Multidisciplinary Reviews

QUESTIONNAIRES APPLICATION
Published Online: November 11, 2025
https://doi.org/10.31893/multirev.2026281

The effect of self-efficacy on problem solving in vocational high schools

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Abstract This study investigates the influence of self-efficacy on students' problem-solving abilities in vocational high schools. Self-efficacy, as a fundamental psychological construct, plays a crucial role in shaping learners' confidence, persistence, and capacity to overcome both academic and practical challenges. A quantitative research design was adopted, employing a one-group pretest–posttest approach to examine the relationship between self-efficacy and problem-solving performance. The study involved 65 vocational high school students as research participants. Data were collected using a validated Self-Efficacy Questionnaire and a Problem-Solving Performance Test. The instruments were developed through expert validation, pilot testing, and reliability analysis to ensure methodological rigour. Data analysis consisted of descriptive and inferential statistical procedures, including normality tests, linearity tests, and simple linear regression analysis. The findings revealed that self-efficacy exerts a statistically significant positive effect on students' problem-solving abilities, with a significance value of 0.008, which is lower than the 0.05 threshold. The coefficient of determination ($R^2 = 0.105$) indicates that self-efficacy contributes 10.5% to students' problem-solving performance, while the remaining 89.5% is attributed to other variables not examined in this study. These results underscore the importance of fostering students' self-efficacy through mastery experiences, constructive feedback, and collaborative learning activities. Strengthening self-efficacy is essential for developing higher-order thinking and problem-solving competencies that are critical for success in vocational education and future professional contexts. The study recommends that educational institutions integrate self-efficacy-oriented strategies into instructional design to enhance students' adaptability, autonomy, and lifelong learning capacities within the framework of Technical and Vocational Education and Training (TVET).

Keywords: academic resilience, cognitive performance, collaborative learning, motivation, persistence

1. Introduction

Vocational high schools are established to equip students with technical expertise and practical work competencies, enabling them to compete effectively in the industrial sector. Within the learning process, students are not only exposed to theoretical concepts but are also challenged with diverse real-world situations that demand rapid and accurate problem-solving abilities (Chaanpraserta et al., 2024). In this context, self-efficacy emerges as a key psychological factor influencing students' capacity to overcome such challenges (Ahmed et al., 2024). Individuals with strong self-efficacy exhibit higher confidence in their ability to manage and resolve problems. As articulated by Bandura (2010), self-efficacy serves as a motivating force for action and a source of psychological resilience when confronting difficulties (Bandura, 2010). Empirical studies further support this view, demonstrating that self-efficacy contributes positively to students' critical thinking and problem-solving skills (Phan et al., 2022; Karataş et al., 2021; Sari & Dewi, 2021).

Students in vocational high schools encounter complex learning demands, including real-world projects, internships, and collaborative tasks that necessitate systematic and reflective problem-solving (Briganti, 2025). Within vocational education, problem solving entails the application of logical reasoning, decision-making, and practical solutions to authentic workplace situations (Habibulloh, 2025; Saengchuk et al., 2024; Syafi'i et al., 2024). Students with higher levels of self-efficacy are more inclined to evaluate alternatives critically, make sound decisions, and assume accountability for outcomes (Johnson et al., 2024; Habibulloh et al., 2024; Satyawati & Dwikurnaningsih, 2024). Self-efficacy significantly influences students' motivation and persistence when undertaking challenging academic tasks (Usher & Pajares, 2009). Consistent with these findings, other scholars (Seibert et al., 2011; Ismanto & Trisatyawati, 2024; Artino, 2012; Arslan, 2022; Honicke & Broadbent, 2016) emphasize that self-efficacy is foundational in developing effective problem-solving strategies, particularly in education systems emphasizing applied and practical competencies.

Field practice findings indicate that many vocational high school students still exhibit weak self-efficacy, often resulting from internal and external factors. Fieldwork programs are intended to integrate both hard skills and soft skills, requiring learners not only to complete technical assignments but also to demonstrate discipline, collaboration, and independent problem-solving capabilities. Low self-efficacy can therefore become a significant barrier to effective vocational learning and

training. Students who lack confidence tend to avoid challenges, depend heavily on others, and easily withdraw when faced with obstacles, thereby hindering the development of their problem-solving capacity. As Elias (1997) observed, students with low self-efficacy frequently adopt passive and ineffective problem-solving patterns (Elias, 1997). Academic self-efficacy plays a critical role in helping students regulate their motivation and achieve their learning goals. Consequently, fostering self-efficacy must become an integral component of pedagogical strategies, enabling students to navigate academic and social challenges effectively (Abubakar & Purniati, 2024).

In vocational education, self-efficacy is not only vital within the classroom but also constitutes a fundamental competency required in the workplace. Problem-solving skills represent one of the essential 21st-century competencies. Therefore, developing students' self-efficacy is central to vocational learning, especially when instruction incorporates project-based learning approaches that simulate real-world problem contexts. Empirical evidence shows that strong self-efficacy enhances student engagement and persistence in solving complex problems both independently and collaboratively by (Bell, 2010; Raelin et al., 2011; Kokotsaki et al., 2016). Moreover, other studies have found that students' perceptions of self-efficacy directly and positively affect their attitudes toward problem solving (Çelik et al., 2024).

In light of these perspectives, it becomes crucial to conduct a scientific investigation on the relationship between self-efficacy and problem-solving ability among vocational high school students. The findings of this study are expected to provide an empirical foundation for developing learning models that not only emphasize cognitive and technical competencies but also strengthen affective and psychological dimensions. Such efforts are essential to ensure that vocational high school graduates possess not only the professional skills demanded by industry but also the psychological readiness and resilience required to adapt to an evolving and dynamic world of work. This argument aligns with the perspectives of Andrews and Higson (2008), Griffin and Care (2015), and Heckman and Kautz (2012), who collectively assert that the cultivation of soft skills such as self-efficacy and problem-solving should be prioritized within modern educational frameworks, particularly in vocational and technical training systems (Andrews & Higson, 2008; Griffin & Care, 2015; Heckman & Kautz, 2012).

2. Materials and Methods

2.1. Research design

This study adopted a quantitative research design employing a one-group pretest–posttest experimental approach (Creswell, 2009). The quantitative design was selected because it enables the objective measurement of relationships between variables and the assessment of causal effects. The primary objective was to determine the extent to which self-efficacy influences students' problem-solving ability within the context of vocational education. Through this design, comparisons were made between students' performance before and after a learning intervention aimed at strengthening self-efficacy through project-based and collaborative learning experiences. The design provided a systematic framework for observing and quantifying changes in student performance resulting from the educational intervention.

2.2. Population and participants

The target population of this study consisted of all tenth-grade students enrolled in a public vocational high school in East Java, Indonesia. A purposive sampling technique was used to select participants who met specific inclusion criteria relevant to the study's objectives (Punch, 2013). Participants were required to have prior experience in project-based and applied mathematics learning, as this background ensured alignment with the skills measured. In total, 65 vocational high school students participated in the study. This number was considered sufficient to achieve statistical reliability in simple linear regression analysis and to represent the target population within the scope of the research.

2.3. Research variables

Two main variables were examined in this study. The independent variable (X) was self-efficacy, defined as a learner's belief in their capacity to plan and execute actions to achieve desired learning outcomes. The dependent variable (Y) was problem-solving ability, defined as the students' capacity to identify problems, generate and evaluate possible solutions, and apply appropriate strategies to achieve effective results. These variables were operationalized through validated measurement instruments to ensure the accuracy and consistency of data collection.

2.4. Research instruments

Two primary instruments were used in this study: a Self-Efficacy Questionnaire and a Problem-Solving Test. The Self-Efficacy Questionnaire consisted of 24 statements rated on a five-point Likert scale ranging from strongly disagree (1) to strongly agree (5). Several items were reverse-scored to reduce response bias and enhance the reliability of measurement. The content validity of the questionnaire was reviewed by three experts in education and psychology, and its reliability was confirmed through pilot testing and Cronbach's alpha analysis. The Problem-Solving Test included ten open-ended questions designed to measure students' analytical, logical, and creative abilities in addressing contextual problems. The test items were

adapted from real-life and industrial situations to reflect the authentic nature of vocational learning. Expert judgment was employed to verify the validity of the test content, and a pilot study ensured the clarity and feasibility of the items for the target participants.

2.5. Data collection procedures

Data collection was conducted in three sequential stages: preparation, implementation, and evaluation (Field, 2013). During the preparation stage, the researcher developed, validated, and pilot-tested the research instruments and obtained formal authorization from the school administration to conduct the study. In the implementation stage, students first completed a pretest to measure their initial levels of self-efficacy and problem-solving ability. They then participated in a structured learning intervention designed to enhance self-efficacy through mastery experiences, peer collaboration, and formative feedback. Upon completion of the intervention, a posttest was administered using the same instruments to assess improvements in performance. The evaluation stage involved data verification, coding, and entry into statistical software for further analysis. This structured procedure ensured that the data collected were accurate, complete, and reliable for inferential analysis.

2.6. Data analysis

Data were analyzed using both descriptive and inferential statistical methods (Teddlie & Tashakkori, 2009). Descriptive statistics were used to summarize the general characteristics of the data, including means, standard deviations, and data distributions. Inferential analysis was applied to test the study hypothesis and examine the effect of self-efficacy on problem-solving ability. Prior to hypothesis testing, assumption tests including the normality test and linearity test were conducted to ensure compliance with statistical requirements. After confirming these assumptions, a simple linear regression analysis was performed to determine the strength and direction of the relationship between self-efficacy and problem-solving ability. The coefficient of determination (R^2) was computed to identify the proportion of variance in problem-solving ability explained by self-efficacy. The level of statistical significance was set at $\alpha = 0.05$.

2.7. Ethical considerations

The study was conducted in accordance with ethical research standards established by Universitas Negeri Surabaya and the participating institution. All participants were informed about the purpose, procedures, and expected benefits of the study prior to data collection. Participation was voluntary, and informed consent was obtained from all students. The anonymity and confidentiality of participants were strictly maintained throughout the research process. No physical, psychological, or academic harm occurred during the study. All collected data were stored securely and used exclusively for educational and scientific purposes.

3. Results

The research data underwent a comprehensive data quality analysis, which confirmed that both data sets were statistically valid and reliable. Following this, a series of preliminary assumption tests were conducted, including the normality test and linearity test, prior to performing the simple linear regression analysis.

The data used in this study were derived from two primary sources: the problem-solving performance test on linear programming material and the self-efficacy questionnaire administered to the participants. The results of the data analysis were presented through both descriptive and inferential statistical procedures to ensure a comprehensive understanding of the findings.

The normality test was conducted to determine whether the distribution of the sample data conformed to the assumptions of normality required for parametric statistical analysis. The results of the normality test are presented in Table 1 below.

Table 1 Normality test.

		Problem Solving	Self-Efficacy
N		65	65
Normal Parameters[a,,b]	Mean	32.69	81.46
	Std. Deviation	9.017	5.911
Most Extreme Differences	Absolute	.183	.171
	Positive	.091	.151
	Negative	-.183	-.171
Kolmogorov-Smirnov Z		1.472	1.382
Asymp. Sig. (2-tailed)		.026	.044
a. Test distribution is Normal.			
b. Calculated from data.			

Based on the data in Table 1, it shows that the significance value of problem solving data is 0.026 < 0.050 and the significance value of self-efficacy data is 0.044 < 0.050. Therefore, it can be concluded that the data is normally distributed. Next is the linearity test, which aims to determine the form of the relationship between the independent variable and the dependent variable. The test results are shown in Table 2 below:

Table 2 Linierity test.

ANOVA Table							
			Sum of Squares	df	Mean Square	F	Sig.
Problem Solving * Self-Efficacy	Between Groups	(Combined)	791.262	5	158.252	2.116	.076
		Linearity	546.799	1	546.799	7.311	.009
		Deviation from Linearity	244.464	4	61.116	.817	.519
	Within Groups		4412.584	59	74.790		
	Total		5203.846	64			

Based on the results presented in Table 2, the significance value for the deviation from linearity was 0.519, which is greater than 0.05. This indicates that there was no significant deviation from linearity, and therefore, the relationship between the independent and dependent variables can be considered statistically linear.

Following the confirmation of the normality and homogeneity assumptions through the prerequisite tests, hypothesis testing was subsequently performed using simple linear regression analysis. The results of the regression analysis are presented in Table 3 below.

Table 3 Hypothesis test.

Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	72.975	14.849		4.914	.000
	Self-Efficacy	-.494	.182	-.324	-2.720	.008
a. Dependent Variable: Problem Solving						

Based on the results presented in Table 3, the significance value was found to be 0.008, which is less than 0.05. This indicates that self-efficacy exerts a statistically significant influence on students' problem-solving ability. To further determine the magnitude of this influence, the coefficient of determination (R^2) was calculated to assess the proportion of variance in students' problem-solving performance that can be explained by their level of self-efficacy.

Referring to Table 4, a coefficient of determination of 0.105 was obtained for the dependent variable. This result indicates that the variation of the independent variable in influencing the regression equation is 10.5%. Based on the calculation of the coefficient of determination (R^2), it can be concluded that the influence of self-efficacy on students' problem-solving ability is 10.5%, which falls into the very low category. The remaining 89.5% (100% - 10.5% = 89.5%) is influenced by other factors not included in the regression equation.

Table 4 Coefficient of determination.

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.324[a]	.105	.091	8.598
a. Predictors: (Constant), Self-Efficacy				

4. Discussion

The findings of this study confirm that the data obtained from the participants fulfilled the statistical assumptions of normality and linearity, ensuring the validity and reliability of the regression analysis. The results of the t-test demonstrated a statistically significant relationship between self-efficacy and students' problem-solving abilities, with a significance level of p = 0.000 < 0.05. Furthermore, the independent t-test results from the posttest indicated that students' problem-solving performance improved following the application of a collaborative problem-solving model. The coefficient of determination (R^2 = 0.105) revealed that self-efficacy accounted for 10.5% of the variance in students' problem-solving abilities, which is categorized as a low level of influence, while the remaining 89.5% of the variance is attributed to other factors not included in the regression model.

These findings are consistent with a range of previous studies emphasizing the crucial role of self-efficacy in enhancing students' problem-solving performance, particularly in vocational education contexts. Zabir et al. (2024) found that self-efficacy had a significant influence on students' performance in linear programming tasks among tenth-grade vocational school

students (Zabir et al., 2024). Similarly, Putra et al. (2023) and Hasanah (2024) confirmed that self-efficacy positively affects students' problem-solving skills (Putra et al., 2023; Hasanah, 2024). In addition, Fitri et al. (2023) highlighted that self-efficacy exerts an indirect influence through metacognitive mediation, leading to improved problem-solving in economics education (Fitri et al., 2023). Correspondingly, Wardanis et al. (2023) and Abubakar and Purniati (2024) reported that self-efficacy demonstrates a positive and significant correlation with analytical and problem-solving capabilities among students (Wardanis et al., 2023; Abubakar & Purniati, 2024).

Empirical studies also demonstrate that self-efficacy and learning motivation jointly contribute to the improvement of students' problem-solving abilities (Septian & Irawan, 2025; Somawati, 2018). According to Khotimah et al. (2020), self-efficacy represents an individual's belief in their own competence to manage and overcome various situations (Khotimah et al., 2020). This belief system determines how individuals perceive challenges, regulate their actions, and sustain their motivation to achieve success. As Sapulete et al. (2023) note, self-efficacy reflects confidence in one's capacity to make sound decisions, act independently, accept the consequences of one's choices, maintain positive social interactions, and pursue excellence while recognizing personal strengths and limitations (Sapulete et al., 2023).

Students with high levels of self-efficacy tend to engage more actively in the learning process, demonstrate persistence in completing tasks, and achieve optimal learning outcomes that align with instructional objectives (Zahro & Surjanti, 2021; Tarumasely, 2021). Moreover, individuals with strong self-efficacy are typically more motivated, enthusiastic, and responsible in performing academic tasks assigned by teachers (Desnatalia, 2022). In contrast, students with low self-efficacy are more likely to exhibit avoidance behaviors, dependency, and diminished perseverance when facing challenging academic situations.

The role of self-efficacy extends beyond problem-solving; it contributes substantially to the broader learning process by fostering resilience, adaptability, and sustained engagement. Students with high self-efficacy are better equipped to manage challenges, maintain composure under pressure, and persist until achieving their academic or vocational goals (Zabir et al., 2024; Hwang & Oh, 2021). A well-developed sense of self-efficacy strengthens students' cognitive engagement and enhances their ability to apply critical and creative thinking in real-world problem contexts. As Duffy et al. (2020) explain, mastery of cognitive systems enables individuals to effectively process internal and external stimuli, thereby promoting deeper understanding and sustained intellectual growth (Duffy et al., 2020).

The findings of this study reaffirm that self-efficacy is a fundamental psychological construct influencing students' problem-solving abilities in vocational education. Although the direct statistical effect appears modest, its broader pedagogical implications are considerable. Therefore, efforts to strengthen self-efficacy through mastery experiences, constructive feedback, and collaborative learning should be integrated into instructional design and teacher development programmes within Technical and Vocational Education and Training (TVET) systems. Such approaches will not only enhance cognitive and technical competencies but also cultivate confidence, persistence, and independence as essential attributes for lifelong learning and workforce readiness.

5. Final Considerations

This section serves as the culmination of the research findings and provides a concise summary of the key outcomes and implications of the study. In this section, the researchers present their final thoughts and insights based on the analysis and interpretation of the data. It is an opportunity to address the research objectives and hypotheses and determine whether they were supported or contradicted by the findings. The conclusions should be supported by evidence from the results and discussion sections, highlighting the significance and novelty of the research outcomes. Additionally, this section may also discuss the limitations of the study and suggest potential areas for future research. This section aims to tie together all the threads of the research and provide a clear and coherent summary of the main findings, ultimately contributing to the broader understanding of the research field and potentially influencing future scientific endeavors.

Acknowledgment

The authors would like to express their deepest gratitude to Universitas Negeri Surabaya for providing support and facilities during the completion of this research. Special thanks are also extended to the vocational high school teachers and students who participated in this study for their valuable time and cooperation. Finally, the authors are grateful to colleagues and reviewers who provided constructive feedback and suggestions, which helped improve the quality of this manuscript.

Ethical Considerations

The study complied with the institutional ethics guidelines of Universitas Negeri Surabaya. Informed consent was obtained from participants and school authorities; data were anonymized and used solely for research. No invasive procedures were involved.

Conflict of Interest

The authors declare no conflicts of interest.

Funding

This research received no specific grant from any funding agency, commercial or not-for-profit sectors.

References

Abubakar, N. M. P., & Purniati, T. (2024). Pengaruh self-efficacy terhadap kemampuan pemecahan masalah matematis peserta didik SMK pada sistem pembelajaran kurikulum merdeka. *Jurnal Jendela Matematika, 2*(2), 112–120. https://doi.org/10.57008/jjm.v2i02.789

Ahmed, N. H., Andersion, J., & Martínez, A. (2024). Innovative blended learning approaches to enhance student engagement in university. *JTL: Journal of Teaching and Learning, 1*(1), 1–21. https://doi.org/10.71305/jtl.v1i1.100

Andrews, J., & Higson, H. (2008). Graduate employability, "soft skills" versus "hard" business knowledge: A European study. *Higher Education in Europe, 33*(4), 411–422. https://doi.org/10.1080/03797720802522627

Arslan, A. (2022). The prediction level of university students' critical thinking dispositions to achievement goal orientations. *International Journal of Curriculum and Instruction, 14*(3), 2505–2530. https://files.eric.ed.gov/fulltext/EJ1364159.pdf

Artino, A. R. (2012). Academic self-efficacy: From educational theory to instructional practice. *Perspectives on Medical Education, 1*(2), 76–85. https://doi.org/10.1007/s40037-012-0012-5

Bandura, A. (2010). Self-efficacy and educational development. In *Self-efficacy in changing societies* (Issue December). https://doi.org/10.1017/cbo9780511527692.009

Bell, S. (2010). Project-based learning for the 21st century: Skills for the future. *The Clearing House: A Journal of Educational Strategies, Issues and Ideas, 83*(2), 39–43. https://doi.org/10.1080/00098650903505415

Briganti, A. (2025). Implementation of inclusive education for students with special needs in public schools: A qualitative study. *International Journal of Interdisciplinary Research, 1*(1). https://doi.org/10.71305/ijir.v1i1.224

Çelik, H. C., Özdemir, F., & Bindak, R. (2024). The effect of problem posing attitude on problem solving attitude: The mediating role of mathematical self-efficacy. *International Journal of Educational Spectrum, 6*(2), 264–281. https://doi.org/10.47806/ijesacademic.1464387

Chaanpraserta, P., Thomas, J. L., & Mitchelle, S. (2024). Innovative learning strategies for enhancing student engagement in multicultural classrooms. *JTL: Journal of Teaching and Learning, 1*(1), 57–72. https://doi.org/10.71305/jtl.v1i1.102

Creswell, J. W. (2009). *Research design: Qualitative, quantitative, and mixed methods approaches* (3rd ed.). Sage Publications.

Desnatalia, I. (2022). Belajar matematika untuk peningkatan efikasi diri peserta didik dengan model pembelajaran problem based learning. *Jurnal Pendidikan Tambusai, 6*, 2861–2868. https://doi.org/10.31004/jptam.v6i1.3327

Duffy, G., Sorby, S., & Bowe, B. (2020). An investigation of the role of spatial ability in representing and solving word problems among engineering students. *Journal of Engineering Education, 109*(3), 424–442. https://doi.org/10.1002/jee.20349

Elias, M. J. (1997). *Promoting social and emotional learning: Guidelines for educators.* ASCD.

Field, A. (2013). *Discovering statistics using SPSS* (4th ed.). Sage Publications.

Fitri, D. S., Prakoso, A. F., & Haq, A. S. (2023). The effect self-efficacy on economic problem-solving student: Metacognitive mediation. *International Journal of Emerging Research and Review, 1*(2), 000011. https://doi.org/10.56707/ijoerar.v1i2.11

Griffin, P., & Care, E. (2015). Policy pathways for twenty-first century skills: Methods and approach. In *Assessment and teaching of 21st century skills*. https://doi.org/10.1007/978-94-017-9395-7_15

Habibulloh, M. (2025). Ethics of artificial intelligence usage in education: A qualitative study on teachers' and students' perceptions. *International Journal of Interdisciplinary Research, 1*(1). https://doi.org/10.71305/ijir.v1i1.222

Habibulloh, M., Sholeh, M. I., & Idawati, K. (2024). Exploring technological innovations and approaches in modern education. *SAHRI: Journal of Studies in Academic, Humanities, Research, and Innovation, 1*(1), 49–66. https://doi.org/10.71305/sahri.v1i1.129

Hasanah, U. (2024). Pengaruh self-efficacy terhadap pemecahan masalah matematika kontekstual pada peserta didik SMP Muhammadiyah 4 Surabaya. *Proceding Fakultas Keguruan dan Ilmu Pendidikan Tahun 2024*, 28–34. https://doi.org/10.30651/pc.v1i1.569

Heckman, J. J., & Kautz, T. (2012). Hard evidence on soft skills. *Labour Economics, 29*(2), 1–6. https://doi.org/10.1016/j.labeco.2012.05.014

Honicke, T., & Broadbent, J. (2016). The influence of academic self-efficacy on academic performance: A systematic review. *Educational Research Review, 17*, 63–84. https://doi.org/10.1016/j.edurev.2015.11.002

Hwang, Y., & Oh, J. (2021). The relationship between self-directed learning and problem-solving ability: The mediating role of academic self-efficacy and self-regulated learning among nursing students. *International Journal of Environmental Research and Public Health, 18*(4), 1–9. https://doi.org/10.3390/ijerph18041738

Ismanto, B., & Trisatyawati, S. (2024). Optimizing financial management to enhance curriculum delivery and student development in vocational high schools. *JTL: Journal of Teaching and Learning, 1*(2), 107–120. https://doi.org/10.71305/jtl.v1i2.123

Johnson, E., Mendoza, C., & Sobirin, M. S. (2024). Strategies of school principals in improving educational quality: An analysis of best practices in American schools. *JMPI: Jurnal Manajemen, Pendidikan, dan Pemikiran Islam, 2*(2). https://doi.org/10.71305/jmpi.v2i2.84

Karataş, Z., Uzun, K., & Tagay, Ö. (2021). Relationships between the life satisfaction, meaning in life, hope and COVID-19 fear for Turkish adults during the COVID-19 outbreak. *Frontiers in Psychology, 12*, 1–9. https://doi.org/10.3389/fpsyg.2021.633384

Khotimah, N. H., Khoirunnisa, A., & Bilda, D. W. (2020). Pengaruh self-efficacy siswa SMP terhadap pemecahan masalah pada materi aritmatika sosial. *EDISI: Jurnal Edukasi dan Sains, 2*(2), 285–291. https://doi.org/10.36088/edisi.v2i2.913

Kokotsaki, D., Menzies, V. J., & Wiggins, A. (2016). Project-based learning: A review of the literature defining characteristics of project-based learning. *Improving Schools, 19*, 267–277. https://doi.org/10.1177/1365480216659733

Phan, H. P., Ngu, B. H., Granero-Gallegos, A., & Mensforth, B. P. (2022). Applied educational practice and research development of 'goals of best practice' (GsBP): Philosophical inquiries and conceptual analysis for consideration. *Heliyon, 8*(6), e09689. https://doi.org/10.1016/j.heliyon.2022.e09689

Punch, K. F. (2013). *Introduction to social research: Quantitative and qualitative approaches.* Sage Publications.

Putra, G., Meiyuntariningsih, T., & Ramadhani, H. (2023). Problem solving ability pada mahasiswa: Menguji peran self-efficacy. *Journal of Psychological Research, 2*(4), 815–822. https://doi.org/10.xxxx/jpr.v2i4.802

Raelin, J., Hamann, J., Whitman, D., & Reisberg, R. (2011). The effect of cooperative education on self-efficacy among undergraduate engineering students. *ASEE Annual Conference and Exposition, Conference Proceedings, 45*(2), 17–35. https://doi.org/10.18260/1-2--3748

Saengchuk, D., Phammesone, S., Traorésa, P., Zeaman, A., & Mose, M. B. (2024). Total quality management strategy to improve organizational culture in multicultural and religious-based educational institutions. *IJEMR: International Journal of Education Management and Religion, 1*(1). https://doi.org/10.71305/ijemr.v1i1.152

Sapulete, L., Laurens, T., & Gaspersz, M. (2023). The effect of self-regulated learning and self-efficacy on student's solving problem ability. *Jurnal Pendidikan Matematika (JUPITEK), 6*(2), 114–122. https://doi.org/10.30598/jupitekvol6iss2pp114-122

Sari, R. S., & Dewi, M. P. (2021). The correlation between students' self-confidence and their speaking skill at the twelfth grade of SMA N 2 Bukittinggi. *ELTALL: English Language Teaching, Applied Linguistic and Literature, 2*(2), 56. https://doi.org/10.21154/eltall.v2i2.3208

Satyawati, S. T., & Dwikurnaningsih, Y. (2024). Strategies for organization in educational resource management. *SAHRI: Journal of Studies in Academic, Humanities, Research, and Innovation, 1*(1), 33–48. https://doi.org/10.71305/sahri.v1i1.144

Seibert, S. E., Wang, G., & Courtright, S. H. (2011). Antecedents and consequences of psychological and team empowerment in organizations: A meta-analytic review. *Journal of Applied Psychology, 96*(5), 981–1003. https://doi.org/10.1037/a0022676

Septian, A., & Irawan, N. Y. (2025). The effect of self-efficacy and learning motivation on students' mathematical problem solving ability. *Jurnal Inovasi Pembelajaran Matematika: PowerMathEdu, 4*(1), 211–222. https://doi.org/10.31980/pme.v4i1.2649

Somawati, S. (2018). Peran efikasi diri (self-efficacy) terhadap kemampuan pemecahan masalah matematika. *Jurnal Konseling dan Pendidikan, 6*(1), 39. https://doi.org/10.29210/118800

Syafi'i, A., Arifin, Z., Sholeh, M. I., & Tasya, D. A. (2024). Integrating leadership strategies with religious values for effective educational management in multicultural institutions. *IJEMR: International Journal of Education Management and Religion, 1*(1). https://doi.org/10.71305/ijemr.v1i1.150

Tarumasely, Y. (2021). Pengaruh self-regulated learning dan self-efficacy terhadap prestasi akademik mahasiswa. *JPE (Jurnal Pendidikan Edutama, 8*(1), 71–80. https://doi.org/10.22437/bio.v7i2.12824

Teddlie, C., & Tashakkori, A. (2009). *Foundations of mixed methods research: Integrating quantitative and qualitative approaches in the social and behavioral sciences.* SAGE Publications.

Usher, E. L., & Pajares, F. (2009). Sources of self-efficacy in mathematics: A validation study. *Contemporary Educational Psychology, 34*(1), 89–101. https://doi.org/10.1016/j.cedpsych.2008.09.002

Wardanis, I., Ervina, I., & Linsiya, R. W. (2023). Pengaruh self-efficacy terhadap kemampuan problem solving mahasiswa akhir fakultas psikologi di Universitas Muhammadiyah Jember dalam mengerjakan tugas akhir. *Jurnal Psikologi, 1*(3), 8. https://doi.org/10.47134/pjp.v1i3.2008

Zabir, Z., Ayal, C. S., & Ngilawajan, D. A. (2024). Pengaruh self-efficacy terhadap pemecahan masalah pada materi program linear. *Jurnal Pendidikan Matematika Unpatti, 4*(3), 117–123. https://doi.org/10.30598/jpmunpatti.v4.i3.p117-124

Zahro, M., & Surjanti, J. (2021). Pengaruh self-regulated learning dan self-efficacy terhadap hasil belajar ekonomi peserta didik dalam pembelajaran daring di era Covid-19. *Edukatif: Jurnal Ilmu Pendidikan, 3*(4), 1470–1479. https://doi.org/10.31004/edukatif.v3i4.560