Confidence Level and Self-efficacy Beliefs of Mathematics Teachers: Evidence from Sarawak

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ABSTRACT

The purpose of this paper is to examine the confidence level and self-efficacy beliefs of Mathematics teachers, particularly in Kuching and Samarahan, using the instrument adapted from two reliable questionnaires: Trend in International Mathematics and Sciences Study (TIMSS) and Teachers' Sense of Teaching Mathematics Efficacy Scale (TSES). The respondents consisted of 49 teachers from both primary and secondary schools. The analysis reported that teachers have shown practically high confidence level in teaching mathematics and they closely agreed on their beliefs about their own teaching mathematics efficacy. Further analysis indicated that the mean scores of confidence level and self-efficacy beliefs for the female teachers were slightly higher than the male teachers. Analysis also reported that there were no significant differences in mean scores between teachers' confidence level and self-efficacy beliefs across gender, highest education attained and years of mathematics teaching. The correlations analysis saw a significant positive strong relationship between teachers' confidence level and self-efficacy beliefs. These findings provided some evidences to the existing pool of knowledge about teaching efficacy beliefs as well as some distinct and new insights relating to efficacy issues.

Keywords: *confidence level; self-efficacy beliefs; mathematics teachers; Malaysian education*

INTRODUCTION

Since the worrying result of Malaysian students in mathematics was reported in the Trend in International Mathematics and Sciences Study (TIMSS) and also the Programme for International Student Assessment (PISA) in 2011 and 2010 respectively, great effort had been planned and executed on top of the expenses spent to rectify the condition (MoE, 2013). The effort has seen positive and encouraging impact when the reported outcome of TIMSS and PISA in 2015 shows improved scores in mathematics (KPM, 2016a; KPM, 2016b). One of the three contributing factors credited to the achievement of Malaysia in TIMSS 2015 is the readiness of teachers (KPM, 2016a). It is noticed from the report that 92% of the mathematics teachers graduated with a degree holder and majority of them have been involved in continuous professional development, which includes training on teaching and learning processes (65%), assessment (56%) and the teaching and learning of higher order thinking skills (HOTS) (70%). The report had also pointed out that categories of less-experienced mathematics teacher (with less than five years of teaching experience) and more-experienced mathematics teacher (with more than 10 years of teaching experience) contributed equally to the improving performance of the students in TIMSS 2015.

On the other hand, in the discussion about factors contributing to the improved performance for the mathematics literacy domain of PISA 2015, the Ministry of Education (MoE) has credited to its enormous effort in various continual resolutions carried out, particularly in the teaching and learning of HOTS (KPM, 2016b). Professional training of the teachers for their competency and empowerment of the teaching professionalism has been emphasized as one of the way forward and initiatives of the ministry in both the reports (KPM, 2016a; KPM, 2016b).

Although the 60:40 Science/Technical:Arts Policy was instituted in 1967 and implemented since 1970, until now our country is still facing great challenges to achieve this target. The country is striving hard to close the gap of an estimated shortage of 236 thousands workforce to fill the forecasted demand of almost 500 thousands of scientist and engineers in 2020 (MoE, 2013). As a result, the Science, Technology, Engineering and Mathematics (STEM) approach particularly stands out as an emphasized initiative implemented to improve the performance of the students in

TIMSS and PISA specifically and in building Malaysia towards a STEM-driven world (MoE, 2013). It has been identified by the ministry as one of the five teaching and learning focus in the 21st century (KPM, 2016b). Looking at the current national education blueprint and the reports mentioned above, it is no doubt that the teacher is one of the most crucial catalysts to work out the successful implementation of all planned initiatives to their students – the end user of the education systems. This is especially true for mathematics teachers as mathematics is the foundation to the field of science, technology and engineering.

It is generally perceived that learners who performed in mathematics are usually having greater possibility to show interest and thus perform in science, technology and engineering related subjects. Eventually, they are more prone to choose STEM-related career. The mathematics teachers play an important part not only in facilitating the mathematical content knowledge to their students but also in imparting positive affection towards mathematics in their students. As stipulated by Wilkins and Ma (2003), one's (either mathematics student or mathematics teacher) beliefs and attitude towards mathematics, and mathematical knowledge are equally important for him or her to make good decision using mathematics.

Mathematics teachers who possessed higher level of confidence are believed to be more competent in delivering constructive and fruitful mathematics lessons (Bobis, Way, Anderson & Martin, 2016; Norton, 2017). Mathematics teacher self-efficacy beliefs, an aspect closely related to teacher confidence level, is allegedly reported as contributing to promising motivation and performance outcomes of the students being taught (Tschannen-Moran & Hoy, 2001; Norton, 2017). Both confidence and self-efficacy are two pertinent characteristics of a successful teacher and have motivated many studies (Kleinsasser, 2014). Nevertheless, similar confidence and self-efficacy studies on mathematics teachers in Malaysia are very limited (Kleinsasser, 2014).

Consequently, this paper intends to consolidate the existing study by looking into the confidence level and self-efficacy beliefs of our mathematics teachers in the public schools. In specific, the objectives of this paper are: (1) To determine the teachers' confidence level and self-efficacy beliefs in teaching mathematics. (2) To investigate the significant

differences in mean scores of teachers' confidence level and self-efficacy beliefs across gender, highest education attained and years of mathematics teaching (3) To examine the relationship between teachers' confidence level and self-efficacy beliefs.

LITERATURE REVIEW

This section presents the existing educational research literature that concerns teachers' confidence level and teachers' self-efficacy beliefs in teaching mathematics.

Teachers' Confidence Level in Teaching Mathematics

The foundation to the vital role of mathematics teachers has been well pointed out by a well-known mathematician Polya (1973) when he commented that "… if [a teacher] challenges the curiosity of his students by setting them problems proportionate to their knowledge, and helps them to solve their problems with stimulating questions, he may give them a taste for, and some means of, independent thinking.". Hence, it is well-accepted that teachers' confidence in teaching mathematics – the contents and the pedagogy – is positively related to the students' confidence in dealing with mathematics, which is then positively related to the students' performance in and affection towards mathematics (Axelsen, Galligan & Woolcott, 2016; Sandowal-Hernández & Bialowolski, 2016).

The level of confidence of teachers in teaching mathematics can be understood as the self-perceived presumption of their own capability to successfully carry out any mathematics-instruction-related action in their routine as mathematics teachers (Norton, 2017). Mathematics teachers who lack confidence usually display the tendency to avoid teaching certain aspect of mathematics, repeating the same planned pedagogies irrespective of the types of students in their classes, and/or delivering only the superficial concept or emphasizing procedural skills over conceptual knowledge and problem solving in a mathematics lesson (Lau, 2004; Axelsen et al., 2016; Bobis et al., 2016).

On the contrary, teachers who are confident always look for opportunities in three aspects: i) to increase the affection of the students

towards mathematics; ii) to follow up and follow through the width and depth of what the students have learned at different points of the mathematics lessons; and iii) to facilitate students in mastering the mathematics concept accustomed to different academic performance level (Axelsen et al., 2016; Bobis et al., 2016; Sandowal-Hernández & Bialowolski, 2016; Norton, 2017). To this end, it is obvious that the aspects of teachers' confidence level in teaching mathematics are strongly related to and can be captured through nine items adapted from TIMSS questionnaire (IEA, 2014), as presented in Table 1.

Table 1: Aspects of Teachers' Confidence Captured by TIMSS Questionnaire

Item in TIMSS questionnaire	Aspects of teachers' confidence
• Inspire students to learn mathematics • Show students a variety of problem-solving strategies • Make mathematics relevant to students	To increase the students' affection towards mathematics
• Assess students' comprehension of mathematics • Adapt my teaching to engage students' interest • Provide challenging tasks for the highest achieving students	To follow up and follow through the width and depth of what the students have learned at different point of the mathematics lessons
• Help students appreciate the value of learning mathematics • Improve the understanding of struggling students • Develop students' higher order thinking skills	To facilitate students in mastering the mathematics concept accustomed to different academic performance level

Teachers' confidence in teaching mathematics is related to their commitment or feeling sure about their ability, qualities or ideas in teaching mathematics (Witt, Goode & Ibbett, 2013). Beswick (2007) claims that confidence in teaching mathematics is of specific importance to teachers' practices, and that it is reflected in the enjoyment of mathematics for its own sake. Some studies have reported that teachers with high confidence in their teaching ability were shown to produce more confident pupils (Eison, 1990; Pajares, 2005). Protheroe (2008) asserts that teachers' own feeling of confidence with regards to their teaching abilities

contributes to their teaching efficiency while Appleton (1995) links teachers' lack of confidence to the lack of background knowledge.

Teachers' Self-efficacy Beliefs in Teaching Mathematics

Self-efficacy beliefs mean one's beliefs in his/her ability to produce a certain outcome successfully. According to Tschannen-Moran and Hoy (2001), teacher's self-efficacy beliefs are a judgment of his or her capabilities to bring about desired outcomes of student engagement and learning, even among those students who may be difficult or unmotivated. Whether a teacher teaches efficiently or otherwise is prominently determined by his or her teaching efficacy.

Teachers' self-efficacy beliefs are a little idea with big impact. Teachers' judgment of their capability to impact on students' outcome has been consistently related to teacher behavior, student attitudes, and student achievement. Taking seriously the potential of self-efficacy beliefs to impact teacher motivation and persistence over the course of a career could also lead to a rethinking of the induction-year experiences of novice teachers, allowing for greater protection and support (Tschannen-Moran & Hoy, 2001). Although there are many studies concerning teacher self-efficacy, there is limited research on mathematics teacher self-efficacy beliefs. Therefore, it is vital to study on mathematics teachers' teaching self-efficacy beliefs. Moreover, in-depth exploration should occur regarding teachers' perceptions of mathematics teaching effectiveness in order to facilitate the development of highly efficacious mathematics teachers.

Hoy and Spero (2005) find that the Teachers Sense of Efficacy Scale (TSES) developed by Tschannen-Moran and Hoy (2001) exhibits a stable factor structure that is an integral part for a quality measurement. Thus, it is not unexpected that the TSES has been widely employed in various setting and samples such as both in-service and pre-service teachers (Tschannen-Moran & Hoy, 2001; Larson & Goebel, 2008), early childhood educators (Brown, 2005), and special education teachers (Smith, 2008).Tschannen-Moran and Hoy (2001) was a foundation article for teacher efficacy and cited 6213 times as in October 2019 (Google Scholar, 2019). TSES was able to provide valid and reliable instrument to estimates the teaching self-efficacy beliefs within the Malaysian contexts (Khairani

& Razak, 2012) and it was among the most widely used scale within the Malaysian context (Abdul Rahim, Mohd Majid, Rashid & Lyndon, 2008; Johari, Ismail, Osman & Othman, 2009).

TSES consists of 3 sub-dimensions of teachers' self-efficacy beliefs scale i.e. student engagement, instructional strategies and classroom management. Table 2 provides the number of items and the description of items for each sub-dimension.

Table 2: Sub-Dimensions of Teachers' Self-Efficacy Beliefs Scale in TSES Questionnaire

Sub-Dimensions	No of items	Description of items
Student engagement (ESE)	4	The items measured teacher's beliefs in his or her ability to motivate, encourage or impart good mathematics values to students.
Instructional strategies (EIS)	4	The items measured teacher's beliefs in his or her ability to strategize deliverance of mathematical knowledge or skills and assessment effectively.
Classroom management (ECM)	4	The items measured teacher's beliefs in his or her ability to conduct good behavior and rules within the classroom environment for conducive learning.

Relationship Between Confidence Level and Self-efficacy Beliefs of Mathematics Teachers

Teachers' confidence level and self-efficacy beliefs hold wide interest across the globe for researchers to investigate teachers in every level of the learning environment. Studies have indicated that teachers' confidence level and self-efficacy beliefs are associated with teachers' effort and persistence in encountering difficulties (Wheatly, 2002), students' motivation and achievement (Mojavezi & Tamiz, 2012) and professional commitment (Ware & Kitsantas, 2007).

It is noticed that among the studies about the confidence level and self-efficacy beliefs of teachers, the main areas that the researchers commonly discuss and are concerned with include gender, highest qualification attained and length of teaching experience. Studies show that the confidence level and self-efficacy beliefs in teaching mathematics are generally similar between both gender of teacher (Levine, 2013; Mamon,

2015; Gulistan, Hussain & Mushtag, 2017) and among teachers with different length (year) of teaching experience (Alrefaei, 2015; Sutton, 2018); closely related with the highest degree or the knowledge of a teacher (Beswick, Callingham & Watson, 2012; Alrefaei, 2015).

METHODS

Participants

The participants were primary school mathematics teachers (n=28) from 27 public primary schools, and secondary school mathematics teachers (n=21) from 17 public secondary schools, residing in Samarahan and Kuching districts (see Table 3). They made up a convenient sample for which to solicit the survey questionnaires for this study. The availability of the teachers throughout the one-day Science, Technology, Engineering and Mathematics (STEM) program in the university was among the motivating factors to include them as the sample for this study besides their schools' engagement, participation and interest towards the STEM program. These teachers included 19 males (38.8%) and 30 females (61.2%). The mean age of the sample was 41.14 (SD = 6.282 years). The diversified ethnics included 42.9% Malay, 34.7% Chinese, 4.1 % Iban, 10.2% Bidayuh and 8.2% Melanau teachers. On average, the teachers' teaching experience was 16.27 years (SD = 6.515). Further, Table 3 shows the demographic profiles of the participants.

Instrument

Apart from providing their background information, participants rated their teaching confidence level and self-efficacy beliefs by using two instruments i.e. TIMSS and TSES respectively. The first instrument measured teacher's confidence level by observing nine items of mathematics-instruction-related actions adapted from Trend in International Mathematics and Sciences Study (TIMSS). Teachers were offered a choice of 5-point Likert scale from Very Low (1), Low (2), Medium (3), High (4) to Very High (5).

Table 3: Demographic Profile of the Participants

Demographic profiles	Total
Gender (n=49)	
Male	19 (38.8%)
Female	30 (61.2%)
Age (Mean ± SD) (n=49)	41.14 ± 6.282
Ethnicity (n=49)	
Malay	21 (42.9%)
Chinese	17 (34.7%)
Iban	2 (4.1%)
Bidayuh	5 (10.2%)
Melanau	4 (8.2%)
Marital Status (n=49)	
Single	7 (14.3%)
Married	42 (85.7%)
Years of Teaching Experience (Mean ± SD) (n=49)	16.27±6.515
Highest Education (n=49)	
Master	2 (4.1%)
Degree	43 (87.8%)
Diploma	4 (8.2%)
Mathematics Subject Currently Teaching (n=49)	
Mathematics UPSR	27 (55.1%)
Mathematics PT3	13 (26.5%)
Modern Mathematics SPM	8 (16.3%)
Additional Mathematics SPM	1 (2.0%)

Note: Primary School Evaluation Test (UPSR); Form 3 Assessment (PT3); Malaysian Certificate of Education (SPM)

The second instrument measured the teachers' self-efficacy beliefs by observing the twelve items adopted from Teachers' Sense of Teaching Mathematics Efficacy Scale (TSES) (short form). Teachers were offered a choice of 5-point Likert scale from Nothing (1), Very Little (2), Some Influence (3), Quite a Bit (4) to a Great Deal (5). The overall Cronbach's alpha values for both instruments were 0.912 and 0.892 respectively, indicating a high level of internal consistency or reliability. TIMSS was constructed within three sub-scales (aspects), namely Student Affection, Student Follow-up and Student Facilitation (see Table 1), while TSES was carried out within three sub-scales (sub-dimensions), namely Efficacy in Student Engagement (ESE), Efficacy in Instructional Strategies (EIS) and Efficacy in Classroom Management (ECM) (see Table 2).

Data Analysis

All data were analyzed using Statistical Program for the Social Sciences (SPSS) version 25 software. Descriptive statistics were used to explore the data to obtain information about the distribution of confidence level and self-efficacy beliefs on the variables. Further, inferential statistics were employed to determine any significant differences and relationships between the variables, and investigate any meaningful issues perceived by the responses of teachers to the questionnaire.

RESULTS

Teachers' Confidence Level in Teaching Mathematics

As shown in Table 4, teachers who are confident always seek opportunities in three aspects mentioned above i.e. student affection, student follow up and student facilitation. Overall, the mean of teacher's confidence was 3.931 (SD = .521). This explains that on the average, teachers have shown practically high confidence level in teaching mathematics. Comparing the three aspects, student affection had the highest mean of 3.99 (SD= .565), followed by student facilitation with a mean of 3.94 (SD=.552) and student follow up of 3.87 (SD=.553). Observing into each item, the highest mean value of 4.00 appeared in two aspects: "Show students a variety of problem-solving strategies" and "Make mathematics more relevant to students" (SD=.612) under student affection, and "Help students appreciate the value of learning mathematics" (SD=.715) under student facilitation. The lowest mean was noticed for the item "Providing challenging tasks for the highest achieving students" with the score of 3.78 (SD=.715).

Table 4: Descriptive Statistics of Teachers' Confidence in Teaching Mathematics

		Mean	S.D.
Confidence (N=45, Min.=2.56, Max.=4.89)		3.93	.536
Student Affection		3.99	.565
	Inspire students to learn mathematics	3.96	.706
	Show students a variety of problem-solving strategies	4.00	.612
	Make mathematics relevant to students	4.00	.612
Student Follow Up		3.87	.552
	Assess students' comprehension in mathematics	3.88	.666
	Adapt my teaching to engage students' interest	3.94	.659
	Provide challenging tasks for the highest achieving students	3.78	.715
Student Facilitation		3.94	.600
	Help students appreciate the value of learning mathematics	4.00	.715
	Improve the understanding of struggling students	3.96	.644
	Develop students' higher order thinking skills	3.86	.764

Teacher's Self-efficacy Beliefs in Teaching Mathematics

Table 5 shows the mean and standard deviation for the 12-items of Teachers' Sense of Teaching Mathematics Efficacy Scale. The entire 12-items of teaching mathematics efficacy mean value was 3.935 (SD = .487). The ECM construct had the highest mean value of 4.026 (SD = .592), followed by EIS construct with mean = 3.898 (SD = .528) and ESE construct with mean = .3883 (SD = .564). The mean values of the individual items ranged from 3.53 to 4.20.

The highest mean value was 4.20 (SD = .113) for the item "How much can you do to get students to believe that they can do well in mathematics?" followed by the item "How much can you do to get students to follow the class rules?" with mean value of 4.12 (SD = .104). Both items "How much can you do to calm a student who is disruptive or noisy?" and "To what extent can you provide an alternative explanation or example when students are confused?" had a mean value of 4.00 (SD = .105 and SD = 0.82 respectively). The item "How much can you assist families in helping their children do well in mathematics?" scored the

lowest mean of 3.53 (SD = .113). The high mean values obtained shows that the mathematics teachers closely agree on their self-efficacy beliefs about their own teaching.

Table 5: Descriptive Statistics of Teachers' Sense of Teaching Mathematics Efficacy Scale

	Mean	S.D.
Efficacy (N=49, Min.=2.75, Max.=5.00)	3.94	.487
Student Engagement (ESE)	3.88	.564
How much can you do to motivate students who show low interest in mathematics?	3.94	.111
How much can you do to help your students value the mathematics learning?	4.06	.098
How much can you do to calm a student who is disruptive or noisy?	4.00	.105
How much can you assist families in helping their children do well in mathematics?	3.53	.113
Instructional Strategies (EIS)	3.90	.528
To what extent can you craft good mathematics questions for your students?	3.90	.089
How much can you use a variety of mathematics assessment strategies?	3.88	.099
To what extent can you provide an alternative explanation or example when students are confused?	4.00	.082
How well can you implement alternative strategies in your mathematics class?	3.82	.100
Classroom Management (ECM)	4.03	.592
How much can you do to control disruptive behavior during mathematics class?	3.84	.121
How much can you do to get students to believe they can do well in mathematics?	4.20	.113
How much can you do to get students follow the class rules?	4.12	.104
How well can you establish a classroom management system with each group of students?	3.94	.094

Teachers' Confidence Level and Self-efficacy Beliefs across Gender

The assumption of normality for confidence and efficacy across gender was met with the Kolmogorov-Smirnov statistics with a Lilliefors significance level as seen in Table 6.

Table 6: Tests of Normality

		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Gender	Statistic	df	Sig.	Statistic	df	Sig.
Confidence	Male	.188	16	.133	.901	16	.083
	Female	.174	25	.024	.931	25	.058
Efficacy	Male	.118	19	.200*	.973	19	.838
	Female	.122	30	.200*	.966	30	.431

*. This is a lower bound of the true significance.
a. Lilliefors Significance Correction

Both the confidence and efficacy mean values for female teachers, 3.976 (SD=0.505) and 3.969 (SD=.476) respectively, were relatively higher as compared to the male teachers, 3.847 (SD=0.595) and 3.881 (SD = .513) respectively, as shown in Table 7.

The independent samples test performed in Table 8 shows that the Levene's test gave probability values greater than .05 for both confidence (p=.092) and efficacy (p=.679), therefore it was assumed that the variances were relatively equal. There were sufficient statistical evidences to indicate that there was no difference between confidence level in teaching mathematics based on gender, t (-0.766), df (43), $p > 0.05$, and likewise the self-efficacy beliefs in teaching mathematics based on gender gave no significance difference, t (-0.611), df (47), $p > 0.05$.

Table 7: Mean and Standard Deviation of Teaching Mathematics Confidence and Efficacy across Gender

	Gender	N	Mean	Std. Deviation	Std. Error Mean
Confidence	Male	16	3.85	.595	.149
	Female	29	3.98	.505	.094
Efficacy	Male	19	3.88	.513	.118
	Female	30	3.97	.476	.087

Table 8: Independent Samples Test for Confidence and Efficacy across Gender

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Confidence	Equal variances assumed	2.973	.092	-.766	43	.448	-.128	.168	-.466	.210
	Equal variances not assumed			-.730	26.994	.472	-.128	.176	-.489	.233
Efficacy	Equal variances assumed	.174	.679	-.611	47	.544	-.088	.144	-.377	.201
	Equal variances not assumed			-.600	36.251	.552	-.088	.146	-.384	.209

Teachers' Confidence Level and Self-efficacy Beliefs across Highest Education

A one-way ANOVA was conducted to compare both the confidence level and self-efficacy beliefs level with the highest education level. Results obtained in Table 9 show that there were no significant differences between both the mean confidence and mean efficacy in teaching mathematics and the highest education level, [$F(2, 46) = 0.532$, $p = 0.591$ and $F(2, 46) = 0.157$, $p = 0.855$] respectively. Further, there were no significant differences between the groups as a whole. Post hoc comparisons using the Tukey HSD test indicated that there were no differences between highest education level since $p > 0.05$, for both confidence and efficacy.

Table 9: One-way ANOVA for Confidence and Efficacy across Higher Education Level

	Sum of Squares	df	Mean Square	F	Sig.
Confidence					
Between Groups	.295	2	.148	.532	.591
Within Groups	12.752	46	.277		
Total	13.047	48			
Efficacy					
Between Groups	0.77	2	.039	.157	.855
Within Groups	11.315	46	.246		
Total	11.392	48			

Teachers' Confidence Level and Self-efficacy Beliefs across Number of Years Teaching

The scatter dots of teaching confidence score and teaching efficacy score plotted respectively against number of years teaching shown in Figure 1 indicate linearity was violated in the relationships, and hence suggested there was no significant relationship between both teachers' confidence level and self-efficacy beliefs as well, with the number of years teaching.

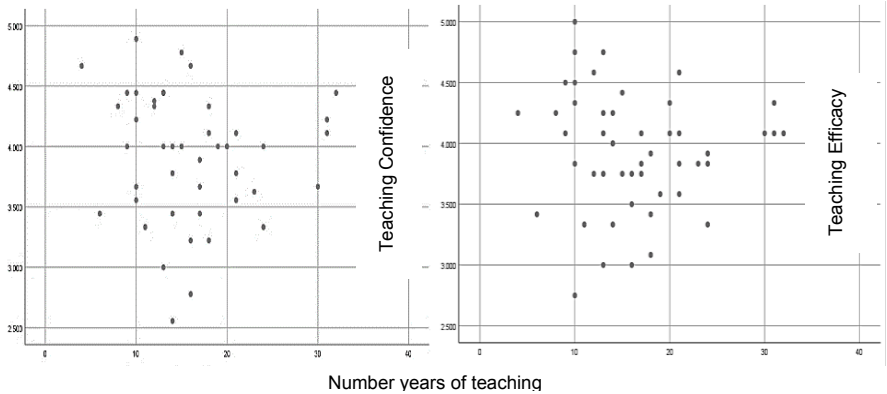

Figure 1: Relationships of Teaching Confidence and Teaching Efficacy on Number of Years Teaching

Relationship of Teacher's Confidence Level and Self-efficacy Beliefs in Teaching Mathematics

Paired-samples t-test conducted on 45 participants shows the mean of efficacy (mean = 3.91098, SD = .481463) was slightly lower than the mean of confidence (mean = 3.91847, SD = .525819), as shown in Table 10.

Table 10: Paired Samples Statistics and Correlations

	Mean	N	Std. Deviation	Std. Error Mean	Correlation	Sig.
Confidence	3.92	45	.526	.0783		
Efficacy	3.91	45	.481	.0718		
Confidence - Efficacy		45			.715	.000

There was no significant difference in the mean score between confidence and efficacy, $t(44) = -.131$, $p = .896$ ($p > .05$) (see Table 11), but teaching confidence and teaching efficacy were positively related as shown in the correlations analysis ($r = .715$, $p < .01$), and hence implies higher self-efficacy beliefs were associated with higher confidence level.

Table 11: Paired Samples Test

	Paired Differences					t	df	Sig. (2-tailed)
			Std. Error	95% Confidence Interval of the Difference				
	Mean	S.D.	Mean	Lower	Upper			
Confidence – Efficacy	-.007489	.382316	.056992	-.122349	.107372	-.131	44	.896

DISCUSSION

Before presenting the discussion, we would like to address the limitations of this study in which the interpretation of the results is based on: the perception of the teachers captured is subjected to the limitation and assumption of the instruments adopted and the background of the respondents of this study besides the small sample size we have.

The present findings revealed some evidences to the existing pool of knowledge about teaching confidence and self-efficacy beliefs as well as some distinct and new insights relating to these issues. Looking into the teacher's confidence aspect, the findings have revealed that in overall, teachers have shown practically high confidence level in teaching mathematics. Higher confidence level was discovered particularly in the aspect of student's affection. This indicates that teachers are doing their very best in inspiring and engaging students in learning mathematics. Apart from that, they believed that the responsibilities of facilitating as well as following-up with their students are highly relevant to their confidence level. This supports other findings which reported that teachers' confidence in teaching mathematics is related to their commitment or feeling sure about their ability, qualities or ideas in teaching mathematics (Witt, Goode & Ibbett, 2013).

From the self-efficacy beliefs perspective, the teachers involved in this study held higher sense of efficacy in the classroom management construct, suggesting that these teachers perceived themselves as being able to communicate instructions, rules and create positive learning to students within the classroom environment effectively. Although schools in Malaysia usually cater an average of 40 to 50 students per class and this huge class size usually concerned pre-service Malaysian teachers (Berg & Smith, 2014), experienced teachers in this study believed in their abilities to handle big class. However, in managing classroom, these teachers perceived lower efficacy in handling disruptive behavior of students during mathematics lessons. Teachers from Canada and Singapore found student behavior a challenge for teaching and learning (Klassen et al., 2008).

For the instructional strategies construct, participating teachers yielded slightly lower sense of efficacy to implement alternative strategies in mathematics class. Future efficacy studies concerning this result may carry some explanation. The lowest sense of efficacy in this study was related to teachers' involvement with families to assist students' mathematics learning. This depleted efficacy concerning parental involvement and expectations was also reported in a focus study by Berg and Smith (2014).

The comparison of mean scores using t-test indicates that no gender differences were found in teacher's confidence and self-efficacy beliefs in teaching mathematics. This shows that male and female teachers have similar confidence and self-efficacy beliefs level. Similar findings were reported in other studies on confidence by Levine (2013) and Mamon (2015) towards pre-service teachers after certain courses in America and prospective teachers in Philippines, respectively. Apart from that, similar findings of no significance difference in mathematics self-efficacy beliefs between the two gender was also reported by Gulistan et al. (2017) from the teachers teaching secondary school mathematics in Pakistan.

Teachers in this study show no differences in the distribution of confidence and self-efficacy beliefs in teaching mathematics with their highest qualifications attained. A study done by Beswick et al. (2012) has considered confidence as part of teachers' knowledge because teachers' confidence and beliefs link straightforward with other aspects of knowledge. One study reported on the significance difference in mathematics teachers' sense of efficacy especially in instructional strategies based on their highest degree attained (Alrefaei, 2015).

Besides gender and education level, the present study also reveals no significant relationship between both mathematics teachers' confidence and teaching efficacy with regards to years of teaching experience. This indicates the teachers' confidence and efficacy levels were similar regardless of years of teaching experience. Findings related to this were reported by Sutton (2018) in which there was no statistically significant difference between teachers' ARM (affective relationship with mathematics) index which also dealt with confidence and their years of experience. Mathematics schoolteachers from Northwest Arkansas had also rated no differences in teaching efficacy and years of teaching experience (Alrefaei, 2015).

The positive association between mathematics teachers' confidence level and self-efficacy beliefs found in this study can be further researched in the future studies. Future studies can also look at aspects that contribute to low confidence level and low self-efficacy beliefs among mathematics teachers including other regions in Sarawak.

CONCLUSION

This study has added values to the body of knowledge that advances the understanding about the confidence and efficacy level of the mathematics teachers serving in the primary and secondary public schools of Sarawak. The teachers are reported as having a high level of confidence and claimed that they are efficacy in teaching mathematics. The teaching confidence and teaching efficacy of these teachers are noticed to be significantly positive and strongly correlated. Our study shows that the teachers of both genders display similar level of confidence and efficacy in teaching mathematics, irrespective of their attained highest level of education, and teaching experience. Nevertheless, this study reveals that there is a statistical significant difference between their salary or job satisfaction level and their confidence level. Besides, the teachers who are very happy are found to be more confident than their counterpart with neutral happiness. Consequently, this study indicates that the teacher's confidence level and efficacy level in teaching mathematics are two closely reticulated constructs that contribute to the constructiveness of any mathematics instructions.

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