before beginning to write. According to a study done by Warsidi et al (2014), there is a connection between mind mapping and structural patterns that can improve students' writing abilities. Students will benefit from this relationship in terms of writing components such as contents, organisations, vocabularies, and language use. Based on item 14, the respondents strongly agreed (43.5%) and 47.8% of the respondents agreed. Only 8.7% of participants were uncertain about this item. Because they believed the technique may assist them in improving the content of their writings, the majority of respondents (91.3%) had positive attitudes regarding its use.

Next, 21.7 % of respondents said they strongly agreed with the statement, and 69.6% said they agreed (item 15). There were just 8.7% of respondents who were uncertain. Because they believed the digital mind map, they made using this technique enhanced their critical thinking, this indicated that the majority (91.3%) had favourable opinions regarding the technique. When students used it as part of the pre-writing stage, it certainly helped them

enhance their critical thinking. For item 16, all respondents (100%) expressed favourable attitudes about the technique since they believed that utilising it to create digital mind maps helped them come up with various ideas and efficiently arrange their ideas. 26.1% of respondents said they agreed, and the remaining 73.9% of respondents strongly agreed.

In item 17, the study also investigated whether respondents believed the procedure of modifying ideas was simple. 30.4 % of respondents said that they strongly agreed, while 56.5% of respondents said they agreed. Only 4.3 % of respondents indicated disagreement, compared to 8.7 % who were uncertain. The majority (86.9%) had favourable attitudes of the technique because they believed it was simple to edit ideas using it and that it provided more area than paper for them to drag ideas, expand lines, and use images with ease. Based on responses to item 18, the respondents believed the technique was an interesting tool (82.6 %). The data clearly shows that 30.4% of respondents strongly agreed that they felt time flew by since they were having so much fun. In addition, 52.2 % of respondents said they liked the technique and believed time went by quickly. However, only 13% of the respondents were uncertain, and 4.3% of the respondents strongly disagreed. Thus, students found the technique was enjoyable and pleasant writing tool.

According to research by Toi (2009), mind mapping can improve a learner's memory by up to 32%. This study and the current study are slightly related. The majority (86.9%) of respondents had favourable attitudes toward this technique because they thought using it improved their recall for learning (item 19). Based on the table, 47.8 % and 39.1% of respondents, respectively, indicated that they agreed and strongly agreed with the statement. While 4.3% of respondents disagreed, 8.7% of respondents were uncertain with the item. Given that most respondents (86.9%) believed that using the technique had improved their memory for learning, this indicated that most respondents (86.9%) had favourable attitudes regarding the technique. This indicated that the respondents found the method to be enjoyable because it improved their memory for writing classes. The majority of the respondents displayed favourable attitudes as they generally agreed that the tasks, they performed using this technique helped to improve their writing.

*Learners' Experiences*

Regarding to the exposure to this technique, the respondents were examined specifically about their writing process experiences. Based on the 13 items from the questionnaire, Table 4 presents the findings for the learner's experience utilising the technique. The writing performance of respondents who utilised this technique improved after they experienced using it. Based on Table 4, the respondents strongly agreed (30.4%) whereas they agreed (60.9%) with item 20. There were only 8.7% of responders who were uncertain. Many respondents (91.3 %) had favourable attitudes of this technique since they looked forward to using it each time. In response to item 21, the respondents strongly agreed (52.2%), and 30.4% of the respondents agreed with the item. 13.0% of respondents expressed that they were uncertain, while 4.3% said they disagreed. This indicated that the majority (82.6%) had favourable attitudes regarding this technique since they found it enjoyable to use.

A strong agreement was indicated by the respondents (13%) and 56.5% of the respondents agree with item 22. 26.1% of respondents were uncertain. When they applied the technique, only 4.3% of them felt anxious. Because they felt less anxious about writing when they utilised

this technique, the majority of respondents (69.5%) had favourable attitudes regarding this item. Most respondents (78.2 %) tremendously expressed favourable attitudes regarding the application of this technique because they believed it helped them feel more confident in their writing. When asked about item 23, 13.0% of respondents said they strongly agreed, and 65.2% said they agreed. Only 4.3% of the respondents disagreed with this item, while 17.4% were uncertain. Item 23 of this questionnaire was also supported by 17.4% of respondents who expressed their strong agreement and 82.6% of the respondents expressed their agreement. Thus, this showed that all the respondents (100%) had positive attitudes towards the technique because they believed it increased their learning productivity. For item 24, the respondents strongly agreed (17.4%) and 82.6% of the respondents agreed with the item. This showed that using the digital mind map via mobile application increases the learners' learning productivity in writing. Similarly, item 25 indicated that all the respondents had positive attitudes towards the technique because they believed that this technique enhanced their motivation to learn writing.

The mind map is one of the techniques that encourage students to use their full potentials and it makes learning easier whilst generating mind maps for memory and recall. In response to the item 26, about 26.1% of the respondents strongly agreed and 69.6% of the respondents agreed. Only 4.3% of the respondents were uncertain. 95.7% of the respondents had positive attitudes towards the use of the technique because they believed that this technique improved their mental abilities in learning writing skills. The finding in item 27 showed that the majority of respondents (95.6%) had positive attitudes towards the technique because they claimed that the technique was a good exercise for their brains. Nevertheless, 30.4% of the respondents strongly agreed and 65.2% of the respondents agreed that using the technique was a good exercise for their brain. Only 4.3% of the respondents were uncertain. Evidently, the technique assisted the students in brainstorming the ideas for writing. Furthermore, for item 28, 30.4 % of the respondents strongly agreed and 56.5% of the respondents agreed. Meanwhile, 13.0% of the respondents were uncertain for this item. The majority (86.9%) of the respondents had positive attitudes towards the technique because they believed that the technique ensured relaxed and stress-free atmosphere.

Table 4
*Learners' Experiences*

| No | Items | Percentage (%) | | | | |
|---|---|---|---|---|---|---|
| | | SD | D | U | A | SA |
| 20 | I looked forward to working on the digital mind map using mobile application every time | 0 | 0 | 8.7 | 60.9 | 30.4 |
| 21 | I enjoy using the digital mind map via mobile Application | 0 | 4.3 | 13.0 | 30.4 | 52.2 |
| 22 | I feel less nervous about writing when I use the digital mind map via mobile application | 0 | 4.3 | 26.1 | 56.5 | 13.0 |
| 23 | I have gained confidence in my writing as I worked on the digital mind using the mobile application | 0 | 4.3 | 17.4 | 65.2 | 13.0 |
| 24 | Using the digital mind map via mobile application increases my learning productivity | 0 | 0 | 0 | 82.6 | 17.4 |
| 25 | Using the digital mind map via mobile application enhances my motivation to learn writing | 0 | 0 | 0 | 82.6 | 17.4 |
| 26 | Using the digital mind map via mobile application improves my mental abilities in learning writing skills | 0 | 0 | 4.3 | 69.6 | 26.1 |
| 27 | Using the digital mind map together with mobile application is a good exercise for my brain | 0 | 0 | 4.3 | 65.2 | 30.4 |
| 28 | Using the digital mind map via mobile application ensures relaxed and stress-free atmosphere | 0 | 0 | 13.0 | 56.5 | 30.4 |
| 29 | Using the digital mind map via mobile application make the information too disorganized | 34.8 | 39.1 | 8.7 | 17.4 | 0 |
| 30 | Using colours and images while creating the digital mind maps via mobile application makes learning easy and interesting | 0 | 0 | 0 | 47.8 | 52.2 |
| 31 | It does not make me feel tired and bored to use colours and images in creating the mind maps using the mobile application | 0 | 8.7 | 17.4 | 39.1 | 34.8 |
| 32 | I found that the digital mind map via mobile application helped me to understand better the writing lessons | 0 | 4.3 | 4.3 | 73.9 | 17.4 |

The majority of respondents (34.8%) strongly disagreed and 39.1% disagreed that the technique makes the information too disorganised. About 8.7% of respondents were uncertain whereas 17.4% were agreed with item 29. Thus, the outcomes showed that the technique aided the respondents' good concept organisation. According to the results in item 30, most respondents (52.2%) indicated their strong agreement with the item, and 47.8% of respondents agreed. This result is consistent with a previous study by Sabah (2015), who observed that the use of colours and shapes helped learners understand the connections between concepts, specifics, and instances from the assigned texts.

Most of respondents (34.8%) strongly agreed and 39.1% agreed that using colours and images to create mind maps did not make them feel sleepy or bored (item 31). Only 17.4% of respondents said they were uncertain, and 8.7% said they disagreed. As a result, this technique gave the students a pleasant learning environment for writing classes. In item 32, the majority of respondents (73.9%) agreed, and they had a favourable attitude of this technique because they believed it helped them to understand better their writing lessons. 17.4% of respondents strongly agreed with this item. Only 4.3% of respondents were uncertain, and 4.3% of respondents disagreed. The technique could therefore be used to assist students write better essays.

In summary, the majority of the respondents gained various experiences and these experiences encouraged them to utilize this technique for the future. In addition, they showed positive attitudes toward this technique. It was an effective and interesting tool and they agreed that they enjoyed using this technique after they experienced it. In conclusion, many respondents obtained different experiences, and these experiences motivated them to continue using this technique. They also displayed favourable attitudes toward this technique. They acknowledged that it was a useful and engaging tool and that, after struggling it out, they liked utilising the technique.

**Conclusion**

The study was aimed to explore the tertiary learners' perceptions, activities and experiences of using digital mind map using mobile application for improving writing performance. The findings of the study revealed that the learners agreed that the technique provided some benefits for improving their writing. In addition, the learners also found that the technique was so enjoyable and interesting when they carried out the activities using the technique. The learners also had experienced different attitudes toward the technique. However, many of the respondents believed that the technique gave them interest and motivation to learn writing. Consequently, the results of the study revealed that the use of digital mind map via mobile application evidently encourages the tertiary learners in helping the learning process of writing and the present study needs further research in future.

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