IJORER : International Journal of Recent Educational Research
Homepage : https://journal.ia-education.com/index.php/ijorer
Email : ijorer@ia-education.com

p-ISSN : 2721-852X ; e-ISSN : 2721-7965
IJORER, Vol. 5, No. 3, May 2024
Page 733-747

The Effect of Learning Method and Self-Confidence on Student Learning Outcomes

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DOI: https://doi.org/10.46245/ijorer.v5i3.604

Sections Info

Article history:
Submitted: May 6, 2024
Final Revised: May 29, 2024
Accepted: May 30, 2024
Published: June 15, 2024

Keywords:
Learning method;
Learning outcomes;
Self-confidence.

ABSTRACT

Objective: This study examines the disparities in enhancing student learning outcomes based on learning methods and varying levels of student self-confidence, categorized as high, medium, and low. **Method:** This study employs quantitative methodologies utilizing quasi-experimental methods. The study uses a non-equivalent control group technique and follows a 2 x 3 two-way ANOVA factorial design. The study sample comprised 1000 students enrolled at the health Polytechnic Banten, an educational institution in Indonesia. The enormity of this scale requires the study to be divided into many portions due to the significant temporal and financial resources needed. Therefore, a sample size of 10.00% of the population was chosen. In addition, the researchers utilized a systematic random sampling method to determine the number of students involved in the study. **Results:** The research findings can be classified into three main areas. Firstly, there were significant differences in student learning outcomes between those taught using STEM learning methods and those who received bedside teaching. Secondly, variations in student self-confidence levels (high, medium, and low) also resulted in differences in learning outcomes. Lastly, an interaction was observed between the learning methods and the levels of student self-confidence, which influenced the overall learning outcomes as measured by the average pre-test and post-test scores and questionnaires. **Novelty:** The novelty of this research was variations from previous research in terms of emphasis, subject, results, and combination of research variables. Previous research only concentrated on STEM methods and self-confidence to improve student learning outcomes. Previous research only examined one research variable: STEM, bedside teaching method, and self-confidence.

INTRODUCTION

When judging the learning program's effectiveness, teachers are crucial. In order to achieve the expected curriculum objectives, teachers must be able to arrange, execute, and evaluate their instructional activities effectively (Herwin et al., 2022; Herwin & Dahalan, 2022; Wuryandani & Herwin, 2021). Teachers play a crucial role in modifying learning strategies and resources to enhance students' growth and the overall quality of educational programs (Sartono et al., 2022; Senen et al., 2021). Learning outcomes involve cognitive, affective, and psychomotor changes in students, with cognitive dimensions focusing on reasoning and thought processes, affective aspects on feelings and attitudes, and psychomotor aspects on physical competencies (Guo et al., 2020; Jenita et al., 2024; Kartini et al., 2023; Sujarwo et al., 2022). Learning outcomes are essential for education, instructors, students, and researchers (Astuti et al., 2022; Kalimat et al., 2022; Saptono et al., 2023). The same opinion was also expressed by Saptono et al. (2023), who said educational achievements in Indonesia remain modest, with insufficient learning outcomes. The average class learning result is only 68 out of 100 and only 40.00% of

Students can understand the material as predicted. The remaining 60.00% still need to gain knowledge on the subject. Internal and external factors influence low student learning outcomes, necessitating the support of teachers to inspire and motivate students during instructional activities (Murtiyasa & Al Karomah, 2020).

Addressing low student learning outcomes can be achieved by implementing alternative learning methods like STEM and bedside teaching, which promote deeper understanding and engagement with concepts. STEM integrates Science, Technology, Engineering, and Mathematics (Pimthong & Williams, 2020). As termed by the National Science Foundation in 2000, STEM encompasses integrating science, technology, engineering, and mathematics within a curriculum (Watson et al., 2022). STEM represents interconnected academic and professional subjects, with varying opinions on their collective emphasis and differing definitions across educational levels. However, on the other hand, Falloon et al. (2022) argue that "As a generic label for any event, policy, program, or practice that involves one or more of the STEM disciplines," the acronym STEM was created in the early 2000s. STEM education is a dynamic and contested field, but its primary goal is to foster interdisciplinary learning in science, technology, engineering, and mathematics to address real-world problems. Though it can also include two or three subjects, STEM education is typically considered a fully integrated science, technology, engineering, and mathematics program. Thus, the idea of STEM represents the four distinct areas and approaches them from an integrated, multidisciplinary perspective. Arguments have been made for treating STEM subjects as distinct disciplines rather than superseding courses through STEM education.

STEM education is pushed as a way to overcome declining student engagement because of its emphasis on applying subject knowledge to solve problems in real-world, genuine contexts. Additionally, there is significant potential for practical training and implementation by modifying and integrating STEM with learning methodologies or models (Awaludin et al., 2024; Martín-Páez et al., 2019; Nehru et al., 2024; Yuniar et al., 2024). Integrating STEM learning methods with bedside teaching in the medical field can enhance interdisciplinary learning and clinical reasoning, leading to more effective patient care and professional development for students and residents. Meanwhile, bedside teaching is a critical component of medical education, providing practical experience and fostering skill development while bridging the gap between theory and practice for future medical professionals (Dam et al., 2020; Wong & Chan, 2023). Bedside teaching in inpatient clinical wards is crucial for imparting professionalism, medical knowledge, and skills through joint examinations conducted by medical educators and students. Bedside teaching can evaluate students' patient management in various clinical settings, including attending formal educational and morning rounds. Although bedside teaching may be less common due to technological advancements, it remains invaluable for effective medical student learning (Destino et al., 2019; Kassutto et al., 2020). Bedside teaching, traditionally associated with hospital settings, extends beyond any environment where teaching occurs in the presence of a patient, including office settings and long-term care facilities (Ijaz et al., 2022). According to Hayat et al. (2022), bedside teaching, while traditionally associated with hospitals, can be applied in various settings where teaching occurs in the presence of patients, including offices and long-term care facilities.

Applying STEM learning methods and bedside teaching increases a holistic understanding of the material and builds students' self-confidence in facing modern medical and technological challenges. Self-confidence is a firm belief and trust in one's

abilities and potential, as confirmed by the statement that it refers to a positive belief in oneself and one's abilities. Self-confidence is a crucial trait that allows individuals to feel free to act without anxiety, be responsible and respectful, and recognize their strengths and weaknesses (Chandra et al., 2019). Meanwhile, according to Febriyani et al. (2020), self-confidence is a general belief in one's abilities, which can help individuals achieve their goals in life. Self-confidence is the belief that one must act according to one's needs to attain the required results. Self-confidence is a neurocognitive process that involves minimizing the surprise expected from actions, and it has practical implications for education, as it is associated with students' motivation in various subjects. Self-confidence also benefits various fields of activity, including academia (Kiverstein et al., 2019; Moeller et al., 2022). Self-confidence is a strong predictor of academic success and is the belief in oneself. It consists of intrinsic and extrinsic components, with intrinsic self-confidence being influenced by self-love and recognition and extrinsic self-confidence reflecting an individual's self-love and satisfaction in their environment (Bozgun & Akin-Kosterelioglu, 2023). General self-confidence is essential for students' academic achievement and is influenced by life experiences, such as support and encouragement from parents, siblings, friends, and teachers. Self-confidence is a quality that allows students to feel assured of their ability to perform various learning activities, both in and out of the classroom. It is related to success, achievements in education, and well-being, among other things. Self-efficacy, self-esteem, and self-compassion are three factors that can affect an individual's level of self-confidence (Akbari & Sahibzada, 2020).

The novelty of this research is that there are variations from previous research in terms of emphasis, subject, results, and combination of research variables. Previous research only concentrated on STEM methods and self-confidence to improve student learning outcomes. Previous research only examined one research variable: STEM, bedside teaching method, and self-confidence. Therefore, this research will explore the influence of learning methods such as STEM and bedside teaching methods, as well as self-confidence, on learning outcomes and whether STEM learning methods and bedside teaching can improve learning outcomes. Therefore, this research will be based on the following three research questions:

1. Is there a difference in learning outcomes between using STEM learning methods and bedside teaching?
2. Are there differences in learning outcomes related to self-confidence for students with high, medium, and low levels?
3. Is there an interaction effect between learning methods and self-confidence on student learning outcomes?

RESEARCH METHOD

This study elucidates the research difficulties being examined. Are there distinct disparities in learning outcomes when comparing the utilization of STEM learning approaches against bedside teaching? Do learning outcomes vary based on pupils' self-confidence levels, specifically high, medium, and low? Does the combination of learning methods and self-confidence impact student learning outcomes? This study demonstrates that the effectiveness of STEM learning methods and bedside teaching in enhancing learning outcomes is influenced by the utilization of these approaches and the level of self-confidence in the learning process. The techniques section delineates the precise approach employed to acquire the findings of this inquiry. This research aims to

identify discrepancies in learning methods and student self-assurance concerning student academic achievements. This study employs quantitative methodologies utilizing quasi-experimental methods. The study uses a non-equivalent control group technique and follows a 2 x 3 two-way ANOVA factorial design. The factorial technique employed in this study enables the examination of the influence of two distinct treatment variables, referred to as factors, on the target population (Creswell & Poth, 2016). Experimental study is a rigorous and systematic approach to uncovering accurate information regarding observed variables. This entails administering targeted interventions to particular cohorts to reveal this truth (Creswell, 2014).

Participants

The study sample comprised 1000 students enrolled at the health Polytechnic Banten, an educational institution in Indonesia. The enormity of this scale requires the study to be divided into many portions due to the significant temporal and financial resources needed. Therefore, a sample size of 10.00% of the population was chosen. In addition, the researchers utilized a systematic random sampling method to determine the number of students involved in the study. Systematic random sampling selects units for a sample at regular intervals, creating gaps between each assigned unit.

Data Collection Procedures

The first phase of this research involved conducting a pre-test to assess the learning outcomes in both the experimental and control courses before administering treatment. In addition, the experimental group acquired knowledge by implementing STEM methods during the treatment. The learning in textbooks in the experimental group was organized based on their different themes or subjects. During the second phase, the control group underwent education using bedside teaching methods. In the third phase, researchers administered a questionnaire from Banten Health Polytechnic to assess students' self-confidence. Furthermore, the students in the experimental group were divided into three equal-sized subgroups within each class, specifically when all students were in attendance. After implementing STEM and bedside teaching approaches, the concluding session evaluated both groups by administering a post-test to measure student learning outcomes. The data on self-confidence was acquired from surveys administered to students at Banten Health Polytechnic. Subsequently, the data was analyzed to derive outcomes. Figure 1 displays the flowchart used in this research.

Figure 1. Flowchart of research procedure (Mulyana et al., 2024).

Instruments

The instruments used to collect data include student learning outcomes and self-confidence questionnaires. In the first class, each instrument is evaluated. Students in each experimental group were tested before (pre-test) and after receiving treatment (post-test). Then, self-confidence is measured with a questionnaire. In addition,

researchers use inferential statistics to prove their hypotheses and analyze data by applying descriptive statistics.

Data analysis

The data analysis approach commences by presenting analytical descriptive statistics derived from this study's objectives and research questions. This analysis employs mean scores, standard deviation measures, significant values, and 2-way ANOVA to uncover disparities in students' proficiency in the English language. The research data was subjected to statistical analysis using two-way ANOVA in SPSS 26. This study aimed to investigate the enhancement of student learning outcomes using STEM and bedside teaching methods while considering students' varying levels of self-confidence (high, medium, and low). Before any analysis, all data was verified to ensure that it satisfied the normality requirements, homogeneity, and correlation feasibility.

The researchers employed a two-way factorial analysis of variance (ANOVA) design to examine the influence of two distinct categorical independent variables on a single dependent variable. In a two-way factorial analysis of variance (ANOVA), researchers conduct tests to examine the primary effect of each independent variable and ascertain if the influence of one independent variable on the dependent variable is constant across all levels of the other independent variables. This study also aims to determine any interaction among the independent variables. This study investigates the relationship between learning methods and self-confidence as independent factors and their impact on student learning outcomes as the dependent variable. The researchers utilized the two-way ANOVA test to examine and interpret the findings of the two-way ANOVA investigation. This test evaluates the data analysis outcomes on several sets of variables to address the research inquiries presented by the researcher. Subsequently, the researcher employed the F test from a two-way ANOVA to scrutinize and comprehend the outcomes. In this study, the researchers employed two-way ANOVA to evaluate the differences in means between groups of independent and dependent variables. The primary advantage of utilizing this ANOVA technique is its capacity to extend the analysis to situations where the measured entity is affected by multiple factors.

RESULTS AND DISCUSSION

Results

This study examines the disparities in enhancing student learning outcomes based on learning methods and varying levels of student self-confidence, categorized as high, medium, and low. The research findings can be classified into three main areas. Firstly, there were significant differences in student learning outcomes between those taught using STEM learning methods and those who received bedside teaching. Secondly, variations in student self-confidence levels (high, medium, and low) also resulted in differences in learning outcomes. Lastly, an interaction was observed between the learning methods and the levels of student self-confidence, which influenced the overall learning outcomes as measured by the average pre-test and post-test scores and questionnaires.

This study investigates the influence of various teaching methods on the learning outcomes of students from Banten Health Polytechnic. The control class uses bedside methods, whereas the experimental class utilizes STEM methods. The pre-test and post-test were conducted to assess student learning outcomes before and after the

intervention. The research findings indicate notable disparities in student learning outcomes across the two class groups, suggesting that incorporating various learning methods enhances student learning outcomes. Substantial disparities in student self-confidence were seen across the two classes. Specifically, there were noticeable distinctions among students with high, moderate, and low levels of self-assurance. This is evident from the disparity in mean scores among the various groups. Preliminary research findings prompt the inquiry into potential disparities in student learning outcomes between those who employ STEM methodologies as a learning method and those who utilize the bedside teaching method. The data is represented by the mean value of the pre-test and post-test results and the standard deviation. Table 1 depicts the extent of student learning outcomes before and after implementing learning methods that integrate student self-confidence across various groupings.

Table 1. Descriptive statistics of the control group**.**

Statistic	Self-Confidence	Pre-test	N	Post-test	N
Means	High	64.27	22	70.42	26
	Medium	55.00	6	59.17	2
	Low	45.75	17	55.00	12
Std. Deviation	High	6.597	22	6.985	26
	Medium	9.164	6	1.050	2
	Low	12.659	17	7.754	12

The data in Table 1 shows that the control group's pre-test outcomes can be summarised as follows: the group with high self-confidence had the lowest average learning outcomes value (M=64.27, SD=6.597); the group with medium self-confidence values had an average learning outcomes value of (M=55.00, SD=9.164); and the group with low self-confidence values had an average learning outcomes value of (M=45.75, SD=12,659). The post-test results showed that the average score for learning outcomes in the low self-confidence group was (M=55.00, SD = 7.754), the average score for learning outcomes in the high self-confidence group was (M=70.42, SD = 6.985), and the average score for learning outcomes in the medium self-confidence group was (M=59.17, SD=1.050).

Table 2. Descriptive statistics of the experimental group.

Statistic	Self-Confidence	Pre-test	N	Post-test	N
Means	High	65.93	6	80.50	4
	Medium	60.42	26	65.00	28
	Low	60.00	23	62.00	28
Std. Deviation	High	3.041	6	1.000	4
	Medium	8.506	26	8.889	28
	Low	6.350	23	8.975	28

In contrast, the pre-test results in the experimental group showed that persons who were identified as having high self-confidence had an average learning outcomes score of (M=65.93, SD=3.041). Individuals with moderate proficiency in self-confidence obtained an average score of (M=60.42, SD=8.506) in learning outcomes. In contrast, individuals with low proficiency in self-confidence obtained an average score of (M=60.00, SD=6.350) in learning outcomes. According to the post-test results for the

experimental group, those with high self-confidence had an average learning outcomes score of (M=80.50, SD=1.000. Individuals with a moderate level of self-confidence obtained an average score of (M=65.00, SD=8.889) in learning outcomes. In contrast, individuals with low proficiency self-confidence obtained an average score of (M=620.00, SD= 8,975) in learning outcomes. The findings of this study address the second research goal, which is to determine if there are notable disparities in learning outcomes among students with different levels of self-confidence (high, medium, or low). The findings of this study indicate that students' learning outcomes can be improved by self-confidence at three levels: high, medium, and low. The average grade of the pupils in the experimental group showed a significant improvement.

The second analysis of this research investigates if there are disparities in learning outcomes depending on different levels of self-confidence. Therefore, the outcomes derived from the experimental group were contrasted with those obtained from the control group. The use of parametric statistics in this comparison is justified because the data follows a normal distribution and is homogeneous. This study applies two-way ANOVA analysis with the aid of SPSS 26 software, which employs parametric statistics to ascertain (1) the simultaneous test measures (F test) and (2) the significance of these data. The F test's significance level is established at a value below 0.05. The results suggest that the statistical significance of the data is vital, with a significance value of less than 0.05 (F = 10.899, Sig 0.000 <0.05). Students' self-confidence can be classified into three skill levels: high, medium, and low. Table 2 illustrates the significance of differences in students' learning outcomes, categorized by their high, medium, and low self-confidence.

Table 3. Test of ANOVA 2 ways.

Dependent Variable: Learning Outcomes					
Source	**Type III Sum of Squares**	**df**	**Mean Square**	**F**	**Sig.**
Corrected Model	9127.404a	5	1825.481	28.851	.000
Intercept	134118.102	1	134118.102	2119.697	.000
Learning Method	1639.704	1	1639.704	27.915	.000
Self-Confidence	1252.707	2	626.354	10.899	.000
Learning Method* Self-Confidence	1782.804	2	891.402	15.088	.000
Error	5947.596	94	63.272		
Total	393300.000	100			
Corrected Total	15075.000	99			
a. R Squared = .705 (Adjusted R Squared = .684)					

According to the findings in Table 3, a two-way ANOVA analysis reveals a notable disparity in learning outcomes of students who utilize either STEM or bedside teaching methods. This is demonstrated by the results of a two-way parametric test or analysis of variance (ANOVA), where the calculated F value is compared with the F table value at a significance level of 5%. The calculated F value (F = 27.915) is found to be more than the F table value (3.936), indicating statistical significance. Additionally, the Sig value (0.000) is less than the significance level of 0.05. This study employs a two-way analysis of variance (ANOVA) to examine variations in variance among different groups. This approach aligns with the researcher's established research objectives and problem

formulation. The analysis of variance, or two-way ANOVA, is employed to examine the interactions among groups of variables.

Moreover, self-confidence significantly impacts students' learning outcomes. This is demonstrated by the results of a 2-way parametric test or analysis of variance (ANOVA), where the computed F value is compared to the F table value at a significance level of 5%. The calculated F value (F = 10.899) is found to be greater than the F table value (3.936), indicating statistical significance (Sig. value = 0.000 < 0.05). This discovery aligns with the second research inquiry. The results of the third study revealed a noteworthy correlation between different learning methods and the student's learning outcomes, specifically about students' self-confidence. This is demonstrated by the results of a 2-way parametric test or analysis of variance (ANOVA), where the calculated F value is compared to the F table value at a significance level of 5%. The calculated F value (F = 15.088) is found to be more than the F table value (3.936), indicating statistical significance.

Additionally, the Sig. Value (0.000) is less than the significance threshold of 0.05. Conversely, an R-squared score of 0.705 indicates that the combined impact of studying learning methods and self-confidence on students' learning outcomes is 70.5%. Furthermore, the influence of learning methods on students' learning outcomes is contingent upon students' self-confidence. The research findings were reinforced by a two-way ANOVA data analysis, which revealed an interaction between the learning method and students' self-confidence (high, medium, and low). This interaction had an impact on students' learning outcomes. The researcher conducted additional tests using the Scheffe test and plotted estimates of the marginal mean. This was done to enhance the validity of the two-way ANOVA test results and minimize any potential bias in the research findings.

According to the findings in Table 3, a two-way ANOVA analysis reveals that self-confidence at various levels (high, medium, and low) has a notable and beneficial impact on students' learning outcomes. In addition, the two-way ANOVA analysis revealed significant variations in students' learning outcomes exposed to the STEM and bedside teaching methods. Furthermore, the findings of the third analysis from the two-way ANOVA indicated the presence of an interaction impact between the utilization of the learning method and self-confidence on the learning outcomes of the students. The research highlights teachers' need to exercise caution when delivering learning methods to learn learning outcomes. Additionally, teachers should incorporate a broader range of digital-based learning resources. According to researchers, many pupils still demonstrate a deficiency in their comprehension and mastery of discourse markers. The findings of this study are consistent with prior research indicating that self-confidence positively influences students' learning outcomes. In addition, researchers face constraints when analyzing data, selecting samples, and determining study techniques. The findings of this study align with the research objectives and formulation outlined by the researcher at the outset of the investigation.

Table 4. Using Scheffe test.

Multiple Comparisons					
Dependent Variable: Learning Outcomes					
Scheffe					
(I) Self-	(J) Self-	Mean	Std. Error	Sig.	95% Confidence Interval

Confidence	Confidence	Difference (I-J)			Lower Bound	Upper Bound
High	Moderate	10.50*	2.054	.000	5.39	15.61
	Low	1.29	1.921	.798	-3.49	6.07
Moderate	High	-10.50*	2.054	.000	-15.61	-5.39
	Low	-9.21*	1.921	.000	-13.99	-4.43
Low	High	-1.29	1.921	.798	-6.07	3.49
	Moderate	9.21*	1.921	.000	4.43	13.99

Based on observed means.
The error term is Mean Square (Error) = 63.272.
*. The mean difference is significant at the .05 level.

Table 4 presents the correlation between different learning methods and varying levels of self-confidence (high, medium, and low) about student learning outcomes. The mean interaction between individuals with high self-confidence and those with medium self-confidence was 10.50. Conversely, when the Sig value is less than 0.05, it indicates that the null hypothesis (Ho) is rejected. The data indicates disparities in learning outcomes between pupils with high and moderate self-confidence. The correlation between high and poor self-confidence is M=1.29. If the p-value is more significant than 0.05, then the null hypothesis (Ho) is accepted. These data indicate that the learning outcomes of pupils with intense and low self-confidence are equivalent. The interaction between individuals with medium and high self-confidence is represented by the coefficient M=-10.50. A significance value less than 0.05 indicates that the null hypothesis (Ho) is rejected. The findings establish disparities in learning outcomes between moderate and high self-confidence pupils. 4). The correlation between moderate and poor self-confidence is M=-9.21. A significance value less than 0.05 indicates that the null hypothesis (Ho) is rejected. The findings of this study establish that there are discernible disparities in learning outcomes between students with moderate and low self-confidence. The interaction between low and strong self-confidence yielded a mean value of -1.29. If the significance value is more significant than 0.05, then the null hypothesis (Ho) is accepted. These data indicate that the learning outcomes of pupils with low and high self-confidence are equivalent. The mean value of the interaction between low and moderate self-confidence was 9.21. A significance value less than 0.05 indicates that the null hypothesis (Ho) is rejected. These data establish disparities in learning outcomes between low and moderate self-confidence students.

The Scheffe test is a post-hoc statistical test employed in statistical analysis. Scheffe's test was utilized to conduct comparisons of group averages in an unplanned analysis of variance (ANOVA). Unplanned comparisons are carried out after an ANOVA test when the comparison factors were not initially included in the ANOVA experiment. Scheffe's test determines if the mean of one set of means is significantly different from the mean of another group of means. Additional analysis reveals that the Scheffe test demonstrates a significant and favorable impact of the interaction between learning technique groups, which include students with varying levels of self-confidence, on learning results.

Consequently, a student's self-confidence level directly correlates with how much their learning outcomes improve. Scheffe's post hoc test revealed that there was a significant interaction between the learning technique group and the levels of self-confidence (high, medium, and low) for four specific comparisons (high vs. medium,

medium vs. high, medium vs. low, and low vs. medium), as seen by the differences in means. The mean is statistically significant at the 0.05 level, as indicated in Table 3. Nevertheless, the analysis did not reveal any significant interaction between the learning method groups and the levels of self-confidence (high, medium, and low) in both groups. Figure 1 depicts the effects of interactions among different groups of learning methods, including students with varying self-confidence levels, on student learning outcomes. The information shown is derived from data analysis conducted using the Scheffe test.

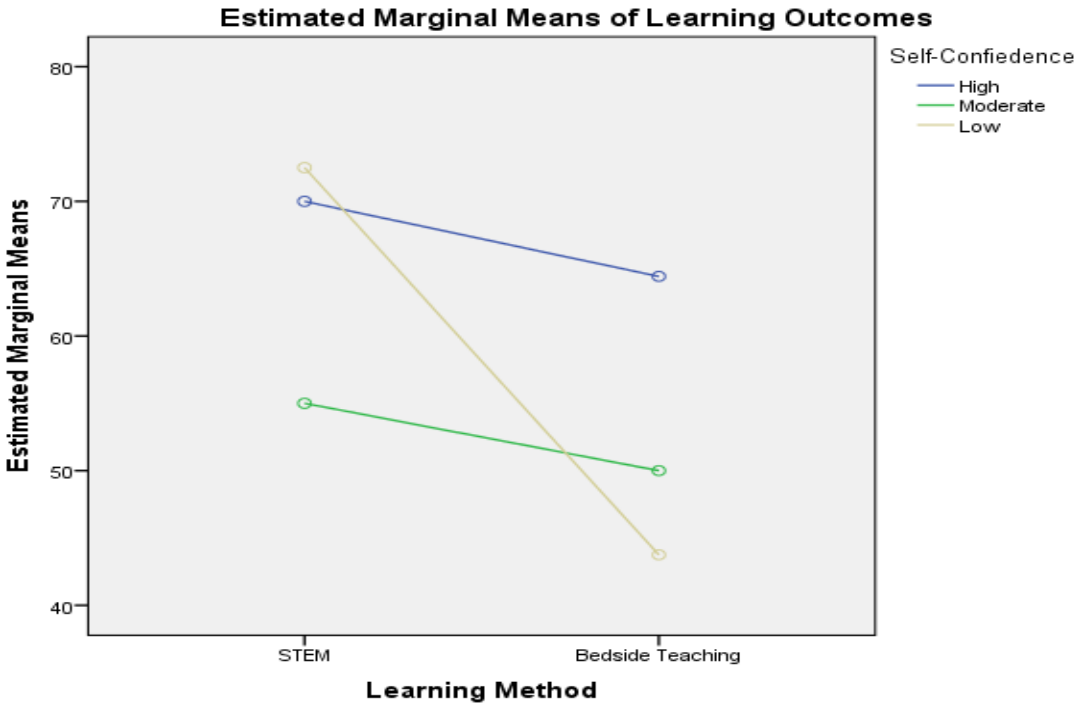

Figure 1. Interactive effects of variables.

Based on Figure 1, it is estimated that there is an interaction between learning methods, self-confidence, and learning outcomes. As visualized in Figure 1, through self-confidence, the group with low self-confidence significantly outperformed the group with high self-confidence in terms of learning outcomes. On the other hand, in implementing bedside teaching, the group with high self-confidence significantly improved their learning outcomes compared to the group with low self-confidence. Next, the marginal average estimate in the graph above shows an image of the interaction of three lines that intersect with other lines. This means that using learning methods influences students' learning outcomes through interaction with their self-confidence, regardless of their self-confidence level in various self-confidence groups. The findings of this research indicate an interaction between the two independent variables and the dependent variable, namely, the interaction between the learning method variables and self-confidence in students' learning outcomes. This finding is a new perspective that has yet to exist in previous research. The new perspective on this finding is integrating learning methods and self-confidence to improve students' learning outcomes. In the context of the research questions and objectives, the research findings are very appropriate to the research questions and objectives the researcher presents. The findings of this research also have beneficial implications: learning methods using STEM and bedside teaching integrated with students' self-confidence

can improve students' learning outcomes. The findings of this research provide a new perspective for lecturers and students in the learning process**.**

Discussion

This research aims to answer three research questions using quantitative methods. Research results show that using STEM learning methods and bedside teaching significantly improves learning outcomes. These findings are consistent with prior studies (Asrizal et al., 2022; Suciana et al., 2023; Zuhroidah et al., 2019). The implementation of STEM methodologies and bedside teaching has a positive impact on enhancing student learning outcomes across different educational levels and courses. Education professionals have thoroughly examined the correlation between classroom exposure to STEM disciplines and positive learning outcomes for pupils. Nevertheless, there needs to be more consensus over the precise definition of STEM education, as evidenced by multiple studies (Wahono et al., 2020). Learning outcomes are specific accomplishments resulting from the teaching and learning process. The outcomes may encompass cognitive aptitudes, emotional maturation, or psychomotor proficiencies (Hidayat & Suryadi, 2023; Novita & Sundari, 2020). According to Zuhroidah et al. (2019), bedside teaching successfully enhances students' understanding and proficiency in performing their responsibilities.

The second study demonstrates that students' self-confidence exhibits changes influenced by different levels of self-confidence, namely high, medium, and low. This study diverges from prior research (Byiringiro, 2024; Salainti, 2024; Siadah, 2023). The distinction between this study and previous studies is that student self-confidence solely impacts learning. In contrast, the present research findings demonstrate that fluctuating levels of student self-confidence can enhance student learning outcomes. Self-confidence is essential to effectively demonstrate their skills, talents, abilities, and knowledge. Sure, pupils possess a high level of expertise, but they need help fully utilizing it due to a need for more self-assurance. They could not disclose their thoughts, even if they wanted to (Indriani et al., 2021). Self-confidence refers to an individual's belief and attitude toward their ability to accept things as they are, whether favorable or unfavorable. It is cultivated and acquired by developing the knowledge and skills to achieve personal happiness (Pečiuliauskienė, 2020).

The third study demonstrates a significant interaction between learning methods and self-confidence in student learning outcomes. Research indicates that combining learning methods and self-confidence substantially impacts students' learning outcomes. This is corroborated by the outcomes of both ANOVA analyses, as indicated by the concurrent F-test values and significant values (Table 3), and is further reinforced by the interactive impact of image variables (Figure 1). These two pieces of evidence substantiate the research findings, demonstrating the existence of this association. The association between the independent and dependent variables in this research indicates that how the data is presented and analyzed improves student learning outcomes. The third research finding highlights the correlation between learning methods and self-confidence about student learning outcomes. The outcomes of this study are unusual as they are entirely new and have never been observed. Enhancing STEM education is a viable solution to address the need for more motivation in science learning. The concept of self-confidence can be applied to a wide range of domains. Self-confidence positively affects academic disciplines such as science and social sciences.

CONCLUSION

Fundamental Finding: Derived from the outcomes and subsequent analysis. The research yielded three main findings: (1) disparities in student learning outcomes between those exposed to STEM learning methods and those taught using bedside teaching methods, (2) variations in student learning outcomes based on different levels of student self-confidence (high, medium, and low), and (3) the influence of the interaction between learning methods and student self-confidence levels on student learning outcomes. This research is innovative because it differs from past studies regarding emphasis, topic matter, results, and the combination of research variables. Prior studies focused exclusively on STEM methodologies and self-assurance to enhance student academic achievements. Prior studies focused on investigating a single research variable, specifically STEM, bedside teaching technique, and self-confidence. This research examines the impact of learning methods, specifically STEM and bedside teaching and self-confidence, on learning outcomes. It also suggests that STEM learning methods and bedside teaching can enhance learning outcomes. **Implication:** Research findings also have practical consequences for achieving student learning outcomes. This study introduces a novel methodology that investigates the influence of integrating different learning techniques and student self-assurance on student academic achievements. The research findings have profound implications for educators as they offer a range of learning modalities, including STEM and bedside approaches, to enhance student learning outcomes. In addition, these findings significantly influence students at Banten Health Polytechnic. **Limitation:** Various limitations constrain this study. The primary hindrance is the restricted sample size resulting from the brief timeframe of the research and the exclusively limited money available. Essentially, this research is constrained by various elements in its research design, including the uneven distribution of students across different groups and a concise data analysis. **Future Research:** While this study demonstrates that combining different learning approaches and fostering confidence might enhance students' learning outcomes, it needs to investigate the current trend of STEM education methods. Hence, additional research is required to delve into many facets of STEM in student learning. Researchers propose conducting further research to explore the application of STEM in the educational process across different levels of education in Indonesia.

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