

RESEARCH PAPER

The Level of Knowledge and Perception of Secondary School Students on i-Think Mind Map in the District of Merlimau, Malacca

Tahap Pengetahuan dan Persepsi Pelajar Sekolah Menengah Terhadap Peta Minda i-Think di Daerah Merlimau, Melaka

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Abstract

This study was carried out to identify the level of students' knowledge and to compare gender perception on the i-Think mind map in Merlimau district, Malacca. A survey design was employed using a five-point Likert Scale structured questionnaire. Respondents were selected using simple random sampling involving 343 forms one to form four students. Descriptive analysis was conducted to find the mean and percentage, while inferential analysis using a two-way ANOVA, t-test to make a comparison between knowledge and perception of the i-Think mind map. This study demonstrated the form four students had the highest knowledge level of 83.72 per cent (excellent) followed by form two and form one with a value of 82.46 per cent (excellent) and 79.49 per cent (good) respectively. The perceptions level among the respondents towards the i-Think mind map was moderately high and uniform (mean value of 3.01 – 4.00). Female students' knowledge was higher (mean value of 3.66) than male (mean value of 3.54). The study also found that there was a significant difference between the level of knowledge and perception of male and female students with significant values of 0.007 and 0.001 respectively. This study concludes that the i-Think mind map is well received by students. Hence, these findings have the potential to be benchmarked on the status of i-Think mind map implementation in Malaysia, particularly in Malacca. Continuous monitoring should be carried out to view its consistency among students. This study implicates that the i-Think mind map should be used to enhance the students' content knowledge on a larger scale.

Keywords: i-Think mind map knowledge, i-Think mind map perception, thinking tools

Abstrak

Tujuan kajian ini dilaksanakan adalah untuk mengenal pasti tahap pengetahuan pelajar dan perbandingan persepsi gender terhadap peta minda *i-Think* di daerah Merlimau, Melaka. Reka bentuk kajian tinjauan ini dijalankan dengan menggunakan soal selidik berstruktur menggunakan Skala Likert lima-mata yang telah diubah suai dari kajian lepas. Responden yang dipilih melalui persampelan rawak mudah melibatkan 343 orang pelajar tingkatan satu, dua dan empat. Analisis deskriptif dijalankan bagi mencari nilai min dan peratus, manakala analisis inferensi ditadbir menggunakan ANOVA dua hala, Ujian Individu (*t-test*) bagi membandingkan pengetahuan dan persepsi pelajar terhadap peta minda *i-Think mind*. Dapatan kajian ini menunjukkan bahawa pelajar tingkatan empat

mempunyai tahap pengetahuan yang paling tinggi iaitu 83.72% (cemerlang) diikuti pelajar tingkatan dua dan satu dengan masing-masing pada nilai 82.46% (cemerlang) dan 79.49% (baik). Tahap persepsi bagi semua responden pula berada pada tahap sederhana tinggi dan seragam dengan julat nilai min 3.01 – 4.00. Seterusnya, tahap pengetahuan pelajar perempuan lebih tinggi dengan nilai min 3.66 berbanding pelajar lelaki dengan nilai min 3.54. Dapatan juga menunjukkan bahawa terdapat perbezaan yang signifikan bagi tahap pengetahuan dan tahap persepsi antara pelajar lelaki dan perempuan dengan masing-masing pada nilai signifikan 0.007 dan 0.001. Kesimpulan kajian mendapati bahawa peta minda *i-Think* diterima dengan baik oleh pelajar. Justeru, kajian ini berpotensi untuk dijadikan penanda aras tentang status tahap pelaksanaan peta minda *i-Think* di Malaysia khususnya di negeri Melaka. Pemantauan penggunaan peta minda *i-Think* perlu dijalankan secara berterusan untuk melihat ketekalannya dalam kalangan pelajar. Implikasinya, peta minda *i-Think* wajar digunakan untuk meningkatkan penguasaan ilmu konten pelajar pada skala yang lebih besar.

Kata kunci: Pengetahuan peta minda *i-Think*, Persepsi, Alat Berfikir

INTRODUCTION

The Ministry of Education introduced the Malaysian Education Development Plan 2013-2025, to help improve the standard of education in Malaysia. In addition, the Malaysian government has implemented the *i-Think* mind map programme in collaboration with the Malaysian Innovation Agency under the auspices of the Ministry of Education (Nik Rosnizasuzila Nik Hassan et al., 2015). The programme helps schools to cultivate thinking skills, inculcate a culture of lifelong learning; proficiency in problem-solving and being able to come up with creative solutions among school children (Agensi Inovasi Malaysia, 2014).

The cutting-edge *i-Think* mind map (Figure 1) was introduced as one of the teaching aids for teachers in schools to make teaching and learning methods more efficient. In addition, it enables the teaching sessions to be more interesting, structured and information can be conveyed to students easily (Hyerle & Alper, 2011; Khairudin Nawawi & Norazilawati Abdullah, 2016).

The implementation of the *i-Think* mind map project by the Malaysian government in all educational institutions in the country was launched almost nine years by now. The national head coaches have given courses to teachers and create committees in schools to encourage and nurture educators and students to use and apply this *i-Think* mind map in their respective institutions. Implementation of the *i-Think* mind map programme at the educational institution level has always been under review and continuous monitoring to assess the effectiveness, level of use and impact of the programme among educators in Malaysia (Shamsazila Sa'aban et al., 2017). This study contributes to the knowledge on the level of *i-Think* mind map awareness and perception among secondary school children in Melaka as a benchmark for Malaysian students in general.

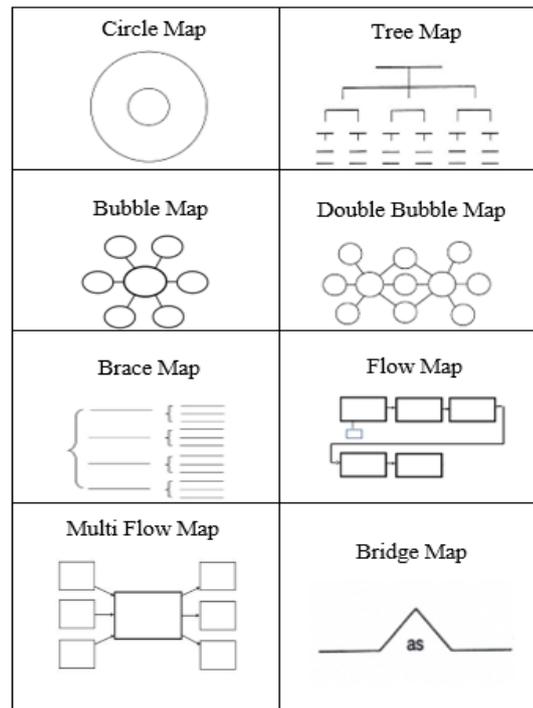


Figure 1. The Eight Types of the i-Think Mind map (Source: Hyerle & Yeager, 2007)

Problem Statement

There are several problems within the current educational scenario in Malaysia for the underutilization of the i-Think mind map in teaching and learning activities. According to Nursyuhadah Maskan (2013), among the existing problems, centralized education focuses more on student's achievements that are based on standardized public examinations and annual summative assessments. Hence, teachers and students are focused on the final achievement results and teachers tend to spend more time completing the syllabus than to improve and develop thinking skills among students during teaching and learning sessions. To conclude, up to this date, there is insufficient data related to the impact of the i-Think mind map utilization among secondary schools children in Malaysia. Thus this study was prompted.

The Trends in International Mathematics and Science Study (TIMSS) report for 2019 (TIMSS, 2020) has also shown a decline in score performance for Mathematics and Science. The average Mathematics score for Malaysian students in TIMSS 2019 is 461. This score is 4 points lower than the achievement of Mathematics in TIMSS 2015 (465). While the average score of Malaysian students in Science for TIMSS 2019 is 460. This score is lower than TIMSS 2015, recorded a score of 471 with a difference of 11 points (Trends in International Mathematics and Science Study, 2020) (Figures 2 and 3).

Contradicting result was reported in a study on teachers' perceptions of the use of i-Think mind map with a handful of teachers, who perceive and disagree that using the i-Think mind map is an enabler to students in doing well in their schoolwork. They indicate that there are problems that arise among students when applying the i-Think mind map during teaching and learning sessions (Roselizam Daud & Roslan Ab Rahman, 2020). Subsequently, reducing the application of the i-Think mind map in the teaching and learning activities.

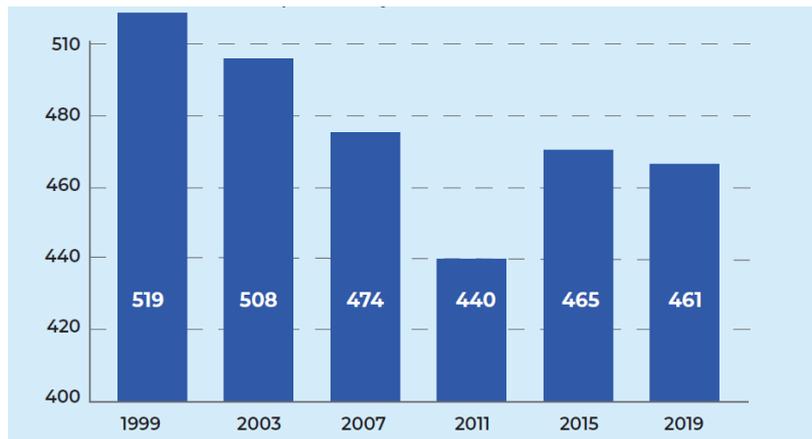


Figure 2. Malaysian Mathematics Score in TIMSS Mean Score
(Source: Trends in International Mathematics and Science Study, 2020)



Figure 3. Malaysian Science Score in TIMSS Mean Score
(Source: Trends in International Mathematics and Science Study, 2020)

Implications of the i-Think Mind Map Implementation on Students

The influence of mind mapping was evidenced on eighth graders' science achievement (Abi-El-Mona & Adbkhalick, 2008). Interestingly, the mind maps built by students who achieved higher levels of conceptual understanding used colours to represent concepts besides depicting accurate links between central themes and major and minor concepts. In addition, Akinoglu & Yasar (2007) reported the better effects of note-taking in science education through the mind mapping technique on students' attitudes, academic achievement and concept learning.

Studies among school children in Indonesia demonstrated upon utilizing the mind map in class, there was a difference in creative thinking skills between the male and the female students. The male students had higher creative thinking skills than the female students (Siti Zubaidah, Nur Miftahul Fuad, Susriyati Mahanal, Endang Suarsini, 2017). The authors presumed this due to the differences in brain anatomy affecting the students' pattern of learning and activities. The success stories of utilizing mind maps among university students were reported by Romlie, Bakar & Azman (2017) with their findings for the survey before the mind map activity showed that the majority of the students are familiar with a mind map and are aware that mind map does help them to learn and that most are willing to put in some effort to use a mind map for learning purposes. The survey's findings showed that even though some respondents have a pessimistic attitude, generally the responses on the mind map have been

positive and well received and some students ask for more guidance and training to be able to master the mind map learning technique.

Besides, Gul, Asif, Ahmad & Ahmad (2017) investigated the effectiveness of Mind Maps as a brainstorming and conceptualization tool for helping has been proven as an important skill among computer programming students to analyse problems and plan its programming solutions. Their results showed the mind map-based methodology worked well with both text and blocks-based programming languages for improving the learning outcomes of students.

According to a study by Mohd Mahzan Awang (2014), the usage of the i-Think mind map can facilitate students' thinking skills, help strengthen memory and remember important facts. Besides that, a study about the effectiveness of a thinking map (i-Think mind map) in improving student achievement in writing the Malay Language has proven that the usage of in the teaching of writing skills has a positive impact on student's achievement (Rohaida & Zamri, 2015). Therefore, continuous development of students' ideas is prevailed among them to find important content in their writing at the same time can develop their skills. Thus, writing tasks become much easier and more effective with the use of the i-Think mind map.

Nur Fatin Afiqah Kamaruzaman & Zolkepli Haron (2018), relate i-Think mind map usage to the achievement and interest of vocational college students in science subjects. The result showed a significant improvement in the students' achievement in using the i-Think mind map compared to the conventional learning methods. Furthermore, when students use the i-Think mind map during the science learning process, they will understand the content of science subjects better while providing better achievement in test scores.

The usage of the i-Think mind map, the teaching and learning process demonstrated a positive impact in terms of knowledge. A study by Shamsazila Sa'aban et al., (2017) was carried out to observe the level of students' knowledge of the i-Think mind map. Although with a short term of i-Think mind map program implementation, the achievement of the students in the cognitive domain was regarded as excellent. The students were able to identify the name of the, and they also displayed improvement in scientific thinking skills and processes.

Aim and Objective of the Study

This study aimed to identify the level of knowledge and perception of students on the i-Think mind map. The objectives of the study are outlined as follows:

1. To compare the knowledge level on the i-Think mind map between forms and gender among Form 1, Form 2 and Form 4 secondary school students in the Merlimau district
2. To compare the perception level on the i-Think mind map between forms and gender among Form 1, Form 2 and Form 4 secondary school students in the Merlimau district.

RESEARCH METHODOLOGY

Research Design

A cross-sectional non-experimental quantitative design via survey was utilised in this study involving three groups of samples, namely form 1, form 2 and form 4 as well as male and female groups. The level comparisons between these groups were among the aspects studied. Samples were determined using a simple random sampling method. According to the Official Portal of the Jasin District Education Office, (2017), there are five secondary schools in the Merlimau. Therefore, all the secondary schools located in the Merlimau area with a population

of 3025 of form 1, form 2 and form 4 students are selected as a population study. A total of 343 samples were determined using the Size Determination Table by Krejcie & Morgan (1970)

Study Instruments

The questionnaires administered is a modification from a previous study by Shamsazila Sa'aban, Muhammad Faizal Abdul Ghani & Ghazali Darussalam (2017) with few items that have been modified according to the objectives of this study. It has three sections, A, B and C. In section A, students are required to answer the demographic profiles such as gender, source of exposure to i-Think mind map, form and locality. Section B is composed of 16 items to match the i-Think mind map shape with its function. In addition, 26 other items are to identify the level of students' knowledge of the i-Think mind map. Section C contains 32 items related to students' level of perception of the i-Think mind map. In total there are 58 items and students are required to choose an option based on a five-point Likert scale. The instrument was validated by two experts in the i-Think mind map. The validity of this instrument was measured by descriptive statistics to obtain the percentage value upon agreement by the panel experts. The instrument validity value is 92.24 per cent and categories as a high level of achievement following Tuckman & Waheed (1981) and Abu Bakar Nordin (1995). The instrument was piloted using 30 respondents from the same population and generated a high-reliability value of 0.869 (Table 1). Thus, a value of 0.869 indicates that each item in the questionnaire question has sufficient reliability to proceed with the study. Thus, certain items or questionnaires are not required to be deleted.

Table 1. Instrument reliability index

Reliability Statistics		
Cronbach's Alpha 0.869	Cronbach's Alpha standard item 0.906	Respondents 30

The student's knowledge level interpretation is based on the score prepared by the Ministry of Education for standard evaluation tool (KPM, 2012) as shown in Table 2. The perception level is graded according to the scale by Nunnally & Bernstein (1994) (Table 3).

Table 2. Interpretation Student's Knowledge Level Performance

Score (%)	Student's Knowledge Level Interpretation
80 – 100	Excellent
65 – 79	Good
50 – 64	Satisfactory
40 – 49	Need Guidance
0 – 39	Need Guidance and Special Attention

Source: KPM (2012)

Table 3. Student's Perception Interpretations of Mean Score

Mean Score	Interpretation of Mean Score
1.00 – 2.00	Low
2.01 – 3.00	Medium Low
3.01 – 4.00	Medium High
4.01 – 5.00	High

Source: Nunnally & Bernstein (1994)

RESULTS AND DISCUSSION

The samples profile is displayed in Table 4. Information on the i-Think mind map is retrieved most by the students due to their exposure within the school environment (80.2%) and the least from others (0.9%). Newspaper is also regarded as among the least for the students to gain information on the i-Think mind map.

Table 4. Respondents' Profile and Source of Information on i-Think mind map Mind Map

		Frequency	Percentage
Gender	Male	172	50.1
	Female	171	49.9
Form	One	119	34.7
	Two	123	35.9
	Four	101	29.4
Locality	Urban	114	33.2
	Rural	229	66.8
Source	Websites	43	12.5
	School	275	80.2
	Magazine	8	2.3
	Newspaper	4	1.2
	Peer Friends	10	2.9
	Others	3	0.9
	Total	343	100.0

The Level of Knowledge on the i-Think Mind Map among Form 1, 2 and 4 Students

This study revealed that form four students have the highest mean value of knowledge level of 83.72 per cent followed by form two (82.46 per cent) while form one recorded the lowest (79.4 per cent).

Figure 2 shows all students can identify circle and bridge maps correctly. The form four students can identify the types excellently in three other maps i.e., bubble (100%), tree (97.02%) and flow (98.02%). Double bubble and brace maps were best identified by the form one students with 100% and 92.44% respectively. For multi-flow map was best identified by the form two students (94.30%). These results can indirectly meet the first objective requirements of the study on the level of students' knowledge of the i-Think mind map.

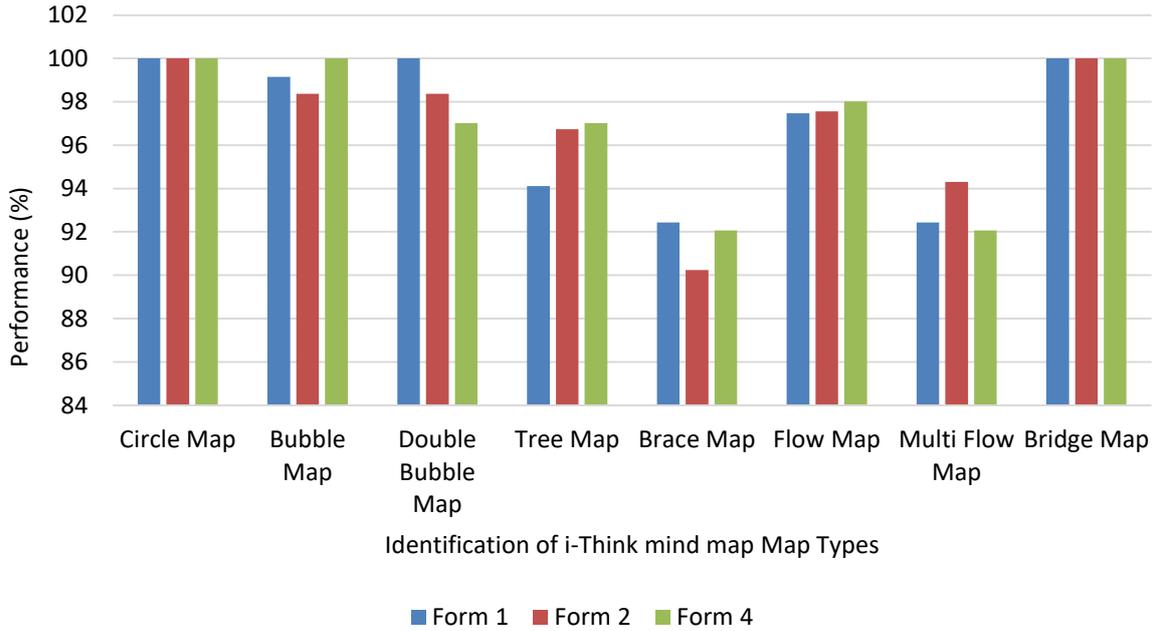


Figure 2. The student's performance in identification of i-Think mind map types

The student's performance on the mapping of type to the function of the i-Think mind map is displayed in Figure 3. The mapping of Circle (70.29%), bubble (60.39%) and tree (66.33%) maps to their respective functions is best displayed by the form four students. The form two students were best to map flow (93.49%), multiple flows (81.3%) and bridge (84.55%) maps correctly. For the form one students, they were able to map the i-Think mind map multiple bubble (82.35%) type excellently.

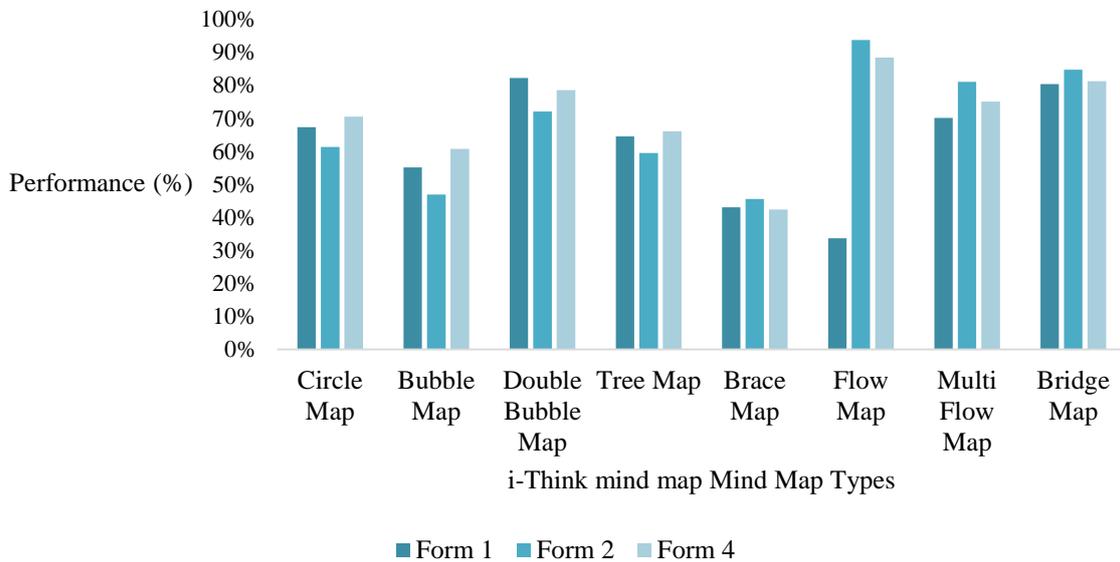


Figure 3. Student's Performance on mapping the type and function of *i-Think* mind map

The Level of Knowledge on i-Think Mind Map by Gender

The female students showed a higher level of knowledge compared to male students with mean values of 3.66 and 3.54 respectively. This study indicates that the female students are more knowledgeable on both aspects to identify the type of i-Think mind map and ability to map correctly to each function.

The Level of Perception on i-Think Mind Map among Form1, 2 and 4 Students

The third objective of this study is to identify the perception level by form. The i-Think mind map is well received among the form two students (mean value= 3.60), followed by the form one students (mean value= 3.54). Form four students (mean value=3.47) on average showed the least acceptance of the i-Think mind map with the lowest mean value (3.47).

The Level of Perception on i-Think Mind Map by Gender

The fourth objective of the study has been successfully achieved by analysing the data from the aspect of perception level according to gender. This study showed the level of perception of female students on the i-Think mind map is higher at a mean value of 3.61 compared to male students at a mean value of 3.43.

The Comparison of Knowledge Levels on i-Think Mind Map by Form and Gender

Next, the fifth objective of this study is to compare students' level of knowledge on the i-Think mind map between form and gender. The results of the data analysis show that there is a strong difference of $t=2.73$, $p=.0001$ between gender compared to between forms to clarify the presence of variables that are directly involved with the level of knowledge of the i-Think mind map among students (Table 5).

Table 5. The comparison of knowledge levels on the i-Think mind map by form and gender among the students

Variables	Estimation Value	t value	Significant value
(Constant)	3.429	31.939	0.001
Gender	0.127	2.733	0.007
Forms	0.011	0.386	0.700

It is clearly shown that gender plays a bigger role in influencing the knowledge level on the i-Think mind map among secondary school children with $t=2.73$, $p=0.007$. Thus, age difference in this study context is not a significant variable ($t=0.386$, $p=0.700$).

The Comparison of Perception Levels on i-Think Mind Map by Form and Gender

The comparison of students' perceptions of the i-Think mind map between form and gender was successfully achieved. The study showed the i-Think mind map is better perceived by gender than form. Result tabulated in Table 6 demonstrates gender is a significant variable on the level of student's perception of the i-Think mind map with a significant value = 0.001 < alpha value = 0.05 (95% reliability interval) and the t value = 3.787. The form does not have a significant value on the level of student's perception of the i-Think mind map with a significant value of 0.124 and the t value = -1.542.

Table 6. The Comparison of Perception Levels on i-Think Mind Map by Form and Gender among the Students

Variables	Estimation value	t value	Significant value
(Constant)	3.331	33.565	0.001
Gender	0.190	3.787	0.001
Form	-0.046	-1.542	0.124

DISCUSSION

The Level of Knowledge on i-Think Mind Map according to Form and Gender

This study showed that the level of knowledge on the i-Think mind map of form four and form two students was excellent. It is in line with the findings of a study conducted by Shamsazila Sa'aban, Muhammad Faizal Abdul Ghani & Ghazali Darusalam (2017) on the student's population in Kuala Lumpur. They confined their studies to the student's ability to label the type of i-Think mind map types. 88.27 per cent of the respondents have managed to achieve an excellent level of knowledge about the i-Think mind map. In this study, the knowledge level is extended to student's competency to identify and map the type of i-Think mind map to their functions. The students in the Merlimau district performed excellently in both tasks.

With the high level of i-Think mind map knowledge, the students are predicted to perform writing tasks better especially in their structure and essay types assessment and project assignments as suggested by Rohaida & Zamri (2015) and Nur Fatin Afiqah Kamaruzaman & Zolkepli Haron (2018). The present study supports the finding by Shamsazila Sa'aban & Muhammad Faizal (2017) that the students can identify the correct type of i-Think mind and with a continuous effort, they may also be able to display improvement in scientific thinking skills and processes.

This study can determine the level of students' knowledge of the i-Think mind map by gender. The female students were at an excellent level and better than the male students who are at a satisfactory level. In addition, there is an indication that there is a significant difference in the level of knowledge according to the gender on the i-Think mind map. Thus, the findings of this study are in line with the study conducted by Hanita Mohd Yusof & Norzaini Azman (2020) where their studies showed that there are differences in student learning engagement between male and female students. Female students showed higher involvement and knowledge level than male students in activities and learning.

The Level of Perception on i-Think Mind Map according to Form and Gender

From the aspect of perception, all students from form one, form two and form four has a moderately high level on the i-Think mind map with a range of mean scores of 3.01 to 4.00. In other words, they have a positive perception of the usage of the i-Think mind map and should be seen as evidence to counterfeited the perceptions by some teachers who perceive and disagree that using the i-Think mind map is an enabler to students in doing well in their schoolwork reported by Roselizam Daud & Roslan Ab Rahman (2020).

Subsequently, the level of students' perception according to gender shows that both are at a moderately high level, male (3.43) and female (3.61) which proves that most of them have a positive perception of the i-Think mind map. In addition, there is no significant difference in the level of perception between the forms ($p=0.124$) towards the i-Think mind map, but gender does ($p=0.001$). These findings show that the i-Think mind map is accepted by all students regardless of the age difference. The use of i-Think mind map could initiate students to feel more motivated to learn (Amni Fauziah, Asih Rosnaningsih & Samsul Azhar, 2017) and with

the external motivation from their surroundings such as teachers and resources supports can influence a person's learning style and increase their desire to learn better (Dembo & Seli, 2016).

CONCLUSION

This study concludes that school is the best resource for student's exposure to the i-Think mind map. Students from forms one, two and four in Merlimau districts are equipped with high levels of i-Think mind map knowledge and perception. The level of knowledge of female students is significantly higher than male students on the i-Think mind map. Similarly, for the perception on the i-Think mind map. Hence, these findings have the potential to be benchmarked on the status of i-Think mind map implementation in Malaysia, particularly in Malacca. Therefore, from the findings of this study, all parties, especially those in educational institutions, can plan more proactive and high-impact initiatives and actions to ensure that the i-Think mind map implementation program continues to be preserved. Continuous monitoring should be carried out to view its consistency among students. This study implicates that the i-Think mind map should be used to enhance the students' content knowledge on a larger scale. A proposal for future research is to study the types of strategies, methods and appropriate approaches used by educators for male and female students in learning sessions. So that these two genders can move in tandem and balance in the achievement and good mastery of the i-Think mind map.

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