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Project based CorelDRAW video tutorial enhancing embroidery ornament design competencies among fashion students

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ABSTRACT

This study aimed to develop and evaluate a project-based instructional video for embroidery ornament design using CorelDRAW to improve university students' practical competencies in vocational fashion education. A Research and Development approach employing the Four-D (4D) model (Define, Design, Develop, and Disseminate) was implemented. The product was validated by two media experts and three content experts, followed by practicality testing involving students and a lecturer. Effectiveness was examined using a one-group pretest-posttest design with 30 undergraduate students. Data were analyzed using Aiken's V, descriptive statistics, normalized gain, and paired-samples t-test. The instructional video demonstrated high validity and practicality and significantly improved students' learning outcomes, with a moderate N-gain and a significant difference between pretest and posttest scores ($p < 0.001$). The developed instructional video is a valid, practical, and effective digital learning resource for enhancing psychomotor competencies in embroidery ornament design.



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Introduction

The increasing integration of digital technologies into higher education has created new opportunities and challenges for vocational education, which requires students to develop both conceptual understanding and practical professional competencies. In fashion design education, digital competencies have become increasingly important because the creative industry requires graduates to be proficient in professional design software. However, preliminary observations and needs analysis in this study indicated that many students experienced difficulties in creating digital embroidery ornament designs due to limited procedural guidance and the predominance of conventional demonstrations, which restricted independent practice. These conditions highlight the need for digital learning media that facilitate flexible, learner-centered, and self-paced learning while supporting lifelong skill development (Asnur et al., 2025; Kavanagh et al., 2024). Video-based instruction is particularly suitable because it enables students to observe, imitate, and repeatedly practice complex procedures through structured visual demonstrations, thereby enhancing practical competencies and learning engagement (Toreyeva et al., 2025; Yang et al., 2025).

The ability to design embroidery ornaments requires artistic creativity as well as technical proficiency in digital design software. CorelDRAW is widely adopted in the fashion and textile industries because it offers

precise vector-based drawing tools, flexible editing features, and compatibility with embroidery production systems. Nevertheless, many students still struggle to master the software due to insufficient procedural guidance and limited opportunities to follow complete design workflows, resulting in reduced confidence and creativity in completing authentic design projects (Octaria et al., 2026; Wei et al., 2025). Therefore, instructional innovations integrating multimedia technology with authentic project-based activities are needed to provide systematic procedural guidance while improving conceptual understanding and practical design competencies.

Previous studies have shown that instructional videos enhance learning motivation, academic achievement, and practical skills by combining visual demonstrations with verbal explanations, whereas project-based learning promotes creativity, collaboration, problem-solving, and authentic learning experiences (Huang & Parker, 2023; Saem & Kyun, 2025; Walter et al., 2024; Zhang et al., 2023). However, most studies have examined these approaches independently or within general vocational, science, and engineering education. Research integrating instructional videos with project-based learning in digital fashion design, particularly for embroidery ornament design using CorelDRAW, remains limited, leaving the instructional mechanism for improving students' psychomotor competencies insufficiently explored (Papahristou & Tatsi, 2024; Sugiyem et al., 2024).

Several research gaps therefore remain. Existing instructional videos generally emphasize software operation rather than authentic project workflows, while many development studies focus primarily on validity and user satisfaction without providing comprehensive evidence of learning effectiveness through normalized gain and inferential statistical analysis. Furthermore, few studies critically examine the integration of multimedia learning and project-based learning as a unified instructional approach in vocational fashion education. These methodological and conceptual limitations indicate the need for an empirically validated instructional medium capable of strengthening students' digital embroidery design competencies while providing stronger evidence of instructional effectiveness (Papahristou & Tatsi, 2024; Sugiyem et al., 2024).

Based on these gaps, this study developed a project-based instructional video for embroidery ornament design using CorelDRAW based on the Four-D (4D) instructional development model. The novelty of this study lies in integrating multimedia learning and project-based learning into a single instructional medium that guides students through complete digital embroidery design projects aligned with vocational learning outcomes. In addition, the developed media was comprehensively evaluated through expert validation, practicality assessment involving lecturers and students, and effectiveness testing using a one-group pretest–posttest design supported by normalized gain and inferential statistical analyses. Therefore, this study aims to develop a valid, practical, and effective instructional video that enhances university students' psychomotor competencies while contributing empirical evidence to digital learning innovation in vocational fashion education.

Method

This study employed a Research and Development (R&D) approach using the Four-D (4D) instructional development model proposed by Thiagarajan, Semmel, and Semmel, consisting of the Define, Design, Develop, and Disseminate stages. The model was selected because it provides a systematic framework for developing and evaluating instructional media through iterative validation, revision, and implementation processes. A mixed-methods approach was adopted to integrate qualitative and quantitative data. Qualitative data were collected through observations, interviews, and expert feedback to support product development and revision, whereas quantitative data were obtained from validation questionnaires, practicality assessments, and students' learning outcomes to evaluate the quality and effectiveness of the developed media.

During the Define stage, a comprehensive needs analysis was conducted through classroom observations, interviews with the course lecturer, and questionnaires administered to students. This stage included learner analysis, concept analysis, task analysis, and formulation of learning objectives to identify instructional problems and determine the specifications of the project-based video tutorial. The Design stage focused on preparing the instructional framework by reviewing relevant literature, developing the instructional storyboard, organizing learning materials, designing the project-based learning sequence, preparing video scripts, and determining visual and audio components for the CorelDRAW tutorial. During the Develop stage, the instructional video was produced using screen-recording techniques and subsequently validated by experts. Product revisions were carried out according to expert recommendations before conducting practicality and effectiveness testing. Finally, the Disseminate stage involved limited implementation by distributing the validated instructional video to lecturers and students through digital platforms, including Google Drive and QR Code access, to facilitate independent learning.

The study involved 30 undergraduate students enrolled in the Fashion Design Education Program at Universitas Aifa Royhan Padangsidempuan who were taking the Fashion Ornament Design course during the 2025/2026 academic year. Participants were selected using purposive sampling because they were enrolled in

the course where the developed instructional media was implemented. Product validation was conducted by two media experts and three content experts, while practicality evaluation involved a small-group trial ($n = 10$), a large-group trial ($n = 30$), and one course lecturer as the end-user evaluator. The effectiveness of the instructional media was examined using a one-group pretest–posttest design, in which students completed a project-based performance assessment before and after learning with the developed video tutorial.

Data were collected using multiple instruments, including observation sheets, semi-structured interview guidelines, expert validation questionnaires, practicality questionnaires, and project-based performance assessment rubrics. The expert validation instruments evaluated media appearance, technical quality, instructional presentation, language, usability, content relevance, accuracy, presentation, and content depth. Practicality questionnaires assessed media appearance, content presentation, ease of use, and instructional usefulness from both student and lecturer perspectives. Students' learning outcomes were measured using a project assessment rubric consisting of ten performance indicators, including design planning, motif construction, motif composition, motif development, CorelDRAW operation, design quality, color application, product suitability, and time management. Content validity of the evaluation instruments was established through expert judgment prior to implementation.

Quantitative data were analyzed using descriptive and inferential statistics with IBM SPSS Statistics version 25. The validity of the instructional media was determined using Aiken's V coefficient, with values of 0.667 or higher indicating acceptable content validity. Practicality was calculated as percentage scores and interpreted according to established practicality criteria. Students' learning outcomes were analyzed descriptively using means and standard deviations. Prior to hypothesis testing, data normality was examined using the Shapiro–Wilk test because the sample size was fewer than 50 participants. Learning improvement was evaluated using the normalized gain (N-Gain) index, while the effectiveness of the developed instructional media was determined through a paired-samples t -test at a significance level of $\alpha = 0.05$. Statistical significance was established when $p < 0.05$, indicating a significant difference between pretest and posttest learning outcomes after implementation of the project-based CorelDRAW video tutorial.

Results and Discussions

This study aimed to develop and evaluate a project-based instructional video for embroidery ornament design using CorelDRAW through the Four-D development model (Define, Design, Develop, and Disseminate). The results are presented sequentially according to the development stages, including the needs analysis, expert validation, practicality evaluation, and effectiveness testing. The effectiveness of the developed media was examined through descriptive statistics, assumption testing, normalized gain analysis, and hypothesis testing to determine its impact on students' learning outcomes.

Table 1. Results of Needs Analysis

Aspect	Percentage (%)	Interpretation
Learning difficulties and prior experience	87.24	High
CorelDRAW utilization	68.75	Moderate
Learning media needs	97.50	Very High
Overall Mean	84.49	High Need

Table 2. Expert Validation Results

Assessment Aspect	Media Expert (Aiken's V)	Content Expert (Aiken's V)	Category
Appearance/Presentation	0.78	0.79	High
Technical Quality / Accuracy	0.80	0.78	High
Learning Content Suitability		0.80	Very High
Content Depth		0.82	Very High
Language	0.80	0.81	Very High
Ease of Use	0.75		High
Overall	0.80	0.81	Very High (Valid)

The needs analysis demonstrated a substantial demand for digital learning support among students. The highest percentage was found in the need for instructional media (97.50%), indicating that students strongly expected structured multimedia learning resources. Although students possessed moderate experience using

CorelDRAW (68.75%), most still encountered difficulties in producing embroidery ornament designs (87.24%). Overall, these findings confirmed the necessity of developing a project-based video tutorial to facilitate independent and systematic learning (Table 1).

The expert validation results confirmed that the developed instructional video satisfied the required quality standards. Media experts assigned an overall Aiken's V coefficient of 0.80, while content experts reported an overall coefficient of 0.81, both categorized as very high validity. All assessment dimensions exceeded the minimum validity criterion (Aiken's V > 0.667), indicating that the instructional media was academically appropriate, technically feasible, and suitable for classroom implementation after minor revisions (Table 2).

Table 3. Practicality Evaluation Results

Aspect	Small Group (%)	Large Group (%)	Lecturer (%)
Media appearance	74.33	88.22	
Content presentation	86.67	90.00	95.00
Ease of use	87.33	91.78	90.00
Learning efficiency			90.00
Content suitability			90.00
Media usefulness	89.14	87.81	90.00
Overall Mean	84.36	89.45	92.00
Category	Very Practical	Very Practical	Very Practical

The practicality evaluation consistently demonstrated excellent user acceptance of the instructional video. The overall practicality increased from 84.36% in the small-group trial to 89.45% during the large-group implementation, indicating improvements after product revision. Lecturer evaluation produced the highest overall score (92%), confirming that the instructional media was easy to implement, pedagogically appropriate, and highly beneficial for project-based learning activities.

Table 4. Descriptive Statistics and Normality Test

Variable	Mean $\pm$ SD	Minimum	Maximum	Shapiro–Wilk (Sig.)
Pre-test	63.92 $\pm$ 6.11	55	75	0.068
Post-test	85.25 $\pm$ 4.27	75	95	0.355

The descriptive statistics indicated a marked improvement in students' performance after the implementation of the instructional video. The average score increased by more than 21 points, while score variability decreased, suggesting more consistent learning outcomes. Furthermore, the Shapiro–Wilk significance values for both the pre-test (0.068) and post-test (0.355) exceeded 0.05, confirming that the data were normally distributed and fulfilled the assumptions for parametric hypothesis testing.

Table 5. Effectiveness of the Developed Instructional Video

Indicator	Result
Mean Difference	21.33
N-Gain	0.58 (Moderate)
t-value	16.616
df	29
p-value	<0.001
Decision	Significant Improvement

The effectiveness analysis demonstrated that the project-based instructional video significantly improved students' practical competencies in embroidery ornament design using CorelDRAW. The normalized gain score of 0.58 indicated a moderate learning improvement, while the paired-samples t-test revealed a highly significant difference between pre-test and post-test scores ($t = 16.616$, $p < 0.001$). These findings confirm that the developed instructional media effectively enhanced students' learning outcomes and can be considered a feasible digital learning resource for fashion design education.

The needs analysis revealed a strong demand for project-based digital learning media, as students experienced difficulties in operating CorelDRAW and producing embroidery ornament designs despite having moderate prior experience. These findings indicate that conventional instruction has not adequately supported the sequential learning process required in vocational fashion education. Accordingly, the instructional video was developed based on learners' actual needs by integrating visual demonstrations with authentic project-based activities, enabling students to repeatedly observe, imitate, and practice complete design workflows independently. This finding supports learner-centered instructional design, which emphasizes aligning learning

media with students' characteristics and learning needs (Ahmar & Azzajjad, 2025; Kohli, 2025). It also reinforces multimedia learning theory, which highlights the effectiveness of combining visual and verbal information to facilitate meaningful learning and psychomotor skill acquisition (Angelova et al., 2025; Velaora et al., 2022), while project-based learning promotes creativity, higher-order thinking, and authentic skill development (Hidayat et al., 2026; Li et al., 2025; Tong et al., 2025).

The high validity and practicality scores demonstrate that the developed instructional video satisfied pedagogical, technical, and content quality standards while being well accepted by both students and lecturers. The increase in practicality from the small-group to the large-group trial indicates that revisions based on expert feedback improved instructional clarity, navigation, and visual presentation, resulting in a more user-friendly learning experience. These findings are consistent with studies showing that iterative validation enhances the quality and effectiveness of digital learning media before implementation (Farrow et al., 2024; Prestiadi et al., 2022; Stott, 2026; Utari et al., 2024). They also support the Technology Acceptance Model, which identifies perceived ease of use as an important factor influencing technology adoption in education (Riehl et al., 2023; Zulkarnain et al., 2024), and are in line with evidence that well-designed multimedia resources reduce cognitive load while promoting independent learning (Liu & Hwang, 2025; Park, 2022; Nannim et al., 2025; Sudarwati et al., 2025).

The effectiveness analysis showed that the instructional video significantly improved students' psychomotor competencies, as evidenced by the significant difference between pre-test and post-test scores and a moderate normalized gain. Although the N-Gain was classified as moderate, it indicates meaningful learning improvement because students initially had limited experience with digital embroidery design and the intervention was implemented within a limited instructional period. The improvement can be attributed to repeated procedural demonstrations and authentic project activities that allowed students to practice independently and progressively refine their skills. These findings support Mayer's Cognitive Theory of Multimedia Learning, which explains that synchronized visual and verbal information enhances cognitive processing and long-term retention (Ahamad et al., 2022; Shi et al., 2024; Varol, 2026), while project-based learning strengthens creativity, problem-solving, and practical competence through authentic learning experiences (Bernstein et al., 2025; Patiño et al., 2023). Similar results have also been reported in studies integrating instructional videos with project-based learning in vocational and higher education contexts (Chu, 2026; Shang et al., 2026).

This study contributes to vocational fashion education by demonstrating that integrating multimedia learning with project-based pedagogy provides a more comprehensive instructional approach than conventional procedural video tutorials. The developed media not only teaches CorelDRAW operation but also guides students through complete embroidery ornament design projects aligned with vocational learning outcomes, thereby fostering technical competence, creativity, and independent learning. Nevertheless, the findings should be interpreted cautiously because the effectiveness evaluation employed a one-group pretest–posttest design within a single institution. Future studies should involve control groups, larger samples, and multiple institutions to strengthen the generalizability of the findings and further examine the long-term impact of the developed instructional media.

Conclusions

This study successfully developed a project-based instructional video for embroidery ornament design using CorelDRAW based on the Four-D (4D) instructional development model. The developed media demonstrated high validity according to expert evaluations, high practicality based on responses from both students and lecturers, and significant effectiveness in improving students' psychomotor competencies in digital embroidery design. The findings indicate that integrating multimedia learning with project-based activities provides an effective instructional approach for enhancing students' practical skills, independent learning, and creative performance in vocational fashion education. Therefore, the developed instructional video represents a feasible and innovative digital learning resource that can support the implementation of technology-enhanced learning in fashion design courses and may serve as a reference for the development of similar instructional media in other vocational education contexts.

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