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Development of an Active Learning Based Tutorial Video for *Mesh-a-Mesh* Design Hair Curling

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Abstract: This study aims to develop an active learning-based tutorial video for *mesh-a-mesh* hair curling design. The study is the limited use of tutorial video media that not enough support in active learning cosmetology practice, where instruction is still dominated by direct demonstrations, resulting in low student engagement and suboptimal skill comprehension. The novelty lies in integrating active learning principles into a visual tutorial, enabling students to observe, analyze, and practice independently. This research employed a *Research and Development* (R&D) approach using the ADDIE model: Analysis, design, development, implementation, and evaluation. The subjects were students of the Cosmetology Education Study Program, UNIMED. Data were collected through observation, interviews, expert validation sheets, and student questionnaires, then analyzed using descriptive quantitative methods with a Likert Scale (1-5). The validation results showed very feasibility, with scores of 92% from material experts and 88% from media experts. Product trials in small, medium, and large groups yielded an average score of 90,29% category of very feasible. The effectiveness test indicate an *N-gain score* of 0,57 categorized as middle. This study suggest that the developed tutorial video is both feasible and effevtive in improving students understanding and practical skills in *mesh-a-mesh* hair curling design.

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Introduction

The development of information and communication technology has driven a transformation in the world of education, particularly in the use of digital learning media. One rapidly developing medium is learning videos, which can present information visually and audibly, making it easier for students to understand the material both conceptually and procedurally. In the context of vocational education, the use of video tutorials is highly relevant because they can display work steps systematically, in detail, and can be repeated according to student needs (Benni et al., 2024; Rahman et al., 2024). Various studies have shown that the use of video tutorials can improve student learning outcomes, motivation, and independence

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because they provide flexibility in accessing learning materials (Nugroho et al., 2021; Aghni et al., 2025).

Furthermore, multimedia learning theory also confirms that the combination of visuals and audio can significantly improve learning comprehension and retention (Mayer, 2009). However, based on the results of initial observations conducted on students in the Cosmetology Education Study Program, Faculty of Engineering, State University of Medan, it was found that the learning process in the design curling course was still dominated by a one-way direct demonstration method.

Empirical data shows that approximately 65% of students have difficulty understanding the sequence of design hair curling procedures, particularly the mesh-a-mesh technique, and approximately 70% of students have difficulty repeating the practical steps independently due to limited learning media. This condition indicates low student active involvement in the learning process. The direct demonstration method tends to position students as passive recipients of information, thus providing less opportunity for exploration, analysis, and independent practice. This is in line with the finding that less interactive learning impacts low understanding of practical skills (Islamimahdi et al., 2022).

Furthermore, conventional methods have limitations because they do not allow students to repeatedly re-access learning materials outside of class. In fact, the mesh-a-mesh design curling technique is a complex skill that requires high precision in hair division, consistency of technique, and a systematic understanding of work procedures to produce optimal curl shapes (Lubis & Harahap, 2022; Nasution et al., 2023). On the other hand, research developments show that integrating video tutorials with active learning approaches can significantly increase student engagement, activity, and learning outcomes (Masruri, 2024; Nisa, 2025).

Active learning emphasizes student involvement in the process of observing, analyzing, and practicing directly, making it very suitable for application in skills-based learning. However, most studies still use video tutorials as passive media and have not systematically integrated active learning approaches, especially in the field of hairdressing vocations. In addition, research that specifically develops video tutorials based on active learning on the material of mesh-a-mesh design curling is still very limited. This indicates a gap between the need for practical learning that requires active student involvement and the availability of learning media that can facilitate this process optimally. Based on these problems, innovation is needed in the development of learning media in the form of video tutorials based on active learning that not only present technical steps visually, but also encourage students to be actively involved in the learning process through independent observation, analysis, and practice.

Therefore, this study aims to develop a video tutorial based on active learning on the material of mesh-a-mesh design curling and to test its feasibility and effectiveness as a learning medium for students of the Makeup Education Study Program, Faculty of Engineering, State University of Medan.

Research Method

This study employed a Research and Development (R&D) approach aimed at producing and testing the feasibility of a video tutorial-based learning medium for active learning on *mesh-a-mesh* design curling. The development model used was the ADDIE model, which includes five stages: analysis, design, development, implementation, and evaluation.

1. Analysis Stage: learning needs were identified through observations and interviews with lecturers and students. The analysis focused on learning challenges, student characteristics, and the limitations of the media used in the design curling course.

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2. Design Stage: This stage included designing the video tutorial media, which included a) Preparation of mesh-a-mesh curling design materials, b) Preparation of storyboards and video scenarios, c) Determination of the learning flow based on active learning (observation, analysis, practice, reflection), d) Design of visual displays, audio, and video duration.
3. Development Stage: The following were carried out: a) producing the video tutorial according to the storyboard, b) editing the video (visual, audio, and text), c) product validation by subject matter experts and media experts. The validation results were used as the basis for revising the product until it met the feasibility criteria.
4. Implementation Stage: The revised product was piloted with students through three stages: (1) Small group trial (10 students), (2) Medium group trial (20 students), and (3) Large group trial (30 students). In this stage, students used video tutorials in the learning process of practical curling designs
5. Evaluation Stage: Evaluation was conducted to assess the feasibility of the media based on expert validation results, student responses, and product trial results.

The research subjects were students of the Cosmetology Education Study Program, Faculty of Engineering, State University of Medan, who were taking the curling design course. Data collection is carried out through forms given to material experts, media experts, and students. Assessment by material experts focuses on content suitability, material accuracy, and linguistic clarity, while media experts assess aspects of visual appearance, audio-visual quality, and editing techniques. Student responses are used to determine the level of practicality and appeal of the developed media.

The data obtained were quantitatively descriptively analyzed using a Likert scale with a score range of 1 to 5. The obtained values were then calculated in percentage form to determine the level of achievement of respondents. These percentage results are further classified into the category of eligibility, i.e. very decent, decent, quite decent, unfit, and very unfit.

$$TCR = \frac{Score\ Obtained}{Total\ Ideal\ Score\ of\ All\ Items} \times 100\ \%$$

The scores obtained are then transferred into the following table:

Table 1. Respondent Achievement Level Categorization

No	Interval	Criteria
1	81-100%	Very Decent
2	61-80%	Decent
3	41-60%	Quite Decent
4	21-40%	Unfit
5	0-20%	Very Unfit

(Source: Sugiyono, 2023)

Meanwhile, product effectiveness is obtained from students' practical scores by conducting pre-tests and post-tests. The results of the increase in students' pre-test and post-test practical scores are known from the normalized gain score with the gain score (g) formula, as follows:

$$N\text{-Gain} = \frac{Posttest - Pretest}{Skor\ maksimal - Pretest}$$

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After getting the gain score, the next step is to determine the criteria for improving student learning outcomes based on the following table.

Table 2. N-Gain Score

Nilai (g)	Criteria
N-gain ≥ 0,7	High
0,7 > N-gain ≥	Middle
N-gain < 0,3	Low

Result and Discussion

Result

This study produced a product called media in the form of an active learning-based design drying tutorial video developed with the ADDIE model. Research results data include assessments from material experts, media experts, and test results to small, medium, and large group students.

Table 3. Material Expert Validation Results

Aspect	Percentage	Category
Material suitability	92%	Very Decent
Feasibility of contents	90%	Very Decent
Language	94%	Very Decent
Total	**92%**	**Very Decent**

Based on material experts' validation results, an average score of 92% falls into the highly feasible category. This suggests that the material presented in the video is compatible with learning competencies, has a good level of accuracy, and is delivered in an easy-to-understand language. The high value in the language aspect indicates that material delivery is able to support students' understanding optimally.

Table 4. Media Expert Validation Results

Aspect	Percentage	Category
Video (View)	88%	Very Decent
Audio & Visual	90%	Very Decent
Editing	86%	Very Decent
Total	**88%**	**Very Decent**

Furthermore, the media validation score showed 88% of the categories were very decent. These scores included visual display aspects, audio-visual quality, and editing techniques. In general, videos are considered to have clear visual and good audio quality so that they support the demonstration process. Nevertheless, in the editing aspect there are still opportunities for improvement, especially in the transition and visual emphasis sections.

Table 5. Student Test Results

Group	Percentage	Category
Small	89%	Very Good
Medium	90%	Very Good
Large	91%	Very Good
Total	**90%**	**Very Good**

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The test results for students also showed a very positive response. In small groups 89%, in medium groups 90%, and in large groups 91%, all of which fall into excellent categories. An increase in scores in each group indicates that the developed media is capable of providing a consistent and effective learning experience.

The effectiveness was analyzed through several statistical stages: the improvement in student mastery was measured using the N-Gain formula.

Tabel 6. Learning Improvement and N-Gain Results

Measurement	Pre-test	Post-test	N-Gain Score	Category
Mean Score	65	85	**0,57**	**Medium**
Pass Rate ≤ 60	40%	10%	-	-

Based on the table above, there was an increase in student learning outcomes, as indicated by an increase in the average score from 65 to 85, a difference of 20 points. This is reinforced by the N-Gain value of 0.57, which is in the moderate category, indicating that the learning media is quite effective in improving student understanding.

The high validation results indicate that the media meets the quality standards for content and learning design. This aligns with research by Zhang et al. (2006), which states that systematically designed video-based learning media can improve student comprehension because they present information in a structured and visual manner. From the perspective of active learning theory, the developed media allows students to engage directly in the learning process through observation and analysis. This is supported by research by Freeman et al. (2014), which shows that active learning significantly improves learning outcomes compared to traditional methods.

Furthermore, based on Richard E. Mayer's (2009) theory of multimedia cognitive learning, the combination of visuals and audio in video tutorials can optimize students' cognitive processes through dual-channel processing, thereby enhancing material comprehension more effectively.

Figure 1 shows the initial cover of the video tutorial on curling designs as a learning medium.

Figure 1. cover of the video tutorial on curling designs

Figure 2 shows the results of parting hair using the mesh-to-mesh technique as one of the stages in curling a design. The systematic and structured parting pattern is clearly visible, which serves to ensure uniformity of the curling results. This stage is an important part of the

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active learning-based video tutorial being developed, as it allows students to visually observe, analyze the parting pattern, and practice independently.

Figure 2. Mesh-a-Mesh Hair Parting Results

Figure 3 shows the results of the hair rolling (rotto) process using the mesh-to-mesh curling technique, carried out systematically and evenly. The structured placement of the rotto reflects the students' understanding of the work procedures learned through active learning-based video tutorials.

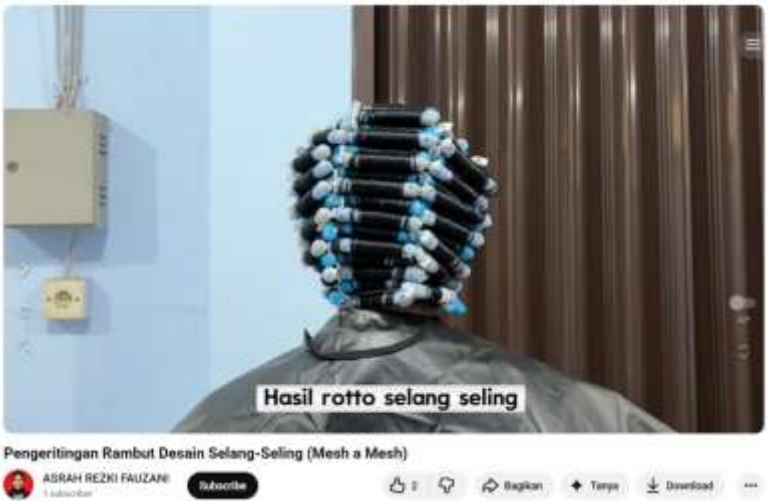

Figure 3. Results of the rotto process in the mesh-to-mesh curling technique

Figure 4 shows the final result of hair curling using the mesh-to-mesh technique after the entire parting and rolling process was completed. The curling results appear even and form a structured wave pattern, reflecting the students' success in systematically applying the work procedures.

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Figure 4. Final Result of Mesh-a-Mesh Hair Curling Technique

This stage is the result of active learning, where students not only observe the process through video tutorials but also analyze and practice the techniques independently. The consistency of the curling results indicates that the students have a good understanding of the work steps.

Discussion

The high level of media feasibility indicates that the developed video tutorial meets the requirements for material quality and media presentation. However, beyond feasibility, the effectiveness of this media can be explained through theoretical and empirical approaches. First, from the perspective of active learning theory, the integration of activities such as observing, analyzing, and practicing allows students to be directly involved in the learning process. Unlike conventional demonstration methods, which tend to position students as passive observers, the developed video tutorial media encourages active student involvement in constructing their own understanding.

Second, the findings of this study can be explained through Richard E. Mayer's (2009) multimedia theory, which states that the combination of visual and audio elements can enhance cognitive processes. The developed video tutorial presents visual demonstrations combined with verbal explanations, helping students understand the procedural steps in curling designs more effectively. This explains the improvement in student learning outcomes, as seen in the increase in posttest scores. The high feasibility score (90.29%) is also influenced by the flexibility of video media, which allows students to review the learning material independently. This ability to re-access material is an advantage over direct demonstration methods, especially in learning complex skills such as curling mesh-a-mesh designs.

Meanwhile, the effectiveness results, with an N-Gain value of 0.57, which falls into the moderate category, indicate that this media is quite effective in improving learning outcomes, although there is still room for further development. This value may be influenced by differences in students' initial abilities and limited time for implementing the learning. These results align with previous research. Nugroho et al. (2021) stated that the use of video tutorials can improve learning outcomes compared to conventional methods. Furthermore, Masruri (2024) found that integrating active learning into learning media can increase student engagement and performance. However, this study provides a novel contribution by integrating

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an active learning approach into video tutorials in the field of cosmetology education, specifically on mesh-a-mesh design curling techniques.

Overall, the results indicate that the combination of active learning and multimedia-based media contributes to improved student learning outcomes. The high level of feasibility and effectiveness of the media is due not only to its format but also to the integration of pedagogical principles that support student-centered learning.

Conclusion

Based on the results of the research and development process, it can be concluded that the active learning-based video tutorial for *mesh-a-mesh* hair curling design developed using the ADDIE model is feasible and practical for use in the learning process. This is supported by the validation results, which showed that the material expert evaluation reached 92% and the media expert evaluation reached 88%, both categorized as very feasible. Furthermore, the student trial yielded an average score of 90.29%, categorized as very good. Improved learning outcomes, as indicated by an N-Gain score of 0.57 (moderate category) and an increase in the pass rate from 60% to 90%, further demonstrate that the developed media supports students' understanding and practical skills. The findings of this study imply that active learning-based video tutorials are highly relevant for vocational education, particularly in skills-based learning. This type of media can serve as an alternative learning tool that encourages independent learning, flexible access to materials, and active student engagement.

Therefore, the development of technology-based learning media, such as video tutorials, can contribute to improving the quality of practical learning in vocational education, particularly in the field of cosmetology.

Recommendation

Based on the results of this study, several recommendations can be put forward for further research. First, future research is recommended to develop video tutorials based on active and interactive learning, for example by adding quizzes, simulations, or direct feedback to increase student engagement. This is important considering that the N-Gain results obtained are still in the moderate category (0.57), so innovation is needed to increase learning effectiveness to a higher category. Second, future research could use an experimental design involving a control group to compare the effectiveness of video tutorials with conventional learning methods more comprehensively. Furthermore, the scope of research subjects could be discussed to ensure a higher level of generalizability of the results.

Third, the development of learning media could be directed towards integrating more sophisticated technologies, such as e-learning, mobile learning, or augmented reality, to support more flexible and contextual learning practices in vocational education. Several constraints in this research that need to be considered are limited learning time, which hinders optimal media use, and differences in students' initial abilities, which can impact learning outcomes. Furthermore, the video media developed is still one-way and not fully interactive, resulting in less than optimal student interaction. Taking these things into consideration, further research is expected to overcome existing limitations and develop more innovative learning media to improve the quality of learning, especially in skills-based vocational education.

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