The Effect of Character-Based Teaching Flipbook Media on The Results of Calculus Learning

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Abstract— **Research on the Effect of Using Character-Based Flipbook Teaching Media on Calculus Learning Outcomes. This research is based on problems in the world of education, especially the use of multimedia learning with the calculus of integral material in rotating objects. Research conducted at FKIP UHAMKA with the research method used is experimental design posttest only form and the research sample was 36 students divided into 2 class groups, the experimental class and the control class. Based on the results of the analysis calculation on the analysis prerequisite test that is using the post test sample the learning outcomes of calculus are normally distributed, namely 5.172 <7.815. Likewise for the calculated X2 value (control class) <of X2 table that is 2,183 <7,815. So for the testing phase you can use the t-test. with a significant level α = 0.05 For the hypothesis test using the t-test the results obtained were 8.621 ≥ 2.014, which means it was rejected and Ha was accepted, while the characters with an average post-test score of 76.67 with the development of the character of the questionnaire was 83, 1 Based on the calculation of hypothesis testing, and character questionnaires it can be concluded that there is an influence of the use of character - based flipbook teaching media on calculus learning outcomes.**

Keywords: ***Teaching Media, Flipbook, Learning Outcomes***

I. INTRODUCTION

The development of information and communication technology that is increasingly rapid can be utilized by teachers to support the learning process of mathematics. In other words, learning mathematics is no longer just delivered by expository method where students only become passive learners, but teachers must facilitate students to learn independently. This is according to the opinion of Chuang (2014) who states that the use of technology in learning will increase motivation and results student learning [1]. In addition, the use of technology can be used as a learning medium can be accessed anytime and anywhere using portable media such as smartphones (Herrington, 2008) [2]. Thus, the learning process can be carried out interactively, inspiratively fun, and motivate students by using technology-assisted learning media.

In the learning process itself, students are faced with a lot of multimedia-based learning media development, one of which is FlipBook. Flip Book or Flipping Book has the meaning of a book that reverses the term Flip Book is taken from a children's toy that contains a series of different images, if opened from one page to another page will show that the pictures seemed to move. Basically Flip Book is a primitive form of animation, but along with the rapid information technology the Flip Book idea is then adopted and used in making a book (e-book) and electronic magazine (emagazine) with characteristics that can be opened and flipped back like a magazine or book in general.

Understanding integral calculus is very important for mathematics education students to be able to follow other lectures well. This is because a lot of mathematical material, especially on the decline formula that requires the ability to integrate a function. Therefore student mastery of integral calculus is absolutely necessary [3]

II. LITERATURE REVIEW

A. Teaching Media

Learning is a complex process that occurs in everyone throughout life due to interactions with their environment, therefore learning can occur anywhere and anytime (Arsyad, 2009) [4].

Learning media is part of learning resources which is a combination of software (learning materials) and hardware (learning tools) [4]. Meanwhile, according to Gerlach & Ely, in Arsyad, that the media if understood in broad outline is human, material, or events that build conditions, which cause students to be able to obtain knowledge, skills, or attitudes [6]. Martin and Briggs argued that learning media includes all the resources needed to communicate with students. This can be in the form of hardware and software used on hardware [7].

According to R.M Soelarko, learning media has a function of visualizing something that cannot be seen or

difficult to see so that it seems clear and can cause understanding or improve one's perception [8].

B. Flipbook

Flipbook is a program full of resources and tools that will be used in an Interactive Whiteboard, in addition to helping teachers to engage students and make lessons more interesting and effective, it can also be used by students at home easily and without supervision.

The flipbook program used in this study is a pro version of the MIT flipbook program. In general, this MIT flipbook multimedia device can insert PDF, image, video (FLV) and animation (SWF) files so that the flipbook created can be more varied and make it easier for users to use this flipbook media. In addition, there are a number of template designs and feature settings such as background colors and images, control buttons, navigation bars, and book pages to display flipbooks that are more attractive to students so that learning will run effectively. So expected with such a user interface, will give a positive impression of learning so that communication in the learning process will be successful (communicative).

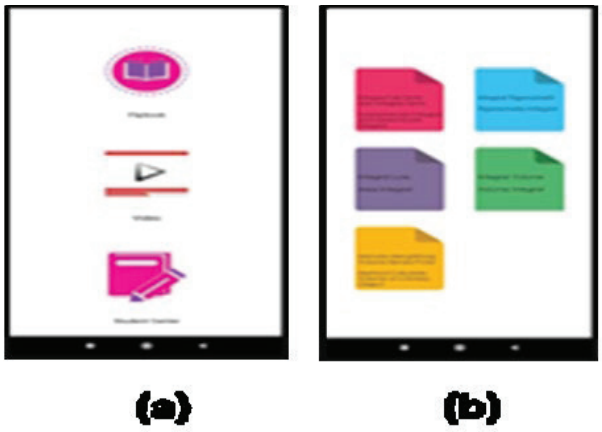

Fig 1. (a) Main menu screen; (b) Menu Flipbook screen

C. Character Value

Coon (Zubaedi, 2011) defines character as a subjective assessment of a person's personality related to personality attributes that can or cannot be accepted by society [9]. Along with character education, Zubaedi explained that character can be an assessment of subjectivity towards one's moral and mental qualities, so the effort to change or shape character is only related to intellectual stimulation someone. Noble characters inherent in a person are characterized by values such as: reflective, confident, rational, logical, critical, analytical, creative and innovative, independent, life healthy, responsible, love knowledge, patience, cautious, willing to sacrifice, brave, trustworthy, honest, keep promises, fair, humble, ashamed to do wrong, forgiving, be gentle, loyal, work hard, persevere, persistent, conscientious, thorough, have initiative, always think positive, discipline. According to Sani (2011) characters are values that underlie human behavior based on religious, cultural, legal / constitutional, customary and aesthetic norms [10].

D. Calculus Learning Outcomes

Learning is a process of behavior change, so changes in behavior expected from the learning process are called learning outcomes. Dimyati and Mudjiono in Munawar (2009) revealed that, "learning outcomes are things that can be seen from two sides namely the student side and the teacher's side". From the student's side, learning outcomes are a better level of mental development when compared to before learning. In terms of instructors learning outcomes as a measurement, whether students have mastered the material they have learned.

Learning outcomes are influenced by factors that influence the learning process itself, namely internal factors which include maturity or growth, learning ability which is a combination of intelligence ability, talent, motivation and will, while external factors include family and environmental conditions, the state of learning material and the factors which are related to learning.

Calculus is a branch of mathematics that studies limits, derivatives, integrals and infinite series. Based on the definition of learning outcomes and calculus it can be concluded that the learning outcomes of calculus are the level of mental development or ability with certain learning processes and steps in the branch of mathematics that studies limits, derivatives, integrals and indeterminate series. The concept of calculus learning outcomes in education generally refers to learning goals that are expected to be achieved by students after attending certain courses in the form of their abilities [11].

III. Methodology

The research used was an experiment with a quantitative approach. The research design used was the Post Test Only Control Group Design. The research analysis used was independent sample t-test. This research was conducted in UHAMKA physics education for the development stage and in UHAMKA mathematics education for the field test stage of using flipbook media.

IV. Results and Discussions

In this study, the retrieval is character questionnaire data and primary data of post-test learning outcomes, with data retrieval once in the post-test (after treatment) in the group of students taught by the flipbook as an experimental class and without Flipbook as a control class, data obtained from this research in the form of integrated character learning outcomes calculus.

Data obtained, character development from character questionnaires and observations are not much different. The difference in questionnaire and observation values occurs because the characters present in students cannot be observed optimally. There are 2 factors that affect the

character development consisting of internal factors and external factors. According to Daryanto & Darmiatun internal factors such as biological instincts, psychological needs, and thinking needs as well as external factors such as the family, social and educational environment. So that the success of character education is not determined by the role of educators in learning but is also determined by the social environment in providing situations that are conducive to character development [12].

TABLE I. PERCENTAGE OF EACH CHARACTER

Character	Development (%)		Criteria		Gain-Test Result
	Before	After	Before	Before	
Honest	68,3	82	Start Developing	Cultivate	0,433
Discipline	63,7	78	Start Developing	Start Developing	0,430
Curiosity	55,4	65,3	Start Developing	Cultivate	0,244
Creative	66,8	81	Start Developing	Cultivate	0,453
Hard Work	63,2	83	Start to Look	Start Developing	0,5
Responsibilities	71	83,1	Start Developing	Cultivate	0,43

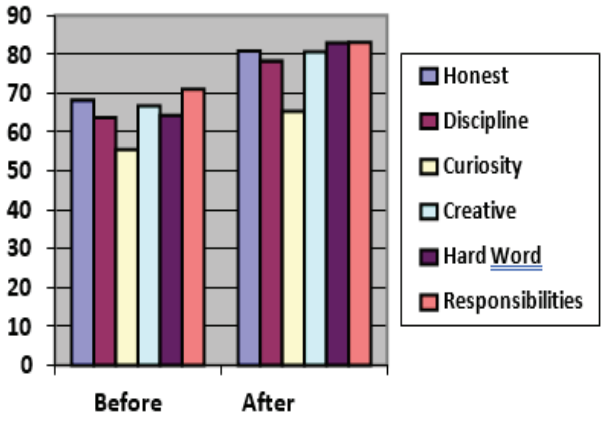

Fig 2. Character Development

The hile the post-test sample of calculus learning outcomes is normally distributed, where the value of X^2 calculated (experimental class) < of X^2 table is 5.172 < 7.815. Likewise for calculated X^2 value (control class) < X^2 table that is 2,183 < 7,815. So for the testing phase you can use the t-test. Based on the data above, it turns out that $t_h \geq t_{table}$ is $8{,}621 \geq 2{,}014$. Thus the hypothesis H_0 is rejected and H_a is accepted. The conclusion is "there is a significant influence on the use of flipbook teaching media in physics learning on calculus learning outcomes." This can be seen from the calculus learning outcomes of groups of students who are taught by using a flipbook is higher than the group of students who are taught without a flipbook on the subject of the volume of rotating objects.

V. CONCLUSION

The paper has discussed on the readiness of two universities students from Malaysia and Indonesia on the use of flipbook in learning. The results have shown that students are optimistic that by using flipbook will be useful to them and therefore have expressed their readiness to adopt it. Therefore, the institutions of higher learning should take this opportunity to make the teaching and learning process in order to spark the students' thinking, develop their potential and promote lifelong learning. The future work will investigate on the suitable content, the Instructional Design Model and theoretical framework for mobile learning for both universities.

Based on the results of the study it can be seen that the average learning outcomes of students' class calculus taught by using a flipbook is 76.67. While the average control class student without a flipbook has an average of 60.00. This shows that the learning outcomes of students calculus using flipbooks is higher than the students who are taught not to use flipbooks. The use of flipbooks can have a positive effect in getting optimum learning results.

Calculus of the subject matter of the volume of rotating objects developed is integrated with the character assisted flipbook equipped with video, can respond to an answer in the form of true or false when students press existing buttons, in the form of integrated soft files that character honest, disciplined, curious, creative , hard work and responsibility through instructions or instructions before lecturing in class as well as inserted motivational sentences from experts in each sub material.

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