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TEACHERS' UNDERSTANDING AND PRACTICES ON THE APPLICATIONS OF 21ST CENTURY LEARNING IN SECONDARY SCHOOL MATHEMATICS IN MIRI, SARAWAK

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Abstract

The objective of this research is to study the understanding and practices of Mathematics teachers on the application of 21st century learning in high schools in Miri, Sarawak. By using a quantitative approach, a questionnaire instrument was constructed and adapted from previous studies that focused on Mathematics teachers in Miri secondary schools as a sample of this study. The research outcome showed that Mathematics teachers have a high level of knowledge in 21st century learning. The application of 21st century learning for cognitive aspect, affective and psychomotor is at a moderate-high level. The statistical analysis one-way ANOVA shows that teachers' understanding of 21st century learning based on teacher's age was found to be insignificant at the value of F (df = 3, 90) = 1.060, p> 0.05 while for teachers' understanding of 21st century learning based on teachers' experience in teaching Mathematics was also not significant at F (df = 4, 89) = 1.931, p> 0.05. In conclusion, Mathematics teachers in Miri secondary schools have a high level of knowledge of 21st century learning. The practices of 21st century learning by teachers in teaching Mathematics for cognitive, affective and psychomotor aspects are at a moderately high level. Although there are differences in the mean between the teachers' age and experience in teaching Mathematics on teachers' understanding towards 21st century learning, these differences cannot be used to generalize this entire study population as there is no significant difference between the two variables, on teachers' understanding towards 21st century learning. The results of this study are expected to help the relevant parties to ensure that teachers are better prepared to deliver 21st Century teaching in the classroom.

Keywords: Mathematics, 21st Century Learning, Teachers' Understanding and Perceptions

INTRODUCTION

The development and change of needs today are demanding transformation in various aspects to form a community that meets the needs of the 21st century. To achieve the status of a developed country, a country must be able to produce citizens with the skills and abilities in facing the world of the 21st century. The 21st century skilled individuals should have the ability to think critically, analyse and collecting information and problems, have communication and collaboration skills as well as excellent levels of creativity and innovation (Salehudin, Hassan & Hamid, 2015). Starting from learning in schools, the transformation of national education should now be able to form students that meet global needs (Retno, Arfatin & Nur, 2019). Yahya and Sa'ari (2015) argue that the basis of a nation's excellence is seen from the ability to produce ideal individuals based on education. Malaysia, as one of the developing countries, not to be left out in making transformations particularly in education, to ensure that the country moves in line with developed countries and capable of producing an individual with 21st century skills in facing the challenges of life in the future.

In adapting to the current trend of education according to global needs, the Ministry of Education Malaysia (MOE), has taken many initiatives to change and ensure that learning is based on skills in the 21st century based on Bloom's Taxonomy. This includes implementing the Malaysian Education Blueprint (PPPM) 2013 - 2025 (Salehudin, Hassan & Hamid, 2015; Rashid et al., 2016). Although educational transformation is actively implemented by applying the concept of 21st century learning in classes as one of the main focus, the teacher itself have to ensure that they understand the concept of 21st century learning well before implementing it in teaching in schools to ensure the goal of transformation is achieved (Patric & Rosli, 2020; Seliaman & Dollah, 2018; Salehudin et al., 2015). The study that was conducted by Xiang and Hj. Ikhsan (2019) found that teachers' understanding of 21st century learning plays a very important role in ensuring the implementation can be carried out effectively. With this, it is necessary to measure the knowledge and mastery of Mathematics teachers about 21st century learning before measuring their ability in applying this concept in educational sessions based on the three main aspects of Bloom's Taxonomy namely cognitive, affective and psychomotor.

Trends in International Mathematics and Science Study (TIMSS) is one of the international assessment use to interprets students' abilities in terms of knowledge, ability to apply knowledge to solve problems and reason in specific fields including Mathematics and Science. Based on the achievements of TIMSS, the evaluation analysis shows that Malaysian students are only able to understand the basic concepts of Mathematics but still unable to master the skills of applying those concepts in solving problems in real life. This achievement shows that the quality of Malaysian education is still at an unsatisfactory level because the ability of students related to Mathematics and Science in particular is still at a low level although this subject is a compulsory subject in schools and institutions of higher learning (TIMSS Report, 2015). This achievement has indirectly raised problems and has become an issue for education in Malaysia, especially on the ability of teachers to teach.

PROBLEM STATEMENTS

21st century learning is defined as a student-centered learning process that has been implemented into the school system since 2016 (Xiang & Hj. Ikhsan, 2019; Kim & Md-Ali, 2017; Bulletin Anjakan, 2015). Students today need to prepare themselves to be able to think critically, able to analyze and gather information, be able to communicate and collaborate well and have good creativity and innovation (Kim & Md-Ali, 2017; Salehudin et al., 2015). Problems arise when most senior teachers will have problems in using technology as they are more comfortable using the conventional method of chalk and talk in the classroom where this method is one-way (Ravendran & Daud, 2019; Md Kamary & Hamzah, 2019). Although 21st century learning is not based on technology, the development of technology today has changed the perception of the public on associating 21st century learning with the application of technology, and this confuses to teachers, especially those who have not yet mastered the use of technology (Bulletin Anjakan, 2015). The developments in the use of ICT have led to new assumptions about teachers' jobs (Kjellsdotter, 2020). So, there is a need to conduct a study on the age difference of teachers on the understanding of 21st century learning.

The change of Curriculum to improve the education system in Malaysia to some extent affects the implementation of 21st century learning in the classroom. Teachers are facing a diverse curriculum will have difficulty adapting to the development of the curriculum and at the same time need to implement 21st century learning in the classroom. Meanwhile, teachers at schools have to complete the syllabus in a limited time, thus causing time constraints and problems in the application of 21st century learning in school especially in Mathematics education. Thus, this has become an excuse for teachers not to apply skills and knowledge related to 21st century learning in their classroom (Abdul Rahim & Abdullah, 2017). The study on the teaching experience towards teachers' understanding of 21st century learning is needed to help teachers regarding these problems.

OBJECTIVE

This study was conducted to achieve the following objective:

i. Identifying teachers' understanding of the application of 21st century learning in Mathematics high school.
ii. Identifying teachers' practices towards the application of 21st century learning in teaching Mathematics from three aspects, cognitive, affective, and psychomotor.
iii. Determine whether there is a significant difference between the age of Mathematics' teachers and the level of understanding related to 21st century learning.
iv. Determine whether there is a significant difference between teachers' teaching experience and the level of understanding related to 21st century learning.

METHODOLOGY

Sample and Procedure

This study was conducted to measure the teacher's level of understanding and practices on the application of 21st century learning in learning Mathematics in secondary school through a Likert-type scale questionnaire. 94 Mathematics teachers selected from all secondary schools in Miri, Sarawak were participated in this survey to gather the related data for this study.

Instrument

A set of questionnaires with close-ended questions were adapted from the previous study by Xiang and Hj. Ikhsan (2019), Rusdin (2018), Abdul Rahim and Abdullah (2017) and the related document published by the Ministry of Education Malaysia. The questions then modified according to the suitability of this study. The questionnaire consists of three sections. Section A is on teachers' demographic details such as gender, age and experience teaching Mathematics subject. Section B and C which consist of 18 and 41 Likert-type scale items respectively, related to teachers' understanding of 21st century learning and their perceptions on the application in teaching and learning. Likert scale measurement use for the instrument is 1= STRONGLY DISAGREE, 2= DISAGREE, 3= NEITHER AGREE OR DISAGREE, 4=AGREE and 5= STRONGLY AGREE. A pilot study has been carried out to test the validity and reliability of the questionnaire constructed. The data from pilot study analysed using Cronbach Alpha Analysis with coefficient value 0.788.

Statistical Analysis

Descriptive analysis is a process that explains the relationship without speculating about the cause (Hoy & Adams, 2016). The inferential analysis in other hand, involves the use of procedures to draw conclusions based on scores collected from respondents and use them to conclude the study population (Jackson, 2015). The following Table 1 which shows the type of data analysis used based on the objectives and hypotheses null (if any) of the study.

Table 1: Type of data analysis

Objective	Null Hypothesis	Analysis
Identifying teachers' understanding of the application of 21st century learning in high school Mathematics	-	Min
Identifying teachers' practices towards the application of 21st century learning in teaching mathematics from three aspects, cognitive, affective, and psychomotor	-	Min
Determine whether there is a significant difference between the age of Mathematics' teachers and the level of understanding related to 21st century learning	H_0^1: No significant difference between teacher age and level of understanding related to 21st century learning	One-way ANOVA
Determine whether there is a significant difference between teachers' teaching experience in Mathematics and the level of understanding related to 21st century learning	H_0^2: No significant difference between teachers' teaching experience for Mathematics subjects and the level of understanding related to 21st century learning	One-way ANOVA

RESULTS

In this study, researchers have distributed questionnaires to every secondary school in Miri district. As of early January 2020, the number of secondary school teachers that teach Mathematics based on information from the Miri District Education Office was around 140 teachers. The number of samples required by researchers according to Krejie and Morgan (1970) is 103 teachers.

210 questionnaires distributed to 14 schools where each school will receive 15 questionnaires to strengthen the findings of the study (researchers take into account the factors of teachers moving out or entering the school during the study was conducted). However, of all the questionnaires distributed, only 94 questionnaires were returned to the researchers and all of the data used in this study are based on the questionnaire returned.

Section A: Teacher Demographic Information

This section discusses the findings of the study for the first part of the questionnaire, which is the teachers' demographic information. Table 2 shows that 19.6% of the respondents are men while 80.4% of the respondents are women. 19.6% of the respondents involved in this survey are 20 years old to less than 30 years old and 43.3% of the respondents are 30 years old to less than 40 years old. 29.9% of respondents are 40 years old to less than 50 years old while 7.2% are 50 years old and above. Also

shown that most teachers involved have experience teaching Mathematics for less than 5 years with a percentage rate of 28.9%. Followed by teachers who have experience teaching Mathematics for 10 years to less than 15 years with the second highest percentage with a percentage rate of 22.7%, teachers with experience teaching Mathematics for 15 years to less than 20 years with the third highest percentage with a percentage rate of 19.6%, while teachers who have experience teaching Mathematics for 5 years to less than 10 years with the fourth highest percentage with a percentage rate of 15.5%. The lowest percentage is from teachers who have experience in teaching Mathematics for 20 years and more with a percentage of 13.4%.

Table 2: Number of respondents according to demographic information

Respondent Information (N=94)		Frequency	Percentage (%)	Cumulative Percentage (%)
Gender	Male	18	19.1	19.1
	Female	76	80.9	100.0
Age	20 years old – less than 30 years old	19	20.2	20.2
	30 years old – less than 40 years old	42	44.7	64.9
	40 years old – less than 50 years old	26	27.7	92.6
	50 years old and above	7	7.4	100.0
Experience in teaching Mathematics High School	Less than 5 years	28	29.8	29.8
	5 years – less than 10 years	15	16.0	45.7
	10 years – less than 15 years	20	21.3	67.0
	15 years – less than 20 years	19	20.2	87.2

Section B: Descriptive Statistics

Based on Table 3, the result of the study found that the understanding of teachers who teach Mathematics towards 21st century Learning is at a high level with an overall average score of 4.06. The

teachers' views on the application of 21st century learning for Mathematics in the cognitive aspect are at a moderately high level with an average overall min of 3.84. This study also indicates that the Mathematics teachers in Miri secondary schools are quite ready to apply 21st century learning into teaching and learning from an affective aspect. Analysis of the study found from the Table 3 shows that the teachers' views on the application of 21st century learning for the Mathematics in the affective aspect and psychomotor aspects are at a moderately high level with an overall mean of 3.87.

Table 3: Questionnaire Items Analysis

Items' Categories	Overall mean	Mean Level
Mathematics teachers understanding towards 21st century learning	4.06	High
Level of readiness for cognitive aspect in implementing 21st century learning in their teaching and learning in the classrooms	3.84	Medium High
Level of readiness for affective aspect in implementing 21st century learning in their teaching and learning in the classrooms	3.87	Medium High
Level of readiness for psychomotor aspect in implementing 21st century learning in their teaching and learning in the classrooms	3.87	Medium High

Section C: Inferential Statistics

1. Differences between teacher's age and the level of understanding related to 21st century learning

The results of the analysis data using one-way ANOVA analysis performed to compare the mean score of the teachers' understanding of 21st century learning based on the teachers' age is as reported in Table 4. Based on the table, statistical values show that the teachers' understanding of 21st century learning based on the teachers' age was found to be insignificant at the value F (df = 3, 91) = 1.060, $p > 0.05$. So, H_0^1 is failed to be rejected. In conclusion, there is no significant difference in teachers' understanding of 21st century learning based on teachers' age.

Table 4: ANOVA Test - Age / Level of Understanding

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.619	3	.206	1.060	.370
Within Groups	17.524	90	.195		
Total	18.143	93			

2. Differences between teachers' experience in teaching Mathematics and level of understanding related to 21st century learning.

Based on Table 5, the statistical values show that the teachers' understanding of 21st century learning based on the teachers' experience in teaching Mathematics is not significant at the value of F (df = 4, 90) = 1.931, $p > 0.05$. So with this, H_0^1 is failed to be rejected. In conclusion, there is no significant difference in teachers' understanding of 21st century learning based on teachers' experience in teaching Mathematics

Table 5: ANOVA Test – Teaching Experience /Level of Understanding

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1.449	4	.362	1.931	.112
Within Groups	16.695	89	.188		
Total	18.143	93			

DISCUSSION

Descriptive Statistics

The result of this study is supported by other research findings such as those implemented by Md Kamary and Hamzah (2019), Xiang and Ikhsan (2019), and Rusdin (2018) who reported that the understanding of school teacher's towards the implementation of 21st century learning is very high and good. This is due to the effort of all parties, especially the State Education Department and the District Education Office that help to disseminate the information and implement courses related to 21st century learning (Md Kamary & Hamzah, 2019).

In addition to the above matter, the headmaster or principal plays a vital role in ensuring that the teachers get accurate information regarding 21st century learning. The headmasters and principals also play a role by ensuring that the school has adequate equipment so that the teachers can successfully implement 21st century learning. In a study conducted by Hashim and Mohd Nor (2019), the study found that the headmaster of the school where the study was conducted has guided in every matter related to education. Apart from that, workshops and simulations of 21st century teaching methods are often done so that teachers can understand and implement 21st century learning well enough in their teaching and learning.

Cognitive Aspect - The result of this study showed that teachers who teach Mathematics in secondary schools in Miri, Sarawak have a moderate level of readiness for the application of 21st century learning in teaching and learning which is implemented through the cognitive aspect. Generally, cognitive is the first component in the classification related to education. It is an aspect that emphasizes on the reminder, what has been learned or solutions to a problem which were republished after ideas are collected and reprocessed based on the knowledge that has been learned (Bloom, Krathwohl & Masia, 1984). The results derived from this study are on line with the study conducted by Abdul Rahim and Abdullah (2017) found that majority of the Mathematics teachers have a moderate level of readiness from cognitive aspects in the implementation of 21st century teaching and learning in the classrooms.

A study that was conducted by Xiang and Ikhsan (2019) stated that the knowledge of primary school teachers in the Pekan district has towards the definition and basic standard of 21st century learning is at a high level. They agreed that the understanding of the teachers in 21st century learning plays a crucial role in ensuring the effective implementation of 21st century learning. This study also argued that although the teachers have received various training related to 21st century learning, there

are still a few teachers who have not yet mastered the method of implementing 21st century learning in their teaching and learning and this opinion is supported by Yahya et al. (2019). The teacher's outlook, understanding, and knowledge greatly influence the actions, decisions, and practices implemented in the classroom where the activities they plan affect the student's mastery of 21st century skills (Patric & Rosli, 2020; Mohd Rusdin, 2018).

Administering teaching and learning by associating it with daily life can develop students' thinking skills as well as improve student's ability to understand something better (KPM, 2017). Md. Kamary and Hamzah (2019) stated that skills in 21st century learning require students to deal with situations themselves where they learned from basic concepts to something complex to improve their understanding. By associating the concept of what they have learned with their daily life, students can develop their existing knowledge and think while solving problems related to their daily life. A study on students' outlook on the implementation of 21st century learning in learning the Malay Language which was carried out by Abraham, Mahamod, and Wan Mohamad (2017), found that students feel the most of the topics studied by them can be applied in their daily life. Other than that, fun activities that were conducted by the teachers can encourage the exploring and researching attributes in students are very helpful for students to think creatively and critically.

In conclusion, the findings of this study show that the level of secondary school Mathematics teachers' readiness in Miri, Sarawak from the cognitive aspect in the application of 21st century teaching and learning is at a moderate level. The teachers realized the importance of applying 21st century learning into their teaching and learning by integrating a lot of other related matters such as knowledge, skills, experience, and reality to ensure effective teaching and learning.

Affective Aspect - The affective domain is the second component in the classification of education (Bloom's Taxonomy) which emphasizes the tone of feelings, emotions including the internal characteristics of one's character (Bloom et al, 1984). Teachers who participated in this research agreed that they wanted to learn new knowledge related to the 21st century teaching methods to improve their mastery of concepts. The results of this study are aligned with the study conducted by Abdul Rahim and Abdullah (2017), who found that 68.0% of teachers prefer to acquire new knowledge in mastering 21st century pedagogy to improve 21st century teaching and learning skills. Also in the same study, 69.0% of teachers feel excited to learn and deepen the field of counselling to develop basic skills to increase the students' potential in teaching and learning in the 21st century. Another study conducted by Patric and Rosli (2020) has concluded that the teachers need to play a role to increase the pedagogical knowledge and skills to ensure that planned teaching and learning can be implemented effectively as both of these factors influence students' learning and understanding in the classroom.

Teachers' knowledge mastery, pedagogy, and content for Mathematics are seen to influence the decline in Mathematics scores in TIMSS dominantly (Ishak, Abdullah & Ishak, 2019). Malaysia's goal to achieve developed country status has placed education as one of the drivers of national development (Ismail, 2018). Although the teachers gave positive views regarding the implementation of 21st century learning in their teaching and learning for affective aspect, they were not sure if they can give immediate feedback on the results of students' assignments. This may be due to some problems and challenges that arise during the implementation of 21st century learning being done in the classrooms. According to the findings of a study conducted by Yahaya et al. (2019), there are still a lot of teachers that are not sure whether they can conduct activities such as lesson study, learning talk, peer coaching, teacher sharing session, and video critics due to some of the constraints faced by the teachers. Other research done by Mazlan (2017) found that even though the level of knowledge of the teachers in Training Methods is high, there are still a few who are not ready to implement it in the classroom.

In conclusion, the findings of this study show that the level of readiness of secondary school Mathematics teachers in Miri district, Sarawak in affective aspects is at a moderate level in the application of 21st century teaching and learning. Although many teachers are excited to learn new knowledge related to 21st century learning in teaching and learning, they still have problems to provide immediate feedback to students for some reasons that are not studied by this research.

Psychomotor Aspect - Researchers found that overall of the teachers have moderate level of readiness for psychomotor aspect in implementing 21st century learning in their teaching and learning in the classrooms. The teachers are aware of their duties in building various activities and also to make sure the environment is suitable and attractive throughout the teaching and learning is being conducted to ensure that the learning takes place effectively. This statement is aligned with the results obtained by

Taufik and Rosli (2020) which they found that the teachers that create learning activities plan and build appropriate and attractive teaching aid could attract the students' interest and at the same time enable the students to apply Mathematics in the activities prepared by the teachers.

The result from Batjo and Ambotang (2019) study found that the teachers who implement good teaching lesson and follow the correct procedure tend to produce a good teaching quality. Although the teachers know that the learning strategies that coincide with Mathematics teaching and learning session can increase the students' interests, a survey conducted by Mantihal and Maat in 2020 found that a lot of teachers still using the conventional one-way method of teaching and learning which caused a lot of students get bored during the process of learning Mathematics in the classrooms. Some of the factors that lead to conventional learning by the teachers is their understanding of 21st century learning (Mohd Rusdin & Ali, 2019), lack of confidence in integrating ICT technology in their teaching (Ravendran & Daud, 2019; Md Kamary & Hamzah, 2019), limited time due to the teacher need to catch up with education syllabus in a short period of time as well as a large number of students (Yahaya et al., 2019).

To ensure that the teachers implement an effective teaching and learning, an assessment needs to be done to test the students' understanding level (KPM, 2017). The result of this study found that the teachers are aware of their responsibility to provide an assessment that is appropriate to the implemented teaching and learning to test the students' understanding level. Assessment is one of the important elements applied in the national education system to ensure the effectiveness of the existing teaching and learning system (Zamri & Hamzah, 2019). In the context of Mathematics education, assessment is a process of gathering information related to students' Mathematical knowledge in daily life and make decisions related to Mathematics. Classroom appraisal is critical because it helps teachers of mathematics to make educated decisions about more lessons and thereby contributes to teaching that suits the expectations and possibilities of their students adequately (Thinwiangthong, Eddy, & Inprasitha, 2020). According to Idris and Krishnan (2016), the implementation of assessment in the Mathematics has become an important element in grade learning because assessment in Mathematics can encourage deeper learning, problem-solving and get to see feedback from students related to learning topics that have been learned in the classroom.

Apart from that, the findings of this study also show that there are teachers who have allowed the students to find alternative solutions to the problems given to the students when faced with failures such as using technology as a solution. From here you can observe that the teachers involved in this study trying to train students to imagine not according to the norm. The application of technology is increasingly synonymous with the current development of globalization. The results of this study found that the teachers have applied technology in their teaching and learning as well as encouraging students to use appropriate technology to solve Mathematical problems given by the teachers. A study was conducted by Awang et al. (2016) where the application of technology such as applying LOGO programming in learning topics related to algebra can stimulate student's high-level thinking skills when compared to teaching using only PowerPoint slides. Students are also seen to be more active in finding their own answers creatively without expecting answers from teachers in solving problems. So it is clear that the use of technology can make teaching in Mathematics, in particular, become more meaningful. Teachers nowadays cannot just concentrate on teaching just to master the content of the subject.

A study conducted by Ravendran & Daud (2019) found that the teachers do not integrate the use of ICT in teaching and learning in the classroom because they are less confident in their abilities and worry that the students may master these skills more. Another study conducted by Md Kamary and Hamzah (2019), states that the level of ICT skills among teachers is at a moderate level. Although the teachers have a high level of knowledge and readiness in implementing the use of technology in their teaching and learning, the level of infrastructure readiness must also be taken into account in ensuring the implementation of this learning method can be run smoothly. Lack of ICT infrastructure in the schools will affect the teachers' attitudes in integrating technology in their teaching and learning process (Ravendran & Daud, 2019; Md Kamary & Hamzah, 2019; Boholano, 2017; Ahmad et al., 2016).

In conclusion, the results of the study show that the level of readiness of secondary school Mathematics teachers in Miri, Sarawak is at a moderate level. Positive outlooks are shown by the teachers involved in the application of 21st century learning in their teaching and learning Mathematics. However, the readiness of the teachers does not guarantee the execution of teaching and learning by implementing 21st century learning can be done successfully.

Inferential Statistics

The results of the one-way ANOVA analysis test found that this study could not reject the hypothesis as no significant difference was seen between the teachers' age and the teachers' teaching experience on their level of understanding of 21st century learning. The level of teachers' understanding on 21st century learning in implementing teaching and learning in the classroom is observed not to be influenced by the age of the respondents as well as their experience in teaching Mathematics.

This study supports the study that was conducted by Apak and Taat (2018). Based on the findings of this study, the mean score of the teachers with over 20 years of experience is higher than other groups of teachers, but it was found that there is no significant difference in terms of the teachers' readiness based on teaching experience. Apart from that, the overseas study conducted by Hung (2016) and Nasri et al. (2017) also supports the findings of this study which is there is no significant difference between the teachers' experience of readiness in the implementation of teaching.

However, some studies do not support the findings of this study. Through literature quoted from a study by Apak and Taat (2018), stated that teaching experience is one of the factors that often associated with the level of teacher's readiness. Another study conducted by Adil (2016) also does not support the findings of this study because the study found that the readiness for change was found to have a different effect on the change to commitment based on experience. The findings of this study are contrary to the study conducted by Abdul Rahim and Abdullah (2017). The study found that the age and duration of a teacher's teaching experience do not affect the readiness of the teacher involved in implementing 21st century teaching and learning in terms of behaviour and affective but affect the cognitive aspects of the teacher. This study as a whole show that the teachers aged 50 and above have high cognitive readiness compared to the teachers of other age categories. So from here, it can be seen that senior teachers with long teaching experience have a higher readiness in terms of knowledge and implementation of 21st century teaching and learning.

Thus, it can be concluded that the age of the teachers and teaching experience does not affect the impact on the teachers' understanding of 21st century learning which began to be a priority in the national education system in Malaysia through the Malaysian Education Blueprint (PPPM) 2013 - 2025.

IMPLICATION OF FINDINGS

This study can be used as a reference for future studies to improve the quality of the education system in Malaysia. Several further research proposals are presented such as the implementation of surveys on the problems faced by the teachers throughout the implementation of 21st century learning in teaching and learning. Apart from that, the scope of the study can also be extended from the respondents of Mathematics teachers in secondary schools in Miri to the districts in Sarawak because this study is less encouraging in Sarawak. Furthermore, this study can be implemented to differentiate the practice and the teachers' understanding of 21st century learning in urban and rural areas in the districts in Sarawak.

CONCLUSION

Through this study, it can be concluded that Mathematics teachers in secondary schools in Miri district have a high level of knowledge. The level of application of 21st century learning in teaching and learning for cognitive, affective, and psychomotor aspects of the teachers that involved have a moderately high level of point of view for all three aspects. Also, this study found that the age of teachers and the duration of teachers teaching Mathematics had to influence in understanding 21st century learning which is currently being implemented in schools. The results of this study provide information related to the views of Mathematics teachers who teach in secondary schools in Miri district, Sarawak as well as the practice of applying 21st century learning in teaching and learning which they implemented briefly.

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