Self-Efficacy as a Predictor of Creative Teaching Practices among Mathematics Teachers in Primary School

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ABSTRACT

Creative teaching plays a vital role in enhancing the quality of mathematics instruction. However, the implementation of creative teaching practices remains inconsistent, as some teachers continue to rely on traditional methods and display limited confidence in applying creative instructional strategies. Previous studies have identified teachers' self-efficacy as a key factor influencing their willingness and ability to adopt creative instructional strategies. Therefore, this study aimed to examine whether self-efficacy significantly predicts creative teaching practices among primary school mathematics teachers. A quantitative survey design was employed, involving 377 mathematics teachers in primary schools selected through stratified random sampling. Data were collected using a questionnaire comprising two main constructs: teachers' self-efficacy, measured with the Teachers' Sense of Efficacy Scale (TSES), and creative teaching, assessed with an adapted instrument based on Torrance's four components of creativity. Data were analysed using descriptive, Pearson correlation and simple linear regression. The results showed a significant positive relationship between teacher self-efficacy and creative teaching, and self-efficacy significantly predicted creative teaching, $F(1, 375) = 349.16$, $p < .001$, $r = .69$. This study suggests that strengthening teachers' self-efficacy is crucial for promoting creative teaching practices and enhancing the quality of mathematics instruction at the primary school level. This can be supported through continuous professional development that provides teachers with opportunities to practise innovative instructional strategies, reflect on classroom experiences, and receive ongoing instructional support.

Keywords: creative teaching, mathematics education, primary teachers, teacher self-efficacy, regression

INTRODUCTION

In the era of Education 4.0, education systems worldwide are increasingly expected to prepare learners who are not only academically competent but also creative and adaptable to rapid societal and technological changes. This global expectation aligns with Sustainable Development Goal 4 (SDG 4), which emphasises inclusive, equitable, and quality education that supports lifelong learning (Thornhill-Miller et al., 2023). Consequently, contemporary education can no longer rely solely on conventional instructional practices but requires pedagogical approaches that foster creativity, engagement, and meaningful learning.

Within this context, twenty-first-century learning highlights key competencies such as creativity, critical thinking, collaboration, digital literacy, and effective communication (Golegou et al., 2025). These competencies require a shift in teachers' instructional roles, with teachers expected to facilitate active knowledge construction rather than merely transmit content. As a result, creative teaching has emerged as a central pedagogical approach that supports student-centred learning and the development of higher-order thinking skills (Mamun, 2024). Research demonstrates that when teachers employ creative instructional strategies, they foster more creative classroom environments that encourage students to engage in problem-solving and conceptual understanding (Yuanti et al., 2025).

The emphasis on creative teaching is also evident in the Malaysian education system. The Malaysia Education Blueprint 2013–2025 highlights the need to develop holistic, innovative, and future-ready learners, with creative teaching identified as a key instructional priority. This focus is particularly relevant in primary mathematics education, where foundational domains such as Numbers and Operations, Measurement and Geometry, and Algebra and Relations require conceptual understanding rather than procedural memorisation (Ministry of

Education Malaysia, 2019). Despite its importance, mathematics is often perceived as abstract and challenging, which can limit student engagement and understanding if taught through routine, teacher-centred approaches.

Creative teaching in mathematics provides opportunities to address these challenges by fostering imaginative thinking, active engagement, and flexible problem-solving. Previous studies have shown that creative teaching practices can enhance students' motivation, engagement, and conceptual understanding (Hayati et al., 2023). Furthermore, research indicates that creative teaching strategies, when combined with task modification activities, can significantly improve students' creative self-efficacy and problem-solving abilities (Suryanti et al., 2024). However, evidence suggests that the implementation of creative teaching remains inconsistent across classrooms. While some teachers readily adopt innovative instructional strategies, others continue to rely on traditional approaches, indicating that creative teaching is not uniformly practised even within similar educational contexts.

This variation in instructional practice highlights the importance of identifying factors that explain why some teachers are more likely than others to implement creative teaching. One factor widely recognised in educational psychology is teacher self-efficacy. Grounded in social cognitive theory, teacher self-efficacy refers to teachers' beliefs in their capability to plan, organise, and execute instructional actions required to achieve desired educational outcomes (Bandura, 1997; Tschannen-Moran & Hoy, 2001). Teachers with strong self-efficacy beliefs are generally characterised by higher levels of confidence and persistence in their teaching practices. In contrast, practices perceived as complex, uncertain, or demanding tend to be avoided by teachers with lower levels of self-efficacy (Berg et al., 2024). Research has demonstrated that teacher self-efficacy significantly influences the adoption of innovative pedagogical practices, with high-efficacy teachers more likely to implement creative teaching strategies that support student-centred learning (Luo et al., 2024).

Although previous studies have consistently reported a positive association between teacher self-efficacy and creative teaching (Hayati et al., 2023), limited attention has been given to the extent to which self-efficacy accounts for variations in creative teaching practices. In particular, empirical evidence positioning teacher self-efficacy as a predictor of creative teaching in primary mathematics contexts remains limited (Shi & Chang, 2025). This gap is significant, as creative teaching often involves instructional risk-taking, experimentation, and uncertainty, all of which are closely linked to teachers' beliefs about their own instructional capabilities. Understanding the predictive power of teacher self-efficacy in explaining creative teaching practices would provide important insights for teacher professional development and school improvement initiatives.

Therefore, rather than simply examining whether teacher self-efficacy is related to creative teaching, the present study focuses on the predictive role of teacher self-efficacy in explaining creative teaching practices among mathematics teachers in primary school. Specifically, this study investigates whether teacher self-efficacy significantly predicts creative teaching and examines the extent to which teachers' efficacy beliefs contribute to variations in creative instructional practices in mathematics classrooms.

This study contributes to the literature by extending existing research on creative teaching beyond relational evidence, empirically examining the predictive role of teacher self-efficacy in explaining variations in creative teaching practices among primary mathematics teachers. Grounded in social cognitive theory, the findings offer explanatory insight into why teachers differ in their adoption of creative instructional approaches, highlighting teacher self-efficacy as a key psychological factor underlying creative teaching behaviour (Zakariya & Adegoke, 2024). Additionally, the findings have important implications for teacher education programmes and school leadership policies aimed at fostering creative and innovative teaching practices in primary mathematics education.

Creative Teaching in Mathematics

Creative teaching in mathematics refers to instructional practices that enable students to engage with mathematical concepts in meaningful, flexible, and innovative ways through varied strategies and learning experiences (Ismayilova & Laksov, 2022). Rather than focusing solely on procedural mastery, creative teaching emphasises idea generation, the exploration of multiple solution pathways, and the development of deeper conceptual understanding (Antao & Morales, 2025). In mathematics classrooms, such practices are particularly important due to the abstract and structured nature of the subject, which often poses challenges for student

engagement and comprehension (Abbas & Al-Karaawi, 2025). Creative teaching encourages an active learning environment, enabling students to connect theoretical concepts with practical applications, thereby fostering intrinsic motivation and sustained effort (Antao & Morales, 2025). It moves beyond traditional teacher-centred approaches, which often limit student innovation, towards dynamic and interactive learning that supports effective knowledge construction (Xia et al., 2023).

Drawing on Torrance's model of creativity, creative teaching in mathematics is characterised by four key elements: fluency, flexibility, originality, and elaboration (Indrapangastuti et al., 2025). These elements are evident in instructional practices that encourage students to generate multiple ideas, approach problems from different perspectives, produce novel solutions, and elaborate on their mathematical reasoning (Rusmana & Shodikin, 2024). Fluency involves producing many ideas; flexibility refers to generating diverse types of ideas; originality concerns creating unique or unusual ideas; and elaboration involves adding detail to ideas (Kwangpukieo & Sawangboon, 2024). Empirical evidence strongly suggests that creative teaching can enhance students' motivation, engagement, and problem-solving abilities, thereby supporting deeper learning in mathematics (Hayati et al., 2023). Studies have shown that integrating creative tasks can lead to significant improvements in students' mathematical proficiency and their capacity for innovative problem-solving (Kwangpukieo & Sawangboon, 2024).

Despite its recognised importance, the implementation of creative teaching in mathematics remains uneven across classrooms. While some teachers consistently use innovative strategies such as open-ended tasks, real-world problems, collaborative learning, and technology-enhanced activities, others continue to rely on routine and teacher-centred approaches (Abbas & Al-Karaawi, 2025). This variation indicates that creative teaching is influenced not only by curriculum requirements or pedagogical knowledge, but also by teachers' readiness and confidence in applying creative instructional practices (Jing & Caiga, 2024). The shift from traditional content-oriented instruction to learner-centred approaches such as constructivism is crucial for fostering critical thinking and creativity, yet challenges such as curriculum rigidity and limited teacher training persist (Evans Atteh, 2023).

Creative teaching in mathematics requires flexibility, responsiveness, and the ability to manage instructional uncertainty. Strategies such as open-ended tasks, multiple solution approaches, and the integration of digital tools increase instructional complexity and place greater demands on teachers' confidence and classroom management skills (Hwang et al., 2025; Saralar-Aras & Ainsworth, 2025). Consequently, although teachers recognise the value of creative teaching, their readiness to adopt such practices may vary due to limitations in time, resources, and technological self-confidence (Elseidy, 2024).

These challenges suggest that creative teaching in mathematics should be understood not merely as a set of instructional techniques, but as a form of teaching behaviour shaped by teachers' beliefs and perceptions of their own instructional capabilities. In particular, the decision to implement creative teaching practices often involves instructional risk-taking, problem-solving under uncertainty, and sustained effort in managing diverse student responses (Dhungana & Thapa, 2023). Research indicates that teachers' attitudes and perceived efficacy significantly influence their willingness to integrate innovative methods and adapt to new teaching paradigms (Cuka & Cindri, 2025). These demands highlight the importance of identifying psychological factors that may predict teachers' engagement in creative teaching.

Therefore, to better understand variations in creative teaching practices among primary mathematics teachers, it is necessary to examine factors that explain why some teachers are more likely than others to adopt creative approaches. This perspective positions creative teaching as an outcome that may be predicted by teachers' internal beliefs, rather than as a practice that arises automatically from policy expectations or pedagogical knowledge alone. In this regard, teacher self-efficacy provides a theoretically grounded and empirically supported framework for explaining differences in teachers' creative instructional behaviour (Zakariya & Adegoke, 2024).

Relationship between Teachers' Self-Efficacy and Creative Teaching

Teacher self-efficacy originates from Bandura's Social Cognitive Theory (Bandura, 1997). This theory conceptualises self-efficacy as individuals' beliefs in their capability to organise and execute actions necessary to manage prospective situations (Donkoh, 2023; Scott et al., 2024). In educational settings, teacher self-efficacy

specifically refers to teachers' confidence in their ability to plan, implement, and manage instructional practices that lead to desired learning outcomes (Martinez & Johnson, 2021). Rather than functioning merely as a personal trait, teacher self-efficacy plays a central role in shaping teachers' instructional decisions, persistence, and willingness to engage in challenging teaching behaviours. Highly efficacious teachers are more likely to exhibit greater commitment to their profession, show increased enthusiasm, and persevere when faced with setbacks (Bardach et al., 2021). These teachers also tend to adapt their instructional strategies to meet diverse student needs, demonstrating pedagogical flexibility and innovation (Agiasotelis et al., 2025).

From a theoretical perspective, teacher self-efficacy is particularly relevant as a predictor of instructional behaviour because it directly influences how teachers respond to complexity, uncertainty, and instructional demands (Martinez & Johnson, 2021). Teaching practices that require flexibility, experimentation, and adaptation, such as creative teaching, often involve a degree of risk-taking and unpredictability. Teachers with strong self-efficacy beliefs are more likely to view such challenges as manageable, whereas teachers with lower self-efficacy may perceive them as overwhelming and therefore avoid them. This distinction positions self-efficacy as a critical explanatory factor in understanding why teachers differ in their implementation of creative teaching practices (Buri et al., 2024). Moreover, a teacher's self-efficacy can influence their willingness to integrate technology in the classroom, adopt new pedagogical tools, and maintain motivation in challenging environments (Momčilović & Ninković, 2024; Pnioar et al., 2020).

Empirical evidence consistently indicates that teachers with higher self-efficacy demonstrate greater openness to creative instructional strategies and are more willing to experiment with new pedagogical approaches (Martinez & Johnson, 2021). In contrast, teachers with lower self-efficacy may be more reluctant to adopt new or unfamiliar methods (Buric & Kim, 2020; Perera & John, 2020). This distinction is particularly evident in mathematics education, where teaching often involves managing abstract concepts, diverse student responses, and multiple solution pathways (Akosah et al., 2025). Such instructional complexity necessitates flexible and adaptive teaching approaches, which form a core element of creative teaching in mathematics classrooms (Roebiantio, 2020). Accordingly, teachers who believe in their instructional capabilities are more likely to adopt student-centred strategies, facilitate problem-solving activities, and create learning environments that encourage exploration and creativity (Phan et al., 2025; Porta & Gaunt, 2025). Previous studies further indicate that high self-efficacy in mathematics teaching is associated with effective pedagogical practices and improved student outcomes (Berg et al., 2024). Moreover, self-efficacious teachers are better equipped to implement differentiated instruction, respond to individual student needs, and sustain student engagement during complex learning activities (Porta & Gaunt, 2025). Consistent with this view, teacher self-efficacy has also been associated with improved teaching quality, innovative instructional practices, effective classroom management, and higher levels of student engagement and achievement (Na & Isa, 2024). This further reinforces the argument that self-efficacy supports instructional behaviours that align closely with the demands of creative teaching.

Teacher self-efficacy is commonly conceptualized as a multidimensional construct encompassing instructional strategies, classroom management, and student engagement (Lazo, 2025; Mishal et al., 2024). These dimensions align closely with the core demands of creative teaching in mathematics. Instructional self-efficacy supports teachers' confidence in designing flexible and innovative learning activities, as evidenced by teachers who are confident in adapting methods for diverse learners, such as those in inclusive settings (Drude & Schlebusch, 2025; UKO et al., 2025). Efficacy in classroom management enables teachers to manage open-ended tasks and collaborative learning environments effectively, contributing to a supportive learning atmosphere where students feel secure to explore and make mistakes (Abellar & Villocino, 2025; Golubtchik, 2024). Similarly, self-efficacy for student engagement reflects teachers' belief in their ability to motivate students and sustain participation during complex and non-routine learning activities, directly impacting student interest and academic motivation (Gopez et al., 2025; Phan et al., 2025). Collectively, these dimensions suggest that teacher self-efficacy provides a coherent framework for predicting creative teaching practices. Research suggests that self-efficacy influences teacher motivation, job satisfaction, and professional development engagement, all of which indirectly contribute to effective instructional practices (Daroy & Gomez, 2025).

Although previous studies have reported positive relationship between teacher self-efficacy and creative teaching (Fadhlilah et al., 2022; Hayati et al., 2023), much of the existing research has focused on identifying relationships rather than examining the predictive contribution of self-efficacy. Consequently, there remains limited empirical evidence that explicitly positions teacher self-efficacy as a predictor capable of explaining variations in creative

teaching practices, particularly within primary mathematics classrooms. This gap is noteworthy, given that creative teaching often demands sustained effort, adaptive decision-making, and confidence in handling diverse instructional situations. Recent studies emphasize that higher teacher self-efficacy correlates with improved teaching quality and the implementation of innovative strategies (Bhattacharya et al., 2025), suggesting its predictive power.

Therefore, positioning teacher self-efficacy as a predictor offers a theoretically grounded and empirically meaningful approach to understanding creative teaching in mathematics. By examining the extent to which teachers' efficacy beliefs predict creative teaching practices, this study seeks to move beyond descriptive associations and contribute explanatory insight into why some primary mathematics teachers are more likely than others to implement creative instructional approaches. This predictive perspective not only strengthens the theoretical contribution of the study but also provides practical implications for teacher professional development and instructional support, such as tailored training programs aimed at enhancing teachers' confidence in specific pedagogical areas (Asante et al., 2025; Taimin & Ngui, 2025).

METHODS AND MATERIALS

A quantitative survey design was employed to evaluate self-efficacy as a predictor of creative teaching among primary school mathematics teachers and to examine the relationships between self-efficacy and creative teaching

Population and sampling

The population of this study comprised 4,276 primary school mathematics teachers from 607 primary schools located in a southern state of Malaysia, which consists of 11 districts. This state was selected as the study location because it has the highest number of national primary schools in Peninsular Malaysia and the third highest in Malaysia, providing a comprehensive and representative context for examining mathematics teaching practices at the primary school level. Based on this population, a sampling procedure was employed to obtain a representative sample of primary school mathematics teachers across districts. A total of 426 teachers were selected using stratified random sampling to ensure proportional representation. The required sample size was determined using the Krejcie and Morgan (1970) formula. To account for potential non-response, an additional 20% was added to the minimum required sample size, in accordance with the recommendation by Hair et al. (2019). Accordingly, 426 questionnaires were distributed. Following data screening and exploratory data analysis (EDA), 377 valid responses were retained for subsequent analysis, representing an effective response rate of 88%.

Research instruments

Data were collected using a structured questionnaire comprising three main sections: Section A (demographic information), Section B (teachers' self-efficacy), and Section C (creative teaching). Items in Sections B and C were measured using a 5-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree). Teachers' self-efficacy was gauged using the Teachers' Sense of Efficacy Scale (TSES) developed by Tschannen-Moran and Woolfolk Hoy (2001), consisting of 24 items across three dimensions, namely instructional strategies, classroom management, and student engagement. An example item for instructional strategies is "I am able to adapt the teaching based on the varying levels of mastery of the students." An example item for classroom management is "I was able to calm the students who were disrupting in the classroom." For the student engagement dimension, an example item is "I am able to help weak students improve their understanding in every lesson." Creative teaching was gauged using an instrument from Azhari (2016), which was developed in the Malaysian context and based on Torrance's (1990) four components of creativity, namely originality, flexibility, elaboration, and fluency. The instrument was culturally refined for use in the Malaysian primary school context through linguistic modification and contextual alignment to ensure that the items reflected local instructional practices and classroom realities. Expert validation was conducted to evaluate conceptual relevance and cultural appropriateness, after which a pilot study was carried out with 40 primary school mathematics teachers to examine item clarity and reliability. An example item for originality is "I spark new ideas for students to think about". For flexibility, an example item is "I change the approach to teaching mathematics when students are less interested" An example item for elaboration is "I use illustrations to explain the solution of math

problems in teaching". The internal consistency of the instrument was satisfactory, with Cronbach's alpha values of α = .89 for teachers' self-efficacy and α = .90 for creative teaching.

Data Analysis

Data were analysed using descriptive and inferential statistics. Descriptive statistics, including frequency, percentage, mean, and standard deviation, were used to summarise the data. Pearson's correlation analysis was conducted to examine the relationships between variables, followed by simple linear regression to assess the predictive effect of teachers' self-efficacy on creative teaching. All relevant statistical assumptions were examined prior to analysis. The analyses were performed using the Statistical Package for the Social Sciences (SPSS) version 29.0. Table 1 provides the interpretation scale for the mean scores, where values between 1.00 and 5.00 are categorised from "very low" to "very high".

Table 1: Mean scores and level of interpretation

Mean score	Interpretations
1.00 – 1.80	Very low
1.81 – 2.60	Low
2.61– 3.40	Moderate
3.41 – 4.20	High
4.21 – 5.00	Very high

Source: Tschannen-Moran, M., & Gareis, C. R. (2004).

RESULT AND DISCUSSION

Demographic characteristics of the respondents

Table 2 shows the characteristics of the individuals participating in the study. Data were collected from primary school mathematics teachers (44 males and 293 females). The respondents were predominantly female (n = 293, 77.7%). The majority of participants were aged between 45 and 54 years (n = 159, 52.4%). In terms of academic qualifications, 322 respondents (85.4%) held a Bachelor's Degree. Regarding teaching experience, most respondents (n = 121, 32.1%) had more than 20 years of experience teaching mathematics. Overall, the demographic profile suggests that the sample was largely composed of experienced and professionally qualified teachers.

Table 2: Characteristics of the individuals participating in the study (N = 377)

Characteristics	Frecuency	Percentage (%)
Gender		
Male	84	22.3
Female	293	77.7
Age		
Below 25 years	4	1.1
25 – 34 years	87	23.1
35 – 44 years	112	29.7
45 – 54 years	159	42.2
55 years above	15	4.0
Educational background		
Diploma	16	4.2
Bachelor	322	85.4
Master	38	10.1
PhD	1	0.3
Teaching experience		
Less than 5 years	90	23.9
6 -10 years	53	14.1

Characteristics	Frecuency	Percentage (%)
11 – 15 years	41	10.9
16 – 20 years	72	19.1
20 years above	121	32.1

Teacher self-efficacy level

Table 3 shows the distribution value of mean, standard deviation, and the interpretation value of the mean score for teachers' self-efficacy dimensions. The data analysis revealed that the overall level of self-efficacy among primary school mathematics teachers was very high (M = 4.33, SD = 0.38). Among the three dimensions assessed, instructional strategies recorded the highest mean score (M = 4.37, SD = 0.39), followed closely by student engagement (M = 4.37, SD = 0.41), while classroom management showed a slightly lower but still very high mean (M = 4.27, SD = 0.43).

Table 3: Analysis of teachers' self-efficacy levels (N = 377)

Dimension	Mean (M)	Standard Deviation (SD)	Interpretation
Instructional Strategies	4.37	0.39	Very high
Classroom Management	4.27	0.43	Very high
Student Engagement	4.37	0.41	Very high
Total mean	4.33	0.39	Very high

Creative teaching level

Creative teaching among primary school mathematics teachers was examined through four dimensions, which are originality, flexibility, elaboration and fluency. Based on Table 4, the overall mean score for creative teaching was M = 4.10, indicating a high level of creative teaching (M = 4.10, SD = 0.42). Two dimensions, elaboration (M = 4.23, SD = 0.43) and fluency (M = 4.14, SD = 0.48), recorded mean scores that were higher than the overall mean. The dimensions with mean scores lower than the overall mean were flexibility (M = 4.09, SD = 0.47) and originality (M = 3.95, SD = 0.51). The analysis also shows that elaboration had the highest mean score, followed by fluency and flexibility. Originality recorded the lowest mean score, but it is still within the high category. Overall, the findings show that the level of creative teaching among primary school mathematics teachers is high.

Table 4: Analysis of creative teaching levels (N = 377)

Dimension	Mean (M)	Standard Deviation (SD)	Interpretation
Originality	3.95	0.51	High
Flexibility	4.09	0.47	High
Elaboration	4.23	0.43	Very high
Fluency	4.14	0.48	High
Total mean	4.10	0.42	High

Relationship between self-efficacy and creative teaching among mathematics teachers in primary school

A Pearson correlation analysis was conducted to examine the relationship between teachers' self-efficacy and creative teaching among primary mathematics teachers. The results indicated significant positive correlations between all dimensions of teachers' self-efficacy and creative teaching, including instructional strategies ($r = .58$, $p < .01$), student engagement ($r = .68$, $p < .01$), and classroom management ($r = .67$, $p < .01$). Overall, from Table 5, teachers' self-efficacy showed a strong positive relationship with creative teaching, $r(375) = .69$, $p < .01$, indicating that higher levels of self-efficacy are linked to greater implementation of creative teaching practices. Based on Cohen's (1988) guidelines, these correlations reflect medium to large effect sizes, indicating that teachers' self-efficacy plays a meaningful role in fostering creative teaching in mathematics classrooms.

Table 5: Pearson correlation between teachers' self-efficacy dimension and creative teaching (N = 377)

Dimension	Creative teaching (r)
Instructional strategies	0.58
Student Engagement	0.68
Classroom management	0.67
Teacher's Self-Efficacy	0.69

Note. $p < .01$ (two-tailed)

From a theoretical perspective, the present findings support social cognitive theory, which explains that teachers' beliefs about their capabilities influence their instructional behaviour (Bandura, 1997; Li et al., 2024). The positive relationships between teachers' self-efficacy and creative teaching, particularly in student engagement and classroom management, suggest that teachers who feel confident in involving students and managing the classroom are more likely to adopt creative teaching practices. These findings are in line with previous studies that have reported a positive relationship between teacher self-efficacy and creative teaching (Fadhlilah et al., 2022; Huang, 2022; Hayati et al., 2023). Furthermore, prior research has demonstrated that higher teacher self-efficacy is associated with improved teaching quality, innovative teaching practices, effective classroom management, and enhanced student engagement and achievement (Na & Isa, 2024). The multidimensional nature of teacher self-efficacy, encompassing efficacy in student engagement, instructional strategies, and classroom management, collectively contributes to the adoption of more creative and adaptive teaching approaches (Buri et al., 2024; Lazo, 2025). The strong relationships found in this study may be due to the nature of mathematics teaching, which often requires flexible and adaptive instructional approaches (Roebiantio, 2020).

Teacher self-efficacy as a predictor of creative teaching among mathematics teachers in primary school

A simple linear regression analysis was conducted to examine whether teachers' self-efficacy significantly predicts creative teaching among primary school mathematics teachers. Based on Table 6, the regression model was statistically significant, $F(1, 375) = 349.16$, $p < .001$, indicating that teachers' self-efficacy is a significant predictor of creative teaching. As illustrated in Figure 1, a positive linear relationship was observed between teachers' self-efficacy and creative teaching practices. Consistent with this pattern, the regression results reported in Table 5 show that teachers' self-efficacy significantly predicted creative teaching ($\beta = .69$, $p < .001$), accounting for 48.1% of the variance in creative teaching (adjusted $R^2 = .481$). The regression equation representing this relationship is expressed as follows:

Creative Teaching = 0.80 + 0.76 (Teachers' Self-Efficacy)

This equation indicates that creative teaching increases by 0.76 units for every one-unit increase in teachers' self-efficacy.

Figure 1: Scatterplot of teachers' self-efficacy and creative teaching

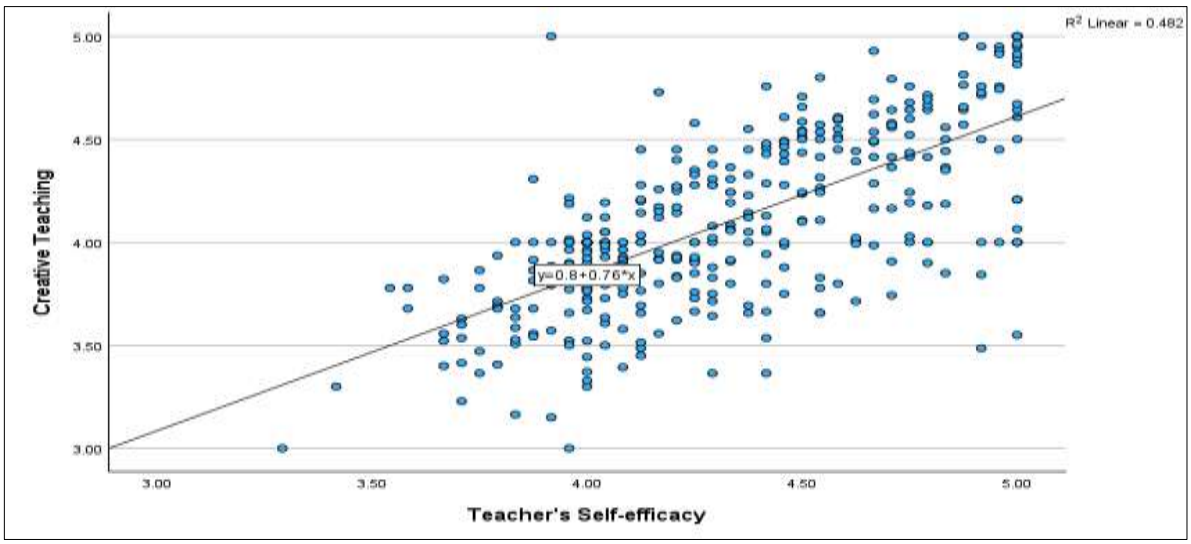

Table 6: Regression Analysis for Predicting Creative Teaching from Teachers' Self-Efficacy

Model	Unstandardized Coefficients		Standardized Coefficients	t	p
	(B)	Std. Error	β		
Constant	0.80	0.18		4.47	<.001
Teacher's self-efficacy	0.76	0.04	0.694	18.69	<.001

$R = 0.69$

$R^2 = 0.482$

Adjusted $R^2 = 0.481$

According to Cohen's (1988) guidelines, this represents a large effect size, suggesting that teachers' self-efficacy plays a significant role in predicting the implementation of creative teaching practices. The findings of this study demonstrate that teachers' self-efficacy is a strong and significant predictor of creative teaching among primary school mathematics teachers. In this context, self-efficacy reflects teachers' confidence in managing instructional tasks, achieving learning goals and addressing classroom challenges. Teachers with high self-efficacy are generally able to manage a wide range of instructional challenges, while those with lower self-efficacy tend to avoid tasks perceived as difficult or demanding (Buric & Kim, 2020; Perera & John, 2020).

Limitations of the study

This study is subject to several limitations. The analysis was restricted to the variables specified in the research, namely teacher self-efficacy and creative teaching. Accordingly, the findings should be interpreted within the scope of the constructs measured and do not account for other contextual or organisational factors that may also influence creative teaching practices. In addition, the study was conducted among primary school mathematics teachers in a single Malaysian state; therefore, the generalisation of the findings to other regions, school systems, or subject areas should be approached with caution. Furthermore, the study employed a cross-sectional survey design conducted within a single time frame; as such, the results reflect teachers' perceptions at that specific point in time and do not permit causal inferences. The data were also obtained through self-reported questionnaire responses, which may be subject to response bias and the tendency of respondents to present themselves favourably. Consequently, the interpretation of the findings should take into account the potential differences between perceived practices and actual classroom behaviour.

CONCLUSION AND IMPLICATIONS

This study highlights self-efficacy as an important factor associated with creative teaching practices among primary school mathematics teachers. The findings show that teachers' self-efficacy significantly predicts creative teaching, explaining a substantial proportion of the variance in creative instructional practices. Creative teaching is further shaped by the three components of self-efficacy, namely instructional strategies, classroom management, and student engagement, with student engagement emerging as the strongest predictor. This indicates that teachers who feel confident in motivating and engaging learners are more likely to adopt flexible, innovative, and student-centred approaches in their classroom practice.

Based on these findings, strengthening teachers' self-efficacy is essential for sustaining creative teaching practices, rather than relying solely on curriculum reform or generic instructional techniques. The implications suggest that teacher training and professional development should incorporate structured, experience-based learning activities such as lesson design workshops, classroom simulation tasks, reflective micro-teaching, and opportunities to trial creative approaches in authentic classroom settings. In addition, mentoring and peer-support systems, including professional learning communities (PLC), peer-coaching cycles, and mentoring arrangements, can provide ongoing feedback, emotional encouragement, and modelling of creative instructional practices,

thereby reinforcing teachers' confidence to innovate. School leadership support is also crucial. Leaders may enhance teachers' self-efficacy by providing time, resources, autonomy, and recognition for creative lesson implementation, as well as by fostering a psychologically safe school climate where experimentation and risk-taking in teaching are encouraged. Such organisational conditions help sustain teachers' belief in their capability to integrate creative pedagogical practices into mathematics instruction.

Future research may extend this study by using longitudinal research designs to observe how teachers' self-efficacy and creative teaching develop over time and across different school contexts. Studies that combine self-report questionnaires with other sources of evidence, such as classroom observations or interview data, may also help reduce response bias and provide a more balanced understanding of teachers' creative teaching practices. In addition, comparative studies across different regions, school types, or subject areas, including mixed-methods approaches, may offer broader insights into how self-efficacy is related to creative teaching in various educational settings.

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