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THE INFLUENCE OF TPACK, CREATIVITY NURTURING BEHAVIOR AND TECHNOLOGY ACCEPTANCE OF SECONDARY SCHOOL MATHEMATICS TEACHERS ON THE IMPLEMENTATION OF 21ST CENTURY LEARNING

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Abstract:

The role of teachers in implementing 21st Century Learning (21st CL) is a demand today in building a generation that is ready to face global challenges in the future. This study was conducted to identify the influence of Technological Pedagogical Content Knowledge (TPACK), Creativity Nurturing Behavior (CNB), and Technology Acceptance (TA) on the Implementation of 21st CL (I-21st CL) by secondary school Mathematics teachers in Sabah, Malaysia. A survey method by employing a stratified random sampling technique was applied involving a total of 248 teachers. Data was collected using a set of adapted questionnaires and analyzed descriptively and inferentially. The t-test result shows a significant difference for CNB and TA based on gender. Only the TA variable showed a significant difference based on teaching experience. There is a significant relationship between TPACK, CNB, and TA with I-21st CL. SEM Path Analysis shows that the combination of the variable contribution of TPACK and CNB is as much as 37.1% towards TA. Meanwhile, the combination of the variables of TPACK, CNB and TA contributed 11.3% of changes to the I-21st CL. The full mediating effect of the TA variable was obtained in the relationship between TPACK and I-21st CL. TA is also a full mediator in the relationship between CNB and I-21st CL. In conclusion, the teacher factor plays an important role in determining the direction of students with a culture of knowledge equipped with 21st-century skills.

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Keywords:

21st Century Learning, Creativity Nurturing Behavior, Mathematics Teacher, Technology Acceptance, Technological Pedagogical Content Knowledge (TPACK),

Introduction

21st century learning (21st CL) is an approach that is in line with the era of globalization in producing a skilled and competent generation. In 21st CL, students should be equipped with the 4C skills (Communication, Collaboration, Critical Thinking, Creativity) in line with the world's economic and technology developments. Therefore, the teacher's role in implementing 21st CL becomes a current demand in building a generation that is ready to face global challenges in the future. In this regard, the implementation of 21st CL (I-21st CL) requires teachers to master 21st century pedagogical skills. Teachers' mastery of 21st century pedagogy in particular means that teachers have the skills to integrate ICT in teaching and learning (TL), to adapt to the pedagogy and use of 21st century TL concepts and techniques (Ministry of Education Malaysia, 2015). In order to achieve effective teaching, teachers need to have a high level of pedagogical competence (Edmond & Hayler, 2013). High Technological pedagogical Content Knowledge is believed to be able to increase teacher readiness and help teachers make better plans (Jusoh & Osman, 2019).

In addition, nurturing teacher creativity in the classroom has been emphasized for a long time in Malaysia. The importance of creativity as part of the education element is gaining ground and the emphasis on creativity is a driving force for the nation's prosperity in achieving the educational vision (Wyse & Ferrari, 2015). In the curriculum of most countries, the concept of creativity is used to encourage the learning process (Park et al., 2017). However, Bloom and Doss (2019) stated that the high focus on assessment aspects and curriculum standards has minimized the space to cultivate creative thinking skills in the classroom, even though creative thinking is one of the important objectives in 21st CL. The importance of achieving performance is one of the reasons why teachers ignore creativity in their teaching and learning. Today, teachers are faced with the challenges of 21st CL which demands that teachers to be ready to change. The ability of teachers to change will put today's education in line with the development of an environment that will be able to meet the needs of students and society. The development of students from the aspects of personality, academics and co-curriculum is the result of meaningful teacher education which has successfully complied with the wishes and expectations contained in the National Education Philosophy. This shows that the teachers' readiness such as the acceptance of technology is also a critical factor and is strongly emphasized to meet the needs of changes in the country's education system. Several studies have been done on Technology Acceptance (TA) (Singh & Chan, 2014). However, the focus of previous studies mostly did not relate to the I-21st CL.

Meanwhile, the literature shows that among the factors that become an important issue in influencing differences in teachers' practices and perceptions are demographic characteristics, especially gender factors and teaching experience (Unal & Unal, 2012). According to Bereczki and Karpati (2018), demography is labelled as a factor capable of influencing a teacher's judgment, values, and beliefs regarding an issue raised. Liu et al. (2010) also stated that direct teaching experience has a connection with deep understanding and a broader knowledge base

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among teachers related to educational practice. This also explains why inexperienced and experienced teachers often have differences in views, beliefs, attitudes and behaviours related to educational issues.

The Sabah State Education Department (SSED) plays a role in culturalizing the I-21st CL in line with current educational demands. Based on instructions issued through the State Curriculum Committee Meeting No. 1/2018 dated 01 February 2018, SSED has decided that 2018 is the year of I-21st CL by all schools in the state based on the 21st CL Information Kit of the Malaysian Ministry of Education. Although the written official instructions have been issued, the fact that the culture of 21st CL and its management among teachers is still lacking. Teachers are said to be faced with challenges such as time constraints, insufficient knowledge and limited ICT resources and facilities (Mohd Rusdin & Ali, 2019). Therefore, this study was conducted to examine the I-21st CL among school teachers and to identify if Technological Pedagogical Content Knowledge, Creativity Nurturing Behavior and Technology Acceptance have a relationship and influence on the I-21st CL.

Literature Review

21st Century Learning (21st CL)

Previous studies show that the I-21st CL involves various subject areas and types of study samples. Several studies show that the I-21st CL is practised at a high level, especially in the aspects of creativity, critical thinking, and collaboration (Seman et al., 2019; Raja Ismail & Ismail, 2018). Despite this, the literature also notes moderate or low implementation, indicating the need to better understand the concept and master current technology (Yahaya et al., 2019; Yunos, 2015). Yunos (2015) found that 21st-century skills in the teaching and learning (TL) process were not applied by teachers, causing students to have less exposure to 21st-century skills. However, for the needs of the 21st century, teachers are required to be facilitators, think critically and openly, and facilitate and be able to integrate technology into their TL (Amin, 2016; Pavlovic & Petrovic, 2017).

Various 21st CL methods have been studied, including game-based learning and project-based learning, which offer opportunities for students to acquire critical thinking skills, collaboration, and creativity (Qian & Clark, 2016; Hixson et al., 2012). Student-centred learning and the use of technology become the main focus, with the need for teachers to acquire ICT skills and further update their knowledge (Umar & Mohd. Yusuff, 2014). The I-21st CL at all levels of education needs to be continued with a deep understanding of the skills required by students to succeed in the modern world that is constantly changing (Makaramani, 2015). Although many studies emphasize the importance of technology integration in 21st CL and its relationship with fostering student creativity, there is still a lack of comprehensive understanding of how Technological pedagogical Content Knowledge specifically affects the Creativity Nurturing Behavior in the context of 21st-century learning. Further research is needed to fill this gap, focusing on the influence of Technology Acceptance in supporting content learning and fostering student creativity in 21st-century learning.

Technological pedagogical Content Knowledge (TPACK)

Technological pedagogical Content Knowledge (TPACK) refers to teaching that uses technology and pedagogical approaches to deliver a skill or curriculum content to students (Mishra & Koehler, 2006). In this study, TPACK means the ability of secondary school

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Mathematics teachers to blend, integrate and transfer knowledge about digital technology, pedagogy and subject content for a skill or topic so that it is easy for all students to understand by taking into account the knowledge related to technology, pedagogy and content during the I-21st CL. The sub-constructs of TPACK are Content Knowledge, Pedagogical Knowledge and Technological Knowledge.

Previous studies in the field of TPACK have played an important role in understanding the relationship between content, pedagogy, and technological knowledge as well as teachers' willingness to integrate it into teaching (Khor & Lim, 2014; Harits et al., 2019). Research findings also show that there is a significant relationship between TPACK and content knowledge and pedagogical knowledge where pedagogical knowledge is believed to have the highest influence (Chai et al., 2010; Schmidt et al., 2009). The findings of this study are consistent with the TPACK theory proposed by Mishra and Koehler (2006) that these three domains of basic knowledge are interrelated and contribute towards the mastery of TPACK. In addition, the level of strength of the relationship is also consistent with the findings of Schmidt et al. (2009) which is according to the order of pedagogical knowledge, technological knowledge and content knowledge. The findings of this study are important to determine the appropriate type of courses, workshops and teacher professionalism training to improve the mastery of skills and TPACK among mathematics teachers.

The use of technology in teaching has also been proven to have a great impact on increasing teachers' willingness to integrate technology in the classroom (Zolkefli et al., 2017). Although TPACK is considered important in implementing technology-based 21st CL, some studies also show that the level of teachers' understanding of TPACK is still at a moderate level (Avidov-Ungar & Eshet-Alkakay, 2011). Research conducted by several studies such as Scherer et al. (2017), Chua and Jamil (2014), Chong (2017), as well as Ozudogru and Ozudogru (2019), show that male teachers tend to have a higher level of knowledge in all TPACK domains compared to female teachers. Despite this, a study by Ismail and Haron (2018) showed that only the Technological Knowledge domain was higher among male trainee teachers, in line with the findings of previous studies. Although many studies have been done on TPACK and have different findings, there is a lack of in-depth understanding of how gender affects the I-21st CL among mathematics teachers. Therefore, this study aims to fill this research gap by quantitatively analysing gender factor in the 21st CL among mathematics teachers.

Creativity Nurturing Behavior (CNB)

Nurturing creativity is closely related to teacher behaviour in the classroom (Dikici & Soh, 2015). Many studies have examined the role of teachers in fostering students' creativity. In this context, teacher behaviour is considered important because it is evaluated as an indicator of their ability to teach creatively in class. Several studies show that teachers have high confidence in their creative practices in the classroom and make efforts to develop students' creativity (Cheung, 2012; Chan & Yuen, 2015). Apak and Taat (2018) show that the behaviour of fostering creativity among teachers and the I-21st CL is practised at a high level. Studies abroad also produced the same results, showing that creativity nurturing behaviour (CNB) is practised at a high level in various contexts (Hondzel, 2013; Ozkal, 2014; Al-Nouh et al., 2014; Rubenstein et al., 2018). Studies have found that female teachers tend to show higher creativity and nurturing behaviour (Ozkal, 2014; Apak & Taat, 2018), but some studies state the opposite (Leikin et al., 2013; Snell, 2013). Teaching experience also plays an important role in teachers' creativity nurturing behaviour. Some studies show that teachers with less than five years of

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teaching experience have high level of creativity and innovation (Loogma et al., 2012; Al-Nouh et al., 2014), while other studies state that teachers with more than 10 years of teaching experience have higher creativity (Rubenstein et al., 2018; Apak, 2019).

Studies show that teachers who can trigger and develop students' creativity will make them feel brave in taking risks in learning (Serdar, 2015). In addition, the aspect of freedom in the classroom environment is also seen as an important factor in influencing student creativity (Ariffin & Baki, 2014). In this context, the teacher's role in creating a creative learning environment becomes very important to develop students' creativity potential (Davies et al., 2014). However, there is still a lack of research conducted on the behaviour of fostering creativity among mathematics teachers (Beghetto, 2008). Therefore, this study was carried out to evaluate if mathematics teachers play a role in creating a positive environment that encourages creativity. This study suggests the need for more in-depth research to understand the influence of creativity nurturing behaviour on 21st CL among mathematics teachers.

Technology Acceptance (TA)

Technology Acceptance (TA) refers to the willingness of users to adopt and use technology to perform certain tasks (Teo, 2010) and assist users in planned tasks (Dillon & Morris, 1996). Davis (1989) categorized TA into four constructs namely Perceptions of Usefulness, Perceptions of Ease of Use, Facilitating Conditions and Attitudes towards Technology Use.

An individual's willingness to change is influenced by the individual's level of awareness and psychological tendencies (Vakola, 2013). Previous studies have shown that teachers' willingness to accept technology is high (Ismail et al., 2013), especially in the context of teaching Tamil (Halili & Suguneswary, 2016). However, the findings of Summak et al. (2010) and Noh et al. (2014) showed that teachers' acceptance of technology as a whole is at a moderate level, with some studies reporting that teachers' willingness to integrate technology is at a low level in the classroom (Sidek & Hasan, 2015). In addition, factors such as ICT knowledge and skills, as well as perceptions of the benefits of technology, also affect teacher readiness to adopt and use technology in TL (Alazam et al., 2013; Teo, 2014).

Research findings also show that the use of ICT in teaching Mathematics can improve students' understanding of basic concepts (Ittigson & Zewe, 2003). However, there are challenges such as lack of time, insufficient school infrastructure, and teachers' lack of knowledge in fully using ICT that hinder teachers' willingness to integrate ICT in the classroom (Lubis et al., 2017). Teacher readiness is also an important variable that affects the I-21st CL (Sun et al., 2017). There is a gap in this study that needs to be studied further, which is the need for research on the factors that influence teachers' willingness to accept technology, especially in the context of 21st CL which is increasingly related to technology. Thus, to improve teacher readiness, aspects such as improving teachers' ICT knowledge and skills, providing adequate infrastructure, and increasing perceptions about the benefits of technology need to be given particular attention in the I-21st CL.

Technology Acceptance (TA) as a Mediator

Mediating variables, such as TA, play an important role in explaining the relationship between two related variables in the study. The TA Model (TAM) has been widely used in this context (Apak, 2019). TAM emphasizes the notion of usefulness and ease of use as the main construct in understanding the acceptance of technology by users (Ngampornchai & Adam, 2016). Studies by Elsayed and Shabbat (2025) and Salleh et al. (2021) showed that TAM plays an

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important role as a mediator in explaining the factors that influence teachers' willingness to use technology in TL. However, the role of TAM as a mediator between TPACK, CNB and 21st CL has not been studied much. Therefore, this study was carried out to examine if TA can explain the influence between TPACK, CNB and 21st CL as suggested by Apak (2019). Apak's study (2019) makes the TA model as one of the elements in the teacher's readiness factor and acts as a mediator in managing the 21st-century classroom showing the close relationship between technology and the I-21st CL.

Research Conceptual Framework

Figure 1 visually represents this research conceptual framework, demonstrating how the influence either directly or indirectly of the independent variables on dependent variable. Based on the previous studies, the researchers set the implementation of 21st century learning as a dependent variable, while Technological Pedagogical Content Knowledge, Creativity Nurturing Behavior, and Technology Acceptance are the independent variables of the study. Technology Acceptance is set as a mediating variable in the relationship between Technological Pedagogical Content Knowledge and creativity fostering behavior with the implementation of 21st century learning.

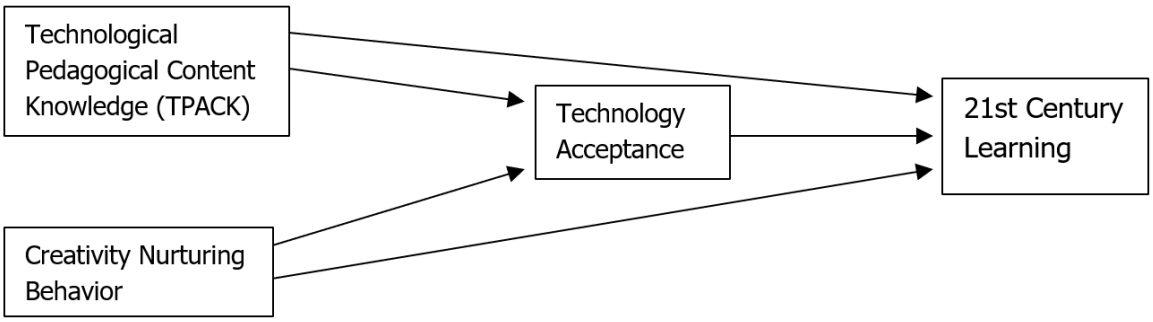

Figure 1: Conceptual Framework of the Study

The Purpose of the Study

In general, this study was carried out to determine the relationship and influence of Technological Pedagogical Content Knowledge (TPACK), Creativity Nurturing Behavior (CNB) and Technology Acceptance (TA) on the Implementation of 21st CL (I-21st CL) of secondary school Mathematics teachers. Specifically, the objectives of this study were to determine:

1. the level of TPACK, CNB, TA and I-21st CL among secondary school Mathematics teachers.
2. whether there is a difference in the mean score of TPACK, CNB, TA and I-21st CL among secondary school Mathematics teachers based on gender.
3. whether there is a difference in the mean score of TPACK, CNB, TA and I-21st CL among secondary school Mathematics teachers based on teaching experience.
4. whether there is a relationship between TPACK, CNB, TA and I-21st CL.
5. whether there is an influence of TPACK and CNB on TA.
6. whether there is an influence of TPACK, CNB and TA on the I-21st CL.
7. whether TA mediates the relationship between TPACK and I-21st CL.
8. whether TA mediates the relationship between CNB and I-21st CL.

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Methodology

Population and Sample

In this study, the population is specifically referred to regular secondary school Mathematics teachers in the West Coast Zone of Sabah which consists of 6 districts. The population of this study is a total of 692 optional or non-optional Mathematics teachers who are still in service, where 227 (32.8%) teachers are male teachers while 465 (67.2%) teachers are female teachers. Based on Krejcie and Morgan's (1970) sample size determination method, the sample size for a population of 692 is 248 people. To determine the number of samples of teachers from each stratum, i.e. district, a non-proportional stratified random sampling technique was used, and the ratio between male and female teachers for each stratum was set at 3:7, in line with the ratio between male and female teacher populations. Next, the selection of schools in each stratum was done using a probability sampling technique proportional to the size considering that all schools in each district have a different number of samples. To avoid oversampling, this study was limited to only half the number of randomly selected schools from each stratum.

Instrumentation

The instrument used in this study contains five Parts namely: 1) Part A: Demographic Information; 2) Part B: TPACK; 3) Part C: CNB; 4) Part D: TA; and 5) Part E: I-21st CL. Based on the findings of a pilot study involving 100 Mathematics teachers, the TPACK, CNB, TA and I-21st CL measures have evidence of construct validity and reliability assessed using the Rasch Measurement Model. In addition, this instrument also contains content validity that is confirmed by being reviewed by a panel of five experts who are experienced in the field of curriculum and teaching and skilled in the study variables.

Demographic Information

Part A is related to teacher demographic information. The items in this section determine the teacher's gender and teaching experience. Teaching experience is categorized into three main groups which are new teachers (novice), experienced teachers, and very experienced teachers (Yeo et al., 2008). The three groups are represented by groups with less than 10 years, 10 to 20 years, and more than 20 years of professional teaching experience.

TPACK Instrument

Part B aimed to measure the TPACK of Mathematics teachers. The researcher has adapted the TPACK instrument developed by Schmidt et al. (2009) and Hosseini and Kamal (2012) to explain this variable. The TPACK instrument used a 5-point Likert scale from 1 which is "Strongly Disagree" to 5 which is "Strongly Agree". The TPACK instrument consists of 15 items representing three main constructs, namely: 1) Content Knowledge (6 items) – Example: "I can set up a laptop/LCD in class without the help of others."; 2) Pedagogical Knowledge (5 items) – Example: “I know how to manage a class.”; and 3) Technological Knowledge (4 items) – Example: “I am good at using software related to mathematics”. The items in this section are all positive. The construct validity of the TPACK instrument was analyzed based on the analysis of the fit order of the items in the Rasch Measurement Model. Three criteria were used to assess the appropriateness of items according to Boone et al. (2014) and Bond and Fox (2015) namely: 1) Outfit Mean Square Values (MNSQ) – the value must be between 0.50 and 1.50; 2) Outfit Z-Standardized Values (ZSTD) – the value must be between -2.00 and 2.00; and 3) Point Measure Correlation (PTMEA-CORR) – the value must be between 0.40 and 0.85. To ensure the appropriateness of the study items, the researcher was guided by the

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recommendations of Sumintono and Widhiarso (2015) who insisted that any item that does not meet these three criteria should be considered for removal or purification. Findings from the evaluation of item suitability in Rasch analysis indicate that there is one item that is within the unacceptable range for all criteria Outfit MNSQ, Outfit ZSTD and PT MEASURE-CORR. The researcher decided to drop this item and this made the TPACK variable reduced to 14 items. Meanwhile, the reliability of the TPACK which was also analyzed using Rasch analysis reported good index values for item reliability (0.95) and respondent reliability (0.87).

Creativity Nurturing Behavior (CNB) Instrument

Part C, was used to measure the CNB of Mathematics teachers. This CNB instrument was adapted from the Creativity Nurturing Teacher Behavior Index instrument developed by Soh (2010) which is based on Cropley's (1997) study. The CNB instrument contains four constructs and 20 items, namely: 1) Motivation (5 items) - Example: "I hope students master the basic skills of Mathematics well."; 2) Consideration (5 items) – Example: "I comment on the student's idea after it has been carefully explored."; 3) Question (5 items) – Example: "I care about every suggestion that the students put forward."; and 4) Opportunities (5 items) – Example: "I give appreciation to students who produce tasks creatively.". The measurement scale used in CNB instrument is a 5-point Likert Scale from 1 "Very Rare" to 5 "Very Often". All item statements in the CNB instrument are positive. The construct validity of the CNB instrument was also analyzed based on the analysis of the appropriateness of the items in the Rasch Measurement Model. Findings from the evaluation of item suitability in Rasch analysis indicate that all items meet at least one criterion of Outfit MNSQ, Outfit ZSTD and PT MEASURE-CORR. The researcher decided to use all the items in the actual study. Meanwhile, the reliability of the CNB instrument which was also analyzed using Rasch analysis reported good index values for item reliability (0.94) and respondent reliability (0.90).

Technology Acceptance (TA) Instrument

Part D, was used to measure the TA of Mathematics teachers. This TA instrument was adapted from a combination of the Technology Acceptance Measure (TAM) instrument by Davis (1989) and the TA instrument, for preservice Teachers by Teo (2010). These two instruments are combined because they coincide as a variable measurement tool for TA in the context of national education. The TA instrument contains 13 items representing 4 constructs, namely: 1) Perception of Usefulness (4 items) – Example: "Digital technology is a useful tool in my work."; 2) Ease of Use Response (3 items) – Example: "Digital technology makes it easier for me to interact with students virtually."; 3) Facilitating Conditions (3 items) – Example: "There are specific guides that can help me when using digital technology."; and 4) Attitude towards the use of technology (3 items) – Example: "I like to use digital technology.". The measurement scale used in TA instrument is a 5-point Likert scale from 1 "Strongly Disagree" to 5 "Strongly Agree". All items in this section are drafted in a positive form. The construct validity of the TA instrument was also analyzed based on the analysis of the item fit in the Rasch Measurement Model. Findings from the evaluation of item suitability indicate that there is one item that is within the unacceptable range for all criteria Outfit MNSQ, Outfit ZSTD and PT MEASURE-CORR. The researcher dropped this item and this made the items of TPACK reduced to 12 items. Meanwhile, the reliability of the TA instrument which was also analyzed using Rasch analysis reported good index values for item reliability (0.90) and respondent reliability (0.95).

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I-21st CL Instrument

Part E was used to measure the I-21st CL by Mathematics teachers. The I-21st CL instrument was adapted from the 21st Century Teaching and Learning Survey instrument by Ravitz (2014). Overall, the I-21st CL contains 20 items representing 4 constructs, namely: 1) Communication Skills (4 items) – Example: "Making conclusions based on the analysis of relevant information."; 2) Collaboration Skills (3 items) – Example: "Creating a product together using contributions from each student."; 3) Critical Thinking Skills (3 items) – Example: "Answer the questions asked with confidence."; and 4) Creative and Innovative Skills (3 items) – Example: "Generate their ideas to solve questions.". The measurement scale used in the I-21st CL instrument is a 5-point Likert Scale that ranges from 1 "Very Rare" to 5 "Very Often". All items in this section are drafted in a positive form. The construct validity of the I-21st CL was also analyzed based on the analysis of the item fit in the Rasch Measurement Model. Findings from the evaluation of item suitability indicate that all items meet at least one criterion of Outfit MNSQ, Outfit ZSTD and PT MEASURE-CORR. The researcher decided to use all the items in the actual study. Meanwhile, the reliability of the I-21st CL instrument which was also analyzed using Rasch analysis reported good index values for item reliability (0.93) and respondent reliability (0.88).

Data Analysis Procedures

Descriptive statistical analysis involving frequency, percentage, and mean was used to comprehensively describe the respondent's background, i.e. gender and teaching experience, as well as the level of the variables studied as in objective No.1. The measurement of the level of TPACK, CNB, TA and I-21st CL in particular was based on three mean score levels, namely low (1.00 – 2.33), medium (2.34 – 3.67), and high (3.68 – 5.00). While inferential statistical analysis was used to assess objectives No.2 to No.8. t-test and One Way ANOVA were respectively used to assess objectives No. 2 and No. 3 which were used to compare the mean scores of study variables based on gender and teaching experience. Meanwhile, Pearson's Correlation Coefficient Test was used to assess objective No. 4 which was to determine the relationship between TPACK, CNB, TA and I-21st CL. Next, Structural Equation Modeling (SEM) path analysis was used to assess objectives No.5 to No.8. Through this study, SEM analysis was used to identify the influence of changes in two or more independent variables/predictors (exogenous) that contribute to variance in the dependent variable (endogenous). In this case, the predictor variables were TPACK, CNB, and TA, while the dependent variable was I-21st CL. The R^2 value was then used as an indicator in explaining the contribution to the change of a predictor variable to the dependent variable of the study, while the strength of influence of the predictor variable was shown in the beta (β) weighting value. In addition, SEM analysis in this study was also used to determine the direct and indirect influence and to determine the appropriateness of the model developed with the study sample data. According to Hair et al. (2014), model fit can be determined by using at least one index from each model fit category, namely 1) Absolute Fit: Root Mean Square of Error Approximation (RMSEA); 2) Incremental Fit: Comparative Fit Index (CFI), Incremental Fit Index (IFI), and Tucker Lewis Index (TLI); and 3) Chi-Square: the relative chi-square (CMIN/DF). Schumacker and Lomax (2004) suggest that to obtain a good model, the RSMEA value should be less than 0.5 to be considered good, while the acceptable RSMEA value is between 0.05 and 0.08. Meanwhile, acceptable values of CFI, TLI, and IFI are more than 0.90. For CMIN/DF, values should be between 1 and 5 to be considered appropriate and acceptable. Before analyzing the data to meet the objectives of the study, the researcher has complied with the initial assumptions for hypothesis tests such as identifying outliers, evaluating normal

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distribution, equality of covariance, linearity of variables, multicollinearity, and homogeneity of variance.

The SEM analysis that was developed involved three predictor variables, namely TPACK, CNB and TA. While the dependent variable is represented by the I-21st CL. The TA was also placed as a mediating variable of the study. The specification of the analysis model of the path of influence between the study variables is shown in Figure 2. The results of the analysis show that the SEM model developed has a reasonable fit with the study sample data (CMIN/DF = 1.493, RSMEA = 0.045, CFI = 0.919, IFI = 0.920, TLI = 0.914).

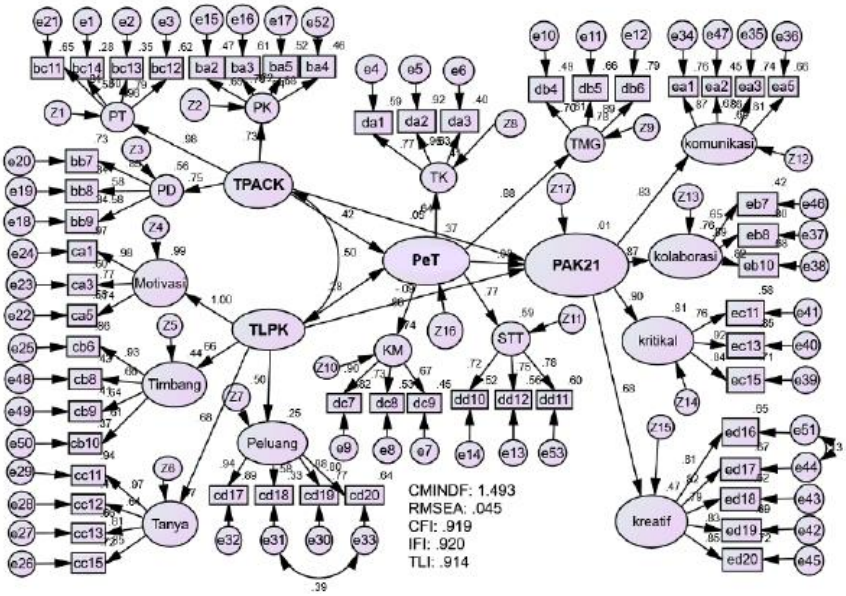

Figure 2: Structural Equation Model on the Influence of Independent Variables on the Dependent Variables

Findings

Level of TPACK, CNB, TA and I-21st CL

Referring to Table 1, the mean score of all variables shows a value that exceeds 3.67, which means a high level. The mean score of the I-21st CL is the highest, while the mean score of the TA is the lowest. For the TPACK, the Content Knowledge construct (M = 4.213, SD = 0.629) obtained the highest score, while the mean score of the Pedagogical Knowledge construct (M = 3.869, SD = 0.745) was the lowest. The CNB shows that the Question construct has the highest mean score (M = 4.132, SD = 0.504) and the Opportunity construct (M = 4.023, SD = 0.586) has the lowest mean score. For the TA, the mean score of Perception of Usefulness (M = 4.137, SD = 0.544) obtained the highest score compared to Attitude Towards the Use of Technology which had the lowest score (M = 3.870, SD = 0.761). Meanwhile, the mean score of the Creativity and Innovation Skills construct (M = 4.145, SD = 0.641) is the highest for the I-21st CL, while the Collaboration Skills construct (M = 4.051, SD = 0.661) has the lowest mean score.

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Table 1: Mean Score of Research Variables and Constructs

Variables/ Constructs	*M*	*SD*
Technological Pedagogical Content Knowledge (TPACK)	**4.071**	.540
Content Knowledge	4.213	.629
Pedagogical Knowledge	3.869	.745
Technological Knowledge	4.060	.554
Creativity Nurturing Behavior (CNB)	**4.080**	.423
Motivation	4.060	.510
Consideration	4.107	.449
Question	4.132	.504
Opportunity	4.023	.586
Technology Acceptance (TA)	**4.013**	.563
Feedback on Usefulness	4.137	.544
Easy Response	4.106	.672
Facilitating Conditions	3.940	.704
Attitudes towards the use of technology	3.870	.761
Implementation of 21st CL (I-21st CL)	**4.090**	.535
Communication skills	4.062	.646
Collaboration Skills	4.051	.661
Critical Thinking Skills	4.100	.658
Creativity and Innovation Skills	4.145	.641

Difference in TPACK, CNB, TA and I-21st CL based on gender

Based on Table 2, there is no significant difference in TPACK (t = -5.83, p = 0.560) and I-21st CL (t = -1.964, p = 0.051) between male and female teachers. On the other hand, there is a significant difference in CNB (t = -5.406, $p < 0.05$) and TA (t = -3.437, $p < 0.05$) between male and female teachers, where female teachers have a higher mean score compared to male teachers in these two variables.

Table 2: T-Test Analysis of TPACK, CNB, TA and I-21st CL based on Gender

Variable	Gender	*M*	*SD*	t-value	*df*	*P*
TPACK	Male	4.044	0.432	-.583	190.337	.560
	Female	4.083	0.583			
CNB	Male	3.874	0.414	-5.406	246	< .05
	Female	4.172	0.394			
TA	Male	3.832	0.541	-3.437	246	.001
	Female	4.093	0.555			
21st CL	Male	4.002	0.407	-1.964	199.424	.051
	Female	4.128	0.580			

Difference in TPACK, CNB, TA and I-21st CL based on teaching experience

Table 3 shows the mean score of research variables according to teaching experience. While Table 4 displays the results of a one-way ANOVA that compares research variables based on teaching experience. Based on the F-statistics, only the TA has a significant difference based on teaching experience [$F(2, 245) = 10.791$, $p < .05$)]. Next, a Post Hoc Multiple Comparisons analysis was performed to examine which pairs of mean scores in the same group showed significant differences. The results show that there is a significant difference in the mean score

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of TA based on teaching experience, that is for teachers who have teaching experience of 10 years or less with 10 - 20 years ($p < .05$). Referring to the mean score value in Table 3, the group of teachers with teaching experience of 10 years or less ($M = 4.164$) is higher compared to teachers with 10 - 20 years of teaching experience ($M = 3.837$).

Table 3: Mean Score of Research Variables According to Teaching Experience

Experience		TPACK	CNB	TA	21st CL
Less than 10 years	*M*	4.070	4.126	4.164	4.221
	SD	0.240	0.252	0.393	0.399
10 – 20 years	*M*	4.047	4.018	3.837	4.021
	SD	0.554	0.382	0.497	0.421
More than 20 years	*M*	4.105	4.136	4.154	4.094
	SD	0.664	0.547	0.675	0.719

Table 4: One-way ANOVA analysis of TPACK, CNB, TA and I-21st CL based on Teaching Experience

Variable		*Sum of Square*	*df*	*Mean Square*	*F*	*P*
TPACK	Between Groups	.158	2	.079	.269	.764
	In Group	71.959	245	.294		
	Overall	72.117	247			
CNB	Between Groups	.792	2	.396	2.238	.109
	In Group	43.331	245	.177		
	Overall	44.123	247			
TA	Between Groups	6.333	2	3.167	10.791	< .05
	In Group	71.895	245	.293		
	Overall	78.228	247			
21st CL	Between Groups	1.509	2	.754	2.672	.071
	In Group	69.174	245	.282		
	Overall	70.683	247			

Relationship between TPACK, CNB, TA and I-21st CL

The results of the correlation test coefficient in Table 5 prove that there is a very weak positive relationship that is significant between TPACK ($r = 0.162$, $p < 0.01$), CNB ($r = 0.191$, $p < 0.01$), and TA ($r = 0.300$, $p < 0.01$) with I-21st CL.

Table 5: Pearson Correlation Analysis between TPACK, CNB and TA with 21st CL

Variable		TPACK	CNB	TA
21st CL	Correlation Pearson	.162	.191	.300
	p	< 0.01	< 0.01	< 0.01

Influence of TPACK and CNB on TA

Based on Table 6, the value of the beta coefficient and the level of significance for the predictor variables show that if TPACK increases by one standard deviation unit, it causes an increase in TA by 0.430 ($\beta = 0.430$, $C.R = 4.020$, $p < 0.01$) unit deviation standard. Next, if the CNB increases by one standard deviation unit, it also increases TA by 0.213 ($\beta = 0.213$, $C.R = 3.576$, $p < 0.01$) standard deviation unit. The R^2 value obtained shows that the predictor variables,

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namely TPACK and CNB, can predict TA by 37.1% of the variance. This means that 62.9% of the variance in the TA is due to other factors that are not included in this SEM model. Since the significant value is less than .01, it is evident that both predictor variables namely TPACK and CNB have a significant influence on TA.

Table 6: The influence of TPACK and CNB on TA

Variable	R^2	β	S.E	C.R	P	Result
TA ←TPACK	0.371	0.430	0.107	4.020	< .001	Significant
TA←CNB		0.213	0.060	3.576	< .001	Significant

Influence of TPACK, CNB and TA on the I-21st CL

Based on Table 7, the value of the beta coefficient and the level of significance for the predictor variables show that if TPACK increases by one standard deviation unit, it causes an increase in I-21st CL by 0.004 (β = 0.004, *C.R* = 0.173, $p > 0.01$) standard deviation unit. Next, if the CNB variable increases by 1 standard deviation unit, it also increases I-21st CL by -0.028 (β = -0.028, *C.R* = -0.284, $p > 0.01$) standard deviation unit. If TA increases by 1 standard deviation unit, it causes an increase in I-21st CL by 0.565 (β = 0.565, *C.R* = 3.273, $p > 0.01$) standard deviation unit. The R^2 value obtained shows a value of 11.3% variance. However, although TPACK, CNB and TA can predict I-21st CL by 11.3%, but all predictor factors are not significant. This means that 88.7% of the variance in the I-21st CL is due to other factors that are not included in this structural equation model. Because the significant value for TPACK, CNB and TA is more than $p > 0.01$, it is evident that the three predictor variables do not have a significant influence to the I-21st CL.

Table 7: The influence of TPACK, CNB and TA on 21st CL

Variable	R^2	β	S.E	C.R	P	Result
21st CL ←TPACK	0.113	0.004	0.173	0.026	0.979	Not Significant
21st CL ←CNB		-0.028	0.098	-0.284	0.776	Not Significant
21st CL ←TA		0.565	0.173	3.273	0.501	Not Significant

The Mediating Effect of TA between TPACK and I-21st CL

The role of the TA as mediating variable whether or not it has a significant effect on the relationship between TPACK and the I-21st CL was also tested through the SEM model as shown in Figure 3. Based on Figure 3, it was found that the direct effect of the TPACK on the I-21st CL is not significant. Meanwhile, the indirect effect of the relationship between the TPACK and I-21st CL after TA is included as a mediator is significant. Based on the analysis results obtained (Figure 3), it was found that the indirect effect (0.53*0.33 = 0.175) is statistically significant while the direct effect (β = .010) is not statistically significant. Therefore, the total effect is 0.175 + 0.01 = 0.185. This shows that TA is a full mediator. From the results obtained, TPACK has an indirect effect on the I-21st CL through the intermediary of the TA. Therefore, this finding shows that TA is a full mediator (complete mediating) on the I-21st CL for secondary school Mathematics teachers.

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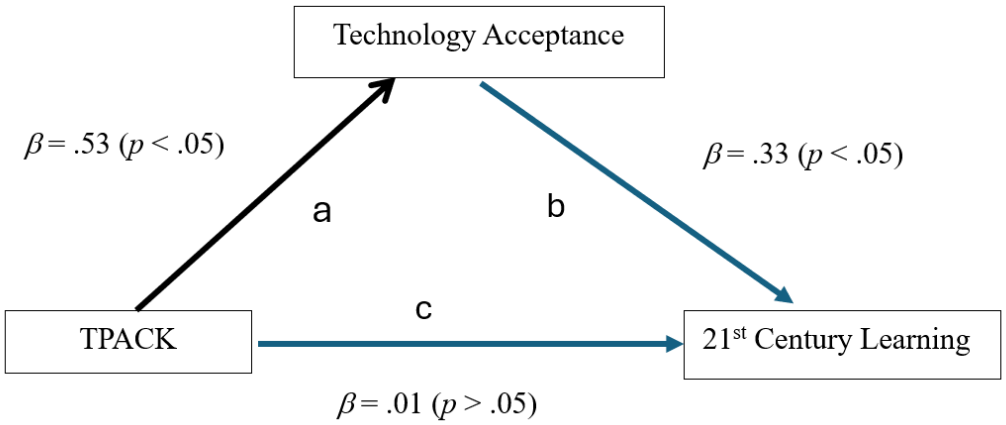

Figure 3: Standardized Regression Coefficient of TA Influence between the relationship between TPACK and 21st CL

The Mediating Effect of TA between CNB and I-21st CL

Based on Figure 4, it was found that the direct effect of the CNB on the I-21st CL is not significant. Meanwhile, the indirect effect of the relationship of CNB and I-21st CL after TA is included as a mediator is significant. Based on the analysis results obtained, it was found that the indirect effect (0.49*0.34 = 0.167) is statistically significant while the direct effect (β = -.02) is not statistically significant. Therefore, the total effect is 0.167 + (-0.02) = 0.147. From the results obtained, CNB has an indirect effect on the I-21st CL through the mediator of the TA. Therefore, this finding shows that TA is a complete mediator of the I-21st CL for secondary school Mathematics teachers.

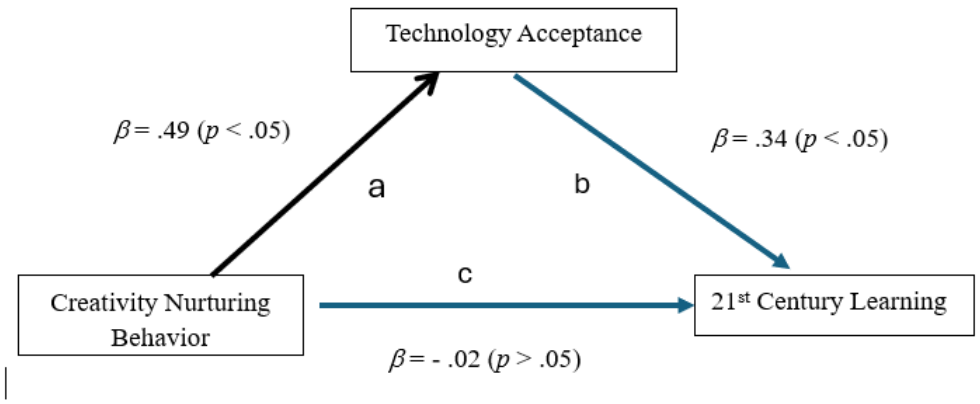

Figure 4: Standard Regression Coefficient of TA Influence between CNB Relationship with 21st CL

Discussion

Levels of TPACK, CNB, TA and I-21st CL

The findings of the study show that each construct and overall TPACK is at a high level among Mathematics teachers. Of the three TPACK constructs in this study, the Content Knowledge construct is the highest followed by Technological Knowledge and Pedagogical Knowledge.

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In relation to that, the findings show that teachers have high content knowledge in the Mathematics subject taught. The results of this study are in line with Khor and Lim (2014), Chai et al. (2010) and Schmidt et al. (2009) who found that Content Knowledge, Pedagogical Knowledge and Technological Knowledge are significant to TPACK. This means that teachers are not only able to handle teaching materials in an orderly manner, but at the same time are able to use technology that suits the students' abilities. According to Mishra and Koehler (2006), teachers should see technology as a tool that can be used to improve their teaching process and student learning based on theories of the process of integrating technology, pedagogy and content. Although technology has opened the door to a new world with a variety of options or delivery patterns, the process of learning development still needs to be paralleled with pedagogy.

Next, the frequency of teachers in implementing CNB in the classroom is also at a high level. The level of all four constructs of CNB is also high, where the Inquiry element is the highest followed by Consideration, Motivation and Opportunity. Concerning that, this finding shows that Mathematics teachers in the state of Sabah have a high level of creativity nurturing behaviour when carrying out teaching and learning activities, in line with the findings of the study by Rubenstein et al. (2018). The CNB of teachers that is often practiced in the classroom as obtained through this study coincides with the wishes of the Malaysian Ministry of Education which takes seriously the emphasis on the element of creativity in teacher teaching. This is so because creativity nurturing behaviour is recognized as an important essence of teaching in the classroom (Chan & Yuen, 2014). Through this study, the frequency of teachers nurturing creativity is proven through their role in promoting the integration of cooperation between students during teaching sessions. This finding is in line with the study of Davies et al. (2014) who explained the importance of the teacher's role in nurturing creativity through building positive relationships and creating opportunities for student collaboration. The integration in the practice of nurturing creativity which is acknowledged to be often done by teachers through this research includes providing opportunities to share ideas, collaborating in groups, and encouraging students to submit their suggestions or views.

The findings of this study also show that teachers perceive themselves as having a high level of TA, which is not in line with Summak et al. (2010) who concluded that the TA level of teachers in their study location is moderate. Of the four constructs of TA in this study, the Perception of Usefulness construct is the highest followed by Perception of Ease of Use, Facilitating Conditions and Attitude towards Technology Use. The details of the situation show that the teacher's perception is at a moderate level in all aspects of the assignment cannot be completed due to the lack of technology and communication facilities offered in their respective schools. This situation is related to the state of Sabah, which is still far behind in terms of basic infrastructure facilities to support the integration of technology in the classroom. The findings of the study also show that Facilitating Conditions is a construct that is perceived at a moderate level compared to other constructs. Facilitating Condition constructs such as specific guidance for teachers when they use or need it are less available. Therefore, improvements related to technology facilities in schools are very important to strengthen the readiness of teachers to support the I-21st CL in the state.

This study also found that the I-21st CL is at a high level. The four constructs in the I-21st CL are also at a high level, where Creativity and Innovation Skills show the highest level, followed by Critical Thinking Skills, Collaboration Skills and Communication Skills. The findings of

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this study are seen to be in line with the findings of the study by Seman et al. (2019), which shows that teachers can implement government policies as a result of teachers' awareness of their accountability. Creativity and Innovation Skills that are at a high-level support the findings of studies where teachers practice Nurturing Behavior Creativity in the teaching and learning (TL). The 21st-century TL skills applied in the classroom encourage students in carrying out learning activities and subsequently have a positive impact on student development (Ahmad et al., 2019). Thus, 21st CL which is said to be able to meet the educational needs of today needs to apply elements of communication, collaboration, critical thinking and creativity to produce competitive students. Although there are constraints in terms of time, creativity, skills and knowledge that make teachers unable to produce the resources they need, this is not an obstacle for teachers to help students get a better education.

Differences in TPACK, CNB, TA and I-21st CL based on Gender

This study found that there is no significant difference between male and female teachers about TPACK, in line with the findings of Leong et al. (2015). Meanwhile, the findings of the study found that there is a significant mean score difference between male and female teachers regarding creativity-nurturing behaviour in the classroom, where the mean score of female teachers is slightly higher than that of male teachers. The higher mean value for the group of female teachers shows that they have creativity-nurturing behaviour more often in the classroom than male teachers, in line with the findings of Ozkal's (2014) study. Meanwhile, several other studies refute the findings of the study by showing that male teachers have a higher level of nurturing creativity than female teachers (Leikin et al. 2013). Chan and Yuen's (2014) study found that gender did not make a difference in teachers' CNB. Next, the research findings also found that there is a significant mean score difference between male and female teachers related to the TA. In this regard, female teachers have a higher mean score compared to male teachers, showing that they have a higher level of readiness in accepting technology than male teachers about the issue of change, especially in the context of 21st-century education. This finding is similar to the findings of Summak et al. (2010) who found that there is a significant difference in terms of technology readiness based on gender, but male teachers have a higher level of TA than female teachers. Meanwhile, the findings of the study also found that there was no significant mean score difference between male and female teachers related to the I-21st CL, indicating that the level of I-21st CL between male and female teachers was the same. The findings of this study are in line with the findings of Rusdin's (2018) study which shows that there is no significant difference between the teacher's gender and the level of teachers' understanding of 21st century skills.

Differences in TPACK, CNB, TA and I-21st CL based on Teaching Experience

One-way ANOVA analysis showed that only the TA had a significant difference based on teaching experience, indicating that the mean score of TA for teachers with less than 10 years of experience was significantly higher than the other two groups of teaching experience. The difference shows that the group of experienced teachers who have taught for less than 10 years have a higher level of willingness to accept technology towards current educational changes compared to teachers who have taught for more than 10 years. Factors such as the lack of training and courses related to the use of technology may be the reason why teachers who have taught for more than 10 years have a lower level of TA when compared to the group of teachers who have only taught for less than 10 years. Many teachers who have been teaching for several years may not have had the opportunity to learn about the latest technology and how to integrate it into teaching. Instead, they may have developed their own teaching styles and teaching

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materials that have worked in their experience and may be less open to trying new technologies. Also, teachers who have been teaching for several years may be in a comfort zone with the way they teach and do not want to change it. The use of technology can change teaching patterns, and teachers in the group may fear that they will not be able to adapt to the changes. The findings of this study support the findings of Hung's study (2016) which states that the readiness and integration of technology of experienced teachers is lower compared to less experienced teachers. In addition, the findings of the study are also in line with the findings of the Msila (2015) study which also found evidence that less experienced teachers are more tolerant of change compared to the experienced group about the use of ICT.

Meanwhile, the other variables of the study did not show significant differences based on teaching experience, showing that the TRACK, CNB and I-21st CL of all teachers according to teaching experience were at the same level. The findings of this study are in line with the findings of Ogbonnaya et al. (2020) which showed that there was no significant difference in the lecturers' knowledge of 21st century learning skills according to teaching experience. However, it is not in line with the findings of Jang and Tsai's (2012) study which found that experienced teachers have a higher level of TPACK compared to new teachers. The findings of this study are also not in line with the findings of Rubenstein et al. (2018) who found that teachers with more than 10 years of teaching experience had higher creativity beliefs than the group of teachers with less than five years of teaching experience.

Relationship of TPACK, CNB, and TA with the I-21st CL

Overall, there is a significant positive relationship between TPACK, CNB and TA with the I-21st CL. However, the magnitude of the relationship between the independent and dependent variables is very weak, indicating that there is a very minimal relationship between these variables. In general, the findings show that when the TRACK and CNB of Mathematics teachers increases overall, their I-21st CL also increases slightly. The findings of this study are in line with the findings of Khor and Lim (2014) who found that there is a positive relationship between TPACK and the I-21st CL which is a factor from the emphasis on the use of ICT in teaching in line with 21st century learning.

In addition, the findings of the study are also in line with the findings of the study by Ucus and Acar (2018) who found a positive relationship between the teacher's creative classroom behaviour and aspects of the 21st CL approach, which is in the aspects of constructivist teaching. In implementing 21st CL as emphasized by most ministry of education, the element of teacher creativity is labeled very critical and highly emphasized. CNB is an important indicator of teachers' readiness for educational changes implemented through 21st-century classroom culture. According to Davies et al. (2014), teachers play an important role in the development of a creative learning environment to foster student creativity. Next, the findings of the study of the positive relationship between TA and the I-21st CL show that the acceptance of technology in the implementation of educational changes in the state of Sabah is complemented by the willingness to accept technology in teaching.

Influence of TPACK and CNB on TA

This study found that TPACK and CNB are two significant predictors of TA. The findings of this study support the findings of Zolkefli et al. (2017) which provides a clear indication that TPACK and Content Knowledge have an impact on teachers' willingness to integrate technology in the classroom. High TPACK is believed to be able to increase teacher readiness

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(Jusoh & Osman, 2019). Chao et al. (2003) argue that teachers should be ready to change, competent and able to master technology because it is the main resource today. Teachers should not only know about technology but also need to appreciate the rapidly developing aspects of technology to keep up with current developments.

The Influence of CNB on Teachers' TA obtained through this study supports the statement of Serdar (2015). The findings of the study show that the seven themes or practices of CNB in applying 21st Century skills are seeing the teacher as the main guide, encouraging student reflection, nurturing community and relationships in the classroom, giving students choices, encouraging project-based or problem-based learning, connecting theory with real life, and encouraging teacher and student collaboration. If all these practices can be adapted by teachers in their teaching, it is not impossible that their readiness can be influenced. This point supports the concepts and principles contained in ideas related to CNB by Cropley (1997) and Soh (2010).

The influence of TPACK, CNB, and TA on the I-21st CL

The SEM model that was developed involves three predictor variables, namely TPACK, CNB and TA. While the dependent variable is represented by the I-21st CL. The TA is also placed as a mediating variable of the study. The findings of the study show that TPACK, CNB and TA do not have a significant influence on the I-21st CL. This shows that TA functions as a study mediator to create a significant influence between TPACK and CNB towards the I-21st CL. This finding is contrary to Apak's (2019) study which shows that CNB and teacher readiness are predictors of 21st-century classroom management. The findings of Chan and Yuen (2014) also show that CNB has an influence on 21st-century classroom management, where this study found that TA opens a wider space for teaching activities in the classroom and as such explained in this study.

In addition, the results of the analysis show that the developed SEM model has a reasonable fit with the study sample data. TPACK, CNB and TA play a role as predictor variables that have a significant impact on the I-21st CL. The correspondence that exists between the research data and the SEM model that was developed shows that there is a direct and indirect influence between the predictor variables and the dependent variable. Based on the findings of this study, it can be concluded that TPACK, CNB and TA play a direct and indirect role in influencing the I-21st CL of Mathematics teachers. In addition, the research findings also show that TA is the most dominant factor compared to other variables. The influence of the predictor variable on the dependent variable can also be observed through path analysis in the SEM model of this study. The study found that there are likely to be several other aspects outside the study that also affect the I-21st CL.

The Mediating Effect of TA between TPACK and I-21st CL

The mediating role of the TA whether or not it has a significant effect on the relationship between TPACK and I-21st CL was tested in the SEM model. The results show that there is no significant direct effect of TPACK on the I-21st CL. Meanwhile, the indirect effect of the relationship between TPACK and I-21st CL after TA was included as a mediating variable was found to be significant. The indirect effect of the mediation of TA on the relationship between TPACK and I-21st CL was found to be greater than the direct effect. This situation shows that TA is completely mediating. The full mediating role played by TA shows how this mediating variable provides information about why two variables, namely TPACK and I-21st CL have a

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very related relationship (Dardas and Ahmad, 2015). Based on several previous studies, the readiness variable is a construct that influences and can explain changes in the dependent variable of a study. In a simple sense, the relationship between two research variables can be influenced by the presence of the mediating variable of TA. TA is related to the thoughts that exist in teachers that influence their behaviour to be ready to implement a change in 21st-century learning. Therefore, TA influences the relationship between TPACK and I-21st CL.

The Mediating Effect of TA between CNB and I-21st CL

TA was also measured to examine whether or not it has a significant effect on the relationship between CNB and I-21st CL The findings of the study show that the direct effect of CNB on the I-21st CL is statistically insignificant. Meanwhile, the indirect effect of the relationship between CNB and I-21st CL after TA was included as a mediator was found to be significant. The indirect effect mediated by TA on the relationship between CNB and 21st CL was found to be greater than the direct effect. Thus, in this situation, TA is a full mediator (complete mediating) for the relationship between CNB and I-21st CL. In this matter, TA is a mediator that can explain the relationship between two research variables, namely CNB and I-21st CL. According to Vakola (2013), an individual's willingness to change is influenced by a person's level of awareness. A high level of awareness among teachers encourages their willingness to change and subsequently accept the changes that have been planned. This study found that teachers perceive themselves to have a high level of preparedness, which supports the findings of Ismail et al. (2013) which showed that the level of readiness of teachers in general is high towards TA. The findings of this study are in line with Apak (2019) which shows that teachers' willingness to use the TAM model is a partial mediator between CNB and 21st-century classroom management. This shows that teachers who practice behaviour to foster elements of creativity in the classroom according to the principles introduced by Cropley (1997) and Soh (2010), especially in the elements of Motivation, Consideration, Question and Opportunity are reported to have a higher willingness to accept technology to implement 21st CL.

Conclusion and Suggestion

Through the findings of the study, it was found that TPACK does not directly affect the implementation of 21st CL among the teachers. The effect of TPACK is indirectly found through the mediation of the Technology Acceptance. TPACK is a predictor for Technology Acceptance in the effort to implement 21st CL. In conclusion, the findings of the study can be used as a guide for future studies, especially in looking at the elements that have a relationship and influence on the I-21st CL. At the same time, the findings of this study also expand the scope of research related to TPACK, Creativity Nurturing Behavior, and the influence of TA. The role of demographic factors, especially gender and teaching experience, also provides additional information regarding the differences between the variables. In addition, the SEM model produced through this study can generate ideas for other researchers, especially in looking at the influence of other factors that were not studied in this research related to the I-21st CL.

A wider range of data collection including observation and interviews in addition to numerical data can help future researchers to obtain a more comprehensive picture of the influence of other factors on I-21st CL. The adoption of interviews allows researchers to gather in-depth and multiple information about individual’s subjective interpretation, compared with a few limited categories of numerical data. Thus, future researchers may combine qualitative with

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quantitative approach in data collection to provide a more in-depth understanding of the observed relationship among the variables.

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