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Embracing Innovation: Teacher Insights and Preparedness for I-THINK Thinking Maps in 21st Century Education

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Abstract

The present research finds into the complicated dynamics of Malaysian secondary school teachers' knowledge, preparedness, and attitudes about using the I-Think mind mapping technique, which is a key component in developing 21st-century learning skills. A comprehensive investigation of 101 educators from the Kuala Selangor district reveals a strong association between instructors' depth of knowledge and their readiness to incorporate I-Think mind maps into their educational methods. The findings show a continuous high level of involvement across all evaluated variables, with educators displaying a thorough comprehension of the I-Think maps, as well as a strong preparedness and positive attitude toward using these tools in classroom settings. The analysis emphasizes the vital role of teachers as change agents in realizing Malaysia's educational goals, stating that their knowledge of and dedication to new teaching approaches are critical for developing students' critical thinking and creativity. This study not only illustrates current successes in the adoption of I-Think mind maps, but it also lays the groundwork for future educational strategies aimed at refining and expanding the use of such cognitive tools, ensuring that they meet the changing demands of contemporary education. This study has far-reaching ramifications, providing significant information for educational officials, curriculum designers, and educators working to improve the quality of education in Malaysia and beyond.

Keywords: Mind Mapping, I-Think, Thinking Skills, Knowledge, Readiness, Correlation

Introduction

The Ministry of Education Malaysia (KPM) is constantly reviewing existing educational patterns to improve educational success and quality, notably in Malaysia. The present curriculum is constantly evaluated, monitored, and revised to ensure that it meets contemporary expectations, particularly in today's education (Baker & Mohammad, 2021). In line with this, KPM has introduced programs such as higher-order thinking skills (HOTS) and the I-Think program (Daud & Ab Rahman, 2020). I-Think stands for creative thinking (Institut Pendidikan Guru Malaysia, 2017). The I-Think program strives to improve and grow students' thinking skills, resulting in inventive and creative students (Daud et al., 2021). There are eight I-Think maps, each with its own set of functionalities that can be tailored to a certain topic (Bahagian Pembangunan Kurikulum, 2012). The eight maps are circle, bubble, double bubble, tree, brace, flow, multi-flow, and bridge.

However, KPM's efforts to implement I-Think thinking maps will be futile if numerous issues are overlooked and underemphasized by various parties such as schools and teachers. The implementation of 21st-century learning is linked to three major requirements: the school environment, classroom design, and teachers' willingness to supervise the learning process (Tajudin & Abdullah, 2018). The I-Think thought map is a thinking tool that helps teachers in conveying the content of an existing subject in a more effective form to students.

Through the study of intelligence, thought maps have united the cognitive learning process and the presentation of information visually in the form of graphics (Kementerian Pendidikan Malaysia, 2012). In the past, there have been several research studies related to the use of I - Think thought maps in schools for almost all subjects. For example, in the study of the Malay language (Isa & Mahamod, 2021; Baker & Mohammad, 2021), for science subjects, (Hata & Mahmud, 2020), mathematics (Isah & Hock, 2020), history (Subhan et al., 2016), Islamic education (Daud & Ab Rahman, 2020; Daud et al., 2020; Abdullah et al., 2021).

Although there have been several past studies on the use of I-Think thought maps, there is a lack of research on the level of a national secondary school teacher's knowledge, readiness and attitude towards I-Think thought maps in the implementation of 21st century learning (Daud et al, 2021). One of the problems is that the school system does not emphasize the development of students' thinking power (Hata & Mahmud, 2020: Idris et al., 2023a). The school system only focuses students more on providing information that aims to prepare students for exams and complete the syllabus that has been prepared by the Ministry of Education in Malaysia (Daud & Ab Rahman, 2020).

As a result, instructors must play an important role in fulfilling the duties and responsibilities that have been assigned to them to generate the individuals that the Ministry of Education Malaysia envisions. To meet the demands of 21st-century education, instructors must also have wide knowledge, high preparedness, and a strong dedication to learning especially to meet the requirement with current situation for build up the talent pool and obstacles and challenge to improvise the student skills for future (Idris & Bacotang, 2023; Idris et al., 2023b).

Literature Review

Thinking skills are essential critical skills that students must acquire. This is in line with the demands of 21st-century education (PAK21). The American Association of Educators has

highlighted four specific skills: critical thinking, communication, collaboration, and creativity (the 4Cs), along with citizenship and creativity (Yee et al., 2018). One of the Ministry of Education's efforts to fulfil the aspirations of 21st-century education is the implementation of the I-Think mind map as a thinking tool.

A study conducted by Isah and Hock (2020), investigated the use of I-Think mind maps among pre-service teachers in teacher training institutes. The study involved 123 pre-service mathematics teachers from seven different institutes. The findings revealed that the utilisation of I-Think mind maps among these pre-service teachers was at a moderate level. Analysis indicated that while pre-service teachers possessed basic knowledge of I-Think maps, they were less likely to implement them in their pedagogical practices during teaching practice in schools.

Furthermore, a study on the level of knowledge and attitude of Malay language teachers in Sibu district in applying 21st-century skills by Hassan (2020), found that the teachers' level of knowledge and readiness was high. Therefore, Malay language teachers in Sibu district have a high readiness to apply 21st-century skills in teaching.

Moreover, a study on the level of knowledge, readiness, and attitude of school Malay language teachers in implementing I-Think mind mapping in teaching and learning (Layang & Mahamod, 2019). This survey study used a questionnaire as a research instrument. A total of 108 Malay language teachers in 44 national schools in Kapit district, Sarawak, participated. The results showed that the level of readiness and attitude of primary school Malay language teachers towards the implementation of I-Think mind mapping in teaching and learning was high. Primary school Malay language teachers in rural areas have extensive knowledge of I-Think mind mapping, are willing to use I-Think mind mapping and have a positive attitude towards using I-Think mind mapping as a teaching aid.

Another study conducted by Aziz and Abd Rahman (2018), found that most teachers were still not ready to implement higher-order thinking Skills (HOTS) in teaching due to the lack of extensive exposure to how to incorporate HOTS elements during the teaching and learning process. In addition, teachers were burdened with additional tasks that could hinder them from carrying out effective teaching and learning processes based on HOTS.

Overall, previous studies have reported that the level of knowledge, readiness, and attitude of teachers in using the I-Think mind map can positively enhance student achievement. Furthermore, previous studies have shown that the I-Think mind map can assist students in teaching and learning, but it must be in line with a teacher's knowledge, readiness, and attitude towards using the I-Think mind map in the classroom.

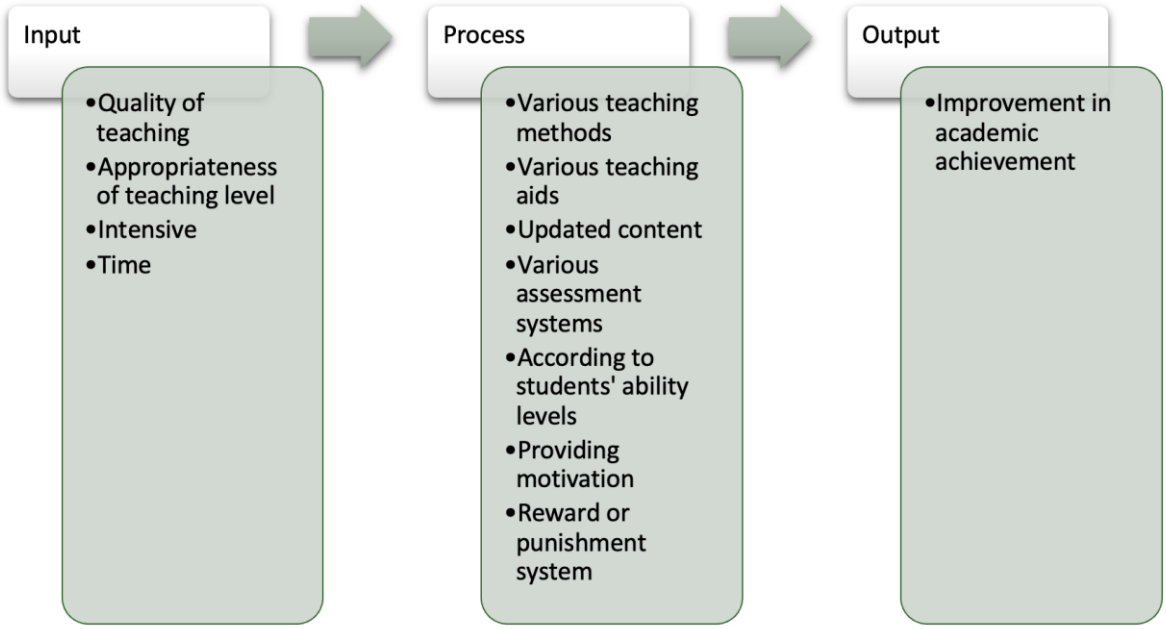

Figure 1: *Theoretical Framework of Slavin's Model (1995)*

Based on Figure 1, this conceptual framework is adapted from a study conducted by (Tajudin and Abdullah 2018). In their study, referring to Slavin's model (1995), the theoretical framework of this study is based on an input-output model. The teacher is a contributor to the effectiveness of teaching conducted in the classroom and it can be influenced by four factors, namely the quality of teaching, the appropriateness of the teaching level, incentives, and time, which are independent variables as input.

Furthermore, the output can be seen through the aspect of increased achievement obtained by students, which is a dependent variable. Taken from this model, incentives refer to the teacher's ability to motivate students to continue learning and complete tasks given by the teacher. Time can be interpreted as sufficient time for students to learn and understand a concept or skill.

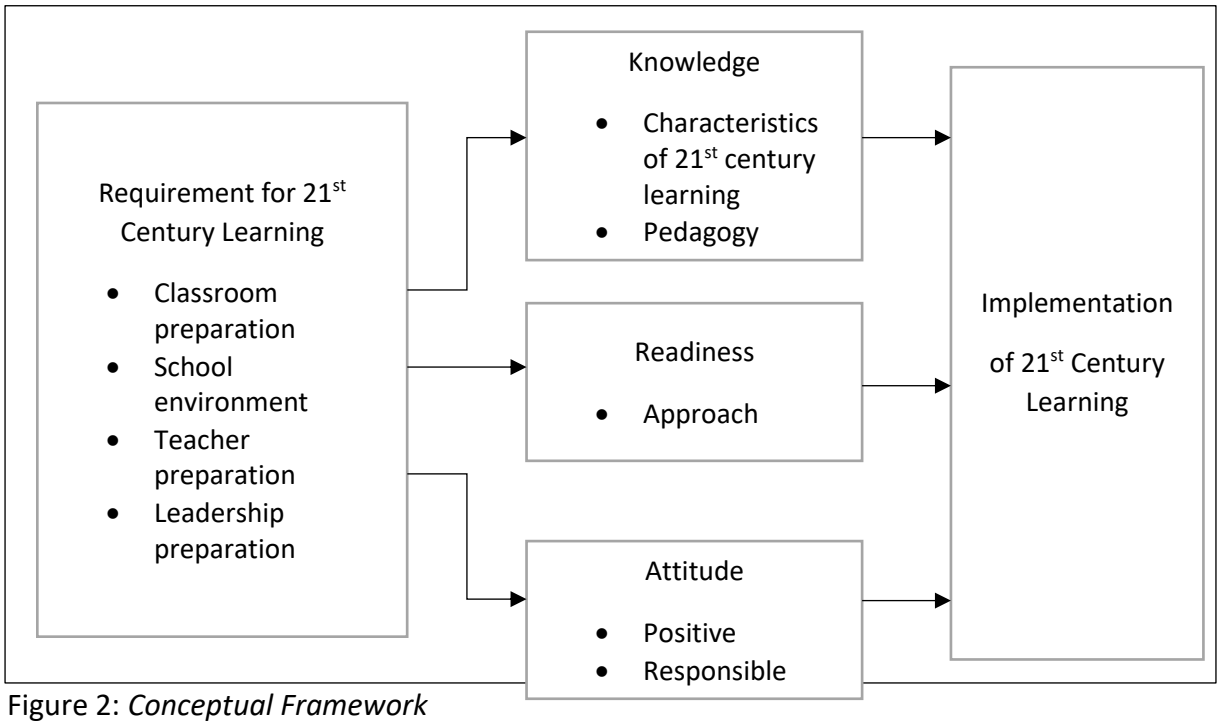

Figure 2: *Conceptual Framework*

Based on the diagram above, the conceptual framework of Figure 2 is modified and adapted from Slavin's teaching model (1995). This model illustrates a teacher readiness process involving closely related attitudes and levels of knowledge as someone who will lead the learning process. Teachers are seen as a necessity for change towards 21st-century learning and the main driver of the implementation of 21st-century learning. A teacher equipped with the necessary knowledge and readiness to face this change can contribute to the success of implementing 21st-century learning in schools.

Methodology

This quantitative research was utilized to collect information for the upcoming research project, utilizing a survey method in the study design (Idris et al., 2024). Data from the Kuala Selangor District Education Office shows that there are 1,076 secondary school teachers in the district of Kuala Selangor. Just 101 secondary school teachers were chosen at random from Kuala Selangor as the sample for this study. This research employs a questionnaire as a tool. Series of inquiries modified by the investigator, utilizing Mohamat (2016), survey on the I – Think mind mapping investigation.

There are 4 sections included in this survey. Section A focuses on the demographic information of the participants, including gender, age, educational background, and teaching experience. Section B (i) consists of 10 questions aimed at determining teachers' understanding of utilizing I-Think mind maps. In section B (ii), there are 10 questions related to assessing teachers' preparedness to utilize the I - Think mind maps. In section B (iii), the level of teachers' attitudes towards using the I-Think mind maps is being evaluated. Every subsection of B (i, ii, iii) consists of 10 elements regarding the level of knowledge, preparedness, and beliefs of educators towards the I-Think mind map. The questionnaire consists of closed-ended questions that utilize a 5-point Likert scale.

The data in this study was analyzed by the researcher utilizing a descriptive method. Once the data collection process is finished, the data will be structured and studied with the assistance of a computer program called the Statistical Package for Social Sciences (SPSS), in order to analyze the mean and standard deviation in line with the aims of this research project outlined earlier. In addition, correlation tests are utilized to assess the degree of the connection between two factors, specifically the knowledge level and readiness level of teachers in adopting I-Thinking maps for 21st-century learning.

Result Findings

From 101 of respondents, 36 (35.6%) were males and 65 (64.4%) were females. Table 1 shows that the majority of respondents in this study are aged between 23 – 27 years old, 49 respondents (48.5%) and 15 respondents (14.9%) fall under 48 years old and above. Next, 12 respondents aged 28 – 32 years old (11.9%) and followed by 10 respondents aged 33-37 years with a percentage of 9.9%. 38 to 42 years old show only 6 respondents with a percentage of 5.9%.

Table 1
Demographic Information of Respondent

Demographic		Frequency (n)	Percentage (%)
Gender	Male	36	35.6
	Female	65	64.4
Age	23 – 27 years old	49	48.5
	28 – 32 years old	12	11.9
	33 – 37 years old	10	9.9
	38 – 42 years old	6	5.9
	43 – 47 years old	9	8.9
	> 48 years old	15	14.9
Academic Level	Certificate	1	1
	Diploma	18	17.8
	Degree	75	74.3
	Postgraduate	7	6.9
Teaching Experience	1 – 3 years	51	50.5
	4 – 6 years	19	18.8
	7 – 10 years	5	5
	>11 years	26	25.7
Used I-Think Mind Map	Yes	91	90.1
	No	10	9.9

For academic qualifications, the highest percentage is a bachelor's degree, which is 74.3% (75 respondents). 17.8% (18 respondents) follow with a diploma, and 6.9% (7 respondents) have an advanced degree qualification. Only 1% have an academic certificate qualification. From the table above, 1 to 3 years of teaching experience is the highest which is 51 respondents (50.5%). Followed by teaching experience of 11 years and above which is 26 respondents (25.7%) and 4 to 6 years is 19 respondents (18.8%). The lowest data is 7 to 10 years teaching experience which is 5 respondents (5%). A total of 91 (90.1%) respondents have used the I-

Think mind map, and only 10 (9.9%) respondents have not. The findings showed that most teachers used an I-Think mind map while in class.

Teachers' Knowledge of Using I-Think Mind Maps in Implementing 21st Century Learning

Table 2 shows the teachers' knowledge level of using I-Think mind maps in implementing 21st century learning.

Table 2
Teachers' Knowledge Level

No.	Item	Mean	Standard Deviation	Interpretation
1.	I know issues related to the I-Think mind map.	4.07	0.725	High
2.	I understand clearly the concept of using the I – Think mind map	4.08	0.703	High
3.	I know the importance of applying the I-Think mind map in the teaching and learning process to students.	4.22	0.540	High
4.	I know the cognitive level in the I-Think mind map.	4.06	0.580	High
5.	I know the common characteristics for creating an I-Think mind map question.	4.17	0.722	High
6.	I know and understand the kind of I-Think mind map used during teaching and learning.	4.24	0.650	High
7.	I learned effective questioning techniques in teaching and learning using the I-Think mind map.	4.11	0.747	High
8.	I can identify items on the I-Think mind map.	4.15	0.654	High
9.	I can identify the role and usefulness of each one of the I-Think mind maps.	4.13	0.716	High
10.	I learned effective pedagogical practices through the I-Think mind map.	4.04	0.747	High
	Average Score	**4.12**	**0.487**	**High**

Based on the table above, the highest mean on teachers' knowledge level is item 6, "I know and understand the kind of I-Think mind map used during teaching and learning" with a mean of 4.24 (*SD* = 0.650). The lowest mean is item 10, "I learned effective pedagogical practices through the I-Think mind map," with a mean 4.04 (*SD* = 0.747). Overall, the mean score for

teachers' knowledge level is high (*m* = 4.12, *SD* = 0.487). Thus, from the findings, it can be seen that the teachers teaching in Kuala Selangor district high school are highly knowledgeable of the I-Think mind map as a teaching tool in the classroom.

Teachers' Readiness to Use I-Think Mind Maps in Implementing 21st Century Learning

This section shows the result of teachers' readiness to use I-Think mind maps in implementing 21st century learning.

Table 3
Teachers' Readiness Level

No.	Item	Mean	Standard Deviation	Interpretation
1.	I identify the level of knowledge of the student in the implementation of the I-Think mind map.	4.07	0.725	High
2.	I designed a teaching method that can promote high-level thinking skills.	4.08	0.703	High
3.	I carry out teaching and learning activities with an I-Think mind map.	4.22	0.540	High
4.	I encourage students to explore a variety of information during teaching and learning based on the I-Think mind map.	4.06	0.580	High
5.	I provide a variety of questioning techniques based on the I-Think mind map.	4.17	0.722	High
6.	I provide questions that enable students to make reflections based on the I-Think mind map.	4.24	0.650	High
7.	I encourage students to argue for improving mental development based on the I-Think mind map.	4.11	0.747	High
8.	I encourage students to engage in improving mental development based on the I-Think mind map.	4.15	0.654	High
9.	I do reflection for improvement of teaching and learning based on the I-Think mind map.	4.13	0.716	High
10.	I provide the question by classification based on an I-Think mind map.	4.04	0.747	High
	Average Score	**4.12**	**0.491**	**High**

Table 3 shows that the highest mean for the teachers' readiness level to the I-Think mind map is item number 6 which is "I provide questions that enable students to make reflections based on the I-Think mind map" with mean score 4.24 (*SD* = 0.650). Item number 10 shows the lowest mean which is 4.04 (*SD* = 0.747). Based on the findings, the teachers show that they are at the high level of readiness towards the use of I-Think mind maps with mean score 4.12 (*SD* = 0.491). This means that the teachers have a high degree of readiness to use the I-Think mind map in teaching.

Teachers' Attitudes Towards Using I-Think Mind Maps in Implementing 21st Century Learning

For this objective, the level of teachers' attitudes towards using the I-Think mind map in implementing 21st century learning will be discussed.

Table 4
Teachers' Attitudes Level

No.	Item	Mean	Standard Deviation	Interpretation
1.	I always prepare a lesson plan that contains an I-Think mind map.	3.81	0.833	High
2.	I often give students the opportunity to present their views during the teaching and learning process.	4.19	0.561	High
3.	I always use the appropriate I-Think mind map elements during teaching and learning.	3.97	0.793	High
4.	I often associate the concept of the I-Think mind map with everyday life issues.	3.99	0.781	High
5.	I build teaching materials more creatively.	4.27	0.488	High
6.	I am more sensitive to the diversity of students' intelligences in the implementation of the I-Think mind map.	4.13	0.643	High
7.	I encourage students to choose the appropriate I-Think mind map to use.	4.13	0.688	High
8.	I always apply good values when using the I-Think mind map.	4.14	0.600	High
9.	I plan activities that suit the students' interest and readiness for the I-Think mind map.	4.15	0.572	High
10.	I implement group work that facilitates students to use the I - Think mind map.	4.25	0.607	High
	Average Score	**4.10**	**0.478**	**High**

Based on the table above, the highest mean for the level of teacher attitudes towards the I-Think mind map is on the 10th item which is "I implement group work that facilitates students to use the I -Think mind map " with a mean of 4.25 (*SD* = 0.607). On the other hand, the lowest mean is on the first item which is " I always prepare a lesson plan that contains an I-Think mind map" with a mean of 3.81 (*SD* = 0.833). Even though it has the lowest mean, it is still at a high level of interpretation. From the findings, the level of teacher's attitude towards the use of the I-Think mind map is overall at a high level of interpretation, with a total average score of 4.10 (*SD* = 0.478).

Relationship between Teachers' Knowledge and Readiness towards Using I-Think Mind Maps in Implementing 21st Century Learning

In this section, correlation between teachers' knowledge and readiness towards using I-Think mind map in the implementation of 21st century learning will be discussed.

Table 5

Relationship between teachers' knowledge and readiness towards using I-Think mind maps in implementing 21st century learning

Variable	n	r	Sg.
Teachers' knowledge Teachers' readiness	101	0.641**	<0.000

**. Correlation is significant at the 0.01 level (2-tailed).

Based on the table above, the findings show that there is a positive relationship (r = 0.641, p= 0.000) between teachers' knowledge and readiness towards using I-Think mind maps in implementing 21st century learning. Therefore, the hypothesis null is rejected and hypothesis alternative is accepted. This shows that teachers who have extensive knowledge in the I-Think mind map will have a high readiness in using the I-Think mind map for the implementation of 21st century learning.

Discussion

Overall, the findings of this study showed that the mean scores for all three objectives were at a high level. This is evidenced by the overall mean score for the objective of teachers' knowledge of using I-Think mind maps in implementing 21st-century learning (4.12 with a standard deviation of 0.487), the level of teachers' readiness to use I-Think mind maps in implementing 21st-century learning (4.12 with a standard deviation of 0.491). Meanwhile, the level of teachers' attitudes towards using I-Think mind maps in implementing 21st-century learning (4.10 with a standard deviation of 0.487). For the fourth objective, the findings showed a positive correlation between teachers' knowledge and readiness to use I-Think mind maps.

Teachers' Knowledge Level

The findings on teachers' knowledge of using I-Think mind maps showed that the respondents in this study had a high level of knowledge about I-Think mind maps. The evidence is shown by the interpretation of the mean scores, which indicated a high level for each item. These findings are in line with the study by Layang and Mahamod (2019) on the level of knowledge, readiness, and attitudes of primary school Malay language teachers in implementing I-Think mind map teaching and learning, which stated that the level of teachers' knowledge in using higher-order thinking skills in teaching and learning is high. In addition, these findings can be

further strengthened by the study of Isa and Mahamod (2021), which found that the level of teachers' knowledge was high.

According to Isa and Mahamod (2021), stated there are also problems with the implementation of HOTS by teachers that can be a problem for students. The results showed that although teachers have a high level of knowledge and a positive attitude towards the implementation of HOTS in KOMSAS learning, there are also teachers who still lack skills and references in applying HOTS in teaching and learning (Othman & Kasim, 2016).

Teachers' Readiness Level

The findings on teachers' readiness levels indicated that the respondents in this study had a high level of readiness to prepare for using I-Think mind maps. This can be evidenced by the interpretation of the mean scores, which indicated a high level for each item. These findings differ from the results of a study by Hassan and Mahamod (2016) on the perceptions of secondary school Malay language teachers towards higher-order thinking skills, which found that teachers' readiness for I-Think mind maps was at a moderate level. However, there is another study by Tajudin and Abdullah (2018) that supports this study, with findings showing that the readiness level of science teachers in terms of knowledge, attitude, skills, and interest, regardless of gender and teaching experience, was at a high level.

Teachers' Attitudes

Generally, the findings of this study show that most secondary school teachers have a positive attitude towards using I-Think mind maps. Evidence of this can be seen in the interpretation of the mean scores, which indicate a high level for each item. This study supports the research by Nor et al. (2017) who stated that teachers who consistently maintain a positive attitude will concurrently succeed in producing quality learning and student outcomes. Another study on the level of knowledge and attitudes of Malay language teachers in Sibu towards applying 21st-century skills by Hassan (2020) stated that the level of teachers' attitudes towards the use of 21st-century skills in Malay language teaching is high. According to Zakaria et al. (2021), a positive attitude from teachers in implementing I-Think mind maps can make the teaching and learning process effective and enjoyable.

Relationship Between Teachers' Knowledge and Readiness

Through Pearson correlation test results, the findings showed that there is a positive correlation between the level of knowledge and the level of readiness for using I-Think mind maps in implementing 21st-century learning. In other words, teachers who have extensive knowledge about I-Think mind maps are more likely to be ready to use I-Think mind maps. This study is supported by a study conducted by Hata and Mahmud (2020), which found that there is a significant relationship between the level of teachers' knowledge and their readiness to implement STEM education. From this study, it can be understood that one way to improve a teacher's knowledge is by increasing the number of professional courses related to I-Think mind maps so that teachers can improve their confidence in implementing education about I-Think mind maps in 21st-century learning (Idris et al., 2023c).

Conclusion and Future Agenda

The study's findings underline the critical role that instructors' knowledge, preparedness, and attitudes play in the successful deployment of I-Think mind maps as part of 21st-century

learning. According to the study, instructors in the Kuala Selangor area have a high degree of awareness about the I-Think mind map, which is essential for developing students' critical thinking and creativity. Furthermore, the teachers' willingness to incorporate these tools into their teaching techniques demonstrates their dedication to improving student learning experiences. Teachers' positive attitudes regarding the use of I-Think mind maps demonstrate their willingness to adopt novel teaching approaches that meet the needs of current education.

The research finds a positive association between teachers' knowledge and their readiness to apply I-Think mind maps, implying that increasing knowledge has a major impact on instructors' ability to implement these tools effectively. This conclusion emphasizes the significance of ongoing professional development and training for teachers in order to guarantee they are prepared to face the difficulties of 21st-century education.

Following the findings, numerous recommendations for future study and educational practice are made. First and foremost, there should be a determined effort to offer instructors with ongoing professional development opportunities, with a focus on advanced training in the use of I-Think mind maps and other 21st-century learning tools. This will help to improve their knowledge and readiness, resulting in more successful classroom implementation.

Furthermore, future study should look outside the Kuala Selangor district to incorporate a more diversified sample from various locations of Malaysia. This would provide a more comprehensive understanding of the elements that influence the use of I-Think mind maps in diverse educational settings. Furthermore, performing longitudinal research could aid in determining the long-term influence of using I-Think mind maps on student outcomes such as critical thinking, creativity, and general academic performance.

Moreover, investigating the integration of digital tools and platforms with I-Think mind maps may improve their efficacy in fostering 21st-century abilities among students. Future research could look into how technology can be used to enhance and expand the usage of mind maps in teaching and learning.

Finally, this study serves as a vital motivator to close the gap in knowing successful advocacy techniques for disability inclusion in education, with the goal of fostering a more inclusive and equitable learning environment. Its purpose is to provide a complete synthesis of current literature, as well as insights and recommendations that might help policymakers, educators, and advocates develop focused interventions for kids with disabilities.

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