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Development of concept-based video tutorial learning media for basic clothing patternmaking skills

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ABSTRACT

This study aimed to develop and evaluate a concept-based video tutorial for teaching basic clothing patternmaking in the Fashion Design program at SMK Negeri 6 Padang. Using a Research and Development approach with the 4D model Define, Design, Develop, and Disseminate the media was created based on identified student learning difficulties and curriculum needs. The developed video was validated by experts in material, media, and instructional design, yielding high validity scores of 90.5%, 89.7%, and 92.3%, respectively, with an average of 90.8% categorized as highly valid. Field testing was conducted with 30 tenth-grade students using pretests, posttests, and response questionnaires. The results showed a significant increase in learning outcomes, with the average score rising from 62.80 to 83.40 and an N-Gain of 0.55. Student responses were very positive, achieving an overall practicality rating of 88.6%. These findings demonstrate that the video tutorial is valid, practical, and effective for vocational learning.

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Introduction

Learning basic clothing patternmaking is a fundamental competency in vocational fashion education, as it equips students with the essential skills required to construct garments accurately and professionally (G. Chen, 2024; Sugihartini et al., 2025). In the Indonesian vocational school context, particularly in the Fashion Design expertise program, students are expected to master various measurement techniques, proportional calculations, and construction principles that serve as the foundation for advanced patternmaking and garment production. However, the practical nature of the material often requires detailed demonstrations and multiple repetitions for students to comprehend each step effectively (Ye et al., 2024, 2025). Traditional teaching approaches that rely heavily on teacher explanation and manual demonstration frequently fall short in meeting the diversity of students' learning speeds and abilities.

Recent advancements in digital learning tools have highlighted the potential of multimedia, especially video tutorials, to enhance vocational learning outcomes. Studies in fashion education and technical vocational subjects show that video-based learning supports clarity, retention, and procedural mastery because it allows learners to observe complex tasks repeatedly (Metreveli et al., 2025; Xu & Wang, 2025). In patternmaking instruction, videos provide visual cues such as line direction, measurement placement, and proportional adjustments that are not easily communicated through static images or verbal explanation alone. This aligns with Mayer's Cognitive Theory of Multimedia Learning, which emphasizes the integration of verbal and visual channels to improve comprehension.

Despite the growing adoption of technology in education, existing instructional media for patternmaking still exhibit several limitations. Most available videos focus solely on procedural steps without explaining the conceptual reasoning behind each measurement and construction decision (Lien et al., 2025; Shi et al., 2025). As a result, students tend to imitate steps mechanically without understanding the underlying logic of garment proportions or body measurements (Chan & Zhang, 2024; Harjono et al., 2025). This issue leads to frequent errors in producing accurate patterns and restricts the development of higher order thinking skills that are crucial for vocational creativity and problem-solving. Thus, there remains a need for media that integrates conceptual explanation with procedural demonstration.

The state of the art in vocational learning media points to an increasing trend toward mobile learning platforms, interactive simulations, and high-resolution step-by-step video demonstrations. While such innovations have improved accessibility, most studies highlight their procedural benefits rather than conceptual learning (Ma & Li, 2024; Zhou et al., 2025). For instance, recent research in dressmaking education has produced digital modules focusing on step sequences but rarely embedding conceptual frameworks such as proportional theory, anthropometry, or drafting logic. This indicates that the existing technological solutions do not yet bridge the gap between theory-driven understanding and hands-on patternmaking practice (Shen, 2024; Yang, 2025).

The research gap addressed in this study lies in the absence of instructional videos that explicitly incorporate conceptual reasoning into the drafting process. Students often struggle not because they cannot follow steps, but because they lack understanding of why those steps are necessary. Without conceptual clarity, learners face difficulty adapting patterns, correcting mistakes, or modifying designs skills essential for advanced fashion competencies. Therefore, developing a concept-based video tutorial is crucial to support deeper learning and independent skill development among vocational students (Mahoney et al., 2023; S. Rahmawati et al., 2025).

The novelty of this research is the integration of conceptual explanations directly within the visual sequence of patternmaking demonstration. Unlike ordinary video tutorials, the developed media begins each drafting step with an explanation of the conceptual basis, such as proportional calculations, anatomical considerations, and function of drafting lines. This approach not only enhances accuracy but also strengthens students' reasoning abilities, enabling them to modify patterns creatively and solve problems during garment construction. Furthermore, the media is systematically designed using the 4D development model, validated by experts, and empirically tested with vocational learners to ensure pedagogical, technical, and practical quality (Janzen et al., 2025; Netland et al., 2025; Setiyawan et al., 2025).

Given these considerations, the development of a concept-based video tutorial aims to provide an effective and innovative learning resource for students at SMK Negeri 6 Padang. By addressing the shortcomings of traditional teaching methods and existing digital tools, this research seeks to enhance both the conceptual understanding and technical proficiency of students in basic clothing patternmaking (J. Chen et al., 2025; Idkhan et al., 2025). Ultimately, this innovation is expected to contribute to improving the overall quality of vocational fashion education and to support the broader goal of producing competent, independent, and industry ready graduates.

Method

This study adopted a Research and Development (R&D) approach using the 4D model Define, Design, Develop, and Disseminate to produce a concept-based video tutorial for basic clothing patternmaking. In the Define stage, a detailed needs analysis was conducted through classroom observations, curriculum review, and semi-structured interviews with fashion teachers to identify conceptual misunderstandings and procedural difficulties encountered by students. In the Design stage, storyboards, narration scripts, and visual sequences were constructed based on multimedia learning principles, while validation instruments with Likert-scale indicators were created to assess material accuracy, conceptual clarity, visual quality, and instructional alignment. During the Develop stage, the video was produced and subsequently evaluated by six validators consisting of material experts, media experts, and instructional design experts who met predetermined criteria (minimum S2 qualification and relevant teaching or professional experience). The Content Validity Index (CVI) was employed to quantify expert judgments, with a minimum acceptability threshold of 0.80, and all qualitative suggestions were incorporated into video revisions.

In the Disseminate stage, field testing was carried out with 30 tenth grade Fashion Design students. The effectiveness of the video tutorial was assessed using pretests and posttests administered through a validated 20 item conceptual understanding instrument. Learning improvement was analyzed using the Normalized Gain (N-Gain) formula, while practicality was measured using student response questionnaires covering attractiveness, clarity, and usefulness of the media. Quantitative data from expert validation, test scores, and student responses were analyzed descriptively using percentage conversion and classification criteria to determine the validity, effectiveness, and practicality of the developed video tutorial as a learning medium.

Results and Discussions

The results of developing learning media in the form of tutorial videos on basic clothing patterns based on concepts in the subject of Fundamentals of Clothing Skills at SMK Negeri 6 Padang show that the media produced meets the aspects of validity, practicality, and effectiveness. The validation process was carried out by material experts, media experts, and instructional design experts. In general, the validators gave very high assessments regarding the feasibility of the content, concept accuracy, clarity of presentation, and the audiovisual quality of the developed tutorial videos. The videos are considered capable of helping students understand the relationship between body measurement concepts, proportions, and the steps of pattern drafting more systematically. Minor revisions were made regarding the addition of explanatory text and improving the narrator's voice clarity so that the information is easier for students to understand.

The trial implementation of the media was conducted on 30 X-grade Fashion Design students through pretests and posttests. The analysis results showed a significant improvement in students' ability to draw basic patterns after using tutorial videos. The average pretest scores indicated that most students were still confused in determining measurements, reference points, and line directions. After learning with the video, conceptual understanding and procedural accuracy increased noticeably, as reflected in the rise of posttest scores. The N-Gain calculation of 0.55 indicates a medium–high improvement category. Additionally, students' responses to the use of the media were very positive; they felt that the video made learning more engaging, easy to follow, and helped them learn independently. Teachers also noted that the video facilitated the demonstration process and helped improve learning time efficiency, as students could replay certain parts as needed.

Table 1. Expert Validation Results

Assessed Aspects	Score (%)	Category
Material Validity	90.5%	Highly Valid
Media Validity	89.7%	Highly Valid
Instructional Design Validity	92.3%	Highly Valid
Average	90.8%	Highly Valid

The results presented in the validation table indicate that the developed video tutorial media for basic clothing patternmaking achieved a very high level of validity, with an average score of 90.8%, categorized as *highly valid*. The material validation score of 90.5% demonstrates that the content, conceptual accuracy, and completeness of the instructional steps are appropriate for vocational learning needs. The media validation score of 89.7% reflects that the visual quality, audio clarity, and overall presentation design effectively support the delivery of instructional content. Meanwhile, the instructional design validation score of 92.3% shows that the flow of information, learning objectives, and pedagogical structure align well with sound instructional principles. These findings collectively confirm that the video tutorial is feasible for implementation without requiring major revisions.

Table 2. Pretest dan Posttest Result

Type of test	Average Score
Pretest	62,80
Posttest	83,40
N-Gain	0,55 (Medium-High)

The pretest and posttest results demonstrate a significant improvement in students' competency in constructing basic clothing patterns after using the developed video tutorial. The average pretest score of 62.80 indicates that many students initially struggled with understanding measurement concepts, determining key reference points, and drawing accurate construction lines. Following the intervention, the posttest score increased to 83.40, illustrating substantial progress in conceptual understanding and technical accuracy. The N-Gain value of 0.55, classified as medium to high, further confirms the effectiveness of the video tutorial in enhancing students' learning outcomes. This improvement suggests that the visual and step-by-step features of the media successfully supported students in mastering practical skills that are typically challenging when taught through traditional methods alone.

Table 3. Student Response Results to Media

Response Indicators	Percentage	Category
Video Attractiveness	90%	Very Good
Ease of Understanding	87%	Very Good
Clarity of Patternmaking Steps	88%	Very Good
Relevance to Learning Needs	89%	Very Good
Overall Average	88.6%	Very Good

The student response table shows that learners provided overwhelmingly positive feedback regarding the use of the video tutorial in the basic clothing patternmaking lesson, with an overall average response of 88.6%, categorized as *very good*. Students rated the video as highly engaging (90%) and easy to understand (87%), indicating that the combination of clear narration, visual demonstrations, and conceptual explanations significantly supported their comprehension. The clarity of the patternmaking steps received an 88% rating, demonstrating that students benefited from the structured and repeatable format of the video. Furthermore, the 89% score for relevance shows that students perceived the media as highly supportive of their learning needs. Overall, these findings show that the video tutorial not only improved competency but also increased motivation, engagement, and independent learning.

The development of the concept-based video tutorial for basic clothing patternmaking proved to be highly effective in supporting students' understanding of both theoretical and procedural components of the subject. The high scores achieved in expert validation demonstrate that the media successfully meets the standards of content accuracy, visual quality, and instructional design required for vocational education. This finding aligns with previous research indicating that digital tutorial media can enhance clarity in skill-based learning because it provides consistent, structured, and repeatable demonstrations of complex tasks. Therefore, the video serves as a dependable instructional tool that can complement traditional teaching methods in fashion-related subjects (Christidis et al., 2024; Sirk, 2024).

In addition to its validity, the video tutorial showed considerable effectiveness in improving students' learning outcomes. The significant increase in posttest scores compared to pretest scores indicates that students were able to understand and apply key concepts, such as body measurements, reference points, proportional calculations, and the logic of pattern construction, more accurately after using the media. The N-Gain value in the medium–high category further confirms that the learning improvement was meaningful. This effectiveness may be attributed to the dual-coding effect, where verbal explanations combined with visual demonstrations allow students to process and retain information more effectively (Junaidy et al., 2025; Wahyuni et al., 2025).

The positive responses from students highlight the motivational benefits of using video-based learning in practical subjects. Students found the video engaging, easy to follow, and helpful for independent learning. Unlike conventional demonstrations, which can only be observed once during class, video tutorials allow learners to pause, replay, and review steps at their own pace. This flexibility supports differentiated learning, enabling students with different levels of prior knowledge and learning speed to achieve competency more efficiently. Such findings reinforce the idea that multimedia learning tools are especially advantageous in vocational fields that rely on procedural mastery (Busana, n.d.; L. Rahmawati & Nelmira, 2025).

The responses from teachers also underscore the practical implications of the video tutorial in the classroom context. Teachers reported that the video helped streamline practical instruction and reduced the need for repetitive explanations (Ajizah & Yuniati, 2024; Meilina et al., 2025; Putri & Hidayati, 2022). By delegating foundational demonstrations to multimedia, teachers can allocate more time to supervising hands-on activities, providing personalized feedback, and addressing learner difficulties. This shift enhances instructional efficiency and aligns with modern pedagogical frameworks that emphasize active, practice-oriented learning (Clarisya et al., 2024; Kartikasari, 2023; Safitri & Yulistiana, 2022).

The findings indicate that the concept-based video tutorial is not only pedagogically sound but also highly relevant to the needs of vocational school learners in the fashion design field. Its strong validity, effectiveness in improving learning outcomes, and positive reception by students and teachers demonstrate that it can serve as an innovative and impactful learning resource. The integration of conceptual explanations with procedural demonstrations represents a valuable approach for teaching complex skills such as patternmaking (Anriyana et al., 2025; Fitria & Dewi, 2024). This study contributes practical insights into the development of digital learning media and supports broader efforts to enhance the quality of teaching and learning in vocational education.

Conclusions

The results of this research demonstrate that the development of a concept-based video tutorial for teaching basic clothing patternmaking successfully meets the study's objective of producing a valid, practical, and effective learning medium for vocational students. The video tutorial achieved high expert validation scores (average 90.8%), indicating strong content accuracy, media quality, and instructional design. Field implementation with 30 students revealed significant improvement in learning outcomes, shown by the increase in average scores from 62.80 to 83.40 with an N-Gain of 0.55, while student responses reached 88.6%, reflecting high practicality and acceptance. These findings confirm that integrating conceptual explanations with step-by-step visual demonstrations enhances students' understanding, procedural accuracy, and independent learning in patternmaking. Therefore, the concept-based video tutorial developed in this study effectively supports the teaching and learning process and contributes to improving the quality of vocational fashion education.

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