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Development of Edutainment-Based Mechanical Engineering Drawing Learning Media Using the Canva Application

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ABSTRACT

Education and learning are developing in accordance with the development of science and technology. The education quality could be improved by changing a conventional learning media into learning media that can increase student motivation so that students can more easily understand the learning material. This research aims to develop and design edutainment-based learning media using the Canva application in the subject of Mechanical Engineering Drawing. The research was carried out using the Research and Development (R&D) method with a 4D development model, which must go through a validation process from experts as a successful process of the feasibility test of the product developed before it is later used by students. This research offers a novelty by integrating specific edutainment elements in the Canva application for Machine Engineering Drawing learning, which has not been explored much in this context before. This innovation creates a more interactive and engaging learning experience, expected to significantly improve material comprehension and retention compared to conventional methods. The results of the feasibility test of edutainment-based mechanical engineering drawing learning media using the Canva application obtained a percentage of 96% from material expert validators, 88% from media expert validators, and 86% from the results of the learning media feasibility test conducted by students. From the results of the test, it can be concluded that Edutainment-Based Mechanical Engineering Drawing Learning Media Using the Canva Application "Very Feasible" is used in the learning process.

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INTRODUCTION

The current learning emphasizes active participation of students in the learning process. This cannot be separated from the need for media to support learning. Currently, educators and students need learning media that can be accessed easily during the learning process. Conventional methods, such as delivering material through lectures in class, tend to make students less interested and motivated to learn. On the other hand, the use of learning media as a support for the learning process

can increase interest, motivation and make it easier for students to understand the material presented by educators (Pamungkas & Koeswanti, 2021).

One learning media that can be applied in the learning process is edutainment-based learning media. Edutainment is a learning media that can increase students' interest and motivation in the learning process. The edutainment concept combines elements of education and entertainment so that it can create an atmosphere in the learning process that is fun and not boring for students (Hoar et al., 2022). Edutainment refers to a teaching method that aims to harmonize learning material and entertainment in a balanced way, so as to make the learning process enjoyable (Putu et al., 2022).

Edutainment learning media can be created through several applications such as Prezi, Focusky, Unity, and Canva. The Canva application is an online graphic design platform that provides various templates and design options for presentations, making posters, profile photos, banners, and so on (Hapsari & Zulherman, 2021). The Canva provides features or uses for education that other apps don't have. Canva is also a creativity and collaboration tool for all classes. The only design platform needed in the classroom to develop creativity and collaborative skills, making visual learning and communication easy and fun (Pelangi, G, 2020). Applying Canva as an application in learning media design can provide convenience and time efficiency for educators, in addition for making it easier to deliver learning material. The Canva application can also make it easier for students to understand lessons, because this application can display various elements such as text, video, animation, audio, images, graphics, artificial intelligence, etc. according to display preferences so that they can helps students to stay focused on the learning material because of its attractive appearance. (Tanjung & Faiza, 2019).

SMK Negeri 1 Cikarang Barat is a state vocational high school located in Bekasi Regency, West Java, which has 8 skill competencies, one of which is Machining Engineering. The Machining Engineering aims to equip students with skills, knowledge and attitudes to be competent, so they can choose a career, compete and develop professional attitudes in the field of Machining Engineering. In implementing the learning process, SMK Negeri 1 Cikarang Barat uses the Kurikulum Merdeka (Independent Curriculum). One of the basic subjects in the Machining Engineering Skills Competency is Mechanical Engineering Drawing. The Mechanical Engineering Drawing subject is a productive subject in the Machining Engineering Skills Competency that must be studied and mastered by the 10^{th} grade. The Mechanical Engineering Drawing subject requires students to be able to understand the basics of drawing in technical drawing, starting with an understanding of technical drawing equipment. to be able to draw complete plans, cuts, views and details properly and correctly in accordance with technical drawing standards (Pitratul & Revian, 2022). Mechanical Engineering Drawing is at the end of phase E of Basics of Mechanical Engineering with a Flow of Learning Objectives, namely: 1) Understand the various types of drawing equipment according to their function and use according to Standard Operating Procedures, 2) Understand how to draw the basic techniques

of machine components according to their appropriate projections, 3) Understand how to read technical drawings according to their projections according to Standard Operating Procedures.

Based on the results of the researcher's observations when carrying out Teaching Skills Practice activities at SMK Negeri 1 Cikarang Barat, the researcher encountered several problems in the process of learning Mechanical Engineering Drawing. When learning takes place, educators use the lecture method to deliver material and distribute digital teaching materials to students. This method causes students to feel bored and less interested in the material presented. The bored feeling tends to make students tempted to play with their respective gadgets. This is supported by the statement made by Dewi (2020) that one of the factors causing students difficulties in understanding learning material is the lack of variety in learning media used in the learning process. Apart from that, based on the results of interviews conducted with the Mechanical Engineering Drawing subject teacher at SMK Negeri 1 Cikarang Barat, it was found that students had difficulty understanding the learning material, especially in the initial material, so that it affected the subsequent material even when practicing drawing. Therefore, learning media is needed that can increase students' interest and motivation in studying Mechanical Engineering Drawing. In a study conducted by Era (2021), it was also found that Mechanical Engineering Drawings were more difficult to understand than other subjects, especially compared to practicum subjects. One of the reasons is the lack of compatibility between students' abilities and the way the material is presented so that Mechanical Engineering Drawings are felt as a difficult lesson to accept. A teacher must be able to determine a learning strategy that suits the abilities of his students so that it is easy to understand.

In previous research conducted by Suri, (2023) with the title "Android Based Learning Media with 10^{th} grade DKV Edutainment Approach at SMKN 1 Kinali". The results of this research show that the results of the validation assessment of all edutainment-based learning media reached an average of 0.819 in the valid category. Apart from that, research conducted by Susanti et al., (2021) on the Mechanical Engineering Drawing subject at SMK Negeri 5 Padang used video tutorial media with the results of a significance value (2 tailed < 0.05) meaning that there were differences in student learning outcomes with using video tutorial media and conventional media. So it can be concluded that the use of this media has an influence on learning outcomes in the Mechanical Engineering Drawing subject.

Based on this background, this research aims to develop edutainment-based learning media using the Canva application and apply it in learning Mechanical Engineering Drawing in 10^{th} grade Mechanical Engineering at SMKN 1 Cikarang Barat. The learning media will be developed using the Four-D (4D) development model which includes the definition stage, design stage, development stage and disseminate stage. The Four-D (4D) development model was chosen with the consideration that the presentation of the model was simple (Rajagukguk et al., 2021). This research aims to find out whether the application of edutainment-based learning media using the Canva application can improve students' understanding of the Mechanical Engineering Drawing Subject.

METHOD

The development method used in this study is research and Development (R&D) with a development model, namely the 4D model. The 4D model was developed by Thiagarajan, Dorothy S. Semmel, and Melvyn I. Semmel in 1974. The 4-D model is a development model that can be used to develop various types of learning media (Arkadiantika et al., 2020). This model consists of four development steps, including define, design, develop, and disseminate. The subjects in this study are students of 10th grade Machining Engineering C SMK Negeri 1 Cikarang Barat with a total of 32 students. The subject of this study was selected based on the sampling technique (purposive sampling), which is sampling based on a specific objective, not on the basis of random strata and research area. The sampling that has been selected is based on the recommendation of the mechanical engineering subject teacher at SMK Negeri 1 Cikarang Barat. In order for the research provided to be of high quality, the data collection process with a 4D model (Define, Design, Develop, Disseminate), involves validators with ideal criteria, namely experts in their fields with a minimum educational qualification of S2 and a minimum of 5 years of experience (Putri et al., 2021).

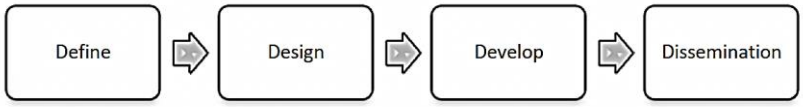

Figure 1. 4D Development Models

The discussion of each stage of development is as follows:

- Define Stage

  At this stage, the determination and description of development conditions or commonly referred to as needs analysis are carried out. Usually, this elaboration is adjusted to the needs of users and research and development models that are suitable for use in developing edutainment learning media.

- Design Stage

  At this stage, the author makes a prototype or product design. In the context of learning media development, this stage is filled with activities to prepare a conceptual framework of learning models and tools which are then simulated for use in a small scope. The product design that has been made needs to be validated first by expert lecturers from the same field before proceeding to the next stage.

- Develop Stage

  At this stage, there are two development activities, namely expert appraisal and developmental testing. Expert appraisal serves as a technique to assess the validity of product designs, by using the suggestions received to improve material and media design. Meanwhile, developmental testing is a product test on a real subject, with the aim of

obtaining data on responses, reactions, or comments from users. The results of this trial are used to make improvements to the product.

- Disseminate Stage

  This stage aims to ensure that the product can be used by others, by distributing the product to get responses and feedback on the teaching materials that have been developed.

RESULTS AND DISCUSSION

The research on the development of edutainment-based mechanical engineering drawing learning media using the Canva application was carried out in 10th grade.C Competence in Mechanical Engineering, SMK Negeri 1 Cikarang Barat. This research was conducted on students of 10th grade C Competence in Machining Engineering Expertise of SMK Negeri 1 Cikarang Barat in the subject of Mechanical Engineering Drawings by using the Research and Development (R&D) method referring to the Four-D (4D) Development model. The Four-D (4D) model consists of 4 (four) stages, namely: define, design, develop and disseminate. The following are the results of product development that have been carried out based on the stages of the Four-D (4D) development model.

Figure 2. Learning Media Barcode

Eligibility of Learning Media

The researcher conducted a series of validation tests, namely the validation of material experts, media experts, and conducted a media feasibility test for students to find out the feasibility of the learning media that had been made. The purpose of this test is to test the feasibility of the learning media that has been developed so that the learning media is suitable for use in the learning process. The scores of the validation and feasibility test results will be interpreted into several categories ranging from very feasible to very unfeasible.

Table 1. Interpretation of Eligibility Score

Percentage Score (%)	Interpretation
81% - 100%	Highly Worthy
61% - 80%	Proper
41% - 60%	Quite Decent
21% - 40%	Less Worthy
0% - 20%	Very Unworthy

Source: Febrianti et al. (2022)

Result of the Material Expert Validation Test

The results of the validation test conducted by material expert Mr. W, who is the mechanical engineering drawing teacher and vice principal for curriculum at SMK Negeri 1 Cikarang Barat, received a score of 72 out of a maximum score of 75 and achieved a percentage of 96%. Based on the interpretation table of eligibility scores, the percentage of 96% falls into the "Very Eligible" category. Therefore, it can be concluded that the material in the developed learning media is very suitable for use in the learning process for the Mechanical Engineering Drawing course in 10th grade for Machining Engineering.

Result of the Media Expert Validation Test

The results of the media expert validation test conducted by Mr. HDN, as a lecturer in Mechanical Engineering Education at the State University of Jakarta, got a score of 66 out of a maximum score of 75 and got a percentage of 88%. Based on the eligibility score interpretation table, the percentage of 88% falls into the "Very Eligible" category. Thus, it can be concluded that the learning media that has been developed is very feasible to be used in the learning process in the Drawing Machine Engineering 10th grade Machining Engineering course.

Result of the Media Feasibility Test

The results of the media feasibility test conducted by students of 10th grade Machining Engineering C got a score of 2069 out of the maximum score of 2400 and got a percentage of 86%. Based on the eligibility score interpretation table, the percentage of 86% is included in the "Very Feasible" category. Thus, it can be concluded that the learning media that has been developed is very feasible to be used in the learning process in the subject of Mechanical Engineering Drawing 10th grade Machining Engineering.

Discussion

This research focuses on the development of innovative and engaging Mechanical Engineering Drawing learning media, specifically for 10th grade Mechanical Engineering students at SMK Negeri 1 Cikarang Barat. This educational media is designed using the Canva application, a user-friendly and feature-rich graphic design platform. The edutainment approach has been selected as the basis for

development, with the primary aim of enhancing students' motivation and interest in subjects that are often perceived as complex and less engaging.

The research methodology applied is Research and Development (R&D) using a 4D development model, which includes the stages of define, design, development, and disseminate. This model was chosen for its systematic and comprehensive nature, ensuring that the resulting product undergoes a series of structured and measurable stages (Jamal, 2020).

In the development process, validation from various experts is a crucial aspect to ensure the quality and feasibility of learning media. First, the validation of subject matter experts is carried out to assess the suitability of the content with the Learning Objectives Flow of the Mechanical Engineering Drawing subject. Mr. W, an experienced teacher in this field, gave a very positive assessment, with a feasibility percentage of 96%. This shows that the material presented in the learning media is relevant, accurate, and in accordance with the needs of students. In addition to material validation, media expert validation is also carried out to evaluate the technical and aesthetic aspects of learning media. Mr. HDN, an expert lecturer in the field of Mechanical Engineering Education, gave an assessment with a feasibility percentage of 88%. These results show that the learning media has good technical quality, an attractive appearance, and is easy to use by students.

These two expert assessments show that the developed learning media is very feasible to use. However, in addition to expert assessments, the feasibility test was also carried out directly to students, namely students of 10^{th} grade of Mechanical Engineering of SMK Negeri 1 Cikarang Barat. This feasibility test aims to get direct feedback from potential users, so that learning media can be refined based on students' needs and preferences. In the process of validating the material, Mr. Warjat, M.Pd., also provided constructive input related to the collection of practical tasks. He suggested that the collection of assignments should still be done manually, so that teachers can check and provide more in-depth feedback on the results of students' work. This input shows attention to the practical aspects of learning, as well as the importance of direct interaction between teachers and students in the evaluation process.

Overall, this research produces an edutainment-based Mechanical Engineering Drawing learning media that is innovative and suitable for use. Through an R&D approach with 4D models, as well as validation from material and media experts, the resulting products are of good quality and relevant to the needs of students. A due diligence by students also provides valuable feedback for further refinement.

CONCLUSION

Based on the results of the research that has been carried out, it can be concluded that, the Development of Edutainment-Based Mechanical Engineering Drawing Learning Media Using the Canva of 10^{th} grade Application of Machining Engineering SMK Negeri 1 Cikarang Barat, was developed using a 4D development model which has 4 stages, namely define, design, develop and

disseminate. The results of the validation of learning materials by material experts were obtained by 96% so that they were included in the "very feasible" category and the results of the validation of learning media by media experts were obtained by 88% so that they were included in the "very feasible" category. Furthermore, the results of the trial to 32 students of 10th grade Machining Engineering C were obtained by 86% so that they were included in the "Very Feasible" category. So that the feasibility level of learning media based on the validation of material experts, media experts, and media feasibility tests is included in the "Very Feasible" category.

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