

Using Peer Teaching to Improve Learning Motivation and Achievement in Hand-Drawn Batik Production

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ABSTRACT

This classroom action research examined the use of peer teaching to strengthen learning motivation and practical achievement in hand-drawn batik (*batik tulis*) among Grade XI students in the Textile Craft Design and Production program at SMK Negeri 1 Sukasada, Bali, during the 2021/2022 academic year. The intervention was implemented in two iterative cycles of planning, action, observation, and reflection. Students with relevant industry-placement experience served as peer tutors during batik-production activities. Motivation, practical performance, and learner responses were assessed using observation, performance assignments, and questionnaires. In Cycle I, mean scores were 78.5 for motivation, 75.0 for batik practice, and 77.1 for learner response; the reported overall achievement score was 76.7. Following tutor reinforcement, additional canting practice, material replacement, and targeted feedback, Cycle II scores increased to 82.0, 83.1, and 84.6, respectively, with reported overall achievement of 83.5. Thus, the overall score improved by 6.8 points between cycles using the abstract figures. The findings suggest that structured peer teaching, supported by teacher monitoring and iterative refinement, can facilitate participation and technical learning in vocational batik workshops. Interpretation is limited by the absence of a clearly reported sample size, independent comparison group, and full individual-level data.

Keywords: *batik tulis*; classroom action research; learning achievement; learning motivation; peer teaching

INTRODUCTION

Vocational textile-craft education requires students to integrate technical knowledge, procedural accuracy, creativity, and the capacity to learn through guided practice. In the Indonesian vocational-school context, hand-drawn batik (*batik tulis*) is a culturally meaningful craft that requires motif transfer, wax-resist application using a canting tool, dyeing, wax removal, and finishing. These procedures depend on repeated practice, immediate feedback, and close observation of skilled performance. Socially situated learning and participation in communities of practice provide a useful framework for understanding how learners acquire practical expertise through interaction (Lave & Wenger, 1991; Vygotsky, 1978; Topping, 2005).

The source study identified a particular learning problem at SMK Negeri 1 Sukasada. COVID-19 disruptions reduced opportunities for school-based practical learning, while industrial placements offered uneven exposure to textile-craft competencies. The author reported a larger achievement gap in batik (0.82

points) than in sewing (0.31), weaving (0.56), and screen printing (0.33). These disparities suggested a need to mobilize students with relevant workplace experience to support classmates who had not encountered the same craft processes.

Peer teaching offers a structured mechanism for sharing procedural expertise. In this model, selected learners act as tutors who demonstrate tasks, explain steps, respond to questions, and provide feedback to their peers. Earlier research on peer-assisted learning has identified academic, social, and motivational benefits, although outcomes vary with tutor preparation, task structure, and monitoring (Cohen et al., 1982; Topping, 1996; Rohrbeck et al., 2003; Ginsburg-Block et al., 2006). A recent meta-analysis also reported a positive overall association between peer instruction and academic achievement (Öz, 2024).

The present study aimed to describe the implementation of peer teaching in batik tulis instruction, document changes in motivation and practical achievement across two action-research cycles, and examine students' responses to the intervention. The contribution lies in its situated application of peer teaching to a traditional craft-production competency following uneven industry-placement experiences.

LITERATURE REVIEW

Peer Teaching and Collaborative Learning

Peer teaching is not merely placing students in groups; it requires clear tutor and tutee roles, task alignment, guided explanation, and opportunities for reciprocal questioning. Foundational reviews distinguish tutoring from broader cooperative learning and describe the potential advantages of peer-supported explanation (Damon & Phelps, 1989; Topping & Ehly, 2001; Boud et al., 1999). Research suggests that tutoring can support both learners and tutors because explaining a procedure demands organization and elaboration of knowledge (Roscoe & Chi, 2007; Duran, 2017; King, 1992; King, 1998).

Cooperative learning also depends on positive interdependence, individual accountability, and productive group interaction (Johnson & Johnson, 2009; Slavin, 2014; Gillies, 2016). Reciprocal teaching, guided questioning, and collaborative dialogue offer related mechanisms for deepening comprehension (Palincsar & Brown, 1984; Webb, 1989; Webb, 2009). These processes are especially relevant when students are required to discuss why wax application, dye concentration, or finishing steps produce different outcomes. Active-learning evidence further supports participatory rather than exclusively lecture-based instruction (Prince, 2004; Freeman et al., 2014; Chi & Wylie, 2014).

Meta-analytic studies provide additional support for peer-assisted interventions, while cautioning against treating all tutoring arrangements as equivalent (Cohen et al., 1982; Rohrbeck et al., 2003; Ginsburg-Block et al., 2006; Nickow et al., 2024). The effects of peer teaching are shaped by the learner population, content domain, duration, and intervention fidelity (Öz, 2024; Topping, 1996; Topping & Bryce, 2004).

Learning Motivation and Self-Regulation

Motivation influences persistence in demanding practical tasks. Self-determination theory highlights competence, autonomy, and relatedness as conditions that support high-quality motivation (Deci & Ryan, 2000; Ryan & Deci, 2020). In a craft workshop, peer tutors may increase perceived relatedness and reduce anxiety about asking questions, while incremental mastery can reinforce competence. Self-efficacy theory likewise predicts that successful task performance and observed peer models can strengthen learners' confidence (Bandura, 1977; Schunk, 1991).

Academic motivation is multidimensional and shaped by goals, self-beliefs, and classroom conditions (Pintrich, 2003; Wentzel, 1998; Cerasoli et al., 2014). Students may also benefit from opportunities to monitor their progress and regulate practice (Zimmerman, 2002; Dignath & Büttner, 2008; Zimmerman & Kitsantas, 2005). Cooperative participation may contribute to social and emotional learning, although this study did not directly measure those constructs (Durlak et al., 2011; Fantuzzo et al., 1992).

Performance Assessment and Feedback in Craft Workshops

Authentic practical assessment should reflect observable production processes rather than only finished-product appearance. Rubric-based assessment can clarify expectations and support feedback (Panadero & Jonsson, 2013; Falchikov & Goldfinch, 2000; Topping, 2009). Formative feedback is most useful when learners understand the task goal, their present performance, and the next step required for improvement (Hattie & Timperley, 2007; Nicol & Macfarlane-Dick, 2006; Boud & Molloy, 2013; Black & Wiliam, 1998; Sadler, 1989; Butler & Winne, 1995). Guided practice and situated participation connect such feedback with vocational skill development (Lave & Wenger, 1991; Fink, 2013; VanLehn, 2011).

Theoretical accounts of cooperative participation also suggest that learners may benefit from purposeful role rotation and structured interdependence (Allen, 1976; Aronson et al., 1978; Johnson & Johnson, 2009). The quality of peer assessment, however, must be monitored because tutor expertise and the accuracy of explanations can vary (Boud et al., 1999; Topping, 2009; Panadero & Jonsson, 2013).

METHOD

Research Design and Setting

The study used two-cycle classroom action research in the Textile Craft Design and Production program at SMK Negeri 1 Sukasada, Buleleng, Bali, during the 2021/2022 academic year. Each cycle comprised planning, action, observation, and reflection. The source text describes Grade XI students but also inconsistently refers to “class XI (twelve)” and the sixth semester; therefore, Grade XI is retained based on the title and abstract, while the contradictory semester notation is flagged for author verification. The manuscript does not provide a reliably identifiable number of student participants.

Instructional Procedure

In Cycle I, the teacher prepared lesson plans, assessment forms, observation instruments, materials, and peer-teaching groups. Students selected as tutors were briefed before workshop activities. Under peer supervision, students prepared fabric, transferred motifs, applied wax with a canting tool, dyed fabric, removed wax, and completed finishing tasks. The teacher observed interactions and assessed both practical work and learning motivation. The first cycle lasted six days.

Reflection identified several implementation constraints: limited prior practice, differences between industrial and school batik techniques, passive tutor guidance, deteriorating dye materials, and low learner confidence. For Cycle II, the teacher introduced extra canting exercises using recycled paper, reinforced tutor skills and communication, replaced problematic dye materials, and provided motivational support. Thus, Cycle II was a revised intervention rather than a direct repetition of Cycle I.

Measures and Analysis

Motivation was evaluated through activity, discipline, cooperation, and persistence. Practical achievement covered wax application, dyeing, wax removal, and finishing. Student responses concerned understanding of tutor explanations, guidance quality, communication, enthusiasm, and interest in learning. The source specifies a composite score weighted 30% motivation, 50% practical performance, and 20% student response. Results were summarized descriptively for each cycle; no individual-level dataset or inferential test was supplied.

The source gives a success threshold of 7.8 on a ten-point scale, corresponding to 78 on a 100-point scale. For transparency, this English manuscript presents the reported component means and published composite values separately, rather than silently recomputing or replacing the source values.

RESULTS

Cycle I: Initial Implementation

The first cycle yielded a mean motivation score of 78.5, practical batik score of 75.0, and student-response score of 77.1. The abstract reports a composite achievement score of 76.7. The relatively low practical score suggested difficulties with transferring industrial techniques to the school workshop and insufficient confidence among novice peer tutors.

Cycle II: Refined Peer Teaching

After tutor reinforcement and targeted workshop improvements, the mean motivation score increased to 82.0, practical performance to 83.1, and student response to 84.6. The source reports a final composite score of 83.5. The improvement in practical performance was the largest among the three component measures.

Table 1. Reported results by action-research cycle

Indicator	Cycle I	Cycle II	Change
Learning motivation	78.5	82.0	+3.5
Batik practical performance	75.0	83.1	+8.1
Student response	77.1	84.6	+7.5
Overall achievement (reported)	76.7	83.5	+6.8

Note: the original article also gives Cycle I overall achievement as 76.8 in one table, and a later discussion describes a 6.7-point increase. The abstract-based 76.7 and 83.5 are shown consistently here; author confirmation is required.

Interpretation of Composite Scores

Applying the stated weights to the displayed component means gives 76.97 for Cycle I and 83.07 for Cycle II, which do not exactly match the reported composites of 76.7 and 83.5. These discrepancies may reflect individual-level weighting, rounding, or transcription, but the source provides insufficient raw data to determine the cause. No values have been fabricated to reconcile them.

DISCUSSION

The descriptive improvement across cycles is consistent with the premise that peer teaching can support participation, explanation, and practical learning. Learners who had encountered batik processes during industrial placement were positioned to share tacit procedural knowledge with classmates. This arrangement resembles situated learning, where access to knowledgeable peers and authentic tasks can facilitate skill development (Lave & Wenger, 1991; Topping, 2005; Roscoe & Chi, 2007).

The increase in motivation from 78.5 to 82.0 may reflect greater learner confidence and a more supportive social environment. Peer support can reduce reluctance to seek help, and successful practice can strengthen self-efficacy (Bandura, 1977; Schunk, 1991; Ryan & Deci, 2020). However, the study did not use a validated motivation scale or provide participant-level data, so the proposed motivational mechanisms remain interpretive rather than demonstrated causal pathways.

The larger gain in practical batik performance (+8.1 points) deserves attention. Unlike purely verbal instruction, batik production requires coordinated manual skills and repeated corrective feedback. In Cycle II, tutors received additional preparation and learners practiced canting before working on fabric; defective dyes were also replaced. These concurrent modifications plausibly contributed to the gain, making it impossible to attribute the entire improvement solely to peer teaching. Feedback and structured practice research provides a rationale for these design changes (Hattie & Timperley, 2007; Boud & Molloy, 2013; Nicol & Macfarlane-Dick, 2006).

The results also resonate with broader evidence supporting cooperative and peer-assisted learning, including reviews and meta-analyses of tutoring effectiveness (Gillies, 2016; Öz, 2024; Nickow et al., 2024). Nevertheless, these studies span different disciplines and learner populations; their findings should be treated as theoretical and comparative support, not as direct validation of batik-specific outcomes.

For implementation, vocational teachers should select tutors based on demonstrated competence, provide explicit coaching in explanation and feedback, use clear performance rubrics, and rotate roles where appropriate. Teacher supervision remains essential to detect procedural errors and ensure safe handling of hot wax and dyes. The practical goal is to complement professional instruction with structured peer support, not to replace the teacher.

LIMITATIONS

This study has several limitations. The source does not state the participant count unambiguously, and no independent control group is described. The two cycles involved multiple simultaneous refinements, including additional practice and material replacement, which prevent causal isolation of peer teaching. The composite achievement scores are not fully reproducible from the displayed weighted component means. There are also inconsistencies in the original reported Cycle I overall score (76.7 versus 76.8) and the stated improvement (6.7 versus 6.8). Finally, no individual-level variability, inferential statistics, validated motivation scale, or follow-up retention measures are available.

CONCLUSION

Peer teaching was implemented through two classroom action-research cycles in hand-drawn batik instruction. Across cycles, motivation increased from 78.5 to 82.0, practical performance from 75.0 to 83.1, and student response from 77.1 to 84.6. Reported overall achievement increased from 76.7 to 83.5. These descriptive results support the practical promise of peer-assisted instruction when tutors receive preparation, learners are given sufficient rehearsal opportunities, and teachers monitor workshop performance. Future research should use consistent scoring procedures, report sample characteristics and full statistical details, and compare peer teaching with a clearly defined alternative instructional condition.

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