

Development of Interactive Multimedia Using Articulate Storyline 3 to Enhance Learning Outcomes in Creative Fabric Lessons at a Vocational High School

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Abstract

This study aimed to develop interactive multimedia based on Articulate Storyline 3 and to test its feasibility, practicality, and effectiveness in teaching Creative Fabric to students in the Fashion Design Expertise Program at SMK Negeri 1 Purwodadi. The research method employed was Research and Development (R&D) using the ADDIE development model, which comprises five stages: Analysis, Design, Development, Implementation, and Evaluation. The experimental research design used was a Pretest-Posttest Control Group Design, involving 60 11th-grade students divided into an experimental and a control class. The results showed that the developed interactive multimedia had a very high feasibility level, with 92.27% approval from media experts and 87.69% approval from material experts. The practicality test conducted by 10 teachers yielded a score of 86.94%, which falls into the "Practical" category. In terms of effectiveness, student learning outcomes in the experimental class showed significant improvement, with an average pretest score of 72.00 and a posttest score of 91.73. In contrast, the control class showed a pretest score of 65.87 and a posttest score of 79.20. The average N-Gain score in the experimental class was 0.7204 (categorized as "very effective"), while the average score in the control class was 0.3459 (categorized as "fairly effective"). A T-test analysis of the N-Gain scores yielded a significance value of 0.000 ($p < 0.05$), indicating a significant difference between student learning outcomes in the experimental and control classes. Thus, interactive multimedia based on Articulate Storyline 3 has proven to be feasible, practical, and effective in improving student learning outcomes in the Creative Fabric subject within vocational education.

Keywords: Interactive Multimedia, Articulate Storyline 3, Vocational Education, Learning Achievement, Creative Fabric Subject

INTRODUCTION

Education is crucial in developing superior, high-quality, and competitive human resources. Law of the Republic of Indonesia Number 20 of 2003 concerning the National Education System explains that educational development aims to develop students' potential to become faithful, pious, noble characters, capable, creative, and independent. Keeping pace with changing times and societal needs, reforms in the education system are imperative, particularly in adapting the learning process to the challenges of the digital era. Information and communication technology development has presented significant opportunities to integrate technology into education, including the development of more innovative and interactive learning media.

Technological developments in learning are supported by Government Regulation of the Republic of Indonesia Number 57 of 2021 concerning National Education Standards. In section four of the process standards, Article 12, paragraph (1) outlines that learning must occur in a learning environment that is interactive, inspiring, challenging, and able to motivate students to participate actively. Furthermore, this approach provides adequate space for effort, creativity, and independence based on students' talents, interests, and physical and psychological development. Then, in paragraph (2), educators implement this by providing role models, mentoring, and facilities. In this case, facilitating the implementation of learning is the role of educators as facilitators to achieve quality learning (Batubara, 2020). One approach currently being widely developed is interactive multimedia, which combines various visual and audio elements to convey material in an interesting and easy-to-understand way. According to Batubara (2020), learning media consists of three main stages, namely the use of image media (visual), sound (audio), and sound and images (audiovisual). Interactive multimedia combines text, images, sound, animation, and video packaged into a

learning system that allows direct interaction between users and the material (Ariyanto et al., 2020). It is a non-linear form of media, allowing students the freedom to determine the learning flow according to their preferences and learning pace (Indrawan et al., 2020). The benefits of using interactive multimedia include increasing student engagement through interactive simulations and supporting learning adaptations to individual learning styles (Ariyanto et al., 2020).

Vocational High Schools are formal education programs that prepare graduates to enter the workforce or continue their education to a higher level. During the learning process, students are equipped with theory and conceptual understanding and trained to develop technical and practical skills aligned with current industry needs (Nidaur Rohmah, 2017). One of the vocational high school expertise programs is Fashion Design. SMK Negeri 1 Purwodadi implements the independent curriculum in its learning process. The independent curriculum has diverse intracurricular learning, where content is optimized to provide students with sufficient time to deepen concepts and strengthen competencies (Ministry of Education, Culture, Research, and Technology, 2022). The Creative Fabric subject, implemented in Phase F, focuses on the Textile Experiment element. However, the learning process is still conducted conventionally using teaching modules and simple PowerPoint presentations, which do not support comprehensive mastery of the material, particularly in understanding *ecoprint* techniques.

Based on observations and interviews with teachers and the head of the Fashion Design expertise program, it was discovered that of the 71 eleventh-grade students, 50 (73.24%) had met the Learning Objective Achievement Criteria. To improve students' cognitive understanding, interactive learning media are needed. However, an identified obstacle is the lack of digital learning media based on Articulate Storyline 3 that supports interactive *ecoprint* technique material. Current *ecoprint* technique instruction remains conventional and does not utilize technology optimally. The current learning media used are simple teaching modules and PowerPoint presentations. Articulate Storyline 3 was chosen for its ability to produce interactive, adaptive, and engaging learning media. Compared to other media like PowerPoint or Canva, Articulate Storyline 3 offers more comprehensive interactive features, such as quizzes, drag-and-drop, simulations, and branching scenarios, enabling students to learn actively and independently. The results of this media development can be accessed through various devices because it is HTML5-based and compatible with the Learning Management System (LMS) through the SCORM format. This study developed interactive multimedia based on Articulate Storyline 3, which includes material on *ecoprint* t-shirt techniques. This material was chosen because it had never been taught at SMK Negeri 1 Purwodadi, while previous material was limited to *ecoprinting* on fabric. The addition of *ecoprinting* on t-shirts is expected to broaden students' insights and skills in creative and contextual textile processing. The focus of this multimedia development covers all cognitive aspects according to Bloom's Taxonomy, from C1 (remembering) to C6 (creating), to optimize learning outcomes (Nafiati, 2021).

This study aims to (1) Develop interactive multimedia based on Articulate Storyline 3 for the Creative Fabric subject for students in the Fashion Design expertise program; (2) Analyze the feasibility of interactive multimedia based on Articulate Storyline 3 for the Creative Fabric subject for students in the Fashion Design expertise program; (3) Analyze the practicality of interactive multimedia based on Articulate Storyline 3 for the Creative Fabric subject for students in the Fashion Design expertise program; and (4) Analyze the effectiveness of interactive multimedia based on Articulate Storyline 3 in the Creative Fabric subject for students in the Fashion Design expertise program. Thus, developing interactive multimedia based on Articulate Storyline 3 is a strategic step to answer the need for interactive and cognitive learning of *ecoprint* techniques in the Fashion Design expertise program. This research is expected to contribute to improving the quality of learning and learning outcomes of students in the Creative Fabric subject at SMK Negeri 1 Purwodadi.

METHODS

This research used the Research and Development (R&D) method. Research and Development (R&D) is a method that can be used to produce a specific product or to test its effectiveness (Sugiyono, 2020). In this study, the research and development (R&D) method assists in creating a product. The product developed in this study is interactive multimedia based on Articulate Storyline 3 for the Creative Fabric subject. The development model chosen in this study is the ADDIE model, which uses simple and systematic steps to develop learning. Purba et al. (2021) state that the ADDIE model is a valid learning design model for all types of education, yet ADDIE encompasses all other design models. The ADDIE development model comprises five stages: Analysis, Design, Development, Implementation, and Evaluation (Sugiyono, 2020).

RESULTS AND DISCUSSION

Result

Analysis Results


The initial stage of this research is the analysis stage, where the main activity is to identify the needs and problems in the learning process before developing new media. At this stage, an analysis of learning media needs is carried out through observation. The observation aims to determine the learning media needed in the learning process of creative fabric subjects. The results of the analysis found before using interactive multimedia are in (1) Needs analysis, the *ecoprint* technique learning process at SMK Negeri 1 Purwodadi still relies on teaching modules that are only used by teachers as a supplement to teaching materials, while students do not have them. Other learning media used are PowerPoint presentations that are dominated by text and have poor image and video quality, causing students to feel bored and have difficulty understanding the *ecoprint* technique material. (2) Problem Analysis: Students lack interactive learning media based on digital devices such as laptops and smartphones, so the development of learning media in interactive multimedia is needed to improve learning outcomes in creative fabric subjects.

The analysis results obtained after using interactive multimedia include: (1) Needs Analysis: Learning becomes more engaging because this media covers the entire *ecoprint* technique material, from the definition, types of plants and fabrics used, to the manufacturing procedure. Using animation, images, video, and sound in this multimedia can increase student interest in learning, active participation, and motivation. (2) Problem Analysis: Students can access the material anytime and anywhere via laptop or smartphone, thus supporting better understanding and problem-solving skills related to the *ecoprint* technique material, which can improve student learning outcomes in the *ecoprint* technique material. Based on the analysis results, interactive learning media are needed, allowing students to access the material anytime and anywhere via a laptop or smartphone. Therefore, developing interactive multimedia-based learning media is crucial to improving learning outcomes, especially in the *ecoprint* technique material in the Fashion Design expertise program at SMK Negeri 1 Purwodadi. In this study, the development of interactive multimedia used Articulate Storyline 3.

Design

The next stage of this research is the design stage. In this research, media design aims to design interactive multimedia to create interactive and interesting learning for students. This multimedia will include the definition of *ecoprint*, types and parts of plants used, types of fabrics used, tools and materials used, and procedures for making *ecoprint* t-shirts. The initial display contains a menu for inputting student identity. The main menu in this interactive multimedia includes instructions for using multimedia, an introduction (containing indicators of subject learning outcomes, element learning outcomes, and learning objectives), learning materials, learning evaluations, and developer profiles. This design will be used as a learning medium in interactive multimedia to improve learning outcomes in *ecoprint* technique materials. The following table shows the interactive multimedia display design:

Table 1. Interactive Multimedia Display Design

No	Display	Description
1.	<div>Cover</div> 	When opening the application, a media introduction video containing the UNNES logo and the title of the learning material appears.

No	Display	Description
2.	<p>Initial View</p> 	At the start of the application, users are asked to enter a name. If they do not enter a name, they cannot access the learning media. Once they enter a name, they can press the ENTER button to access the Main Menu.
3.	<p>Main Menu</p> 	The Main Menu scene contains four menus: introduction, materials, evaluation, and profile.
4.	<p>Module Usage</p> 	The Module Usage scene explains how to use the learning module to help students easily use the interactive multimedia.
5.	<p>Introduction</p> 	The Introduction Menu scene contains Subject Learning Achievements, Element Learning Achievements, and Learning Objectives. The next Introduction scene contains a brief explanation of the learning media.
6.	<p>Materials</p> 	In the Material Menu scene, clicking the Material button will take you to the lesson materials menu. This scene contains five materials.
7.	<p>Evaluation</p> 	Clicking the Evaluation button in the Evaluation Menu scene will take you to the Evaluation menu. This scene contains 25 cognitive multiple-choice questions.
8.	<p>Profile</p> 	Clicking the profile button in the Profile Menu scene will take you to the profile menu, which contains the interactive multimedia developer profile.

Development Results

After the interactive multimedia product based on *ecoprint* techniques was developed, the next step

was to test the product's feasibility with material experts and media experts. The feasibility test was also conducted using multiple-choice test instruments. The steps are as follows:

a) Media Expert Feasibility Test Results

The media expert feasibility test was conducted by three media experts: a lecturer from Universitas Negeri Semarang and a Visual Communication Design (DKV) teacher from SMK Negeri 1 Purwodadi. The media experts were selected based on their competencies in learning media development. Based on the product's feasibility test results, the three media experts obtained a total score of 346 out of a maximum score of 375. The total score was divided by the maximum score and then multiplied by 100% to obtain a percentage score of 92.27%. This result falls within the "Very Feasible" criteria because it meets the feasibility criteria.

b) Results of the Material Expert Feasibility Test

The material expert feasibility test was conducted by three experts: lecturers from Universitas Negeri Semarang, *ecoprint* artisans from *Shifia* Store, and a fashion design teacher from SMK Negeri 1 Purwodadi. The material experts were selected based on the three experts' competencies in fashion design, specifically in *ecoprint* techniques. Based on the product feasibility test results, the three material experts obtained a score of 171 out of a maximum of 195. The total score obtained was divided by the maximum score and then multiplied by 100%, resulting in a percentage value of 87.69%. This result falls within the "Very Feasible" criteria because it meets the feasibility criteria.

c) Practicality Results of Interactive Multimedia

Data on the practicality of the media for the developed product were obtained from a questionnaire completed by practitioners or teachers. Thirty respondents had used interactive multimedia learning media for *ecoprint* techniques. The practicality calculation for interactive multimedia yielded a score of 86.94%, which qualifies it as "Practical" as a learning medium.

d) Results of the Multiple-Choice Test Instrument Feasibility Test

The feasibility test for the multiple-choice test instrument was conducted before the pretest and posttest. The feasibility test included several tests: validity, reliability, item difficulty, discriminatory power, and distractor effectiveness. Validity testing aimed to determine the validity of each item being tested. Reliability testing aimed to determine the consistency of the test instrument through the pretest and posttest. Analysis of the item difficulty level determined whether the item was easy or difficult. Discriminatory power is the ability of an item to differentiate between high-achieving and low-achieving students. Distractor effectiveness also determined whether distractor answers were functional.

The analysis of 40 multiple-choice test items revealed that 25 were valid and 15 were invalid. Based on these results, the decision was made to use the 25 multiple-choice items for the pre- and posttest implementation phases. Reliability testing was conducted after the validity test results were obtained. The reliability test using SPSS yielded a value of 0.927. Based on the difficulty level test results above, there were eight easy and 32 medium questions. Based on the discrimination power test results above, there were 15 poor, three fair, and 22 good questions. Based on the effectiveness results above, there were 15 rejected and 25 accepted questions.

Implementation

At this stage is the field application stage, by applying the interactive multimedia *ecoprint* technique is applied, and the material is used as a learning medium in the Creative Fabric subject. In the field application, it is done by giving pretest and posttest questions. Pretest and posttest questions are given to class XI students of the Fashion Design expertise program at SMK Negeri 1 Purwodadi, totaling 30 students for the control group and 30 students for experimental classes. Based on the results of the average pretest score of 68.9, with a minimum score of 32 and a maximum score of 88. The average posttest score is 83.0, with a minimum score of 60 and a maximum score of 100.

Evaluation

The evaluation stage provides feedback to product users, allowing revisions based on the evaluation results or any needs that the product has not yet met (Sugiyono, 2020). It is also used to determine the effectiveness of interactive multimedia. Several tests are used to determine this effectiveness, including the normality, homogeneity, N-Gain, and N-Gain T tests. The normality test in this study used the Kolmogorov-Smirnov (K-S) test (Ghozali, 2018). The results of the Kolmogorov-Smirnov normality test obtained from data processing using SPSS yielded a significant result. 0.146, sig. 0.092, sig. 0.116, and sig. 0.082. All four values have a significance level >0.05 , indicating that the residuals are normally distributed.

Data is considered homogeneous if the significance level is >0.050 (Ghozali, 2018). Based on Table 4.15, the homogeneity significance value is read in the "based on mean" row, which is 0.105. A significance value of $0.105 > 0.050$ indicates a homogeneous data distribution. The requirements for parametric statistics are met because the data are normally distributed and the variance is homogeneous. Based on the results of

the N-Gain test using SPSS, the average N-Gain value in the experimental class was 0.7204, and the average N-Gain value in the control class was 0.3459. Based on the N-Gain classification, the average N-Gain value in the experimental class falls into the "Very Effective" category. In contrast, the average N-Gain value in the control class falls into the "Quite Effective" category.

Based on the results of the N-Gain T test, it is known that the significance value of Levene's Test for Equality of Variances is $0.850 > 0.05$, so it can be concluded that the variance of the N-Gain data (%) between the experimental class and the control class is homogeneous. Thus, the independent sample t-test for the n-gain score is guided by the Sig. Value is found in the assumed table for equal variances. Based on the Independent Samples Test table, the Sig. Value (2-tailed) is $0.000 < 0.05$. This shows that there is a significant difference between the N-Gain scores of the two groups. Thus, there is a real difference in effectiveness between student learning outcomes before and after using interactive multimedia, which is indicated by a significant difference in N-Gain scores between the control and experimental groups.

Discussion

Interactive Multimedia Development

This research uses the R&D (Research and Development) development method with the ADDIE development model, namely Analyze, Design, Development, Implementation, and Evaluation. This research aims to develop interactive multimedia-based learning media using Articulate Storyline 3 that can support the learning process more interestingly and effectively. The development of interactive multimedia-based learning media using Articulate Storyline 3 by creating a script in the form of a presentation of material and practice questions, creating a storyboard, preparing media assets in the form of backgrounds, animations, images, videos, sounds, and navigation icons. Then the script and media assets are inserted into several slides according to the titles contained in the slides that have been provided. After the product is finished being produced, validation is carried out to determine the feasibility of the product. Validation is carried out with three expert validators: media and material experts. This validation process encompasses instructional aspects (including display design, learning strategies, and interactivity), display aspects (including display quality), and content aspects (including the suitability of the material to learning objectives, the accuracy of the content, and evaluation) (Surjono, 2017).

This research also aligns with research conducted by Adelia & Wandini (2023) on the development of interactive multimedia based on Articulate Storyline 3 using the ADDIE (Analysis, Design, Development, Implementation, Evaluation) development model. The interactive multimedia developed incorporates text, visuals, and sound into the interactive multimedia design, enabling content creators to arouse media users' curiosity and make the content more relevant. This also supports the theory, according to Astuti et al. (2019), that the use of interactive learning media creates an engaging learning environment, which contributes to students' cognitive development and encourages their active involvement in all stages of learning. Media development with Articulate Storyline can effectively convey learning material while making it easier for users to operate and engaging students' attention (Husna & Fajar, 2022).

Interactive Multimedia Feasibility

Based on the interactive multimedia development results using the ecoprint technique, the result was "Very Feasible." This assessment was obtained from interactive multimedia feasibility testing conducted by media and material experts. The interactive multimedia demonstrated an average media feasibility rating of 92.27%, indicating a "Very Feasible" category for use. Meanwhile, the material feasibility rating averaged 87.69%, indicating a "Very Feasible" category. This interactive multimedia was deemed highly feasible because it met several aspects, including instructional aspects (including display design, learning strategies, and interactivity), display aspects (including display quality), and content aspects (including the suitability of the material to learning objectives, the accuracy of the content, and evaluation) (Surjono, 2017). This interactive multimedia met the criteria, as the interactive multimedia assessment results obtained a score of 214 out of a maximum of 225 for the instructional aspect, a score of 132 out of a maximum of 150 for the display aspect, and a score of 171 out of a maximum of 195 for the content aspect.

The interactive learning media based on Articulate Storyline 3 developed in this study was deemed "Very Feasible" regarding both media and materials. From a media perspective, feasibility is supported by the fulfillment of the characteristics of interactive multimedia according to Ariyanto et al. (2020) and Rho & Kang (2019): having audio-visual components, being interactive, independent, and allowing students to control the learning flow according to their needs. This media meets the criteria of an attractive display, easy-to-understand navigation, and interactivity that encourages active student participation. Regarding materials, relevant, contextual, and appropriate content supports the media's feasibility. The material developed, namely ecoprint t-shirt making techniques, has never been taught before, thus providing novelty and broadening students' horizons. The suitability of this media is further supported by Dale's (1969) Cone

of Experience theory, which emphasizes the importance of concrete learning experiences. This is further supported by Indrawan et al.'s (2020) theory of interactive multimedia, which demonstrates the effectiveness of combining text and visuals in enhancing understanding. Therefore, in terms of both media and materials, the development of this interactive multimedia is considered "Very Suitable" for use in the learning process, particularly in creative fabric subjects in vocational schools.

This research also aligns with Anita Azmi et al. (2020), which states that using interactive multimedia in learning can help students develop critical thinking skills. Interactive multimedia can encourage students to be more active in learning, increase their cognitive engagement, and help them understand the material more deeply. Munir (2012) underscores the importance of interactive multimedia in education, demonstrating that this medium can assist learning. By using various interactive multimedia elements, teachers can cater to the various learning styles of students, enabling each student to learn in a way that best suits them.

Practicality of Interactive Multimedia

Based on the results of the practicality assessment of interactive multimedia on ecoprinting techniques given to 10 practicing teachers who have used interactive multimedia, the percentage score was 86.94%, which falls into the "Practical" category for use as a learning medium. This practicality assessment encompasses several aspects, including usefulness and attractiveness, ease of use and independence, and material suitability (Arikunto, 2013). This aligns with Kumalasani's (2018) opinion that a developed product is practical if implemented in the field and generates a positive user response.

The practicality of interactive multimedia will determine its usability. This aligns with Akker et al. (2012), who stated that practicality is a criterion for the quality of learning tools, assessed by the ease with which teachers and students can use the developed learning tools. Multimedia is considered practical if it is easy for teachers and students to use and increases motivation in learning. This aligns with previous research by Kifron (2024), which found that learning media that includes videos, images, and audio don't quickly become boring and can increase students' enthusiasm for learning, thus making them practical. In this context, interactive multimedia functions as a visual aid and a means to simplify material delivery, save time, and encourage student learning independence. Therefore, practicality is seen not only from a technical perspective but also from the effectiveness of media use in efficiently and enjoyably supporting the achievement of learning objectives efficiently and enjoyably.

This research also aligns with research conducted by Arsyad (2019), who stated that practical learning media are easy to use and do not require complicated technical and content procedures. This practicality encompasses several important aspects, namely ease of access, simplicity of operation, flexibility in use, and efficiency in terms of time and resources. This aligns with the opinion of Sadiman et al. (2011), who stated that the practicality of media lies not only in its theoretical function but also in its ease of use, efficiency, and suitability to real-world needs and conditions.

Effectiveness of Interactive Multimedia

Based on the learning evaluation results, interactive multimedia based on Articulate Storyline 3 in *ecoprint* technique material for Fashion Design students was declared "Effective." This interactive multimedia was deemed effective because there was a difference in the average pretest and posttest scores. The experimental class had an average pretest score of 72.00 and a posttest score of 91.73, while the control class had an average pretest score of 65.87 and a posttest score of 79.20. A T-test for the N-Gain Score yielded a significance value of 0.000, concluding a significant (real) difference in effectiveness between the learning outcomes in the pretest and posttest data. The improvement in learning outcomes in the experimental class was categorized as "Very Effective" with an N-Gain score of 0.7204. According to Widikda et al. (2013), the effectiveness of the interactive learning media can be seen in the students' cognitive learning outcomes. This aligns with the findings of Ibrahim & Suardiman (2014), who highlighted the positive influence of interactive multimedia on student learning motivation. Intrinsic motivation theory also emphasizes the importance of active student involvement in learning (Falah & Arsana, 2023). The interactive multimedia approach, by integrating elements such as text, images, video, animation, and sound, elevates learning to a more engaging and effective level. This contribution was recognized by Cheong et al. (2014), who emphasized that using interactive multimedia learning media can increase student engagement and strengthen their understanding of the learning material.

This research aligns with the results of research conducted by Rahman (2021), which showed that the use of interactive multimedia learning media significantly improved student conceptual understanding and academic achievement. Similarly, research conducted by Huang (2019) stated that application-based interactive multimedia can increase student motivation and engagement, and help overcome difficulties in understanding certain concepts. Furthermore, research conducted by Zhang et al. (2022) stated that

interactive multimedia improves overall student learning outcomes and enhances long-term information retention and problem-solving skills. Research conducted by Suryanti (2021) added that using interactive multimedia learning media helps students better understand the subject matter and improves their ability to apply these concepts in relevant contexts. Furthermore, research conducted by Surjono (2017) revealed that interactive multimedia provides a dynamic and enjoyable learning experience for students, improving their learning motivation and academic outcomes. Thus, these various studies confirm that interactive multimedia learning media has proven effective in improving student learning outcomes.

CONCLUSION

Based on the results of this study, it can be concluded that (1) The development of this media produces a product in the form of interactive multimedia based on Articulate Storyline 3 in the Creative Fabric subject for students in the Fashion Design expertise program. This interactive multimedia was developed by adopting the ADDIE development model: Analyze, Design, Development, Implementation, and Evaluation. After the product was finished being produced, validation was carried out to determine the feasibility of the product. (2) The results of the feasibility assessment of learning media using interactive multimedia based on Articulate Storyline 3 in the Creative Fabric subject that was developed were declared "Very Feasible" to be used as a learning medium. The total score obtained from media experts was 92.27%, with the category "Very Feasible". Furthermore, based on the total score obtained from material experts, the percentage value obtained was 87.69% with the category "Very Feasible". (3) The results of the practicality assessment of learning media using interactive multimedia based on Articulate Storyline 3 in the Creative Fabric subject, given to 10 practicing teachers who have used the multimedia, obtained a percentage value of 86.27% which is included in the "Practical" category for use as learning media. (4) The results of the learning evaluation that the use of interactive multimedia based on Articulate Storyline 3 in the Creative Fabric subject for students in the Fashion Design expertise program were declared "Effective". It is considered effective because there is a difference in the average pretest and posttest scores, namely, in the experimental class, the average pretest score was 72.00, and the posttest score was 91.73, while in the control class, the average pretest score was 65.87, and the posttest score was 79.20. In the T test for the N-Gain Score, a significance value of 0.000 was obtained. There is a real difference in effectiveness between student learning outcomes before and after using interactive multimedia, which is indicated by a significant difference in N-Gain scores between the control and experimental groups. The results of the increase in learning achievement in the experimental class were categorized as a "Very Effective" increase with an N-Gain value of 0.7204.

ACKNOWLEDGEMENT

The researcher would like to thank the entire extended family of SMK Negeri 1 Purwodadi, the supervising lecturer, and all lecturers of the Vocational Education Study Program, Postgraduate, Universitas Negeri Semarang.

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