Development of mechanics techniques learning media-based three-dimensional flipbook

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Abstract. This research aims to produce a valid and practical three-dimensional-based learning media. This research was a research and development. Materials and media experts assessed the validation of this learning media. The results of this study showed a valid learning media with excellent categories by media expert assessment. Assessment by materials expert showed in the good category. Based on a small group test and field test, the product practically was in useful categories.

1. Introduction
At the university, public and private universities are still the main character, and approximately 80% of the time is used to convey their knowledge with lecture methods [1] while the learning pattern that is expected at this time is implementing a learning pattern that is no longer centred on educators. The success factor in the process of learning is the pedagogy competency and using learning media in teaching-learning. There is still a minimal number of lecturers who convey learning materials with creativity. The limitations of learning media and the needs of lecturers in using instructional media so that learning is not optimal and there is still little use of literature teaching material [2]. Teaching materials are all forms of material used by teachers in conducting teaching and learning activities in the classroom.

In the learning process there is a process of teacher-student interaction through teaching and learning activities and students [3] lecturers make the main role in the learning process to have creativity and a good learning strategy so that it can support the learning process and student success. In the learning process. It can be done to help or offset the learning process by improving the quality and learning quality by utilising technology.

So that with the problem, there is an idea to change the mindset that exists today is to change the mindset in the use of learning media that was initially a single media into multimedia utilising technology. In the era of informatics technology such as today, educators have to be able to integrate a kind of medium learning media so that it has a wide choice of learning media use [4].

Learning Media is a tool or material used in the learning process that contains information and message learning [5]. As for one of the learning media that utilises this information technology is one of the only media-based learning three-dimensional (3D) FlipBook. However, the purpose of learning
by using the FlipBook 3D media so that students can study independently, measuring until where the learning materials can be mastered so that the intended learning objectives can be achieved well.

2. Methods
This Learning Media development procedure refers to the 4D design model. The development is divided into 4 phases: define, design, develop and disseminate. In detail, the procedure of this research is as follows: At the define stage include needs analysis, learners analysis and instruction analysis. At this stage, there is a purpose of learning instruction that will be achieved by the breastplate of mechanical mechanics and then designing the order of material to be conveyed. The design phase includes the preparation of tests, presentation of materials, formatting and design of teaching materials prototype. Stages of developing include expert validation, first revision, one-to-one evaluation, revision two, small group test, field test. The dissemination phase consists of socialisation of teaching materials, publications.

2.1 Design trial
Trials on development research are paramount, as these trials can result in a deficiency, weakness in product errors. Besides, trials are conducted to know the quality of learning media products that will be developed and feasible or not to be used in the learning process.

The subject of this study consisted of media experts and material experts. Furthermore, the subject of product trials is that students, data retrieval is conducted on three stages with different students. The instrument used in the study in the form of poll instruments, the instruments in this study are validated by media experts, material experts and students as users. These poll instruments include aspects of the display, aspects of learning and content aspects. The instrument validation is carried out by media experts and further material experts the result of such validation in the analysis and performed improvements as per the suggestion of the validator. After the repair and has been declared valid by the validator, then the poll can be used.

2.2 Data Analysis Techniques
In this research data was analysed using the data likelihood category. Score results are then converted into values. The data likelihood table used refers to [6] as the below table:

| Interval | Category |
|----------|----------|
| \((\bar{X}_i + 1.80 \text{ Sbi}) < X\) | Excellent |
| \((\bar{X}_i + 0.60 \text{ Sbi}) \leq X \leq (\bar{X}_i + 1.80 \text{ Sbi})\) | Good |
| \((\bar{X}_i - 0.60 \text{ Sbi}) < X \leq (\bar{X}_i + 0.60 \text{ Sbi})\) | Enough |
| \((\bar{X}_i - 1.80 \text{ Sbi}) < X \leq (\bar{X}_i - 0.60 \text{ Sbi})\) | Less |
| \(X \leq (\bar{X}_i - 1.80 \text{ Sbi})\) | Very Less |

Description:
\(\bar{X}_i = \frac{1}{2} (\text{Maximum + minimum score})\)
\(\text{Sbi} = \frac{1}{6} (\text{Maximum score – minimal scores})\)
\(X = \text{Actual Score}\)

3. Results and Discussion
This research aims to produce a media-based learning 3D FlipBook on technical Mechanics Course in the educational Study program of valid and practical tracers of Sriwijaya University. The research procedures used to consist of four phases: define, design, develop and disseminate.

The development of this learning media starts from conducting preliminary studies further obtained the following information: the extent to which the development of learning media in the mechanics of mechanical engineering is needed to optimise the process learning. This data is obtained by conducting observations and interviews on students who are weeper technical mechanics. Data
obtained in the form of information that students need various learning media. The result of the analysis in the define phase is concluded that lecturers and students struggle to obtain complete learning resources about the learning of technical mechanics so that it can be concluded that lecturers and students need learning media that can support the learning process. With the development of media-based learning 3d, FlipBook on the mechanics of this technique can contribute to addressing several problems faced by students and lecturers such as learning media used.

At the design, the stage consists of test preparation, material presentation, formatting determination, specifying the format, as well as the design of the teaching material prototype that will be in the hatrack in the learning media to be developed. The teaching material that will be used first prepared in the form of wood is then confer into a PDF. This learning material is adjusted to the competency to be achieved and refers to the syllabus. The next step creates a flowchart, a storyboard that will be used in producing the learning media. The Flowchart and storyboard created were used to help develop learning media so that are testing and activities were in line with semester learning plans.

Next use the 3D Page Flip Book Professional software to confer the material that has been prepared in PDF form. Next added animations and learning videos that will be shown in the development of mechanics learning media. The selected videos and animations are adapted to the syllabus as well as the semester learning plan, that is the reference target for learning. The advantages of this 3D Page Flip Book Professional can convey animation and video material so it is suitable for media learning. Once the learning media is completed, the next step is tested with the students who are in the technical mechanics. To see the extent of the success achieved by students according to the purpose of the learning materials formulated in the beginning.

Development of media learning in the mechanics of this technique discusses several subjects about the mechanics of engineering, the target user of this product is the technical education student of the machine Unsr which is being educated in the mechanics of the engineering class Indralaya or Palembang class. The finished product is stored in the Flasdisc, so it is easy to spread it.

To achieve an excellent product at this stage of development through the following stages: (1) to check all components of learning media development that has been compiled as a whole both animation material and video will be used. (2) The validation of the products that have been made, this validation is done by media experts and material experts. Criteria in determining the media experts that one has understood and set up education in the field of development of learning media while the selection of the criteria of material members who have understood and experience in the field of Engineering Mechanics. After going through the validation phase, there is a revision so that improvements to the suggestion of both validators, done repairs until declared valid can be resumed.

One-to-one evaluation, at this stage, the teaching materials were tested on three prospective students of the learning media. The selection of the three students was chosen with low, medium and high ability criteria in the see from the study results (LHS). These three students were given a questionnaire in the form of assessment, and learning media that was made and used next is welcome to assess. The next stage revisions are based on one-to-one assessments given by the three students.

Small group test, used to test the practicality of learning media is developed. This trial was conducted by a limited group of 10-12 people to provide an assessment of advanced teaching materials. Further revisions are made to the advice and assessment of the limited group.

Field test, in this activity, the material is re-test on 32 students, the assessment is carried out using a poll and the final test results. This poll is used to see the degree of the practicality of the use of advanced teaching materials. Practical means were making it easy for students to understand learning. Poor learning is supported by learning media users [7].

The media validation is recorded by Mr H. Imam Syofii, S. Pd., M. Eng. He as a lecturer who has been able to study media and learning media experts. From the assessment of media, experts concluded that the media learning on the mechanics of techniques based on the 3D Flipbook has very good judgment. The validation of material experts was done by Mr. Drs. Zulherman, M. Pd. He is a lecturer who has been able to have technical mechanics. From the results of the expert assessment, it can be concluded that the developed learning media has good judgment.
Students are given a product developed next to be welcome to assess using a questionnaire. The results of this assessment are used for phase two revision guidelines. Of the multiple items of poll instruments provided by students can be concluded that the media learning mechanics based on 3d technique FlipBook is excellent. In this assessment includes some aspects of the quality of competence, evaluation quality found in the media developed. From the student assessment of the learning aspect it has good judgment. The content aspect is used to determine how the student's response as a user that includes the contents of the product learning media developed, from the results of the assessment obtained product conclusions developed in good criteria.

Respondents who were subject to a small group test amounted to 9 students. The results gained on the display aspect show very well. From the results of a trial analysis in a small group consisting of aspects of learning, material aspect/content it can be concluded the quality of learning media developed is very well.

At the trial stage, the test is the main stage that is useful to measure the feasibility of a developed media. Trials are expected to know which parts are well-known and need to be a trade from the student assessment. The field trials were conducted by 32 students of the mechanical education course of the engine class Indralaya. Aspect assessed that is an aspect of product display, learning aspect and material aspect/content. The results of all aspects obtained are very good.

4. Conclusion
A valid learning media with excellent categories by media expert assessment. Assessment by materials expert showed in the good category. Based on a small group test and field test, the product practically was in useful categories.

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