ACTIVE LEARNING STRATEGY ON COLLEGE STUDENTS' SELFEFFICACY: A QUASI-EXPERIMENTAL STUDY

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Abstract:

This study addresses the challenge of enhancing college students' self-efficacy, which has been widely recognized as a critical factor influencing learning persistence, motivation, and achievement but is often insufficiently fostered in traditional lecture-based teaching. The objective of the research was to examine whether a short-term blended active learning intervention could significantly improve students' self-efficacy and provide evidence for differentiated instructional strategies in higher education. A quasi-experimental design was employed with 240 undergraduate students from two intact classes, randomly assigned to an experimental group (n = 120) and a control group (n = 120). The experimental group received a 5-week blended active learning intervention incorporating experiential learning, problem-based learning, inquiry-based learning, collaborative learning, and flipped classroom approaches, while the control group continued with traditional instruction. Selfefficacy was measured using a validated 10-item scale administered at both pre-test and post-test stages. The results demonstrated that the experimental group's post-test selfefficacy scores were significantly higher than those of the control group ($p < 0.01$), with particularly strong effects observed among students who initially reported lower selfefficacy. These findings confirm that short-term blended active learning interventions can effectively strengthen students' self-efficacy, elucidate its underlying mechanisms, and offer practical implications for optimizing teaching practices. The study contributes empirical evidence to support ongoing reforms in college instruction and highlights the importance of tailoring strategies to meet diverse student needs.

Keywords: Active learning, self-efficacy, short-term intervention, quasi-experimental study, college students.

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1. Introduction

Self-efficacy has become a central concern in educational psychology due to its strong influence on students' learning processes and outcomes. Since Bandura first proposed the concept in 1977, numerous studies have confirmed that self-efficacy is closely related to learning motivation, persistence, emotional regulation, and performance in diverse academic settings (Hendrickson, 2021). However, low self-efficacy remains a common challenge among university students worldwide, particularly in traditional lecture-based learning environments, where teacher-centered instruction often limits opportunities for active participation, self-directed exploration, and confidence-building. Recent studies have further highlighted that blended and active learning approaches can play a crucial role in addressing this issue by providing interactive, student-centered contexts that enhance confidence and engagement (Jeong et al., 2019).

Low self-efficacy can trigger a series of negative consequences. Students who doubt their abilities are more likely to avoid challenging tasks, display low levels of engagement, and experience negative emotions such as anxiety and frustration. These patterns often undermine persistence, hinder knowledge application, and ultimately weaken test scores and long-term learning motivation (Rafiola et al., 2020). Conversely, high self-efficacy promotes resilience, willingness to engage in deep learning, and the capacity to cope with academic difficulties, making it a crucial factor for success in higher education. Supporting this, Wu et al. (2020) reported that blended learning designs foster medium-to-high levels of academic, behavioral, cognitive, and emotional engagement, which are directly tied to the development of strong self-efficacy.

In response, active learning strategies have been widely implemented across universities to counteract the shortcomings of passive lecture methods. Approaches such as problem-based learning, cooperative learning, inquiry-based learning, and flipped classrooms have shown effectiveness in enhancing engagement, critical thinking, and students' confidence(Chavan & Kadam, 2022). Yet, most interventions have been long-term or limited to single strategies. Evidence on short-term blended active learning interventions that integrate multiple strategies is still scarce, leaving higher education institutions without practical, short-cycle teaching models that can be directly applied to boost self-efficacy(Tien et al., 2020).

This gap highlights the need for empirical research exploring whether short-duration, multi-strategy active learning designs can effectively enhance students' self-efficacy. Therefore, the present study investigates the impact of a five-week blended active learning intervention, aiming to provide theoretical insights and practical guidance for universities seeking efficient, evidence-based methods to improve student confidence and autonomous learning ability within limited teaching time.

2. Methods

This study employed a quasi-experimental design using natural classes as the research subjects. Two existing parallel classes (Class A and Class B) from the same major at a certain university were selected to ensure comparability, as both classes shared identical curricula, faculty allocation, and class hour arrangements. Class A (n = 120) was designated as the experimental group, while Class B (n = 120) served as the control group, yielding a total sample size of 240 students. A pretest–posttest control group design was adopted, wherein the experimental group received a five-week blended active learning intervention that integrated multiple strategies-experiential learning, problem-based learning, inquiry-based learning, collaborative learning, and flipped classroom-implemented in a complementary manner throughout the intervention period. In contrast, the control group continued with the traditional lecture-based method. By comparing the pretest and posttest results, this study examined the effectiveness of blended active learning strategies in enhancing college students' self-efficacy.

2.1 Instruments of the Study

This study utilized the 10-item General Self-Efficacy Scale developed by Schwarzer and Jerusalem (1995). The scale employed a 4-point scoring system (1 = completely disagree, 4 = completely agree) and covered aspects such as problem-solving, self-confidence, coping with emergencies, and generating multiple solutions. Examples of items include "I am confident that I can achieve my goals" and "When faced with problems, I can find multiple solutions." The scale demonstrated high internal consistency reliability (Cronbach's $\alpha = 0.89$).

2.2 Experimental Procedure

One week prior to the start of the experiment, pretests were conducted on both the experimental and control groups using the 10-item General Self-Efficacy Scale to accurately assess students' baseline levels, which served as the foundational data for subsequent comparisons in the study. Subsequently, the intervention phase commenced, during which the experimental group received a 5-week mixed active learning intervention. Over these 5 weeks, a variety of active learning strategies were comprehensively employed: Experiential learning activities were carried out, such as setting up situational simulations and organizing role-plays, to immerse students in specific scenarios and enhance their practical experience. Problem-based learning was implemented, with groups working together to explore and solve challenging problems, thereby cultivating students' problem-solving abilities and teamwork spirit. Inquiry-based learning was promoted, encouraging students to independently select topics, conduct in-depth research, and present their findings in class, thus improving their autonomous learning and presentation skills. Collaborative learning was conducted, with students completing project tasks through group collaboration to strengthen their cooperative awareness and practical abilities. The flipped classroom model was adopted, enabling students to learn new knowledge independently outside the classroom and focus on discussions and question-answering in class to deepen their understanding

and mastery of the knowledge. During this period, the control group maintained the traditional teaching model centered around lectures, with teachers taking the lead in imparting knowledge in the classroom and students primarily receiving knowledge passively. One week after the intervention ended, the same 10-item General Self-Efficacy Scale was used to conduct posttests on students in both groups. By comparing the pretest and posttest data, the changes in self-efficacy among students in the two groups were comprehensively and accurately evaluated.

3. Results

3.1 Descriptive Analysis

Table 1. Descriptive Statistics of Self-Efficacy Scores in the Pretest and Posttest.

Group	Phase	N	Minimum	Maximum	Mean	Std. Deviation	(ΔM)
Active	Pretest	120	1.00	3.80	2.24	0.66	1.00
	Postest	120	2.60	4.00	3.24	0.29	
Traditonal	Pretest	120	1.00	3.60	2.23	0.46	0.58
	Postest	120	1.80	4.00	2.81	0.43	

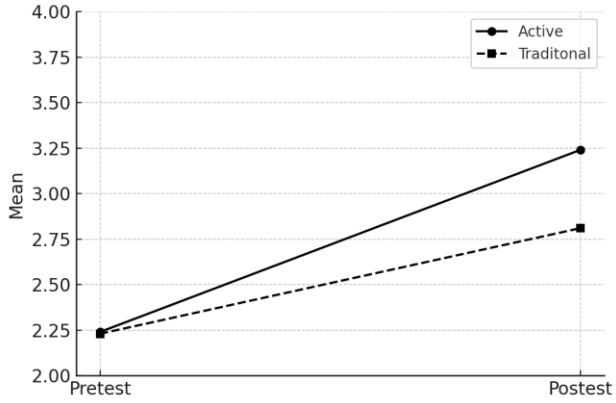

Figure 1. Self-Efficacy Mean Scores by Group and Phase.

The comprehensive data presented in Table 1, coupled with the visual depiction in Figure 1, offer a clear insight into the evolving patterns of self-efficacy scores for both the experimental and control groups across pre-test and post-test assessments. As per the tabulated information, the experimental group recorded a pre-test mean self-efficacy score of 2.24 (SD = 0.66), with scores spanning from 1.00 to 3.80. Post-intervention, this mean escalated to 3.24 (SD = 0.29), with the score bracket narrowing to between 2.60 and 4.00, reflecting an average increment (ΔM) of 1.00. In contrast, the control group's pretest average stood at 2.23 (SD = 0.46), also within the 1.00–3.60 spectrum. Their post-test average climbed to 2.81 (SD = 0.43), with scores ranging from 1.80 to 4.00, indicating a mean rise (ΔM) of 0.58. Although both cohorts demonstrated progress from pre-test to post-test, the experimental group's advancement was markedly more substantial.

3.2 Independent Samples Test Results

The results of the Kolmogorov-Smirnov test indicated that all data met the assumption of normality at both the pretest and posttest stages. For the pretest, the active group showed K-S = 0.070, p = 0.200* (lower bound), and the traditional group showed K-S = 0.074, p = 0.163. For the posttest, the active group showed K-S = 0.074, p = 0.099, and the traditional group showed K-S = 0.057, p = 0.200* (lower bound). Since all significance levels were greater than 0.05, the score distributions of both groups at pretest and posttest did not significantly deviate from normality, thereby satisfying the normality assumption required for the independent samples t-test.

Table 2. Independent Samples Test Results of Self-Efficacy Scores in the Pretest and Posttest.

Phase	Levene's Test F	Sig.	t(df)	p	Mean Difference	95% CI (Lower, Upper)
Pretest	16.080	<0.05	0.045 (213)	0.964	0.003	[-0.143, 0.149]
Postest	14.759	<0.05	9.203 (208)	<0.01	0.432	[0.339, 0.524]

The results of the independent samples t-test are presented in the table. Levene's test indicated unequal variances for both the pretest and posttest (Pretest: $F = 16.080$, $p < 0.05$; Posttest: $F = 14.759$, $p < 0.05$); therefore, the results under the assumption of unequal variances were adopted. For the pretest, there was no significant difference between the experimental and control groups, $t(213) = 0.045$, $p = 0.964$, with a mean difference of 0.003 and a 95% confidence interval of [-0.143, 0.149], which included zero. This suggests that the two groups were at the same baseline level prior to the intervention. For the posttest, the experimental group scored significantly higher than the control group, $t(208) = 9.203$, $p < 0.01$, with a mean difference of 0.432 and a 95% confidence interval of [0.339, 0.524], which did not include zero. These results indicate a statistically significant effect of the intervention.

4. Discussion

This study pioneeringly validated the remarkable effectiveness of short-term blended active learning interventions in enhancing college students' self-efficacy, achieving substantial outcomes within a limited intervention period. In contrast to previous studies that typically required longer cycles, the findings underscore the high efficiency of scientifically integrating multiple active learning strategies to produce significant improvements in a relatively short timeframe. By moving beyond reliance on a single teaching method and instead combining the advantages of multiple strategies, this approach establishes a comprehensive and multi-level support system that provides more appropriate developmental pathways for students with diverse needs. The results further indicate that although both the experimental and control groups improved in self-efficacy following the intervention, students exposed to blended active learning demonstrated significantly greater gains, confirming its superiority over traditional instruction in enhancing self-efficacy.

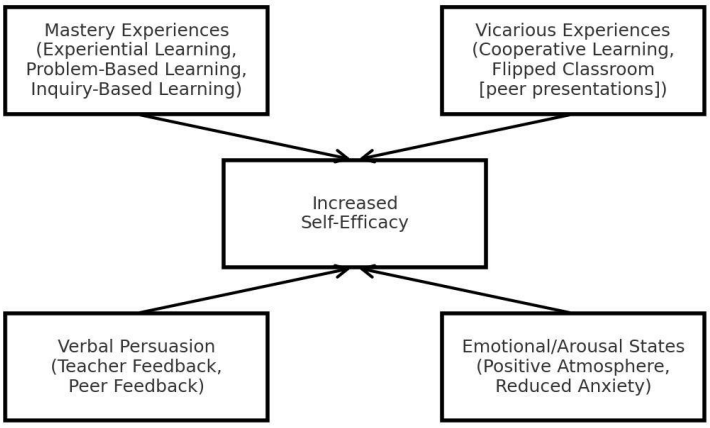

Figure 2. Bandura's Four Sources of Self-Efficacy in Active Learning Contexts

The underlying mechanism of this effectiveness can be explained through Bandura's four sources of self-efficacy information (Chopra & Madan, 2021). Mastery experiences are promoted through experiential, problem-based, and inquiry-based learning, allowing students to gain authentic achievements and reinforce their sense of competence. Vicarious experiences emerge in cooperative learning and flipped classroom activities, where peer presentations and observable successes provide valuable models to emulate. Verbal persuasion is delivered through consistent and constructive feedback from teachers and peers, strengthening students' belief in their abilities and encouraging persistence. Finally, emotional and arousal states are improved by cultivating a positive classroom atmosphere and reducing anxiety, which enables students to concentrate more effectively on tasks. The synergistic activation of these four sources of self-efficacy explains why short-term blended active learning interventions can generate significant improvements. This holistic integration not only validates the effectiveness of multiple strategies but also demonstrates their potential to sustain students' confidence, resilience, and long-term development (Asadi Noghabi et al., 2022).

5. Conclusions and Recommendations

This study demonstrates that short-term blended active learning interventions can significantly enhance college students' self-efficacy. Compared with traditional lecture-based instruction, the intervention achieved more substantial improvements within a relatively limited period, underscoring its practical value in higher education classrooms. These findings provide an effective pathway and evidence-based support for universities seeking to improve students' self-efficacy within constrained instructional time.

Drawing on these insights, several practical recommendations are proposed. College instructors are encouraged to proactively and systematically integrate a diverse set of active learning strategies—including experiential learning, problem-based learning, inquiry-based learning, collaborative learning, and flipped classrooms—into their teaching. This approach can enrich learning experiences, address the

varied needs of students, and allow learners with different strengths to thrive through tailored methods (Dogani, 2023). In course design, teachers should carefully consider the distinctive features of each strategy and thoughtfully plan instructional activities. Moreover, it is essential to recognize the central role of successful learning experiences in building self-efficacy. Educators should ensure that students have frequent opportunities to experience success, such as engaging in group discussions that foster knowledge construction, receiving positive reinforcement, or presenting projects that showcase progress and achievements, thereby consolidating their confidence and motivation (Germain et al., 2022).

While this study presents promising findings, it also opens avenues for further exploration. The research was limited to a relatively narrow context, suggesting that future studies should expand to larger and more diverse samples to enhance generalizability (Regmi et al., 2024). The intervention period was short, and subsequent research could examine longer-term effects of blended active learning. Moreover, while this study focused on self-efficacy, future investigations could explore outcomes such as test scores, critical thinking, or creativity. Research could also compare different combinations of active learning strategies to determine their relative effectiveness and provide more personalized guidance for instructors. Finally, with the rapid development of educational technologies such as virtual and augmented reality, future studies may leverage these tools to design more immersive and complex learning environments, further advancing students' self-efficacy and learning effectiveness (Mekheimer, 2025).

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