The Impact of Activity-Based Learning in Art Creation Courses on the Creativity of Higher Vocational Students

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Abstract

Activity-Based Learning (ABL) is a student-centred, task-driven pedagogy that emphasises knowledge construction through authentic practice, collaboration, and reflection. Although ABL has shown promise in general education, empirical evidence on its effectiveness in higher vocational art and design contexts—especially regarding creativity development—remains scarce, and the underlying mechanisms are unclear. This study employed a non-equivalent pretest-posttest quasi-experimental design with 72 first-year Digital Media Art and Design students from Quanzhou Light Industry Vocational College. The experimental group (n=36) received an 8-week ABL intervention, while the control group (n=36) followed traditional demonstration-imitation instruction. Multiple instruments were used: the Torrance Tests of Creative Thinking (TTCT), expert Consensual Assessment (CAT), Creative Self-Efficacy Scale, Learning Engagement Scale, Perceived Classroom Collaboration Climate Scale, and a Satisfaction Questionnaire. Results showed that ABL met the "80/80" efficacy criterion (83.3% of experimental students scored ≥80 on creativity post-test; 86.1% scored ≥80 on satisfaction). ANCOVA revealed a significant large-sized effect of ABL on creativity ($F(1,69)=220.15$, $p<0.001$, partial $\eta^2=0.761$). Serial mediation analysis confirmed a significant indirect pathway: ABL ⟶ Collaborative Climate ⟶ Learning Engagement ⟶ Creative Self-Efficacy ⟶ Creativity (Ind7: B=6.05, 95% CI [3.78, 8.86]), with a remaining direct effect indicating partial mediation. Qualitative feedback further highlighted gains in creative confidence, cultural integration, and collaborative problem-solving. The study extends constructivist and social-cognitive theories to vocational art education, opens the "black box" of ABL's influence, and provides practical benchmarks for curriculum reform. Recommendations for teaching, administration, and future research are discussed.

Keywords: Activity-Based Learning, Quasi-experimental Study, Creativity in Art Education

1. Background and Significance of the Problem

China's innovation-driven development strategy has made the cultivation of creative talents a national priority. Vocational education, as a vital component of the national human-resource system, is mandated by the revised Vocational Education Law (2022) to foster both craftsmanship spirit and innovation capability. However, in higher vocational art and design programmes-exemplified by

the Digital Media Art and Design major at Quanzhou Light Industry Vocational College-classroom practice often overemphasises software operation and technical imitation while neglecting originality, divergent thinking, and individual expression. The prevalent "teacher demonstrates, students imitate" model may improve short-term proficiency but suppresses students' creative potential and fails to meet the creative industries' demand for unique ideas and complex problem-solving.

Activity-Based Learning, grounded in constructivist and experiential learning theories, offers a promising alternative. By shifting the focus from passive reception to active inquiry, from rote skill drilling to meaning-making in authentic contexts, ABL aligns naturally with the creative process in art. Yet, empirical research on ABL in higher vocational art education is limited; most studies target undergraduate or K-12 settings, and few have explored the mediating mechanisms-such as self-efficacy, engagement, and collaborative climate-through which ABL influences creativity. This study addresses these gaps by implementing a rigorous quasi-experiment in a real vocational college context, thereby providing both theoretical insights and practical guidance for curriculum innovation.

2. Research Objectives

This study pursues four interrelated objectives: (1) To examine the overall instructional effectiveness of ABL in an art creation course and assess whether it meets the quantitative "80/80" benchmark (≥80% of students achieving acceptable creativity scores and ≥80% positive satisfaction). (2) To compare, through a quasi-experimental design, the differential effects of ABL versus traditional instruction on students' creativity performance. (3) To explore and validate the serial mediation pathway involving perceived classroom collaboration climate, learning engagement, and creative self-efficacy as sequential mediators between ABL and creativity. (4) To understand, from students' subjective perspectives, their holistic experience of ABL, identifying perceived challenges and growth to provide qualitative evidence for optimising implementation.

3. Research Hypotheses

Based on the literature and theoretical framework, the following hypotheses were formulated: H1: The implementation of ABL in the art creation course will achieve the "80/80" standard, meaning that more than 80% of students will demonstrate acceptable creativity performance and more than 80% will provide positive evaluations of the instructional process. H2: Compared to the traditional lecture-imitation model, ABL will significantly enhance students' overall creativity scores (fluency, flexibility, originality, and elaboration) as measured by the TTCT. H3: The positive effect of ABL on creativity will be serially mediated by the pathway: ABL ⟶ Perceived Classroom Collaboration Climate ⟶ Learning Engagement ⟶ Creative Self-Efficacy ⟶ Creativity. Specifically, ABL will first improve students' perception of collaborative climate, which in turn increases their learning engagement, which then strengthens creative self-efficacy, ultimately leading to higher creativity performance. H4: Students in the ABL condition will report high satisfaction and

perceive substantial growth in creative confidence, cultural integration ability, and collaborative problem-solving skills.

4. Scope of the Study

Content scope: The intervention covered four thematic units: (1) "From Observation to Expression: Creative Sketching and Ideational Fluency"; (2) "Material Experimentation: Problem-Solving in Mixed Media Creation"; (3) "Collaborative Co-creation: Group Thematic Creation Project"; and (4) "Reflection and Reconstruction: Artwork Presentation and Enhancement of Creative Expression." The study also measured three mediating variables—creative self-efficacy, learning engagement, and perceived classroom collaboration climate.

Population and sample: The population comprised all first-year Digital Media Art and Design students (Class of 2025, about 120 students) at Quanzhou Light Industry Vocational College. Using cluster random sampling, two natural classes were selected, yielding a sample of 72 students—36 in the experimental group (ABL) and 36 in the control group (traditional instruction).

Time scope: The study was conducted during the second semester of the 2024-2025 academic year, with an 8-week intervention (Weeks 6-13, 2 class hours per week, total 16 hours), pretest in Week 5, and posttest in Week 14.

Geographical scope: The research was carried out at Quanzhou Light Industry Vocational College, Fujian Province, China, a representative higher vocational institution closely linked to local creative industries (footwear, apparel, cultural products, digital media).

Variables: Independent variable was ABL instructional model (vs. traditional teaching). Dependent variable was student creativity (multi-dimensional: TTCT scores, expert CAT ratings, and innovation practice ability). Mediating variables were creative self-efficacy, learning engagement, and perceived classroom collaboration climate. Control variables (artistic foundation, learning motivation type) were balanced via pretest equivalence and random assignment.

5. Research Methodology

A non-equivalent pretest-posttest control-group quasi-experimental design was adopted. The design can be symbolised as: Experimental group: $O_1 \longrightarrow X \longrightarrow O_2$; Control group: $O_3 \longrightarrow C \longrightarrow O_4$, where O_1 and O_3 are pretests (TTCT, self-efficacy, engagement, collaboration climate), X is the 8-week ABL intervention, C is traditional instruction, and O_2 and O_4 are posttests (same scales plus CAT expert ratings and satisfaction questionnaire for the experimental group). To enhance internal validity, both groups followed the same syllabus and creative themes, received equal instructional hours (16 hours over 8 weeks), and were taught by the same instructor (the researcher) to eliminate teacher-related bias. Classroom observation and teaching logs ensured fidelity of implementation.

6. Research Instruments

The following instruments were employed: ABL Instructional Package: A self-designed 4-unit activity package with teacher guides, student task manuals, resource kits, and formative/summative assessment tools, validated through expert review and pilot testing. Torrance Tests of Creative Thinking (TTCT) – Adapted Version: A 30-minute test comprising figural and verbal subtests, measuring fluency, flexibility, originality, and elaboration (Cronbach's α = 0.861). Consensual Assessment Technique (CAT): Three expert art teachers independently scored students' final creative works on novelty, technical skill, and aesthetic value (ICC = 0.87). Creative Self-Efficacy Scale: Adapted from Tierney & Farmer (2002), 8 items, 5-point Likert, α = 0.892. Learning Engagement Scale: Adapted from Schaufeli et al. (2002), 12 items covering vigour, dedication, and absorption, α = 0.915. Perceived Classroom Collaboration Climate Scale: Self-developed based on Johnson & Johnson (2014), 10 items, α = 0.877. Student Learning Experience and Satisfaction Questionnaire: Self-developed, 25 items (5-point Likert) plus open-ended questions, α = 0.938. All instruments underwent expert content validity review and pilot testing prior to formal administration.

7. Data Collection

Data collection proceeded in three phases: Phase 1 – Pretest (Week 5): Both groups completed the TTCT, Creative Self-Efficacy Scale, Learning Engagement Scale, and Collaboration Climate Scale to establish baseline equivalence. Phase 2 – Intervention (Weeks 6-13): The experimental group received ABL instruction (one unit every two weeks), while the control group followed the traditional model. Process data (sketches, reflective journals, observation records) were collected weekly. Phase 3 – Posttest (Week 14): Both groups repeated the TTCT and the three mediating-variable scales. The experimental group also completed the Satisfaction Questionnaire. All students' final works were collected for CAT scoring by three experts. All data were collected under standardised conditions, and anonymity was guaranteed.

8. Data Analysis

Quantitative data were analysed using SPSS 26.0 and the PROCESS macro (Model 6). The analytical procedures included: descriptive statistics (means, standard deviations, frequencies) for demographic and key variables; independent-samples *t*-tests to check pretest equivalence between groups; paired-samples *t*-tests to examine within-group pre-to-post changes; analysis of covariance (ANCOVA) with pretest TTCT scores as covariate to compare posttest creativity between groups; serial mediation analysis (PROCESS Model 6) with 5,000 bootstrap samples to test the hypothesised chain (Collaborative Climate ⟶ Learning Engagement ⟶ Self-Efficacy ⟶ Creativity); frequency and mean analysis for satisfaction questionnaire items; and thematic analysis of open-ended responses to complement quantitative findings.

9. Research Findings

The major findings are summarised below:

H1 (80/80 efficacy): In the experimental group, 83.3% of students (30 out of 36) achieved a TTCT posttest score ≥80, and 86.1% (31 out of 36) scored ≥80 on the satisfaction questionnaire (percentage-transformed). The control group had only 22.2% reaching the creativity threshold. Thus, H1 was supported.

H2 (Effectiveness comparison): ANCOVA revealed a significant main effect of group on posttest creativity, $F(1,69)=220.15$, $p<0.001$, partial $\eta^2=0.761$. The adjusted mean of the experimental group (84.52) was significantly higher than that of the control group (64.75). Paired *t*-tests showed the experimental group made a large gain (mean change +23.22, $t=18.76$, $p<0.001$, Cohen's $d=4.12$), while the control group's change was non-significant (+3.19, $t=1.89$, $p=0.067$). H2 was supported.

H3 (Serial mediation): The total indirect effect of ABL on creativity through the three mediators was significant (B=15.86, 95% CI [13.51, 18.30]). Specifically, the complete serial path (Group ⟶ Collaborative Climate ⟶ Learning Engagement ⟶ Self-Efficacy ⟶ Creativity) had an indirect effect of B=6.05 (95% CI [3.78, 8.86]). The direct effect remained significant (B=4.28, $p<0.001$), indicating partial mediation. Other significant specific indirect paths included Ind4 (Climate ⟶ Engagement ⟶ Creativity), Ind5 (Climate ⟶ Self-Efficacy ⟶ Creativity), and Ind6 (Engagement ⟶ Self-Efficacy ⟶ Creativity). H3 was supported.

H4 (Satisfaction and perceived growth): The overall satisfaction mean percentage score was 86.94%, with all sub-dimensions (unit satisfaction, content, activity design, collaboration, learning gains, teacher support, overall evaluation) above 84%. Thematic analysis of open-ended responses revealed prominent themes: increased creative confidence, deeper understanding of local culture (e.g., Quanzhou Zanhua tradition), improved collaborative skills, and challenges in idea generation and time management. Students expressed a strong sense of accomplishment from completing independent projects. H4 was supported.

10. Discussion

The results robustly confirm that ABL is highly effective in fostering creativity among higher vocational art students, surpassing the traditional model by a large margin. The effect size (partial $\eta^2=0.761$) indicates that the teaching method alone accounts for over three-quarters of the variance in post-test creativity after controlling for baseline, which is both statistically and practically significant. The serial mediation mechanism identified in this study provides a theoretical contribution by opening the "black box" of ABL's influence. The chain—Collaborative Climate ⟶ Learning Engagement ⟶ Creative Self-Efficacy ⟶ Creativity—aligns with self-determination and social-cognitive theories. ABL first establishes a psychologically safe and supportive collaborative environment (through structured group work and peer interaction), which enhances students' behavioural and emotional engagement. Higher engagement, in turn, provides more opportunities for

mastery experiences and vicarious learning, thereby boosting creative self-efficacy, which directly predicts creative performance. The fact that the direct effect remained significant suggests that ABL may also operate through additional pathways, such as increased cognitive flexibility or reduced anxiety, which warrant further investigation.

Compared to previous literature, this study extends findings from general education and undergraduate settings to the under-researched higher vocational population. The inclusion of culturally embedded projects (e.g., the "Zanhua" unit) resonated strongly with students, suggesting that contextually relevant content amplifies the benefits of ABL. The high satisfaction rate (86.1%) supports the practical viability of ABL in vocational colleges, where students often value hands-on, meaningful tasks. However, several limitations should be acknowledged: the single-site design, relatively small sample, short intervention duration, and potential researcher-as-instructor bias. Despite these, the strong effect sizes and consistency between quantitative and qualitative data lend confidence to the conclusions.

11. Recommendations

For practice: Adopt the "80/80" standard as a practical self-evaluation tool for instructors to diagnose and refine their ABL designs. Intentionally cultivate the mediation chain: build collaborative norms (e.g., through team contracts and structured discussion protocols), design optimally challenging tasks with frequent feedback, and provide mastery experiences and attributional feedback to strengthen self-efficacy. Embed local cultural content meaningfully (e.g., traditional crafts, local history) to enhance cultural confidence and creative expression, as demonstrated in this study. Integrate structured reflection (logs, peer feedback, gallery walks) as a core component, not an optional extra. For administrators: prioritise ABL in curriculum reform, invest in flexible classroom spaces and extended studio time, and reform assessment systems to reward ideation, process documentation, and collaboration alongside technical execution.

For future research: Conduct longitudinal follow-ups (e.g., delayed post-tests after one semester) to assess sustainability and transfer of creativity gains. Replicate the study in multiple vocational colleges and across different art/design majors to test generalisability. Employ objective behavioural measures (digital trace data, physiological indicators) to complement self-reports. Examine moderating factors such as growth mindset, tolerance for ambiguity, and group composition. Compare variants of active learning (e.g., Problem-Based Learning vs. Design Thinking) to identify optimal models for vocational creativity. Implement teacher professional development studies with random assignment to ABL training to separate teacher effects from method effects. Carry out cross-cultural comparisons (e.g., Northern vs. Southern China, China vs. Thailand) to test cultural moderators of the mediation pathway.

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