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The Influence of Teacher Efficacy on 21st Century Pedagogy

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Abstract. This paper explores the influence of teacher efficacy in classroom management, student involvement, and teaching strategy on 21st century pedagogical practice. A total of 201 teachers from schools implementing the International Baccalaureate-Middle Year Program (IBMYP) and schools implementing the Secondary School Standard Curriculum (KSSM) in Perlis, Kelantan, and Penang were selected through cluster sampling and purposive sampling. Data were collected using an instrument adapted from the Teacher's Sense of Efficacy Scale (TSES) with 24 items that measure three dimensions of teacher efficacy, namely classroom management, student involvement, and teaching strategy. Teachers' 21st century pedagogy in this study was measured using the West Virginia 21st Century Teaching and Learning Survey, which has been modified into five main dimensions with 22 items. These are critical thinking, collaboration, communication, creativity and innovation, and information technology. Data collected were analyzed using Smart-Partial Least Squares 3.0 and Statistical Package for the Social Sciences 22.0 software. Analysis showed that the effectiveness of teachers' teaching strategy influences 21st century pedagogy significantly. In contrast, teacher efficacy in classroom management and student involvement does not significantly influence 21st century pedagogical practice. This study shows that the effectiveness of classroom management, that is the ability to control student behavior and manage the classroom according to lesson planning, does not contribute to 21st century pedagogical practice. Similarly, student involvement does not contribute significantly to 21st century pedagogical practice, possibly due to the dense curriculum and the large number of students in the classroom.

Keywords: 21st century pedagogy; **c**lassroom management; student involvement; teacher efficacy; teaching strategy

1. Introduction

The shift of the educational landscape towards a more interactive and creative one has prompted policy makers in most countries to make changes in the educational system to be in line with global educational needs (Baez, 2004; Engberg, 2007). To

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meet the challenges of global educational transformation, Malaysia has also aimed to stay abreast in planning strategies, as seen in the Malaysian Education Development Plan (PPPM) 2013–2025. In 2017, the Malaysian Ministry of Education (MOE) revised the school curriculum and replaced it with the Secondary School Standard Curriculum (KSSM) as one of the efforts to support the national educational transformation agenda. This newly introduced curriculum emphasizes critical thinking, collaboration, communication, creativity and innovation, and the use of information technology, and also inculcates noble values in the teaching and learning (T&L) process (Kementerian Pendidikan Malaysia [KPM], 2013). In addition, the MOE has conducted a pilot project, the International Baccalaureate World School (IBWS), in 10 selected schools to support the mission of the PPPM. These schools have implemented the International Baccalaureate-Middle Year Program (IBMYP), which supports 21st century pedagogy by encouraging student-centered activities and project-based learning and promotes inquiry based-learning.

The MOE has intended that 21st century pedagogy can be cultivated in all schools by the third wave of the PPPM (KPM, 2013). Therefore, teachers in Malaysia are called upon to strengthen their self-efficacy in 21st century T&L to ensure the quality of national education (Ariffin & Yunus, 2017). This change towards the new millennium pedagogy urges teachers to prepare themselves with the necessary knowledge and skills-based teaching strategies. However, although the PPPM has entered the third wave (2021–2025), a report in 2018 by 115 head coaches from the State Education Department (JPN) indicated that of the 1476 teachers surveyed, 1077 (73%) achieved only the "minimum good" level in teaching, with only 399 (27%) achieving the "excellent" level. These findings show that most teachers are still comfortable practicing a teacher-centered teaching style. Similarly, in their study, Nor and Kamarudin (2017) explained that most teachers are more interested in implementing traditional, passive teaching strategies compared to new pedagogies that emphasize student involvement.

2. Theoretical Framework

2.1 Tschannen-Moran, Hoy, and Hoy Efficacy Models

The Tschannen-Moran, Hoy, and Hoy (1998) model describes three dimensions of teacher self-efficacy, which are classroom management, student involvement, and teaching strategy. Effective classroom management relates to the ability of teachers to implement T&L effectively according to lesson planning and the ability to control student behavior throughout the teaching process. Effective teachers are able to control emotions and stress in controlling disruptive student behavior without wasting instructional time (Brouwers & Tomic, 2000). Effective classroom management is an important element of teacher self-efficacy, because this dimension not only influences teacher behavior but could also impact the effectiveness of student learning (Dicke et al., 2014).

In turn, effective teachers will also ensure that students are actively involved in the T&L process (Skinner & Belmont, 1993; Wiseman, 2012). In addition, teachers who value student involvement in the T&L process will be able to foster student interest and commitment to learning and indirectly affect student achievement

(Arbaa et al., 2010). The third dimension of teacher self-efficacy, namely teaching strategy, relates to the ability of teachers to plan and implement appropriate instructional strategies to ensure the effectiveness of the T&L process (Caprara et al., 2006). According to Mok (2013), teaching strategies include planning lessons based on objectives, using appropriate pedagogy, planning teaching time, and selecting teaching aids.

Furthermore, teachers with high self-efficacy will strive to diversify their teaching approaches in order to improve the quality and effectiveness of T&L (Skaalvik & Skaalvik, 2014; Tschannen-Moran & Hoy, 2001). Ross and Gray (2006) explained that effective teachers will improve the quality of their teaching by learning new methods that are more interesting and creative. According to Mohd and Johdi (2009), although various theories of educational pedagogy have been studied during teacher training, an effective approach is yet to be produced that demands the experience and willingness of teachers to improve personal qualities.

2.2 21st Century Pedagogical Framework

The 21st century pedagogical framework that has guided most past researchers is the 21st Century T&L Skills Framework introduced by Partnership for 21st Century Skills. The framework includes the skills needed in the 21st century based on suggestions from organizational members with backgrounds in education and business. The skills that need to be emphasized in 21st century pedagogy, which are referred to as "4C", are: 1) critical thinking, 2) collaboration, 3) communication, and 4) creativity and innovation. Critical thinking refers to students' ability to think deeply and analytically in the process of problem-solving. According to Saavedra and Opfer (2012), inquiry-based learning methods that require high-level thinking skills can help develop students' abilities. Next, collaborative skills hone students in working together, and to understand and respect the needs and wants of other individuals.

Communication skills in the framework of 21st century pedagogy means that students not only can convey information effectively, accurately, and clearly, but also are exposed to conflict management, effective listening, negotiation, and persuasion and are able to establish relationships with various levels of society, background, and culture. In addition, 21st century students also need to have creativity and innovation skills, namely the ability to think outside the box and be able to create and change ideas for future use. As the 21st century school environment is not spared the use of technology and media, this framework then also focuses on technology and information literacy among students. Therefore, one of the responsibilities of teachers then becomes to help students make adjustments and develop technological skills (Breslow, 2015).

This 21st century pedagogical framework also describes that 21st century students need life and career skills in a complex and competitive environment, because today the world needs individuals who are flexible, productive, and responsible and have leadership qualities and values. Based on this study, KPM (2018) has recommended that good values be applied during teaching sessions to form students who are mutually tolerant and who respect the differences that exist to

achieve national unity. In conclusion, in order to cultivate 21st century pedagogy, principals and teachers must work together and play a decisive role to ensure the implementation of the curriculum in line with the mission of 21st century pedagogy.

2.3 Influence of Teacher Self-Efficacy on 21st Century Pedagogy

Changes in education systems around the world have had implications for teacher competence and self-efficacy in implementing the new millennium pedagogy (Schleicher, 2012). Bandura (1997) stated that teachers' beliefs in personal abilities can help them to be better prepared to face new scenarios in the field of education. Self-belief is closely related to self-efficacy in carrying out a responsibility until the desired goal is achieved. According to Ayub (2014), teachers' skills and attitudes are the key factors in the success of 21st century pedagogy implementation. Thus, the failure of teachers to add skills and knowledge related to 21st century pedagogy will complicate materialization of the mission of transformation (Tajudin & Abdullah, 2018). Bakar (2016) stated that effective 21st century T&L does not focus only on the equipment of facilities, technological tools, and physical arrangement in the classroom; rather, more priority is given to the enrichment of student-centered activities.

According to Rahim and Abdulah (2017), most teachers are more comfortable with the conventional approach rather than the new millennium method due to limited time, dense subject content, workload, and large numbers of students in a class. Bandura (1977) believed, however, that teachers with high self-efficacy are able to cope with any challenging and stressful situations. Furthermore, effective teachers are more optimistic about any challenges and more resilient to face any problems (Azizuddin et al., 2015; Darling-Hammond, 2007, 2009; Milner & Hoy, 2003). Bandura (1997) explained that teachers with high self-efficacy have positive attitude and strive to improve the quality of teaching. This view is supported by Norita (2012), who stated that high teacher self-efficacy relates to the ability of teachers to carry out instructional responsibilities effectively.

Since teachers are the main leaders in implementing 21st century pedagogy, teacher self-efficacy therefore needs to be given more attention (Schleicher, 2012). However, few studies have focused on the influence of teacher self-efficacy on 21st century pedagogical practice. Most previous studies have focused more on the level of teachers' readiness and challenges of 21st century pedagogy implementation (Bael et al., 2021; Ismail & Othman, 2017; Rahim & Abdullah, 2017; Rusdin, 2018). Thus, the present study focuses on the influence of teacher efficacy in classroom management, student involvement, and teaching strategy on 21st century pedagogical practices in Malaysia. We expect that the findings of this study will help educational policy makers better understand the importance of teacher self-efficacy in facing the phenomenon of education today. Furthermore, the findings may help the MOE, JPN, and District Education Office (PPD) to improve existing programs and plan workshops to strengthen teacher professionalism related to 21st century pedagogy. As such, the hypotheses of the study include the following:

1. Teacher self-efficacy in classroom management influences 21st century pedagogy significantly.
2. Teacher self-efficacy in student involvement influences 21st century pedagogy significantly.
3. Teacher self-efficacy in teaching strategy influences 21st century pedagogy significantly.
4. Teachers' 21st century pedagogical practice differs based on school categories with different curricula.

3. Methodology

3.1 Population and Sampling

This study adopted a quantitative research design by using the cross-sectional survey method. The survey method is a research method widely used in various fields of research involving a large number of respondents (Johnson & Christensen, 2008). In addition, cross-sectional survey studies can help researchers collect data more efficiently at a lower cost as well as facilitate respondents to answer the questionnaire with sufficient time (Cohen et al., 2011). The target population for this study consisted of teachers from IBWSs in Malaysia. Thirteen IBWSs have been established in Malaysia since 2014 as a pilot project to support the mission of new millennium pedagogy.

The study focuses on three IBWSs that respectively represents each school category: Sekolah Berasrama Penuh (Boarding School [SBP]), Maktab Rendah Sains MARA (MARA Junior Science College [MRSM]), and Sekolah Menengah Kebangsaan (National Secondary School [SMK]). Furthermore, three schools which fully implemented the KSSM for the SBP, MRSM, and SMK categories were selected to make a comparison in terms of 21st century pedagogical practice. Three schools that run the KSSM were selected in the state of Perlis because the scenario of the school system in Perlis is similar to that of the schools in Malaysia and there are various types of school categories, including the SBP, MRSM, and SMK, in Perlis. Table 1 below shows the list of schools included in the study population and sample for this study.

Table 1: Study population and sample

No.	School	School category (Curriculum)	No. of teachers	Sample (n)
1	SMS Tengku Muhammad Faris Petra	SBP (IBMYP)	70	(70/432) x 205 = 34
2	SMS Tuanku Syed Putra	SBP (KSSM)	63	(63/432) x 205 = 30
3	MRSM Balik Pulau	MRSM (IBMYP)	68	(63/432) x 205 = 30
4	MRSM Beseri	MRSM (KSSM)	72	(72/432) x 205 = 35
5	SMK Dato' Sheikh Ahmad	SMK (IBMYP)	67	(67/432) x 205 = 32
6	SMK Arau	SMK (KSSM)	92	(92/432) x 205 = 44
Total			**432**	**205**

For the determination of sample size, the sampling table by Krejcie and Morgan (1970) was used. Based on the sample size table, the estimated number of respondents required in this study were 205. Since this study used the partial least squares – structural equation modeling (PLS-SEM) method, a small sample

(n = 100) achieved acceptable statistical power (Reinartz et al., 2009). In the first stage, to choose a sample, stratified sampling was used by arranging 13 IBWSs into three categories of schools, namely the SBP, MRSM, and SMK. Then, for each category, schools were selected using simple random sampling, where one school represents each category.

Next, we selected three schools that implement the KSSM by using purposive sampling to compare the level of 21st century pedagogical practices with that of the schools implementing the IBMYP. To determine the number of respondents required, the number of teachers in each school were divided by the total population frame, and then multiplied by the required sample size. Lastly, teachers were selected using simple random sampling for each school until the required sample was reached.

3.2 Research Instruments

The items used to measure teacher self-efficacy in this study were adapted from the Teachers' Sense of Efficacy Scale (TSES) developed by Tschannen-Moran and Hoy (2001). The instrument contains 24 items that measure three aspects of teacher efficacy in terms of classroom management, student involvement, and teaching strategy. To measure 21st century pedagogical practice, the West Virginia 21st Century Teaching and Learning Survey developed by Hixson et al. (2012) was modified and adapted in this study. The original instrument containing eight dimensions was modified into six dimensions with 28 items, namely critical thinking, collaboration, communication, creativity and innovation, information technology skills, and life and career skills. However, the results of the analysis of the pilot study on the instrument of this study indicated that six items had to be dropped because they had low reliability. In total, 22 items were used to measure 21st century pedagogy with five main dimensions: critical thinking, collaboration, communication, creativity and innovation, and information technology skills.

3.3 Validity and Reliability

For the purposes of this study, we conducted PLS-SEM analysis in the form of a measurement model to test the instrument validity and reliability. The validity and reliability are measured through the value of the composite reliability (CR), the outer loading for each item, and average variance extracted (AVE). A variable has high validity and reliability if each item has an outer loading > 0.60, CR > 0.708, and an AVE > 0.5 (Fornell & Larcker, 1981; Hair et al., 2014).

If the outer loading of an item is less than 0.60, the item needs to be reviewed. Meanwhile, items with an outer loading value of between 0.40 and 0.60 can be considered to be kept if the CR > 0.708 and the AVE > 0.50. However, items with outer loadings < 4.0 should be removed because of a low reliability value (Hair et al., 2014). The analysis showed that all items with outer loadings > 0.6 were acceptable because the CR value exceeded 0.708 and AVE exceeded 0.50. Only six items of the 21st century pedagogical instruments needed to be removed because of outer loading values below 0.50. After the problematic items were removed, the analysis was reconducted and it was found that all the conditions of instrument validity and reliability were met.

3.4 Data Collection Procedures and Data Analysis

Firstly, we applied for permission at the Policy Planning and Research Division, MOE through the Educational Research Application System (eRAS 2.0) website. After obtaining approval, we applied at the JPN of Perlis and Kelantan to conduct the study and at the Secondary Education Division of MARA to conduct research at selected MRSMs. Next, the questionnaire was distributed after we had obtained permission from the selected school management. The questionnaires were retrieved for analysis from respondents after two weeks.

The study data obtained were processed using Statistical Package for the Social Sciences (SPSS) 22.0 and Smart-PLS 3.0 software. Descriptive statistical analysis and inferential statistics were conducted using one-way analysis of variance (ANOVA) to test hypotheses involving differences. Moreover, for hypothesis testing involving relationships, structured equation model analysis using Smart-PLS 3.0 software was used. Next, to determine the mean level, we categorized data into three levels, poor, moderate, and excellent. The categories of mean levels were determined by measuring the difference between the highest and lowest scores of the five-point Likert scale used in this study. The values were then divided into three (Harris & Willower, 1998; Murray-Harvey et al., 2000).

4. Study Findings

4.1 Levels of Teacher Efficacy and 21st Century Pedagogical Practice

Analysis revealed that the level of teacher efficacy among respondents was excellent and that the three dimensions of efficacy were also excellent, that is they received a mean score of between 4.01 and 4.15 (refer to Table 2).

Table 2: Levels of teacher efficacy

Dimension	Mean	SD	Level
Classroom management	4.01	0.57	Excellent
Student involvement	4.09	0.58	Excellent
Teaching strategy	4.15	0.61	Excellent
Total mean	**4.08**	**0.55**	**Excellent**

Similar to the above results, the levels of 21st century pedagogical practice among respondents were also found to be high, as shown in Table 3.

Table 3: Levels of 21st century pedagogical practice

Dimension	Mean	SD	Level
Critical thinking	4.43	0.46	Excellent
Communication	4.50	0.48	Excellent
Creativity and innovation	4.17	0.59	Excellent
Collaboration	4.61	0.45	Excellent
Information technology	3.91	0.58	Excellent
Total mean	**4.32**	**0.41**	**Excellent**

4.2 The Influence of Teacher Efficacy on 21st Century Pedagogy

To identify the influence of the independent variable on the dependent variable, the significance of the path coefficients was tested by conducting a structural model measurement (Table 4).

Table 4: Results of path coefficient analysis

Path model	β	SD	t	p
TECM → PAK21	0.167	0.119	1.404	0.16
TESI → PAK21	-0.252	0.14	1.803	0.071
TETS → PAK21	0.341	0.131	2.608	0.009

Note: TECM: classroom management; TESI: student involvement; TETS: teaching strategy; PAK21: 21st century pedagogy

Based on the analysis displayed in Table 4, teacher efficacy in classroom management was found to not significantly influence 21st century pedagogy ($\beta = 0.167$; $t = 1.404$; $p > 0.05$). Similarly, teacher efficacy in student involvement did not significantly influence 21st century pedagogy ($\beta = -0.252$; $t = 1.803$; $p > 0.05$). In contrast, teacher efficacy in teaching strategy was found to significantly influence 21st century pedagogical practice ($\beta = 0.341$; $t = 2.608$; $p < 0.05$). Therefore, hypotheses 1 and 2, which assumed that teacher efficacy in classroom management and student involvement influences 21st century pedagogy, are rejected. Meanwhile, hypothesis 3, which assumed that teacher efficacy in teaching strategy influences 21st century pedagogy, is accepted.

4.3 21st Century Pedagogical Practice Based on School Categories with Different Curricula

As seen in Table 5, the level of 21st century pedagogical practice differed significantly based on the school categories with different curricula ($F [5,195] = 45.28$; $p < 0.05$), with a large size effect ($f^2 = 0.537$). This size effect indicates that the school category factor influences 21st century pedagogical practice by 53.7%.

Table 5: 21st century pedagogical practice based on school categories with different curricula

Variable	Sum. sq.	df	Mean sq.	F	p
Between group	18.320	5	3.664	45.280	0.000
In group	15.779	195	.081		
Total	34.099	200			

*significant at the $p < 0.05$ level

As seen in Table 6, the results for teachers' 21st century pedagogical practices of schools implementing the IBMYP differ significantly from those of schools implementing the KSSM. These results illustrate that teachers from schools implementing the IBMYP are more likely to implement 21st century pedagogy than teachers from schools implementing the KSSM. As such, hypothesis 4 is accepted, which assumed that teachers' 21st century pedagogical practice differs significantly based on school category with different curricula.

Table 6: Post-hoc (Scheffe) analysis levels of 21st century pedagogical practice based on school categories with different curricula

School category		Mean diff	SE	p
SBP (KSSM)	SBP (IBMYP)	-.42172*	0.07333	0.00
	MRSM (IBMYP)	-.64632	0.07333	0.00
	SMK (IBMYP)	-.69160*	0.07433	0.00
	MRSM (KSSM)	-.22172*	0.07546	0.02
	SMK (KSSM)	.07622	0.06954	0.94
MRSM (KSSM)	MRSM (IBMYP)	-.42460*	0.07125	0.00
	SBP (IBMYP)	-0.2	0.07125	1.69
	SMK (IBMYP)	-.46989*	0.07229	0.00
	SMK (KSSM)	.29793*	0.06735	0.03
SMK (KSSM)	SMK (IBMYP)	-.76782*	0.06609	0.00
	MRSM (IBMYP)	-.72253*	0.06495	0.00
	SBP (IBMYP)	-.49793*	0.06495	0.00
SBP (IBMYP)	MRSM (IBMYP)	-0.22460	0.06899	0.07
	SMK (IBMYP)	-.26989*	0.07006	0.01
MRSM (IBMYP)	SMK (IBMYP)	-.04529	0.07006	0.99

5. Discussion

This study found that teacher efficacy in teaching strategy significantly influences 21st century pedagogical practice. This finding illustrates that teachers tend to apply a variety of teaching techniques and methods to make T&L more interactive and engaging. Consistent with the views of Ross and Gray (2006), effective teachers will seek to diversify methods in teaching by learning new pedagogies in order to ensure the effectiveness of their teaching. In addition, effective teachers will feel responsible to plan the best teaching strategy to improve the quality of their teaching (Skaalvik & Skaalvik, 2014).

On the contrary, this study found that teacher efficacy in student involvement does not significantly influence 21st century pedagogy. Yahaya et al. (2019) found that a dense syllabus, exam-oriented curriculum, and large number of students in the classroom make it difficult for teachers to carry out activities during the T&L process. In addition, the lack of facilities and equipment in the classroom and limited financial resources are also barriers to T&L activities in the classroom (Jaflus, 2008).

Furthermore, this study found that teacher efficacy in classroom management also does not influence 21st century pedagogy. This result is contrary to the view of Dibapile (2012), who stated that classroom management skills such as controlling student discipline, setting rules, and systematic lesson planning can influence teacher efficacy. However, the results of this study support the view of Kabrich (2007) which characterizes the new millennium learning environment as more flexible and interactive and not too rigid. According to Pirto (2011), children have a high level of creativity from childhood, but the development of their creativity will be stunted if the teacher sets a rigid and controlled T&L environment.

The study has also found that schools implementing the KSSM have less 21st century pedagogical practices than schools implementing the IBMYP. This difference is likely due to IBWSs being monitored and evaluated by the International Baccalaureate Organization (IBO) to ensure that 21st century pedagogy is implemented to maintain recognition of IBWSs (KPM, 2018). In addition, teaching equipment, internet access, and learning centers with new millennium pedagogy concepts have been found more excellent in IBWSs. Garba et al. (2015) stated that some of the factors that prevent teachers from implementing 21st century pedagogy were lack of tools and limited internet access. Therefore, the results of this study illustrate that the differences in the quality and quantity of facilities provided in schools can influence the implementation of the pedagogy of the new millennium.

6. Conclusion

This study clearly has illustrated that teacher efficacy in teaching strategy has an impact on 21st century pedagogical practice. Therefore, teachers need to enhance personal qualities by adding knowledge and skills that are relevant to the needs of the current curriculum. This study also found that teacher efficacy in classroom management and student involvement does not influence 21st century pedagogy. According to Tschannen-Moran et al. (1998), teacher efficacy in managing the classroom includes practices such as managing student discipline, setting rules, and controlling situations during the T&L process. Conversely, 21st century pedagogy requires a more creative, dynamic, and student-centered T&L process (KPM, 2018). Teachers thus need to be more flexible in teaching sessions, not be too rigid, and serve as facilitators in the T&L process. Teachers need to be optimistic by believing in students' abilities and encouraging more meaningful inquiry-based learning. In addition, this study found that teachers' 21st century pedagogical practice differs based on school category. Analysis showed that teachers from schools that implement the IBMYP are more likely to practice 21st pedagogy than those in schools implementing the KSSM.

The above results suggest that the MOE and school management should strengthen the role of the professional learning community (PLC) to enhance teachers' skills and knowledge, especially in understanding 21st century pedagogy. In addition, the MOE should consider re-evaluating the compact and examination-oriented curriculum syllabi that prevent teachers from allocating time to carry out more meaningful activities. Moreover, the MOE also needs to look seriously at infrastructure facilities and provision of tools and internet access in every school to ensure that all schools can cultivate 21st century pedagogical practices. Though promising, these findings cannot be generalized, since the sample was limited to teachers in Malaysia.

In the future, it would be interesting to administer the questionnaire used in this study and compare the findings at a cross-cultural level. Further analysis could investigate the relationships between teacher efficacy and 21st century pedagogy from a longitudinal perspective to eliminate potential bias due to the cross-sectional design. In addition, it seems that the importance of the role of organizational support on 21st century pedagogy is an additional mediator. Lastly,

it would be interesting to investigate the differences of teachers' 21st century pedagogical practice between rural and urban schools.

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