

ANALYSIS OF MATHEMATICS TEACHING EFFICACY BELIEF OF PROSPECTIVE MATHEMATICS TEACHERS

Louise M. Saija¹, Masta Hutajulu²

¹Universitas Advent Indonesia, Jl. Kolonel Masturi No.288, Bandung Barat, Indonesia

louise.saija@unai.edu

²IKIP Siliwangi, Jl. Terusan Jend. Sudirman, Cimahi, Indonesia

masthahutajulu@ikipsiliwangi.ac.id

ARTICLE INFO

Article history:

Received Mar 25, 2025
Revised Apr 23, 2025
Accepted May 16, 2025

Keywords:

Mathematics Teaching
Efficacy Belief
Prospective Teachers
Mathematics Teachers

ABSTRACT

Mathematics is a fundamental subject that plays a crucial role in students' academic development, thus requiring competent teachers to effectively deliver mathematical concepts. One factor influencing teacher competence is mathematics teaching efficacy belief, which reflects a teacher's confidence in their ability to teach mathematics successfully. This study aims to describe the mathematics teaching efficacy beliefs, among prospective mathematics teachers in West Java, Indonesia. The research involved 55 undergraduate students majoring in mathematics education from various universities in West Java. The instrument used to collect data was the Mathematics Teaching Efficacy Belief Instrument (MTEBI), originally developed by (Enochs et al., 2000) and translated into the Indonesian language. The MTEBI consists of two sub scales: Personal Mathematics Teaching Efficacy (PMTE) and Mathematics Teaching Outcome Expectancy (MTOE). Descriptive quantitative analysis was conducted to categorize students' efficacy beliefs. The results show that, on average, prospective mathematics teachers in West Java exhibit a high level of mathematics teaching efficacy belief. Most of them fall into the high category for PMTE, with none categorized as low. Additionally, nearly all participants scored high in MTOE, with mean scores higher than those in the PMTE dimension. These findings suggest that prospective mathematics teachers generally possess strong confidence in their teaching abilities and believe in the positive outcomes of their teaching efforts. This highlights the potential readiness of these future educators to effectively teach mathematics.

Copyright © 2025 IKIP Siliwangi.

All rights reserved.

Corresponding Author:

Masta Hutajulu,
Department of Mathematics Education,
Institut Keguruan dan Ilmu Pendidikan Siliwangi,
Jl. Terusan Jend. Sudirman, Cimahi, Indonesia
Email: masthahutajulu@ikipsiliwangi.ac.id

How to Cite:

Saija, L.M., & Hutajulu, M. (2025). Analysis of Mathematics Teaching Efficacy Belief of Prospective Mathematics Teachers. *JIML*, 8(2), 401-410.

INTRODUCTION

Mathematics is an important subject to learn and master, because mathematics plays a role in many developments, that are: intellectual, vocational, moral, spiritual, cultural, education system, infrastructure, science and technology, medical science and agricultural, social (Algani, 2022). Because mathematics is important, in schools in Indonesia, mathematics lessons are included in the school curriculum, from elementary school to secondary school. (Reza Lestari et al., 2024). This also shows that the existence of competent mathematics subject teachers is important, and for this reason competent prospective mathematics teachers are needed. Thus, it

can be concluded that mathematics has a very broad role in various aspects of life, so that learning it becomes a necessity in the education system. The existence of competent mathematics teachers is a key factor in ensuring the quality of mathematics learning, so efforts are needed to produce qualified prospective teachers who are able to teach mathematics effectively.

One of the things that influences the competence of a prospective mathematics teacher is also influenced by his/her belief in mathematics teaching efficacy. (Sumartini, 2020). Bandura (1925-2021) a psychologist and founder of social cognitive theory argues that efficacy refers to a person's perception and belief about their potential to achieve a goal, and self-efficacy is a person's belief in their skills to optimally execute and organize a series of actions necessary for a particular achievement (Olawale & Hendricks, 2024) (Alibakhshi et al., 2020). Self-efficacy beliefs play an important role in shaping the competence of prospective mathematics teachers. The higher a person's self-efficacy beliefs, the greater their ability to organize, implement, and achieve learning objectives optimally. Therefore, strengthening the self-efficacy of prospective teachers is a crucial aspect in improving the quality of mathematics teaching in the future.

(Bandura, 1997) also stated that based on self-efficacy theory (SET), people often only do things that they think will work and avoid trying things that they think will fail. However, people who have high self-efficacy believe that they can carry out tasks that seem difficult, because they see difficulties as obstacles to be overcome, not threats to be avoided (Alibakhshi et al., 2020). Bandura also added that people with high self-efficacy beliefs lead to higher performance achievements. (Sogutlu, 2022). Individuals with high self-efficacy tend to be more courageous in facing challenges and see difficulties as opportunities for growth, rather than threats. In addition, strong self-efficacy beliefs contribute to improved performance, so it is important to grow and strengthen self-efficacy in order to achieve more optimal results in various areas of life.

So the competence of a prospective mathematics teacher is influenced by his/her self-confidence in his/her skills and capacity to plan and carry out his/her task of teaching mathematics optimally. Furthermore, research shows that the self-efficacy of a prospective mathematics teacher will influence the self-concept, attitude, and also influence the mathematical achievement of the prospective teachers (Dua et al., 2022), even teacher self-efficacy also influences teacher work motivation (Hosseinzadeh & Moosavinejad, 2023), so that it also has an impact on the success of the learning process (Lestari et al., 2022). Research that has been conducted shows that prospective teachers who have high levels of self-efficacy are more successful in the classroom. (Barni et al., 2019), and higher self-efficacy is also associated with higher STEM pedagogical content knowledge (Twaddle, 2023). Self-efficacy has a significant impact on the competence of prospective mathematics teachers. Self-confidence in teaching skills not only affects the planning and implementation of learning, but also has an impact on the self-concept, attitude, and academic achievement of prospective teachers. In addition, high self-efficacy contributes to increased work motivation and the success of the learning process. Therefore, strengthening the self-efficacy of prospective teachers is an important factor in increasing the effectiveness of teaching and mastery of pedagogical content knowledge, especially in the STEM field.

(Novianti et al., 2023) (Segarra & Julià, 2022) states that studying teachers' teaching efficacy beliefs must consider two separate dimensions. The first dimension is Personal mathematics teaching efficacy (PMTE), subject to the teacher's belief in his/her skills and abilities to be an effective teacher. And the second dimension is Mathematics Teaching Outcome Expectancy (MTOE), subject to the teacher's belief that effective teaching can be realized in student learning without paying attention to external factors such as the home environment, family background, and parental influence (Segarra & Julià, 2022). Teachers' teaching efficacy beliefs

consist of two main dimensions, namely PMTE and MTOE. PMTE focuses on teachers' confidence in their teaching skills, while MTOE relates to the belief that effective teaching will produce positive outcomes for students, regardless of external factors. Understanding these two dimensions is important in efforts to improve mathematics teachers' teaching competence and effectiveness.

This study aims to examine the mathematics teaching efficacy beliefs among prospective mathematics teachers in West Java, covering the two dimensions mentioned above, PMTE and MTOE.

METHOD

This study employed a quantitative approach using a descriptive research method. The participants were 55 prospective mathematics teachers enrolled in mathematics education programs at several universities in West Java, Indonesia. The instrument used in this study was the Mathematics Teaching Efficacy Belief Instrument (MTEBI) developed by (Enochs et al., 2000) which was translated into the Indonesian language. The MTEBI consists of 21 items rated on a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). It comprises two subscales: (1) Personal Mathematics Teaching Efficacy (PMTE), consisting of 13 items (items 2, 3, 5, 6, 8, 11, 15, 16, 17, 18, 19, 20, 21), and (2) Mathematics Teaching Outcome Expectancy (MTOE), consisting of 8 items (items 1, 4, 7, 9, 10, 12, 13, 14). Responses for negatively worded items (items 3, 6, 8, 15, 17, 18, 19, and 21) (Segarra & Julià, 2022).

The research steps included: (1) translating and validating the MTEBI instrument, (2) administering the instrument to participants, and (3) collecting and organizing the data for analysis. Data analysis was conducted descriptively. Participants' scores were categorized based on classification schemes from (Hourigan & Leavy, 2022). For PMTE (score range 13–65), scores of 13–29 were categorized as low, 30–46 as moderate, and 47–65 as high. For MTOE (score range 8–40), scores of 8–18 were categorized as low, 19–28 as moderate, and 29–40 as high. In addition, mean scores and standard deviations were calculated for each item to provide a more detailed analysis of participants' efficacy beliefs.

In addition to conduct more complete descriptive analysis for the two dimensions of mathematics teaching efficacy beliefs, PMTE and MTOE, descriptive analysis was also carried out for each statement item on each dimension of mathematics teaching efficacy beliefs for prospective teacher students, that is based on the average value and standard deviation for each statement item. The research instrument used has undergone reliability testing with Alpha Cronbach test results are 0.846 for PMTE dimension, 0.722 for MTOE dimension, and 0,818 for the whole MTEB instrument. Since all the reliability test results are greater than 0.70, based on (Enochs et al., 2000). The MTEB instrument considered suitable for use in this study (Twhill et al., 2023).

RESULTS AND DISCUSSION

Results

This section divided into three sub sections, they are: Descriptive analysis for the MTEB dimensions, descriptive analysis for PMTE dimension, overall and by items; and descriptive analysis for MTOE dimension, also overall and by items.

Descriptive Analysis of Prospective Mathematics Teacher's Mathematics Teaching Efficacy Belief (MTEB)

The result in below table showed the description of both MTEB sub scales, for prospective mathematics teachers by level and overall.

Table 1. Description of the *MTEB Sub scales*

| Level | MTBI subscales | Range | Mean | Standard deviation |
|--------|----------------|-------|-------|--------------------|
| I & II | PMTE | 47-53 | 49.43 | 2.23 |
| | MTOE | 32-34 | 33.00 | 0.95 |
| III | PMTE | 35-58 | 47.86 | 5.49 |
| | MTOE | 24-40 | 31.86 | 4.52 |
| IV | PMTE | 36-65 | 46.59 | 7.09 |
| | MTOE | 29-40 | 32.85 | 2.91 |
| I - IV | PMTE | 35-65 | 47.3 | 6.2 |
| | MTOE | 24-40 | 32.8 | 3.3 |

Table 1 shows that the PMTE scores of prospective teachers in levels I and II range between 47 and 53, with a mean score of 49.43 and a standard deviation of 2.23. These scores fall within the high category, indicating that early-year prospective teachers already have strong personal confidence in their teaching abilities. For students in level III, the mean PMTE score is 47.86 (SD = 5.49), also in the high category, while level IV students have a slightly lower mean of 46.59 (SD = 7.09), placing them between the moderate and high categories. Overall, from level I to IV, the mean PMTE score is 47.3, classified as high, suggesting a generally strong teaching self-efficacy among all participants.

For the MTOE dimension, level I and II students show a mean of 33.00 (SD = 0.95), clearly within the high category. Level III and IV students have mean scores of 31.86 (SD = 4.52) and 32.85 (SD = 2.91), respectively, both still in the high category. The overall MTOE mean score across all levels is 32.8, categorized as high as well. These findings imply that most prospective teachers not only believe in their teaching ability (PMTE), but also in the positive outcomes that result from effective teaching (MTOE).

In summary, the majority of prospective mathematics teachers surveyed in this study demonstrate high mathematics teaching efficacy beliefs in both PMTE and MTOE dimensions. No participants fell into the low category for PMTE, and nearly all scored high for MTOE. This indicates that they are generally confident in both their capability to teach mathematics and in their belief that their teaching will positively impact student learning.

Descriptive Analysis of Prospective Mathematics Teacher's Personal Mathematics Teaching Efficacy (PMTE)

This section is divided into two parts: the percentage of students for each PMTE categories and the description of each PMTE statement item.

Percentage of Prospective Mathematics Teacher's PMTE Categories

The following table shows the percentage of prospective mathematics teachers for each category of personal mathematics learning efficacy of prospective teacher students, by level and overall.

Table 2. Percentage of PMTE Category

| Level | Category | Number of Students | Percentage |
|--------|----------|--------------------|------------|
| I & II | High | 7 | 100% |
| | Moderate | 0 | 0% |
| | Low | 0 | 0% |
| III | High | 6 | 42.9% |
| | Moderate | 8 | 57.1% |
| | Low | 0 | 0% |
| IV | High | 18 | 52.9% |
| | Moderate | 16 | 47.1% |
| | Low | 0 | 0% |
| I - IV | High | 31 | 56.3 % |
| | Moderate | 24 | 43.7 % |
| | Low | 0 | 0 % |

The results in Table 2 above show that by level or overall, there are more prospective mathematics teachers with high category PMTE than moderate category, except for the level III where more prospective mathematics teachers with moderate categorical PMTE than high, and there are no prospective mathematics teacher students with low PMTE category.

Description of Each PMTE Statement Item

In order to obtain a more detailed description, the following table shows the mean scores and standard deviations for each statement for the PMTE.

Table 3. Descriptive of PMTE Items

| Statement | Mean | Standard Deviation |
|---|------|--------------------|
| I need to find better ways to teach mathematics continually | 4,48 | 0,57 |
| I will not teach mathematics as well as I will most subjects, Even if I try very hard | 3,39 | 0,97 |
| I confident that I can teach mathematics concepts effectively | 3,93 | 0,63 |
| Monitoring mathematics class activities is one of the thing that I can not do in a very effective way | 3,45 | 0,97 |
| Generally I will teach mathematics ineffectively | 4,11 | 0,87 |
| I can teach elementary mathematics effectively because I understand mathematics concepts well enough | 4,23 | 0,60 |
| Using manipulative to explain to students why mathematics works is one difficult thing | 2,96 | 0,81 |
| If students ask questions I will typically be able to answer it | 4,04 | 0,47 |

| Statement | Mean | Standard Deviation |
|---|------|--------------------|
| I wonder if I will have the necessary skills to teach mathematics | 2,16 | 0,73 |
| If I can choose, I will not invite the principal to evaluate my mathematics teaching | 3,54 | 1,01 |
| I will usually be at a loss as to how to help the student understand mathematics concept better, if they have that difficulty | 3,38 | 1,02 |
| I will usually welcome student to ask questions when I teaching them mathematics | 4,23 | 0,50 |
| I do not know what to do to turn students on to mathematics | 3,39 | 1,04 |

The results in Table 3 above show that the item mean values are more than three in almost all PMTE dimension statements, two statements have mean values lesser than three, and five statements have mean values greater than four.

Descriptive Analysis of Prospective Mathematics Teacher's Mathematics Teaching Outcome Expectancy (MTOE)

This section is divided into two parts, namely the percentage of prospective mathematics teachers for each MTOE category and a description of each MTOE statement item.

Percentage Of Prospective Mathematics Teacher's MTOE Categories

The following table shows the percentage of prospective mathematics teachers for each category of mathematics teaching outcomes expectancy, by level and overall.

Table 4. Percentage of MTOE Category

| Level | Category | Number of Students | Percentage |
|-------------------|-----------------|--------------------|------------|
| I & II | High | 7 | 100% |
| | Moderate | 0 | 0% |
| | Low | 0 | 0% |
| III | High | 11 | 78,6% |
| | Moderate | 3 | 21,4% |
| | Low | 0 | 0% |
| IV | High | 34 | 100% |
| | Moderate | 0 | 0% |
| | Low | 0 | 0% |
| I - IV | High | 52 | 94,6 % |
| | Moderate | 3 | 5,4 % |
| | Low | 0 | 0 % |

The results in Table 4 above show that almost all prospective mathematics teacher have a high MTOE category, and a few are in the medium category, that is for level 3 students, and there are no prospective mathematics teacher students with a low MTOE category.

Description of Each MTOE Statement Item

In order to obtain a more detailed description, the following table shows the mean values and standard deviations for each statement for the MTOE dimension.

Table 5. Descriptive of MTOE Item

| Statement | Mean | Standard Deviation |
|---|------|--------------------|
| Most often when the teacher exerted a little extra efforts, student will do better than usual in their mathematics | 4,32 | 0,58 |
| It is very often that when teacher found a more effective teaching approach, the mathematics grades of students improved | 4,39 | 0,68 |
| If students are underachieving in mathematics, it is most likely cause by ineffective mathematics teaching | 3,96 | 0,74 |
| Good teaching can overcome the inadequacy of a student's mathematics background | 4,25 | 0,51 |
| Usually when teacher give extra attention, a low-achieving child show progresses in mathematics | 3,91 | 0,94 |
| Teacher responsible for the achievement of students in mathematics | 3,85 | 0,68 |
| The teacher's effectiveness in mathematics teaching is related directly to the students' achievement in mathematics | 4,11 | 0,62 |
| If parents comment that their child is showing more interest in mathematics at school, it is probably due to the performance of the child's teacher | 4,02 | 0,75 |

The results in Table 5 above show that based on the mean value, in almost all statements of the MTOE dimensions is greater than three and almost approaching four, and five of the statement mean values are greater that four.

Discussions

Averagely the mathematics teaching efficacy belief of the prospective teachers in West Java are high, but the standard deviation for PMTE are higher from MTOE. This finding is aligns with the result of the study conducted by (Mulu et al., 2021), that is the prospective mathematics teacher's efficacy belief are in the high category, except there are prospective mathematics teacher with low categorical efficacy belief in (Mulu et al., 2021) study result, while none of the prospective mathematics teachers in this study has low categorical efficacy belief. One interesting thing about the findings in this study is that prospective mathematics teachers in level 1 and 2 have higher mathematics teaching efficacy belief than their seniors, specifically for their Personal Mathematics Teaching Efficacy (PMTE). Teacher efficacy belief is associated with various positive student learning outcomes, making it one of the key factors in delivering high-quality mathematics instruction (Giles et al., 2016).

There are more prospective mathematics teachers who are very confident in their personal abilities in teaching mathematics. More specifically, for the prospective mathematics teachers level 1 and 2 in this study, all of them showed high confidence in their personal abilities in teaching mathematics. Based on the item mean values, it is found that most of the prospective mathematics teachers believe that they can still improve their personal ability and they put students' questions and answers as a priority. They showed confidence in their personal abilities in teaching mathematics, but some still doubt their ability in their skills in teaching mathematics and using manipulatives in teaching mathematical concepts. More further, the prospective mathematics teachers agree that they will continuously find better ways to teach mathematics, understand mathematical concepts well enough to be able to teach elementary mathematics effectively, and welcome and be able to answer students' questions. The results in this section align with the findings in the study conducted by (Mulu et al., 2021) and (Hourigan & Leavy, 2022) researches. But the mean values on some PMTE item in this study are higher than in (Hourigan & Leavy, 2022) study.

Almost all prospective mathematics teachers have high confidence in the expected outcomes of the mathematics learning they teach. More specifically, all prospective mathematics teachers level 1, 2 and 4 in this study had high confidence for the mathematics teaching outcome expectancy. This result is also aligned with the findings in the study conducted by (Mulu et al., 2021). This is also in line with the findings of (Strayer et al., 2021). Who stated that well-designed learning experiences can enhance pre-service teachers' confidence in mathematics teaching outcome expectancy.

The prospective mathematics teachers showed confidence in their personal abilities in teaching mathematics, they believe that: If teachers put in more effort in teaching, then students will be able to do better than usual; if teachers find more effective learning, then student grades will increase; deficiencies in students' learning backgrounds can be overcome with good teaching; the effectiveness of teacher teaching has a direct effect on student learning achievement; and teacher performance will result in student interest in learning, in this case mathematics learning. The distinct roles of mathematical beliefs, mathematics self-efficacy, and mathematics teaching efficacy in explaining and predicting the teaching and learning conceptions of pre-service mathematics teachers (Lau, 2022).

CONCLUSION

The result in this study showed that the prospective mathematics teachers in West Java Indonesia have high categorical mathematics teaching efficacy beliefs, and that there are more prospective mathematics teacher students with high category of personal mathematics teaching efficacy (PMTE) than medium category, and there are no prospective mathematics teacher students with low category PMTE. Another finding in this research is that almost all the prospective mathematics teachers have high categorical mathematics teaching outcomes expectancy (MTOE), and the mean values are higher than the PMTE dimension.

Factors such as classroom management, communication with students and parents, mathematical knowledge for teaching, use of instructional materials, and use of textbooks influence efficacy beliefs during the first year of teaching (Işıkşal-Bostan, 2016). Some preservice teachers feel highly confident in their teaching abilities but have low mathematical knowledge, which can negatively impact their teaching effectiveness (Austin, 2015).

Based on the research findings, the following recommendations can be provided for Practitioners (Teacher Educators) to integrate more hands-on teaching experiences early in teacher preparation programs. Emphasize reflective teaching practices and model effective strategies that build mathematical understanding and confidence. Then, for Institutions can design curriculum that balances both content knowledge and pedagogical skill, with emphasis

on building a growth mindset in mathematics teaching. Finally, for future studies should explore the long-term development of PMTE during student teaching and into early professional years. Additionally, qualitative research can provide deeper insights into personal experiences and specific instructional practices that shape teaching efficacy.

ACKNOWLEDGMENTS

The Researchers would to express our deepest gratitude to Hanisa Tamalene, S.Pd., M.Pd. and Dr. Yatha Yuni, M.Pd. for their willingness to distribute the research instrument to the respondents in this research.

REFERENCES

- Algani, Y. M. A. (2022). Role, need and benefits of mathematics in the development of society. *Journal for the Mathematics Education and Teaching Practices*, 3(1), 23–29.
- Alibakhshi, G., Nikdel, F., & Labbafi, A. (2020). Exploring the consequences of teachers' self-efficacy: a case of teachers of English as a foreign language. *Asian-Pacific Journal of Second and Foreign Language Education*, 5(1), 1–19. <https://doi.org/10.1186/s40862-020-00102-1>
- Austin, J. (2015). Prospective teachers' personal mathematics teacher efficacy beliefs and mathematical knowledge for teaching. *International Electronic Journal of Mathematics Education*, 10(1), 17–36. <https://doi.org/10.29333/iejme/289>
- Bandura, A. (1997). Self-efficacy. In *The Wiley Encyclopedia of Personality and Individual Differences* (Issue 1994). <https://doi.org/10.1002/9781118970843.ch243>
- Barni, D., Danioni, F., & Benevene, P. (2019). Teachers' self-efficacy: The role of personal values and motivations for teaching. *Frontiers in Psychology*, 10(JULY), 1–7. <https://doi.org/10.3389/fpsyg.2019.01645>
- Dua, C. C., Mancera, A., Solis, Y. J., Pentang, J., & Bautista, R. (2022). Preservice Teachers' Self-concept, Self-efficacy, and Attitude: Its Implications to Mathematics Achievement. *Studies in Technology and Education*, 1(1), 1–13.
- Enochs, L. G., Smith, P. L., & Huinker, D. A. (2000). Establishing Factorial Validity of the Mathematics Teaching Efficacy Beliefs Instrument. *School Science and Mathematics*, 100(4), 194–202. <https://doi.org/10.1111/j.1949-8594.2000.tb17256.x>
- Giles, R. M. M., Byrd, K. O., & Bendolph, A. (2016). An investigation of elementary preservice teachers' self-efficacy for teaching mathematics. *Cogent Education*, 3(1), 0–11. <https://doi.org/10.1080/2331186X.2016.1160523>
- Hosseinzadeh, M., & Moosavinejad, S. M. (2023). Elementary School Teachers' Math Teaching Efficacy Beliefs and Job Motivation: A Correlational Study. *Iranian Journal of Educational Research*, 2, 41–51.
- Hourigan, M., & Leavy, A. M. (2022). European Journal of Mathematics and Science Education. *Science Education*, 3(1), 133–148.
- Işıkşal-Bostan, M. (2016). A Longitudinal Study on Mathematics Teaching Efficacy: Which Factors (Un)Support the Development? *Eurasia Journal of Mathematics, Science and Technology Education*, 12(8), 2085–2102. <https://doi.org/10.12973/eurasia.2016.1277a>
- Lau, W. W. (2022). Predicting pre-service mathematics teachers' teaching and learning conceptions: The role of mathematical beliefs, mathematics self-efficacy, and mathematics teaching efficacy. *International Journal of Science and Mathematics Education*, 20(6), 1141-1160.

- Lestari, N., Eveline, E., & Permatasari, R. (2022). Self-Efficacy Calon Guru Sekolah Dasar Di Remote Area. *Jurnal Pendidikan Dasar*, 10(2), 280–284. <https://doi.org/10.46368/jpd.v10i2.887>
- Mulu, H., Kurnila, V., & Ningsi, G. (2021). Mathematics Teaching Efficacy: Differences in Beliefs of Preservice and In-Service Teachers. *ICHELAC*. <https://doi.org/10.4108/eai.30-7-2021.2313604>
- Novianti, I., Soebagyo, J., & Toyib, W. (2023). Diagnosis of Maths Teaching Efficacy Beliefs Using Expert System. *AL-ISHLAH: Jurnal Pendidikan*, 15(1), 1053–1066. <https://doi.org/10.35445/alishlah.v15i1.2996>
- Olawale, B. E., & Hendricks, W. (2024). Mathematics teachers' self-efficacy beliefs and its relationship with teaching practices. *Eurasia Journal of Mathematics, Science and Technology Education*, 20(1). <https://doi.org/10.29333/EJMSTE/14123>
- Reza Lestari, Habibi, & Syaiful Bastari. (2024). Persepsi Siswa Terhadap Mata Pelajaran Matematika (Studi Kasus Siswa Kelas VI SD Negeri 03 Gumay Ulu). *Jurnal Ilmu Pendidikan*, 3(1), 21–28. <https://doi.org/10.58222/jurip.v3i1.777>
- Segarra, J., & Julià, C. (2022). Mathematics Teaching Efficacy Belief and Attitude of Pre-service Teachers and Academic Achievement. *European Journal of Science and Mathematics Education*, 10(1), 1–14. <https://doi.org/10.30935/SCIMATH/11381>
- Sogutlu, E. (2022). Pre- And In-service Teachers' Self-Efficacy Beliefs: A Case Study of an English Language Teacher Education Programme in Albania. *International Journal of Learning, Teaching and Educational Research*, 21(2), 303–319. <https://doi.org/10.26803/ijlter.21.2.17>
- Strayer, J. F., Adamoah, K., & Yvonne, L. (2021). *Prospective Secondary Mathematics Teachers' Expectancy and Value for Teaching Practices: Comparing Across Content Areas*. 2, 163714.
- Sumartini, T. S. (2020). Self-Efficacy Calon Guru Matematika. *Mosharafa: Jurnal Pendidikan Matematika*, 9(3), 419–428. <https://doi.org/10.31980/mosharafa.v9i3.624>
- Twaddle, J. (2023). The Self-Efficacy of Preservice Teachers in STEM Pedagogical Content Knowledge. *London Journal of Research In Humanities and Social ...*, 23(13).
- Twohill, A., NicMhuirí, S., Harbison, L., & Karakolidis, A. (2023). Primary Preservice Teachers' Mathematics Teaching Efficacy Beliefs: the Role Played by Mathematics Attainment, Educational Level, Preparedness to Teach, and Gender. *International Journal of Science and Mathematics Education*, 21(2), 601–622. <https://doi.org/10.1007/s10763-022-10259-5>