



# Education Quarterly Reviews

---

**Rabab'h, B. S. (2023). A Study of Mathematics Teachers' Self-Efficacy Beliefs, Mathematics Teaching Anxiety and Motivation towards Teaching Mathematics. *Education Quarterly Reviews*, 6(2), 94-100.**

ISSN 2621-5799

DOI: 10.31014/aior.1993.06.02.741

The online version of this article can be found at:  
**<https://www.asianinstituteofresearch.org/>**

---

Published by:  
The Asian Institute of Research

The *Education Quarterly Reviews* is an Open Access publication. It may be read, copied, and distributed free of charge according to the conditions of the Creative Commons Attribution 4.0 International license.

The Asian Institute of Research *Education Quarterly Reviews* is a peer-reviewed International Journal. The journal covers scholarly articles in the fields of education, linguistics, literature, educational theory, research, and methodologies, curriculum, elementary and secondary education, higher education, foreign language education, teaching and learning, teacher education, education of special groups, and other fields of study related to education. As the journal is Open Access, it ensures high visibility and the increase of citations for all research articles published. The *Education Quarterly Reviews* aims to facilitate scholarly work on recent theoretical and practical aspects of education.



ASIAN INSTITUTE OF RESEARCH  
Connecting Scholars Worldwide

# A Study of Mathematics Teachers' Self-Efficacy Beliefs, Mathematics Teaching Anxiety and Motivation towards Teaching Mathematics

Belal Sadiq Rabab'h<sup>1</sup>

<sup>1</sup> University of Bahrain

## Abstract

This study aimed to assess the relationship between the teaching self-efficacy beliefs, teaching anxiety and motivation towards teaching mathematics among Math teachers in schools. A total of 51 schools-teachers participated in the study, with 31 male teachers and 20 female teachers. The study variables were measured by instruments adopted from literature for data collection using the survey method. Based on the obtained results, there is a significant relationship between mathematics teaching anxiety and motivation towards teaching mathematics, but not between self-efficacy beliefs and mathematics teaching anxiety. This study concluded with recommendations for future research.

**Keywords:** Mathematics, Motivation, Anxiety, Self-Efficacy Beliefs, Teachers

## 1. Introduction

An outbreak of a severe acute respiratory syndrome caused by the Coronavirus-2 (Covid-19) occurred in China in December 2019. Covid-19 has now proliferated to all countries of the globe (Jukic et al., 2020; Zu et al., 2020), and inevitably led to a large-scale pandemic (World Health Organization, 2020), developing into an acute infection that has extensive effects on life various aspects, including education, economy, sports, and businesses (Jucik et al., 2020; Parnell et al., 2020; Ratten, 2020). Consequently, several countries began adopting a strategy to control the virus spread affecting the people's lives, and this holds true for the field of education. In relation to this, teaching practices and the characteristics of teachers have a major role in successful learning of students. This may be exemplified by the beliefs of teachers concerning teaching mathematics that affects successful learning of mathematics among students (Takunyaci, 2021). Similarly, self-efficacy beliefs were also evidenced to have a key role in the inculcation of mathematics education (Rabab'h & Veloo, 2014; Unlu, Ertekin & Dilmac, 2017) which is referred to as an individual's judgment of their capability of organizing the activities needed to perform a certain activity and to achieve such performance (Bandura, 1986; p.391). The above premise is advocated by the Social

Cognitive Theory that defines self-efficacy as the belief of individuals of their own capacities to conduct and organize activities required for work fulfillment (Bandura, 1997).

Another belief factor which was evidenced in the cognitive psychology approach is anxiety and mathematics anxiety refers to the feeling of tension and anxiety interfering with the number's manipulation and the solution of mathematics problems in various situations in life and academia (Richardson & Sunin, 1972; Peker, 2015). This belief factor was also evidenced to have extensive outcomes considering that there is extensive under-achievement in mathematics and subjects related to mathematics which may be related to anxiety and avoidance of the subject (Rabab'h, B.S. H, 2015; Wilder, Lee & Mackrell, 2021; OECD, 2013). In related studies, one of the top factors that influence mathematics anxiety formation is the teacher's effect on students (Unlu et al., 2017; Peker & Ertekin, 2011).

Another effective factor on learning and behavior is motivation as mentioned in Sahat et al. (2018) and it is determined through attraction, retention, and concentration (Sinclair, 2008). Motivation is an effective determinant of the attraction of individuals to teaching, the period of remaining in the initial education courses and the teaching profession, as well as the level to which the courses and the teaching profession are engaged in (Sinclair, 2008, p.80). Even though motivation has been evidenced in literature to influence learning and behavior, it is ambiguous as to the way it should be employed in the process of teaching and learning (Suren & Kandemir, 2020).

Studies in literature have highlighted the importance of teachers' efficacy beliefs, mathematics anxiety and motivation towards mathematics teaching that influences their objectives and practices in classrooms (e.g., Takunyaci, 2021; Velthuis, Fisser & Pieters, 2014). This is because there is lack of studies dedicated to the relationship between teachers' efficacy beliefs, their mathematics anxiety and their motivation towards mathematics teaching (Suren & Kandemir, 2020; Peker, 2015; Richardson & Watt, 2016), which is why this study is an attempt to mitigate the literature gap. Focusing on the above variables is the fundamental idea that is required for conducting this study to determine the variables' relationships during the current Covid-19 pandemic. In so doing, this study contributes to literature concerning mathematics teaching.

## **2. Purpose of the Study**

The main objective of the study is to investigate the relationship between the self-efficacy beliefs, mathematics anxiety and motivation towards teaching mathematics among schools-teachers and accordingly, this study aims to determine the answers to the following questions:

1. Is there a relationship between self-efficacy beliefs and mathematics anxiety among schools-teachers?
2. Is there a relationship between self-efficacy beliefs and motivation towards teaching mathematics among schools-teachers?
3. Is there a relationship between mathematics anxiety and teachers' motivation towards teaching mathematics?

## **3. Literature Review**

Studies dedicated to exploring mathematics teaching efficacy beliefs among schools-teachers showed that regardless of the provided professional development training programs and guidelines to prepare teachers, the feeling of inadequacy still prevails when teaching mathematics (Marrongelle, Sztajn & Smith, 2013; Swars, Hart, Smith, Smith & Tolar, 2007). Additionally, negative perceptions and beliefs abound among primary school teachers, particularly those in the first level of education and this has an indirect effect on their teaching quality and the academic achievement of students (Borko & Whitcomb, 2008). Studies of this caliber documented those beliefs have a significant effect on the achievement of students' accomplishments, as such beliefs relate to the teachers' planning, implementation, and decision-making processes (Fives & Buehl, 2016; Kitsantas, Ware & Cheema, 2010; Klassen & Tze, 2014; Schoenfeld, 2015; Skott, 2015; Thomson & Gregory, 2013). Moreover, studies concerning the mathematics teaching efficacy beliefs indicated that highly proficient teachers have higher likelihood to apply new teaching innovations and establish higher self-goals and student goals (Charalambous,

Philippouve Kyriakides, 2008; Swars et al., 2007; Utley, Moseley & Bryant, 2005; Schunk, Pintrich & Meece, 2008).

Moreover, a correlation was noted between mathematics anxiety and anxiety involved in teaching mathematics (Brown, Westenskow & Moyer-Packenham, 2011; Haciomeroglu, 2014; Peker & Ertekin, 2011). Added to the above, teachers with high mathematics anxiety were noted to lack enjoyment in teaching mathematics and often fail in the endeavor (Brown et al., 2011), in which case, teachers in primary education should possess high self-efficacy beliefs in teaching mathematics and using methods (Doruk & Kaplan, 2012).

Studies in the same line, like Han and Yin (2016) indicated a significant relationship between teachers' motivation and students' motivation. Also, commitment levels to teaching careers should be high and not only linked to the academic ability among teachers (Brookhart & Freeman, 1992). Teachers should concentrate on their motivation as a crucial non-cognitive element for enhanced effectiveness of teaching in classrooms, in that highly motivated teachers have higher likelihood to present quality instruction compared to those with low motivation (Almulla, 2020).

## 4. Methodology

### 4.1. Study Design

A descriptive study design through quantitative survey was opted for in this study following other social sciences and education studies (Fared, Jdaitawi & Sheta, 2018; Jdaitawi, 2020; Rababh & Veelo, 2014). The study sample comprised of 51 schools' teachers, randomly chosen through their voluntary participation. The participants consisted of 31 male teachers (60.8%) and 20 female teachers (39.2%), with 18 teachers having 5 years of experience (35.3%), 17 with 5-10 years of experience (16%) and the remaining had 10 years of experience (31.4%).

### 4.2. Data Collection

The study adopted several measures for collecting data to achieve the purpose and objectives of the study. Items measuring self-efficacy beliefs were adopted from Barros, Laburu and Silva (2010) – an instrument consisting of 11 items measured on a 5-point Likert scale ranging from strongly disagree represented by 1 to fully agree represented by 5. Items receiving high scores show the positive perception of self-efficacy from the participants. Cronbach's alpha value for the construct was found to be 0.83. With regards to the mathematics teaching anxiety construct, the measurement items were adopted from Alkan, Cosguner and Fidan (2019) and it was directed towards determining the mathematics teaching anxiety among teachers. The adopted instrument consisted of 13 items measured on a 5-point Likert scale that ranged from strongly disagree represented by 1 to completely agree represented by 5. The construct obtained Cronbach's alpha value of 0.80. Lastly, Fuqoha, Budiyo and Indriati's (2018) instrument was adopted to measure mathematics teaching construct, comprising of 12 items gauged on a 5-point Likert scale that ranged from 1 (strongly disagree) to 5 (strongly agree). The measure's high score showed the positive and high motivation level of participants towards teaching mathematics and the construct obtained an alpha value of 0.81.

### 4.3. Data Analysis

The study employed SPSS to analyze the gathered data and upon the examination of results, the values of mean and standard deviation were obtained and tabulated in Table 1. Based on the values in the table, the mean of mathematics self-efficacy beliefs is 3.54, with standard deviation of 0.646, evidencing that the teachers had moderate self-efficacy beliefs level in teaching. As for teaching anxiety, low to moderate mean level was obtained at 3.23, with standard deviation of 0.598, while motivation towards teaching mathematics obtained a mean of 3.63 and standard deviation of 0.659, indicating moderate motivation level among the teachers (refer to Table 2).

Table 1: Descriptive Statistics of the Study Variables

Variable	Mean	SD
Self-Efficacy Beliefs	3.54	.646
Mathematics Teaching Anxiety	3.23	.598
Motivation towards Mathematics	3.63	.659

The significant relationships among the study variables were determined using Pearson Correlation analysis. Table 2 tabulates the results and based on them, mathematics teaching anxiety significantly correlated with motivation towards teaching mathematics ( $r=.530^{**}$ ,  $.000$ ,  $p<.01$ ), but self-efficacy beliefs-mathematics teaching anxiety and self-efficacy beliefs-motivation towards teaching mathematics were both insignificant ( $r=.066$ ,  $.644$ ,  $p>.01$ ,  $r=.242$ ,  $.087$ ,  $p>.01$  respectively).

Table 3: Pearson Correlation between the Study Variables

Variable	Motivation	Mathematics-Anxiety
Self-Efficacy Beliefs	.242	.066
	.087	.644
Mathematics-Anxiety	.530	-
	.000**	

## 5. Discussion

The main aim of the study is to determine the relationships between the study variables and their strength and direction. Based on the obtained results, mathematics teaching anxiety significantly correlated with motivation towards mathematics. Results in literature concerning this relationship have been mixed (e.g., Suren & Kandemir, 2020; Lyons & Beilock, 2012). In Suren and Kandemir's (2020) study, the authors reported a positive anxiety-motivation towards mathematics teaching relationship, indicating that individuals who are anxious may perceive themselves to perform poorly and this may prevent them from resolving the problem as their memory may be disturbed. Other studies like Arnsten (2009) and Diamond et al. (2007) indicated that average level of anxiety boosts focus and enhances memory, low levels are related with insufficient cognitive resources appropriated to the work at hand, and this holds true for high levels.

With regards to the self-efficacy beliefs-anxiety in teaching mathematics relationship, the result indicated an insignificant correlation – a result which contradicts prior studies that supported a significant relationship between the two (e.g., Peker, 2015). In Jain and Dowson's (2009) study, a significant effect was reported from self-efficacy beliefs and mathematics anxiety, while Hoffman (2010) showed a negative moderate relationship between the same constructs. Studies that examined anxiety in teaching mathematics and self-efficacy beliefs have been few and far between (Ural, 2015; Peker, 2015). Specifically, Ural (2015) indicated a negative moderate relationship between mathematics teaching anxiety and self-efficacy perception of mathematics. Lastly, self-efficacy beliefs were found to have an insignificant relationship with teacher's motivation towards teaching mathematics in this study. More studies are needed to confirm this relationship as only few focused on it in literature.

## 6. Conclusion

According to the results, the participants possessed low to moderate levels of the study variables and supported a significant relationship between mathematics teaching anxiety and motivation towards mathematics. However, self-efficacy beliefs had insignificant correlations with motivation towards teaching mathematics and teaching mathematics anxiety. This study contributes to both theory and practice, in that literature concerning the identification of the relationship between efficacy beliefs, motivation and teaching mathematics anxiety among

schools' teachers has been lacking. The results also contribute to practice via decision-making on how to design and develop training initiatives to enhance the abilities of teachers and teaching practices using technology strategies and tools, at the time of the pandemic.

## 7. Limitations and Suggestions

One of the major limitations of this study is the sample size and one-gender examination, and thus, a greater number of sample and both genders need to be included in future studies. The study adopted a quantitative approach in collecting data, which may have introduced inflated biases and as such, future studies may adopt a qualitative approach or a mixed approach. Also, there are other individual and work factors that have the potential to affect the teacher's anxiety, motivation and self-efficacy like background, school setting and other factors in their working environment.

## References

- Alkan, V., Cosguner, T., & Fidan, Y. (2019). Mathematics teaching anxiety scale: Construction, reliability and validity. *International Journal of Assessment Tools in Education*, 6(3), 506-521. <https://dx.doi.org/10.21449/ijate.625423>
- Almulla, M. (2020). *An investigation of teachers motivations for entering the teaching profession in Saudi Arabia*. Unpublished Doctoral Dissertation, University of York.
- Arnsten, A. (2009). Stress signaling pathways that impair prefrontal cortex structure and function. *Nature Reviews Neuroscience*, 10(6), 410.
- Bandura, A. (1986). *Social foundations of thought and action*. Englewood Cliffs, NJ: Prentice Halls.
- Bandura, A. (1997). *Self-efficacy. The exercise of control*. New York: Freeman.
- Barros, M., Laburu, C., & Silva, F. (2010). An instrument for measuring self-efficacy beliefs of secondary school physics teachers. *Procedia-Social and Behavioral Sciences*, 2(2), 3129-3133. Doi:10.1016/j.sbspro.2010.03.476.
- Beker, M. (2016). Mathematics teaching anxiety and self-efficacy beliefs toward mathematics teaching: A path analysis. *Educational Research and Review*, 11(3), 97-104. Doi:10.5897/ERR2015.2552.
- Borko, H., & Whitcomb, J. A. (2008). Teachers, teaching, and teacher education: Comments on the national mathematics advisory panel's report. *Educational Researcher*, 37, 565-572.
- Brown, A. B., Westenskow, A., & Moyer-Packenham, P. S. (2011). Elementary pre-service teachers: Can they experience mathematics teaching anxiety without having mathematics anxiety? *Issues in the Undergraduate Mathematics Preparation of School Teachers*, 5, 1-14.
- Charalambous, C. Y., Philippou, G. N., & Kyriakides, L. (2008). Tracing the development of preservice teachers' efficacy beliefs in teaching mathematics during fieldwork. *Educational Studies in Mathematics*, 67(2), 125-142.
- Diamond, A., Barnet, W., Thomas, J., & Munro, S. (2007). Preschool program improves cognitive control. *Science*, 318(5855), 1387-1388.
- Fared J, Jdaitawi M, & Sheta H. (2018). Fostering positive adjustment behavior: Social connectedness, achievement motivation and emotional-social learning among male and female university students. *Active Learning in Higher Education*, 19, 145-158.
- Fives, H., & Buehl, M. M. (2016). Teachers' beliefs in the context of policy reform. *Policy Insights from the Behavioral and Brain Sciences*, 3(1), 114-121.
- Fuqoha, A., Budiyono, B., & Indriati, D. (2018). Motivation in mathematics learning. *Pancaran Pendidikan*, 7(1), 202-209. Doi:10.25037/pancaran.v7i1.151
- Hacıömeroğlu, G. (2014). Elementary pre-service teachers' mathematics anxiety and mathematics teaching anxiety. *International Journal for Mathematics Teaching and Learning*, 1-10.
- Hoffman B (2010). "I think I can, but I'm afraid to try": The role of self-efficacy beliefs and mathematics anxiety in mathematics problem solving efficiency. *Learn. Individ. Diff.* 20, 276-283.
- Jain S, Dowson M (2009). Mathematics anxiety as a function of multidimensional self-regulation and self-efficacy. *Contemp. Educ. Psychol*, 34, 240-249.
- Jdaitawi M. (2020). Does flipped learning promote positive emotions in science education? A comparison between traditional and flipped classroom approaches. *Electronic Journal of E-learning*, 18: 516-524.
- Jukic, I., Calleja-González, J., Cos, F., Cuzzolin, F., Olmo, J., Terrados, N., Njaradi, N., Sassi, R., Requena, B., Milanovic, L., Krakan, I., Chatzichristos, K., & Alcaraz, B. (2020). Strategies and Solutions for Team Sports Athletes in Isolation due to COVID-19. *Sports (MDPI)*, 8(56), doi:10.3390/sports8040056

- Kitsantas, A., Ware, H., & Cheema, J. (2010). Predicting mathematics achievement from mathematics efficacy: Does analytical method make a difference? *International Journal of Psychological and Educational Assessment*, 5, 25-44.
- Klassen, R., & Tze, V. M. C. (2014). Teachers' self-efficacy, personality, and teaching effectiveness: A meta analysis. *Educational Research Review*, 12, 59-76.
- Marrongelle, K., Sztajn, P., & Smith, M. (2013). Scaling up professional development in an era of common state standards. *Journal of Teacher Education*, 64(3), 202-211.
- OECD (Organisation for Economic Co-Operation and Development) (2013). *Mathematics Self-Beliefs and Participation in Mathematics-Related Activities*. In PISA 2012 Results: Ready to Learn: Students' Engagement, Drive and Self-Beliefs, 3, 79-104. OECD Publishing.
- Parnell, D., Widdop, P., Bond, A., & Wilson, R. (2020). COVID-19, network and sport. *Managing Sport and Leisure*. Doi: 10.1080/23750472.2020.1750100.
- Peker M (2015). *The relationship between mathematics teaching anxiety and self-efficacy beliefs toward mathematics teaching*. International Conference on Social Sciences and Education Research. Antalya-Turkey.
- Peker, M., & Ertekin, E. (2011). The relationship between mathematics teaching anxiety and mathematics anxiety. *The New Educational Review*, 23 (1), 213-226.
- Rabab'h, B. S. H. (2015). *Mathematics Learning Strategy and Mathematics Achievement among Middle School Students in North of Jordan* (Doctoral dissertation, Doctoral Dissertation, Kedah: Universiti Utara Malaysia).
- Rabab'h, B., Arsaythamby, V. (2014). Prediction of Mathematics Learning Strategies on Mathematics Achievement among 8<sup>th</sup> Grade Students in Jordan. *Asian Social Science*, 11(1), 276- 283.
- Ratten, V. (2020). Coronavirus disease (COVID-19) and sport entrepreneurship. *International Journal of Entrepreneurial Behavior & Research*, 1356-2554. DOI10.1108/IJEBR-06-2020-0387.
- Richardson, F. & Suinn, R. (1972). The mathematics anxiety rating scale: Psychometric data. *J. Counsel. Psychol.* 19(6), 551-554.
- Sahat, H., Rahman, A., Tengah, k., & Chuan, H. (2018). A study of mathematics teachers motivation towards teaching in Brunei Darussalam. *Journal of Studies in Education*, 8(2), 18. Doi:10.5296/jse.v8i2.12732.
- Sinclair, C. (2008). Initial and changing student teacher motivation and commitment to teaching. *Asia-Pacific Journal of Teacher Education*, 36(2), 79-104. <https://doi.org/10.1080/13598660801971658>
- Schoenfeld, A. (2015). *What counts, when? Reflection on beliefs, affect, attitude, orientations, habits of mind, grain size, time scale, context, theory, and method*. In B. Pepin, & B. Roesken-Winter (Eds.), From beliefs to dynamic affect systems in mathematics education (pp. 395-404). Switzerland: Springer International.
- Schunk, D., Pintrich, P., & Meece, J. (2008). *Motivation in education: Theory, research, and applications*. Upper Saddle River, NJ: Pearson.
- Skott, J. (2015). *Towards a participatory approach to 'beliefs' in mathematics education*. In B. Pepin, & B. Roesken-Winter (Eds.), From beliefs to dynamic affect systems in mathematics education (pp. 3-23). Switzerland: Springer International.
- Suren, N. & Kandemir, M. (2020). The effects of mathematics anxiety and motivation on students mathematics achievement. *International Journal of Education in Mathematics*, 8(3), 190. Doi:10.46328/ijemst.v8i3.926.
- Swars, S., Hart, L. C., Smith, S. Z., Smith, M., & Tolar, T. (2007). A longitudinal study of elementary preservice teachers' mathematics beliefs and content knowledge. *School Science & Mathematics*, 107, 325- 335.
- Takunyaci, M. (2021). Investigation of mathematics teachers self-efficacy in teaching mathematics in the covid-19 pandemic process. *The Asian Institute of Research Education Quarterly Reviews*, 4(2), 396-407. Doi:10.31014/aior.1993.04.02.289
- Thomson, M. M., & Gregory, B. (2013). Elementary teachers' classroom practices and beliefs in relation to US science education reform: Reflections from within. *International Journal of Science Education*, 35(11), 1800-1823.
- Timpka, T. (2020). Sport in the tracks and fields of the corona virus: Critical issues during the exit from lockdown. *Journal of Science and Medicine in Sport*, 23(2020), 634-635. <http://doi.org/10.1016/j.jsams.2020.05.001>.
- Unlu, M., Ertekin, E., & Dilmac, B. (2017). Predicting relationship between mathematics anxiety, mathematics teaching anxiety, self-efficacy beliefs towards mathematics and mathematics teaching. *International Journal of Research in Education and Science*, 3(2), 636-645.
- Ural A (2015). Matematiköz-yeterlikalgısının matematiköğretmeyeyönelikkaygıya etkisi. *Kuramsal Eğitim Bilim Dergisi*, 8(2), 173-184.
- Utey, J., Moseley, C., & Bryant, R. (2005). Relationship between science and mathematics teaching efficacy of preservice elementary teachers. *School Science & Mathematics*, 105(2), 82-87.
- Velthuis, C., Fisser, P., & Pieters, J. (2014). Teacher training and preservice primary teachers' self-efficacy for science teaching. *Journal of Science Teacher Education*, 25, 445-464.
- Wilder, S., Lee, C., & Mackrell, K. (2021). Addressing mathematics anxiety through developing resilience: Building on self-determination theory. *Creative Education*, 12(9). Doi:10.4236/ce.2021.129161.

- World Health Organization. Situation Report 65.* (2020). Available online: [https://www.who.int/docs/defaultsource/coronaviruse/situation-reports/20200325-sitrep-65-covid-19.pdf?sfvrsn=2b74edd8\\_2](https://www.who.int/docs/defaultsource/coronaviruse/situation-reports/20200325-sitrep-65-covid-19.pdf?sfvrsn=2b74edd8_2) (accessed on 24 April 2020).
- Zu, Z., Jiang, M, Xu, P, Chen, W., Ni, Q., Lu, G., Zhang, L. (2020). Coronavirus Disease 2019 (COVID-19): A Perspective from China. *Radiology*, 21, 200-490.