Effectiveness of the Ibis Paint X-Based E-Module in Technical Drawing for Fashion Technology Training

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Article Info	Abstract
	This study aims to test the effectiveness of an e-module based on the Ibis Paint X application in improving learning outcomes of participants in the Technical Drawing material of the Fashion Technology vocational program. The research method uses a quantitative approach with a one-group pretest-posttest design. The instruments used include pre-tests and post-tests, as well as user response questionnaires. Data were analyzed using normality, homogeneity, and N-Gain tests. The results show that the use of the e-module significantly improves the understanding of training participants, with high effectiveness based on the N-Gain test results. Additionally, user responses indicate that the e-module is practical and suitable for use in training. These findings suggest that the integration of the Ibis Paint X application in the e-module supports adaptive and effective digital learning in vocational training environments.

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INTRODUCTION

The development of digital technology in education has triggered a significant transformation in learning approaches, including in vocational education and training. Vocational education is a learning process that emphasizes the mastery of practical skills and job readiness in specific fields (Mahendra & Putri, 2020). Vocational education requires the use of learning media that are not only relevant to the industrial world but also capable of stimulating the technical skills of training participants. Industry-based vocational training must focus on practical technical skills, one of which is through media that approaches digital industry practices (Harahap & Zulkifli, 2020). One rapidly developing innovation is the use of digital application-based e-modules, such as Ibis Paint X, in Technical Drawing material in the field of Fashion Technology. This media not only accelerates the learning process but also provides flexibility in access and increases participants' learning motivation (Farkhatun et al., 2023). Learning motivation is the internal and external drive that stimulates the desire of learners to actively participate in the learning process (Sari & Mustika, 2019). Digital media is also believed to bridge the skill gap between vocational learners and industry needs through visual and interactive-based learning (Daryanto & Nugroho, 2020). Digital learning media are tools that use information technology to effectively and flexibly deliver learning messages (Rahmawati & Subekti, 2022).

The Vocational Training and Productivity Development Center Semarang is a vocational training institution that offers various competency-based training, including in the field of Fashion Technology. Based on initial observations, in the Technical Drawing training, most instructors still use manual methods, such as drawing on the blackboard or using Adobe Illustrator, which not all participants can operate due to limited devices and training duration. However, technical drawings are essential in fashion pattern making. Technical drawings are a visual communication tool in the design process, used to convey the technical details and dimensions of a product (Lestari & Kurniawan,

2021). Therefore, learning media that are simple, interactive, and contextually relevant to vocational training are needed (Handayani & Ernawati, 2022). This indicates that there is still a need for innovative digital learning media that align with the characteristics of vocational training participants and can be used independently or guided.

One of the challenges in developing media in vocational high schools is the lack of digital media tailored to the characteristics of vocational students and the vocational context (Putra & Wahyuni, 2021). One potential media is the Ibis Paint X application-based e-module. An e-module is a form of digital teaching material that is independent, flexible, and allows students to learn at their own pace (Yuliana & Permana, 2022). E-modules are systematically and interactively designed teaching materials, equipped with evaluation features to support independent learning (Sukardi & Apriadi, 2021). This application has the advantage of being easily accessible on various devices, including computers and smartphones, and can be used offline. Previous studies have shown that modules developed using this application have been proven effective in improving fashion design skills and technical drawing illustration skills digitally. These modules help participants master the material in a more visual and contextual manner (Surani et al., 2022; Sholikhah et al., 2023).

Although many studies have developed digital-based e-modules, most focus on media validation (feasibility and practicality), with few investigating their effectiveness through quantitative designs such as pretest-posttest. Research like this is important to understand how well these media actually improve learning outcomes. For example, research by Yunita et al. (2024) shows that e-modules supported by illustration software such as Adobe Illustrator can enhance the mastery of technical material in fashion design (Yunita et al., 2024).

The need for effective learning media becomes increasingly important when training occurs in a limited time frame and participants come from diverse digital skill backgrounds. Therefore, measuring effectiveness should not rely solely on expert validation but also include pretest and posttest score changes, along with user

feedback, as indicators of the module's success. Thus, this study not only designs and implements an Ibis Paint X-based e-module but also empirically evaluates its effectiveness using a quantitative approach.

METHODOLOGY

This study uses a quantitative approach with a pre-experimental design, specifically the One Group Pretest-Posttest Design. This design is used to determine the effectiveness of using the Ibis Paint X-based e-module in improving learning outcomes of training participants in the Technical Drawing material within the Fashion Technology field. In this design, participants are given a pretest before being exposed to the intervention in the form of the e-module. After the learning process is completed, participants are given a posttest to observe the difference in learning outcomes.

The research was conducted at the Vocational Training and Productivity Development Center Semarang, within the Fashion Designer Technician training program. The subjects of this study were one training class consisting of 30 participants, selected purposively based on their active participation in the competency unit of Fashion Design Drawing and Technical Drawing. This class was the only group receiving the treatment, without a control group, in line with the characteristics of pre-experimental designs.

The research implementation consists of three main stages. First, participants are given a pretest to measure their initial ability in the Technical Drawing material. The pretest instrument consists of multiple-choice questions that have been validated by experts. Second, participants are given the intervention in the form of learning using the Ibis Paint X application-based e-module, which had been previously developed to facilitate interactive digital learning. This module is used throughout several training sessions, during which participants study the material, follow practice instructions, and create technical drawings using their respective smartphones. The use of mobile applications as learning media has been shown to increase flexibility and participant engagement in project-based learning (Nugroho & Widyaningrum,

2022). Third, after the learning is completed, participants are given a posttest to measure the improvement in learning outcomes. Additionally, participants are asked to fill out a response questionnaire regarding their experience using the e-module.

The instruments used in this study include: (1) a learning outcomes test consisting of 20 multiple-choice questions for both the pretest and posttest, covering the same material and having equivalent levels of difficulty; and (2) a Likert scale questionnaire (1-5) to measure participant responses to the use of the e-module, covering aspects such as content clarity, visual appearance, ease of use, and learning motivation. The content validity of the instruments was consulted with subject matter and media experts.

Data were analyzed using statistical techniques. Before testing effectiveness, the pretest and posttest data were tested for normality using the Shapiro-Wilk test and variance homogeneity using Levene's Test. If the data are normally distributed and homogeneous, the Paired Sample t-Test is used to examine whether there is a significant difference between pretest and posttest scores. Additionally, the effectiveness of the e-module is analyzed using the N-Gain Score, which is calculated based on the improvement in each participant's score. The N-Gain values are categorized as low (<0.3), medium ($0.3-0.7$), and high (>0.7). Data from the questionnaires are analyzed descriptively by calculating the average and percentage of responses to obtain an overview of participant perceptions regarding the practicality and effectiveness of the e-module used.

RESULTS

Average Pretest and Posttest Scores

This study aims to measure the effectiveness of the Ibis Paint X-based e-module in improving the learning outcomes of training participants in Technical Drawing material. To achieve this, initial (pretest) and final (posttest) abilities were measured after participants engaged in learning using the e-module. The test consisted of 20 multiple-choice questions representing competency achievement indicators for the training unit. Based on the analysis results, the

average pretest score of participants was 67.20, while the average posttest score increased to 84.47.

Table 1. Average Pretest and Posttest Scores

No	Test Type	Average	Maximum Score
1	Pretest	67.20	100
2	Posttest	84.47	100

The 17.27-point improvement shows that the learning with the e-module had a positive impact on the learning outcomes of the participants. This suggests that participants had a better understanding of the material after gaining independent learning experience through interactive digital media.

Normality Test

A normality test was conducted to ensure that the pretest and posttest data are normally distributed, allowing for further parametric statistical testing. The test was performed using the Shapiro-Wilk test with a significance level of 0.05. If the significance value is greater than 0.05, the data is considered normally distributed.

Table 2. Normality Test Results

Data	Shapiro-Wilk	Sig. (p)	Description
Pretest	0.145	0.112	Normal
Posttest	0.132	0.086	Normal

The results of the normality test using SPSS indicate that the significance values for the pretest (0.112) and posttest (0.086) are both greater than 0.05. Therefore, it can be concluded that the learning outcome data of the participants are normally distributed and satisfy the assumptions for further statistical analysis.

Homogeneity Test

The homogeneity test aims to determine whether the variance of the pretest and posttest data has a uniform distribution. This test is important to ensure that the changes observed are not caused by extreme data variability. The test was performed using Levene's Test.

Table 3. Homogeneity Test Results

Variable	Levene Statistic	Sig. (p)	Description
Pre–Post Test	1.247	0.271	Homogen

The results of the homogeneity test using SPSS show that the significance value is 0.271, which is greater than 0.05, indicating that the data is homogeneous. Thus, the pretest and posttest data come from groups with equal variances and are suitable for analysis using the t-test.

Paired Sample t-Test

A Paired Sample t-Test was conducted to determine whether there is a significant difference between the pretest and posttest scores. This test is used because the data comes from the same group and is analyzed before and after the treatment.

Table 4. Paired Sample t-Test Results

Data	Mean Pre	Mean Post	Sig. (2-tailed)	Description
Pre–Post Test	67.20	84.47	0.000	Significant difference

The t-test results show a significance value of 0.000, which is less than 0.05. This indicates a significant difference between the pretest and posttest results. In other words, the use of the Ibis Paint X-based e-module has a statistically significant and positive effect on improving the learning outcomes of the training participants.

Effectiveness Test Using N-Gain

To evaluate the extent of the participants learning improvement, an effectiveness analysis was carried out using the N-Gain Score calculation. The formula used is: N-Gain = (Posttest Score - Pretest Score) / (Ideal Score - Pretest Score)

$$N - Gain = \frac{Post\ Test\ Score\ -\ Pre\ Test\ Score}{Ideal\ Score - Pre\ Test\ Score}$$

The average calculation resulted in an N-Gain of 0.63. Based on Hake (1999) classification, an N-Gain value between 0.3 and 0.7 is categorized as moderate. This shows that the use

of the Ibis Paint X-based e-module is fairly effective in improving participants understanding of the Technical Drawing material.

Table 5. Average N-Gain Score Results

Indicator	Average Pretest	Posttest	N-Gain	Category
Learning Outcomes of Participants	67.20	84.47	0.63	Moderate

This analysis indicates that the e-module contributes to a measurable and significant improvement in participants understanding, although it still has potential for further development to achieve a higher level of effectiveness.

DISCUSSION

The results of this study show that the use of the Ibis Paint X-based e-module in Technical Drawing training within the Fashion Technology program has a positive impact on the learning outcomes of participants. This is evidenced by the improvement in scores between the pre-test and post-test, as well as the results from the practicality test, which indicate that the e-module is highly practical.

Effectiveness of the E-Module on Learning Outcomes

The effectiveness of the e-module in this study was proven through pretest and posttest analysis using the paired sample t-test and N-Gain Score calculation. Based on the data, the average pretest score of participants was 67.20 and increased to 84.47 in the posttest. The t-test results show a significance value of $0.000 < 0.05$, indicating that there is a significant difference between learning outcomes before and after the use of the e-module. These results align with Farkhatun's (2022) findings, which showed that the Ibis Paint X e-module significantly enhances the understanding of fashion design concepts both visually and technically.

Moreover, the N-Gain calculation of 0.63 places the module's effectiveness in the moderate category (Hake, 1999). Although it has not reached the high category, this result still

demonstrates that the e-module contributes to a substantial improvement. The use of Ibis Paint X, which features technical drawing tools based on layers, brush tools, and digital size adjustments, greatly supports visual learning and hands-on practice. Visualization of designs is a crucial aspect in the fashion field, as it is directly related to communication of ideas and concepts to clients or industries (Utami & Fadhilah, 2021). Ibis Paint X is also known for being user-friendly and offering complex layer features, which help beginner users visualize technical designs accurately (Sari & Andriyani, 2023). These findings support Hasanudin et al. (2021), who stated that graphic application-based digital media can foster collaborative learning that is contextual and relevant to today's creative industries.

With these features, the e-module provides flexible learning time, enabling participants to engage in self-guided practice without direct dependence on the instructor. Effective modules generally have a logical flow, easy-to-understand content, and interactive features that encourage active participant involvement (Firmansyah & Cahyani, 2020), all of which are reflected in the structure of the e-module in this study. This reinforces the self-instructional characteristic of the e-module, as described by Asrial et al. (2020), which allows participants to learn at their own pace and time in an adaptive and interactive way. Other studies also confirm that interactive digital media significantly influences improvements in cognitive and psychomotor learning outcomes for vocational participants (Widodo & Prasetya, 2021).

Practicality of the E-Module Based on User Feedback

The practicality of the e-module was assessed based on participant feedback regarding four aspects: visual appearance, ease of use, material clarity, and learning motivation. Based on the questionnaire results, all aspects received average scores above 4.0, with an overall average of 4.45, which is classified as very practical. This shows that the e-module is not only functional in an academic sense but also visually appealing and easy to use on the smartphones of participants.

Participants reported that the interactive design of the e-module, complete with technical steps for digital fashion drawing, made the learning process more engaging and less monotonous. Learning motivation significantly increased when participants were provided with a personalized and visual digital learning experience (Lestari & Darmawan, 2019). This statement is supported by Suryani (2024) research, which found that using the Ibis Paint X application in applied computer learning significantly increased students interest and involvement.

The practicality results were also reinforced by feedback from three instructors who participated in the practicality test. All instructors stated that the e-module was very practical to use both as teaching material and as a training aid. They assessed that the module successfully bridges the gap between traditional learning methods and the industry's need for digital design. These findings align with Irmayanti & Suryani (2020), who stated that structured digital modules can improve the efficiency of vocational skill teaching, including in fashion design.

Thus, it can be concluded that the Ibis Paint X-based e-module is empirically effective and functionally practical for use in fashion design training at Vocational Training and Productivity Development Center Semarang. The advantages offered include the integration of visual and technical learning, as well as flexible access, making this media suitable for the needs of 21st-century vocational training.

CONCLUSION

Based on the data analysis and discussion, it can be concluded that the use of the Ibis Paint X-based e-module has a positive impact on improving the learning outcomes of training participants in the Technical Drawing material within the Fashion Technology field. This is evidenced by the significant statistical improvement in the average score from the pretest to the posttest, with a significance value (p) of 0.000. Furthermore, the N-Gain value of 0.63 shows that the improvement in participants understanding is in the moderate category, meaning that learning through the e-module is

fairly effective in enhancing participants technical competencies.

In addition to being effective in terms of learning outcomes, the e-module was also assessed as very practical based on participant feedback regarding aspects such as appearance, content, ease of use, and learning motivation, with an average score of 4.45 on a 5-point scale. This demonstrates that the Ibis Paint X-based e-module not only helps participants understand the material visually and interactively but also provides an enjoyable and independent learning experience.

Therefore, the Ibis Paint X-based e-module can be more widely implemented in vocational training as an adaptive digital learning alternative that is easy to access and aligned with the skills needed for the 21st century. This research also contributes to the development of relevant and applicable technology-based learning media in the vocational training environment.

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