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Teachers' Readiness in Using I-Think Mind Maps in The Subject of Mathematics in Primary Schools

Then Chin Tart, Muhammad Sofwan Mahmud

Faculty of Education, National University of Malaysia, 43600 Bangi, Selangor, Malaysia

Email: p118247@siswa.ukm.edu.my/ sofwanmahmud@ukm.edu.my

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Abstract

The i-Think Mind Map is a method employed in the teaching and learning of mathematics aimed at developing critical thinking skills and Higher Order Thinking Skills (HOTS) in 21st-century learning. This study aims to investigate teachers' readiness to utilise the i-Think Mind Map in the teaching and learning of mathematics in primary schools. The objective of this study is to determine the extent of teachers' readiness to integrate the i-Think Mind Map in the teaching of mathematics in the Padawan district. This study employs a quantitative research method, utilising a questionnaire as the data collection instrument for 134 respondents, who are mathematics teachers. The data were analysed using descriptive and inferential statistical methods to identify teachers' readiness to use the i-Think Mind Map. The findings of the study indicate that the mean level of teacher readiness is high (M=3.88, SD=0.75). The t-test analysis, on the other hand, shows no significant difference in the level of teacher readiness in terms of knowledge, attitude, and skills based on the location of teaching, whether in urban or rural schools. The implications of this study underscore the importance of providing training and support to teachers in utilising the i-Think Mind Map in the teaching of mathematics. Additionally, understanding and awareness of the advantages of the i-Think map need to be enhanced among teachers so that they can effectively leverage this method in mathematics instruction. In conclusion, this study provides an overview of teachers' readiness to use the i-Think Mind Map in teaching mathematics in primary schools. The findings of this study offer guidance to educational management and government authorities in developing suitable training programmes to enhance teachers' readiness to utilise the i-Think Mind Map, thereby improving the effectiveness of mathematics teaching and learning in primary schools.

Keywords: Teacher Readiness, i-Think Mind Map, Higher Order Thinking Skills (HOTS), Primary School, Mathematics.

Introduction

Competence in the fields of mathematics education and mathematical sciences plays a crucial role in this era of globalization. Mathematics education serves as one of the fundamental foundations for the development of a country (Jamian & Taha, 2020). The success of a nation's development and progress cannot be achieved without paying attention to aspects related to mathematics education. Therefore, the Ministry of Education Malaysia has introduced

various approaches to the teaching and learning system of mathematics in schools. This is driven by the awareness that effective mathematics education can produce a society with quality thinking capabilities, aligning with advanced nations. One of the approaches emphasised among mathematics teachers at all school levels is the use of the i-Think Mind Map. This approach is also considered a relevant learning technique in the 21st century, especially in the field of mathematics education.

Quality mathematics education is crucial in developing and enhancing critical and creative thinking skills among students. To achieve this objective, mathematics teachers have played a significant role in helping students better understand mathematical concepts and encouraging them to think analytically (Abu & Eu, 2017). However, according to the literature, there are still many teachers who fail to engage students in thinking activities during the process of teaching and learning mathematics (Wilson & Narasuman, 2020). This is evident from the performance in PISA and TIMSS. Based on the TIMSS results in 2011, 35% and 38% of Malaysian students failed to achieve the minimum score in mathematics and science subjects. Furthermore, the Organisation for Economic Co-operation and Development (OECD) reported that in 2012, Malaysia ranked 39 out of 44 in PISA for creative problem-solving assessments. This indicates that Malaysian students are weak at solving mathematical problems. In other words, Malaysian students lack higher-order thinking skills. The emergence of the International Mathematics and Science Study (TIMSS) and the Programme for International Student Assessment (PISA) has been an international milestone in assessing students' achievements in science and mathematics. Both programmes emphasise higher-order thinking skills.

Furthermore, the use of the i-Think Map is a 21st-century learning technique that can enhance effectiveness in teaching and learning. However, there are still many mathematics teachers not fully prepared to integrate the i-Think map seamlessly into teaching and facilitation. According to Daud and Ab Rahman (2020), the school system places insufficient emphasis on developing students' thinking skills. This can result in teaching and learning becoming mere knowledge dissemination processes. Students may acquire knowledge but struggle to apply it in new situations. Therefore, the i-Think map is seen as one of the efforts used to assist students in illustrating the connections between data and information in a visual form. Furthermore, a study conducted by Zaidi, Rosli, and Nor (2017) found that the application of the i-Think Mind Map is a pedagogical technique that can be used by mathematics teachers in teaching and learning mathematics. This technique can create a meaningful and creative learning environment for students to face various issues in mathematics education.

There are studies that examine the use of the i-Think Mind Map among mathematics trainee teachers at Teacher Training Institutes. For example, a study by Noornabilah and Hock (2020) indicated that overall, the utilisation of the i-Think Mind Map among mathematics trainee teachers at Teacher Training Institutes is still relatively low. This suggests that mathematics trainee teachers possess basic knowledge of the i-Think Mind Map but use it less frequently in pedagogical practices throughout their mathematics teaching experiences in schools. Similarly, the awareness level regarding the effectiveness of the i-Think Map among mathematics trainee teachers is also moderate. Therefore, every mathematics teacher needs to update their knowledge in line with the changing needs of the current educational landscape and must have extensive knowledge of the mathematics subject they teach (Arumugam & Mahmud, 2022; Noornabilah & Hock, 2020). Thus, mathematics trainee teachers should make an effort to enhance their knowledge of the i-Think Mind Map.

Furthermore, the i-Think Mind Map is a mental process that combines, organises, and establishes relationships between ideas. The graphic organisation of these ideas can assist students in categorising, comparing, and distinguishing, creating connections between information, and managing information wisely (Gallavan & Kottler, 2007). In a study by Layang and Mahamod (2019), it was indicated that the level of knowledge, readiness, and attitude of primary school Malay language teachers towards the implementation of the i-Think Mind Map in teaching and learning is at a high level. This implies that school teachers have knowledge and positive attitudes and are prepared to use the i-Think Mind Map as a teaching aid. However, most past studies focused on identifying factors or the effectiveness of the i-Think Mind Map on students' achievements and interests. Yet, studies related to teachers' readiness to use the i-Think Mind Map in the subject of mathematics are still limited. Jikin and Haron (2018) conducted a study on teachers' readiness to use the i-Think Mind Map, but their study was limited to science teachers in the Kapit district only.

Nevertheless, there are still some mathematics teachers who underutilize the i-Think Mind Map in delivering mathematical content to students. This has been elucidated in a study conducted by Ismail (2006), which states that there are issues in the learning process when teachers do not emphasise the mental mapping element in their teaching methods. If this situation persists, it will hinder the government's efforts to produce students who are proficient, creative, critical, and innovative thinkers, ultimately impeding the achievement of the country's progress. Therefore, this programme should not be evaluated solely based on its effectiveness with students without considering the willingness of mathematics teachers to change. In schools, the readiness of teachers is one of the main factors in implementing any programme (Abdullah & Darusalam, 2018). Therefore, the readiness of mathematics teachers needs to be investigated so that this study can provide data to explore a formula for enhancing the support and involvement of mathematics teachers in implementing the i-Think Programme.

Figure 1 illustrates the conceptual framework for explaining the processes involved in this study. This conceptual framework is adapted from the HOTS study by Zarina (2016). The theory underlying this conceptual framework is based on constructivism. This is because this theory supports the practice of Higher Order Thinking Skills (HOTS) within students, and the i-Think map is one of the strategies for implementing HOTS in the classroom. The attributes in each aspect of readiness (knowledge, attitude, and skills) act as independent variables. Meanwhile, the level of readiness of teachers in these three aspects acts as the dependent variable. This readiness level is also assessed in three aspects, and each aspect is compared based on the teachers' teaching location (urban and rural).

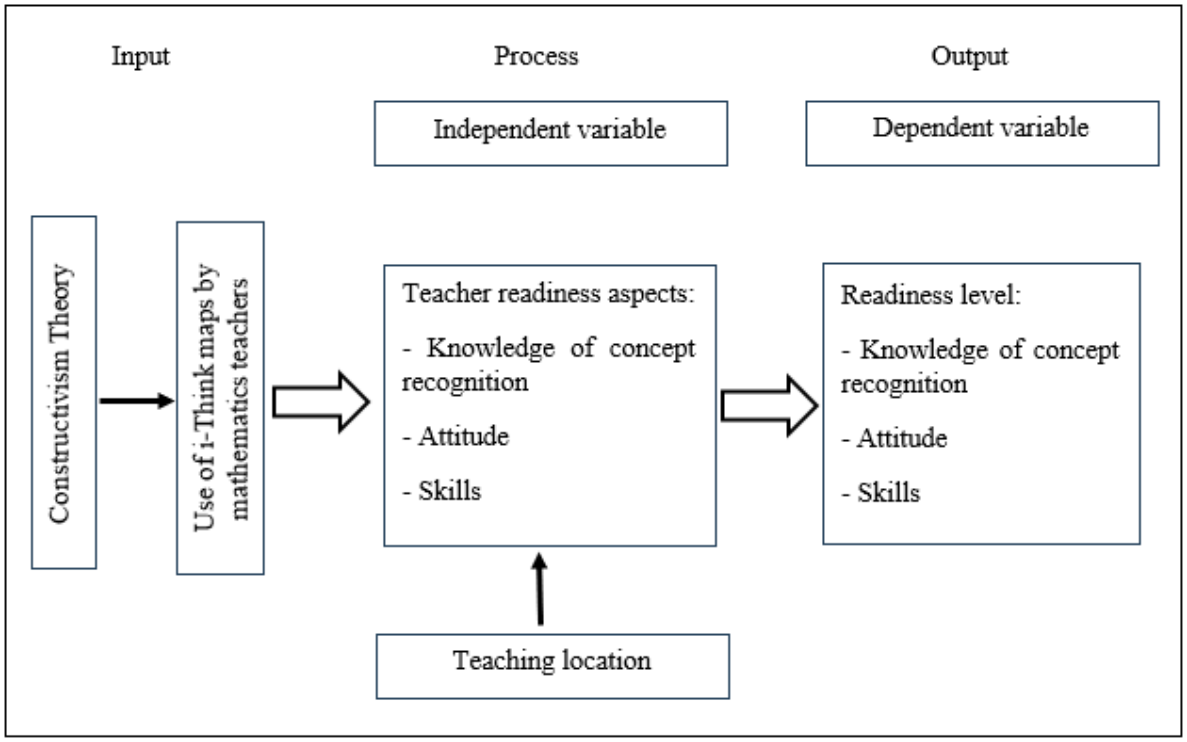

Figure 1: Conceptual framework of the study

In this study, the unit of analysis used is mathematics teachers teaching the subject of mathematics in primary schools in Padawan District, Sarawak, regardless of their specialization. With the data obtained from this study, educators, especially mathematics teachers in Padawan District, will realise the importance of the i-Think map in improving students' achievements. Additionally, this study will benefit administrators at the district, state, or ministry levels in planning suitable strategies to make the i-Think Mind Map a primary method in 21st-century learning. Besides identifying the readiness of mathematics teachers to use the i-Think Mind Map in terms of knowledge, attitude, and skills, the teaching location for urban and rural schools is also considered in this study to explore the scenario of i-Think Mind Map usage. The implication of this study is that the researcher hopes the exploration of scenarios in rural schools, especially in Padawan District, can serve as a reference for the Federal Government to collaborate with the Sarawak State Government to collectively understand the needs and challenges faced by mathematics teachers in rural schools in implementing educational transformations in the Land of the Hornbills.

Research Objectives

The objective of this study is to

1. Examining the level of readiness of mathematics teachers in the Padawan District to use the i-Think map in the subject of mathematics.
2. Examining the differences in the level of readiness of mathematics teachers in the Padawan District in using the i-Think map in the subject of mathematics based on school location.

Research Questions

Based on the above objectives, two research questions are formulated to solidify the direction of the study, as follows

1. What is the level of readiness of mathematics teachers in the Padawan District to use the i-Think map in the subject of mathematics?
2. Is there a significant difference in the readiness level of mathematics teachers in the Padawan District to use the i-Think map in the subject of mathematics based on school location?

Research Hypothesis

The hypothesis to be tested in this study, based on the research objectives, is:

H_o: There is no significant difference in the readiness level of mathematics teachers in the Padawan District to use the i-Think map in the subject of mathematics based on school location.

Methodology

Research Design

The research design plays a crucial role in ensuring the achievement of research objectives and providing answers to research questions. Therefore, this study will employ a cross-sectional survey design with a quantitative approach. According to Mohd Majid (2005), the quantitative research method is a suitable choice as it allows the explanation of phenomena through numerical data and measurements. The selection of this survey method is due to its ability to be conducted on a sample within a limited time frame. In this study, the researcher has adapted a survey questionnaire inspired by the research of Jikin and Haron (2018) as the data collection instrument. Azizi Yahaya et. al (2017) argue that the research instrument has a close relationship with data collection techniques. Some advantages of using a questionnaire include the uniformity of items for all samples, responses unaffected by the researcher, and ease of data analysis (Chung & Jamaludin, 2010).

Population and Study Sample

This study involves six primary schools with mathematics teachers from National Schools (NS) and Chinese National-type Schools (CNS) teaching the subject of mathematics in the Padawan District. A total of 134 mathematics teachers participated in this study's sample. A set of survey questionnaires in the form of a Google Form was distributed to each of these schools. The researcher used a simple random sampling method to determine the number of respondents from the study population.

Study Instrument

In this study, the instrument used is a questionnaire conducted on respondents with the aim of collecting data and insights regarding teachers' readiness levels in terms of knowledge, attitude, and skills related to the concept of the i-Think map. Mohd Majid (2005) asserts that the use of questionnaire instruments plays a crucial role in the field of education as a necessary data source. The questionnaire set consists of four sections: Section A, Section B, Section C, and Section D. Section A covers demographic information about the respondents. Section B contains 11 questions related to the knowledge aspect of teachers' readiness regarding the i-Think map concept. Section C contains 10 questions related to the attitude aspect of teachers' readiness regarding the i-Think map concept, and Section D contains 10 questions related to the skills aspect of teachers' readiness regarding the i-Think map concept.

The questionnaire items in this survey are formulated using a Likert scale, such as 'Strongly Disagree (SD)', 'Disagree (D)', 'Uncertain (U)', 'Agree (A)', and 'Strongly Agree (SA)', each representing scores 1, 2, 3, 4, and 5, respectively, as the respondents' answer choices. Respondents only need to indicate their level of agreement by marking the corresponding number based on the instructions and scale explanations provided at the beginning of the questionnaire set. This approach facilitates the researcher in the data coding process and subsequent data analysis.

Data Analysis

The questionnaire will be analysed using the Statistical Package for Social Science (SPSS) version 26.0. The analysis employed includes descriptive statistical analysis and inferential statistics. In the context of this study, descriptive data analysis is conducted to determine the percentage, minimum value, and standard deviation for each assessed aspect. To ascertain the level of readiness among teachers, the percentage of respondents who strongly disagree, disagree, are uncertain, agree, and strongly agree will be discussed in this study.

For inferential statistical analysis, a t-test will be conducted to identify differences between the dependent and independent variables. In this study, the dependent variable is the level of teacher readiness, while the independent variable is the teaching location of the teachers. Therefore, independent sample t-tests will be performed to determine the differences in the level of readiness among mathematics teachers based on their teaching locations in urban and rural areas. In this regard, the researcher will use t-test analysis to determine whether to reject or accept the stated research hypotheses.

Research Findings

Descriptive Statistics

Descriptive analysis in the form of percentages (%), mean (M), and standard deviation (SD) was employed to analyse the level of teacher readiness in terms of knowledge, attitude, and skills. The percentages of teachers who strongly disagree (SD), disagree (D), uncertain (U), agree (A), and strongly agree (SA) with each item in the questionnaire will be presented in Tables 1, 2, and 3.

The level of readiness of mathematics teachers in Padawan District in terms of knowledge about the concept of i-Think maps.

Based on Table 1, the study shows a mean (M = 4.0) and standard deviation (SD = 0.65), for the readiness level from the knowledge aspect. 64.2% of respondents agreed with the items in the questionnaire for this aspect. No respondents indicated 'strongly disagree' for all items in this aspect.

Table 1
Percentage of agreement level for items in the knowledge aspect.

		Percentage of agreement level (%)						
	Knowledge Aspect	**SD**	**D**	**U**	**A**	**SA**	**Mean**	**S.D**
1	i-Think means innovative thinking.	0.0	3.0	6.7	71.6	18.7	4.06	0.61
2	The use of i-Think maps can enhance students' thinking skills.	0.0	1.5	9.7	61.2	27.6	4.15	0.64
3	The use of i-Think maps generates creative, critical, and innovative thinking.	0.0	2.2	9.0	63.4	25.4	4.12	0.65
4	i-Think consists of eight mind maps.	0.0	1.5	12.7	58.9	26.9	4.11	0.67
5	The use of i-Think maps will cultivate active student participation in the classroom.	0.0	2.2	15.7	64.2	17.9	3.98	0.65
6	The use of i-Think maps will make learning more enjoyable.	0.0	1.5	14.9	62.7	20.9	4.03	0.65
7	The use of i-Think maps can improve students' academic achievements.	0.0	2.2	16.4	65.7	15.7	3.95	0.64
8	The use of i-Think maps will enhance students' focus during learning.	0.0	1.5	19.4	61.9	17.2	3.95	0.65
9	The use of i-Think maps can boost students' confidence.	0.0	3.7	16.4	64.2	15.7	3.92	0.68
10	The use of i-Think maps can bridge the communication gap between teachers and students.	0.0	5.2	20.9	61.9	11.9	3.81	0.71
11	The use of i-Think maps can produce students capable of high-level thinking.	0.0	3.7	9.7	70.9	15.7	3.99	0.64
	Overall	0.0	2.56	13.8	64.2	19.4	4.0	0.65

SD=Strongly Disagree, D=Disagree, U=Uncertain, A = Agree, SA = Strongly Agree, S.D=Standard Deviation

The readiness level of mathematics teachers in the Padawan District in terms of attitude towards the use of i-Think maps in mathematics teaching and learning.

The study shows a mean (M) of 3.79 and standard deviation (S.D = 0.74) for the readiness level in the attitude aspect. 61.3% of respondents agree with the items in this questionnaire in terms of attitude. However, there is also a small percentage (1.2%) of respondents who strongly disagree with the presented items.

Table 2
Percentage of agreement level for items in the attitude aspect.

		Percentage of agreement level (%)						
	Attitude Aspect	**SD**	**D**	**U**	**A**	**SA**	**Mean**	**S.D**
1	I am always ready to embrace new ideas that involve the use of i-Think maps.	0.0	3.0	11.9	64.2	20.9	4.03	0.67
2	I need to think outside the box in the i-Think Program.	0.7	3.0	18.7	61.2	16.4	3.90	0.72
3	I am willing to take any risks that may arise in the use of i-Think maps.	0.7	5.2	36.6	43.3	9.7	3.62	0.75
4	I am open to acknowledging mistakes in the use of i-Think maps.	0.7	5.2	26.1	57.5	10.4	3.72	0.75
5	I do not allow my experiences and practices to influence my thoughts about the use of i-Think.	3.0	11.2	23.1	54.5	8.2	3.54	0.91
6	I gather various sources or materials related to i-Think for teaching purposes.	1.5	3.0	17.9	73.9	3.7	3.79	0.68
7	I greatly enjoy incorporating readings or studies related to i-Think as preparation for teaching.	0.7	9.0	23.9	58.9	7.5	3.63	0.77
8	I believe students need to be exposed to the latest approaches in the teaching and learning process.	1.5	2.2	14.2	64.9	17.2	3.94	0.73
9	I am confident that teaching mathematics will be more effective with the use of i-Think maps.	1.5	1.5	18.7	66.4	11.9	3.85	0.69
10	I am always ready to use i-Think maps in the teaching and learning process.	1.5	1.5	17.2	67.9	11.9	3.87	0.68
	Overall	1.2	4.5	20.8	61.3	11.8	3.79	0.74

SD=Strongly Disagree, D=Disagree, U=Uncertain, A=Agree, SA=Strongly Agree, S.D=Standard Deviation

The readiness level of mathematics teachers in the Padawan District in terms of skills in using i-Think maps in mathematics teaching and learning.

The study shows a mean (M) of 3.85 and standard deviation (S.D = 0.85) for the readiness level in the skill aspect. 55.5% of respondents agree with the items presented in this questionnaire in terms of skills. 20.2% of respondents strongly agree with the items in this questionnaire. It was found that only 38.1% of respondents agree, and 11.2% strongly agree that the item "i-Think map is not actually a mind map". This is quite surprising, as half of the mathematics teachers among the respondents are unable to differentiate between the concepts of mind maps and i-Think thinking maps.

Table 3
Percentage of agreement level for items in the skill aspect.

Skill Aspect		Percentage of agreement level (%)					Mean	S.D
		SD	D	U	A	SA		
1	Circle maps are used to define objects or ideas according to context.	1.5	2.2	9.7	60.4	26.1	4.07	0.76
2	Bubble maps are suitable for describing certain things.	1.5	1.5	14.2	56.7	26.1	4.05	0.77
3	Double bubble maps are suitable for explaining the similarities and differences of an object.	1.5	2.2	9.7	58.2	28.4	4.10	0.77
4	Tree maps are used to classify objects.	2.2	2.2	10.4	57.5	27.6	4.06	0.82
5	Brace maps are used to describe the components or parts that make up an object.	1.5	2.2	12.7	60.4	23.1	4.01	0.77
6	Flow maps are not suitable for explaining cause and effect.	4.5	8.2	23.1	50.0	14.2	3.61	0.98
7	Multi-flow maps are not suitable explaining the sequence of events and stages of development/growth.	3.0	8.9	27.6	47.8	12.7	3.59	0.93
8	To find similarities or be exposed to an issue-based approach, bridge maps are suitable.	1.5	5.2	19.4	58.2	15.7	3.81	0.81
9	I believe that I will be able to use i-Think maps if I consistently use them.	1.5	4.5	10.4	67.2	16.4	3.93	0.76
10	i-Think maps are actually not mind maps.	7.5	20.1	23.1	38.1	11.2	3.26	1.13
	Overall	2.6	5.7	16.0	55.5	20.2	3.85	0.85

SD=Strongly Disagree, D=Disagree, U=Uncertain, A=Agree, SA=Strongly Agree, S.D=Standard Deviation

Inferential Statistics

From the study sample, 106 respondents from urban schools and 28 respondents from rural schools answered this research questionnaire. The inferential analysis used is an independent sample t-test. The following are the results obtained based on hypothesis testing below:

There is no significant difference in the readiness level of mathematics teachers in Padawan District in terms of knowledge about the concept of the i-Think map based on the teaching location.

In the aspect of knowledge, t-test analysis shows a t-value of 1.187 with a p-value of 0.091 for the comparison of the readiness level of teachers between teaching locations in urban and rural areas. The significance value, p, for the knowledge aspect is greater than 0.05 (p>0.05). The researcher fails to reject the null hypothesis because the p-value is greater than 0.05. Therefore, the null hypothesis will be accepted for the knowledge aspect. In conclusion, there

is no significant difference in the readiness level of mathematics teachers in Padawan District in terms of knowledge about the concept of the i-Think map. Table 4 shows the t-test analysis for the knowledge aspect based on teaching location.

Table 4
T-test analysis for the knowledge aspect based on teaching location.

Aspect	Teaching Location	N	Mean	Standard Deviation	t	df	P
knowledge	Urban	106	4.03	0.49	1.187	132	0.091
	Rural	28	3.90	0.68			

There is no significant difference in the readiness level of mathematics teachers in Padawan District in terms of attitude towards the use of i-Think maps in the teaching and learning of mathematics based on the teaching location.

In the aspect of attitude, t-test analysis shows a t-value of 1.503 with a p-value of 0.090 for the comparison of the readiness level of teachers between teaching locations in urban and rural areas. The significance value, p, for the attitude aspect is greater than 0.05 (p>0.05). The researcher fails to reject the null hypothesis because the p-value is greater than 0.05. Therefore, the null hypothesis will be accepted for the attitude aspect. In conclusion, there is no significant difference in the readiness level of mathematics teachers in Daerah Padawan in terms of attitude towards the concept of i-Think maps. Table 5 shows the t-test analysis for the attitude aspect based on teaching location.

Table 5
T-test Analysis for the Attitude Aspect Based on Teaching Location

Aspect	Teaching Location	N	Mean	Standard Deviation	t	df	P
Attitude	Urban	106	3.83	0.54	1.503	132	0.090
	Rural	28	3.64	0.81			

There is no significant difference in the readiness level of mathematics teachers in Padawan District in terms of skills using i-Think maps in mathematics teaching based on teaching location.

In the skills aspect, the t-test analysis shows a t-value of 1.503 with a p-value of 0.090 for the comparison of the readiness level of teachers between teaching locations in urban and rural areas. The significance value (p) for the skill aspect is greater than 0.05 (p>0.05). The researcher fails to reject the null hypothesis because the p-value is greater than 0.05. Therefore, the null hypothesis will be accepted for the skills aspect. In conclusion, there is no significant difference in the readiness level of mathematics teachers in Daerah Padawan in terms of skills regarding the i-Think map concept. Table 6 shows the t-test analysis for the skills aspect based on teaching location.

Table 6
T-test Analysis for the Skills Aspect Based on Teaching Location

Aspect	Teaching Location	N	Mean	Standard Deviation	t	df	P
Skills	Urban	106	3.89	0.556	1.448	132	0.061
	Rural	28	3.69	0.915			

Discussion

Based on the findings of the study analysis, a total of 64.2% of respondents agree in terms of knowledge, 61.3% of respondents agree in terms of attitude, and 55.5% of respondents agree in terms of skills. This proves that the majority of mathematics teachers still agree with their readiness levels in terms of knowledge about the i-Think map concept, their attitude towards using the i-Think map, and their skills in using the i-Think map. Since the introduction of the i-Think Programme in 2012, teachers have undergone sufficient training in the use of the i-Think map. They have acquired in-depth knowledge about the concept, principles, and strategies of using the i-Think map in teaching mathematics. Effective training provided by the government has greatly assisted teachers in understanding and mastering this tool. Therefore, mathematics teachers can demonstrate a high level of confidence in terms of knowledge about the i-Think map concept, a positive attitude towards the use of the i-Think map, and high skills when using the i-Think map in mathematics classroom teaching. A study conducted by Irma-ain and Zolkepeli (2017) also shows that the readiness level of mathematics teachers is increasing as they receive sufficient training to successfully implement the i-Think Programme in schools.

The levels of the knowledge and skills aspects each show an average minimum value of 4.0 and 3.85, which is higher compared to the attitude aspect, which has an average minimum value of 3.79. This indicates that mathematics teachers have a high level of knowledge and skills in their readiness to use the i-Think mind map. Ab Rahman et al. (2022) also stated that the use of i-Think thinking can facilitate the learning process, improve the quality of learning, enhance student achievement, and make the learning process more effective. Therefore, the use of the i-Think mind map has the potential to enhance higher-order thinking skills (HOTS) among students.

Additionally, the percentage of respondents agreeing with items in the attitude aspect is also the highest compared to other aspects. This conclusion aligns with a study conducted by Mohamad Nurul Azmi Mat Nor and Nurzatulshima Kamarudin (2017), which showed that teachers' positive attitudes consistently have a positive impact on learning achievements and student development. Teachers' positive attitudes towards this approach are closely related to their level of attitude and implementation skills of teachers. The findings of this study are also supported by Layang and Mahamod (2019), who stated that the level of teachers' attitude towards the use of i-Think mind maps is high. Furthermore, Rothman et al. (2018) stated that the level of teachers' attitudes towards the use of i-Think can be further improved, even though the study's findings indicate that the level of teachers' attitudes towards the use of i-Think is high, by expanding the exposure to the use of i-Think in the field of education.

The item 'i-Think Map is not actually a mind map in terms of skills' is the item indicating the lowest mean. This is a cause for concern for all parties because many mathematics teachers still perceive that the i-Think map is a mind map. In reality, the use of mind maps and i-Think concept maps is different. Mind maps are used to encompass notes related to specific topics in subjects according to their usage principles. On the other hand, i-Think

concept maps are used to organise reference sources or perspectives from various parties (Sa'aban et al., 2017). Therefore, mathematics teachers should be cautious when selecting suitable thinking tools for their teaching practices so that students do not misinterpret the difference between mind maps and i-Think concept maps.

An analysis of the comparison of readiness levels between teachers in urban and rural areas is conducted to determine whether the challenges of working in rural areas have different effects on teachers' readiness levels or vice versa. This is because the challenges faced by teachers in rural schools have the potential to influence the reluctance of other teachers to serve in rural schools, thereby affecting the readiness levels of teachers for any initiatives or programmes initiated by the Ministry of Education (Maizura, 2008).

However, the t-test conducted by the researcher in this study does not show significant differences between mathematics teachers in urban and rural schools in Kuching for skill, attitude, and knowledge aspects. This indicates that the school location factor does not influence the level of teachers' readiness to use i-Think thinking maps in teaching. This is likely due to the collaborative support from both rural and urban schools, which consistently organise internal courses and relevant workshops to enhance the skills, attitudes, and knowledge of teachers.

Furthermore, the government consistently ensures that schools in rural areas are equipped with adequate infrastructure and access to educational technology. This includes stable internet connectivity, sufficient teaching equipment, and digital learning software. By ensuring uniform technological capabilities in all schools, teachers in rural areas will be able to access learning resources and teaching aids similar to those in urban areas. Finally, the level of teacher skills in implementing the i-Think Programme still requires continuous monitoring and encouragement so that mathematics teachers become more proficient and confident in applying i-Think thinking maps in mathematics teaching.

Conclusion

Overall, teachers show a high level of readiness for applying i-Think maps. Although the skill aspect indicates a lower level compared to other aspects, teachers still possess a high level of readiness in terms of knowledge and attitude. However, there are some problems and constraints faced in enhancing the skill of using i-Think thinking maps in the teaching process at schools. Therefore, mathematics teachers need to always be prepared and strive to improve their skills, attitudes, and knowledge so that the teaching implemented achieves the expected effectiveness of the programme's objectives. In this study, no significant differences were found in the readiness level for using i-Think thinking maps among mathematics teachers based on the school location factor. In conclusion, teachers need to master the use of thinking maps well so that students can experience maximum impact on higher-order thinking skills (KBAT) during the teaching and learning process.

This study aims to raise awareness among mathematics teachers about their readiness level towards the i-Think Program. The findings obtained can serve as a guide for mathematics teachers to assess and reflect on their usage of i-Think maps in their respective classrooms. Furthermore, this study can be used as a reference by relevant authorities to evaluate the effectiveness and relevance of thinking maps before thinking tools such as Habits of Mind and 6 Thinking Hats are introduced in the future i-Think Program (BPK, 2012).

The data analysis indicates the need to enhance the level of mathematics teachers' skills in guiding students using i-Think maps. Although mathematics teachers have received exposure and training on this program, a monitoring mechanism is required to ensure that

teachers use i-Think maps more frequently, thereby improving their skills in utilizing these thinking tools. In addition to monitoring, the use of mind map modules will facilitate the task of mathematics teachers in integrating i-Think maps into their teaching and learning processes. The development of mind map modules or i-Think is one way to streamline the teaching and learning process for mathematics teachers and indirectly encourage them to use i-Think maps more frequently (Mapeala & Nyet, 2016).

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