INTERNATIONAL JOURNAL OF ACADEMIC RESEARCH IN BUSINESS & SOCIAL SCIENCES

Vol 9, Issue 3, (2019) E-ISSN: 2222-6990

Teaching Media Design Innovation Using Computer Application with Scientific Approach

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To Link this Article: http://dx.doi.org/10.6007/IJARBSS/v9-i3/5689 DOI:10.6007/IJARBSS/v9-i3/5689

Published Date: 17 March 2019

Abstract

This study aims to produce innovative teaching media design products using computer applications with a scientific approach. The subjects used in this study were mathematics with extensive material and circumference building space for class II semester I MI Bahrul Ulum Becirongengor Wonoayu Sidoarjo. The steps applied in the scientific approach includes determining problems, submitting hypotheses, collecting data, and draw a conclusion. The type of this research is Research and Development by using ADDIE development model. The results indicate that the development product of this innovative teaching media design is valid based on the results of content expert validation which is 95%, design expert validation which is 92.5%, individual trial result which is 94.5%, small group test which is 93.33% and the result of large group trial which is 94.76%. The result of the t-test analysis with 0.05 significance level shows that the p-value of the t-test is 0.001 which means (<0.05). It implies that the innovation of teaching media design by using computer application with scientific approach significantly influence student's learning achievement and motivation. It also indicates that the design of teaching media developed at MI Bahrul Ulum Wonoayu Sidoarjo is effective and efficient.

Keyword: Innovation Media Design, Computer Application, Scientific Approach

Introduction

Innovative Teaching Media Design is a learning process with the help of tools (Mujiarto et al, 2018; Kazanidis et al, 2018) that are designed in a way that is different from learning in general (Ebner et al, 2018; O. Weiser et al, 2018).

Conventional learning will make students become less interested (S. Radović et al, 2019) and less motivated while participating in learning activities (Jatmiko, 2018) which then result in low student learning outcomes (Johnson & Johnson, 2009) and meaningless learning activity (Pombo et al, 2017).

Furthermore, the knowledge obtained by students in the classroom tends to be artificial and separated from student's daily problems (Roux & Nagel, 2018). Presently, learning must be scientifically based (Voronina et al, 2019). So that the students can perceive the impact of their learning right away (Bhattacharya & Coombs, 2019).

Innovative learning by using teaching media is more directed at learner-centered learning (Di Felice, 2018). The learning process is designed, organized and conditioned for students to learn independently by using computer applications (Cao et al., 2019). Computer applications designed using Microsoft Visual Basic (MVB) 6.0 (Grossu et al., 2009; Davis & Parashar, 2002) and Microsoft PowerPoint (MPP) (Alley & Neeley, 2005). So that learning can run effectively because it combines three learning modalities namely kinetic, visual and audiovisual.

Innovative teaching media design will provide students with motivation and achievementsignificantly (Duckworth & Yeager, 2015). Thus, the learning will go quickly and on target.

Methodology

The method used in this research was Research and Development (Gall et al, 2003) with ADDIE approach (Amir, Hasanah & Musthofa, 2018; Akker, 1999). The rationale for using this method and approach was because it was suitable for the development of teaching media (Arif et al, 2014). The data were collected through the results of pre-test, post-test, observation and product implementation results (Reis, 2017).

A. Result and Discussion

1. Implementation of Innovative Teaching Media Design Theory

A reality in the field shows that the use of teaching media in learning is very minimal by educators. At present learning is only based on textbooks and presentations without the development of material in depth. the school has provided textbooks (BP) and student activity sheets (LKP) for students but the material in the delivery of BP and LKP is not as expected because of the lack of material in the textbook so that the knowledge of students is less developed.

Teaching media should be positioned as the main tool to be able to understand students in learning the subject matter (Musfiqon & Nurdyansyah, 2014). Teaching media has practicality in its implementation, so the learning process will be easier, effective and efficient.

One teaching media that can help students to achieve maximum learning is to design innovative teaching media based on computer applications (Nurdyansyah, 2015). With this media it is expected that students can maximize their existing potential and become a generation that is IT literate so that they can achieve at the National and International level. The design of computer application-based teaching media uses a scientific approach because in Indonesia the learning curriculum uses this approach (Musfiqon & Nurdyansyah, 2014.). The scientific approach is the implementation of coherent scientific learning using the 5M method (Observing, Asking, Trying, Reasoning and Communicating). This method will provide a broad space for students to be able to create and innovate.

Implementation of Innovative Learning Media Descriptions using Application Computer (DMAAC) by implementing Microsoft Visual Basic (MVB) and Microsoft PowerPoint (MPP) applications with the Scientific Approach as follows:

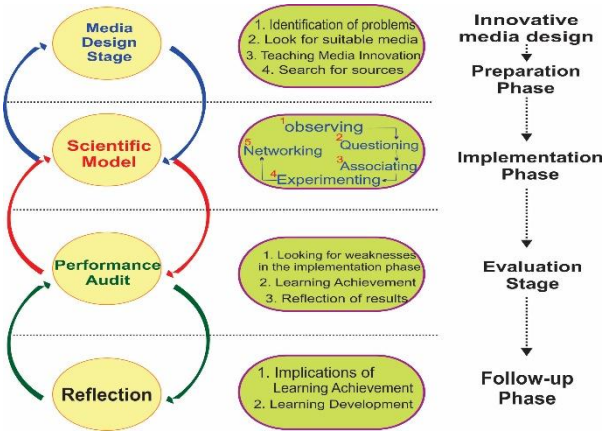


Figure 1.1 DMAAC Implementation

On the DMAAC figure, we, as the teacher must able to accompany and guide students to use computer at the implementation phase, especially on the Associating stage. At this stage, it is necessary for the teacher to be careful while directing and guiding students to get accurate data from various sources through various applications on the computer in order to take relevant sources.

This stage is very crucial since it allows us to check which student who can run the computer applications Microsoft Visual Basic (MVB) 6.0 (Grossu et al, 2009; Davis & Parashar, 2002) and Microsoft Power Point (MPP) (Alley & Neeley, 2005) well which ones who cannot, so that the competencies achievement could be seen clearly.

Figure 1.2 MVB mathematics with extensive material and circumference building space results

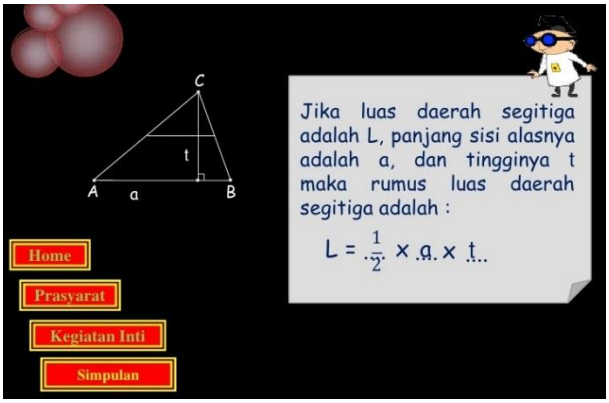


Figure 1.3 MPP mathematics with extensive material and circumference building space results

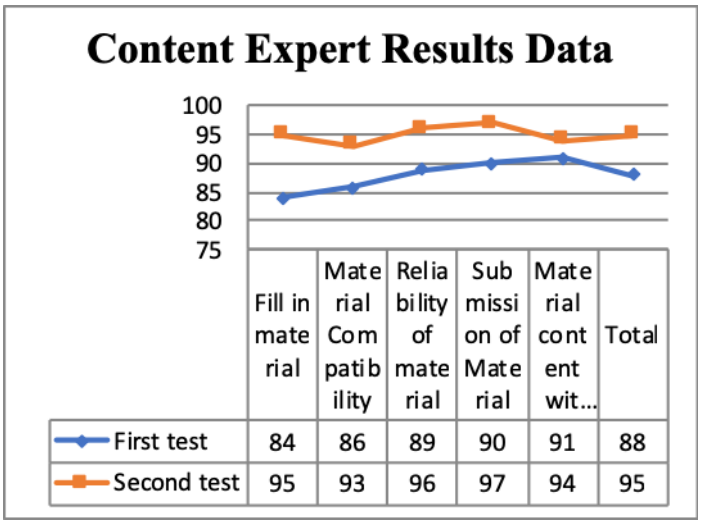
After the implementation phase, there will be an evaluation stage and a follow-up phase. At this stage the teacher provides certain input and correction according to the evaluation results of learning and teaching media innovation.

The development of innovative teaching media being mentioned above is expected to be one of the tools to improve learning in a systematic and integrated manner so that students can master each competency thoroughly.

2. Results

a. Content Expert Verification Results

Data obtained from consultation with the expert was in the form of closed questionnaire instrument. The results of the consultation are as follows:

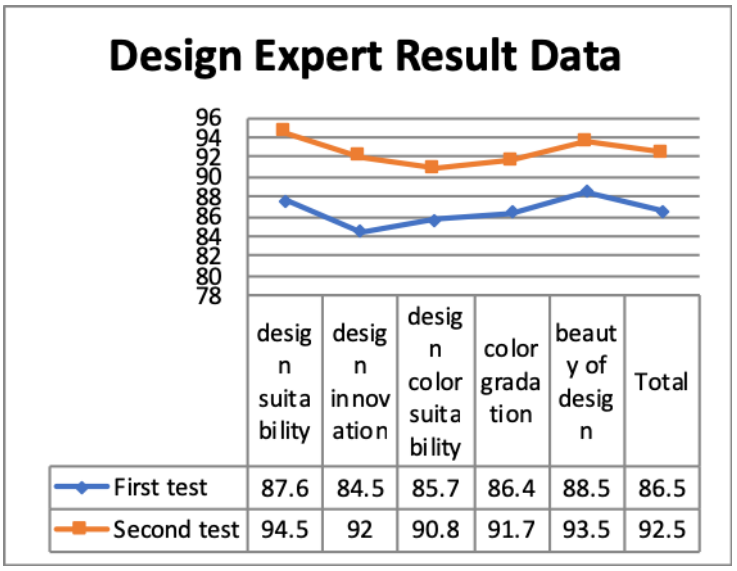


	Fill in material	Material Compatibility	Reliability of material	Submission of Material	Material content wit...	Total
First test	84	86	89	90	91	88
Second test	95	93	96	97	94	95

Figure 1.4 Content Expert Result Data

b. Design Expert Verification Results

Meanwhile, the Verification Results from Design expert are as follows:



	design suitability	design innovation	design color suitability	color gradation	beauty of design	Total
First test	87.6	84.5	85.7	86.4	88.5	86.5
Second test	94.5	92	90.8	91.7	93.5	92.5

Figure 1.5 Design Expert Result Data

Based on the assessment results from the two experts on the design of Teaching Media by using scientific approach being developed in this research, it is stated that the innovation product of Teaching Media Design by Using Computer Application with Scientific Approach, seeing from the attractiveness of design, font shape and size, picture color, color combination, as well as the picture suitability, is already compatible and does not need revision because it is already in line with the existing learning standards.

Trials

The trial performed in the large group involving 25 students at MI Bahrul Ulum Wonoayu Sidoarjo. Based on the result of question naire given to the students, they agreed on the point: Teaching media by using a computer application makes it easier for students to learn and motivates them to learn more, as well as the ease of reading the text which then make the percentage on each criteria is 100%.

On the point of character materials by using computer application, it is stated that the material can be understood easily, and it can improve student's achievement and motivation in learning. The details are as follows: 1) the material being presented is simple (24 students answered yes and 1 answered no) so, the percentage is 95.23%. 2) On the point of activeness in learning, interest in learning character material by using computer application (19 students answered yes and 2 answered no) the percentage was 90.47%. 3) And on the point of picture criteria being presented 18 students answered yes and 3 students answered no, so the percentage was 85.71%.

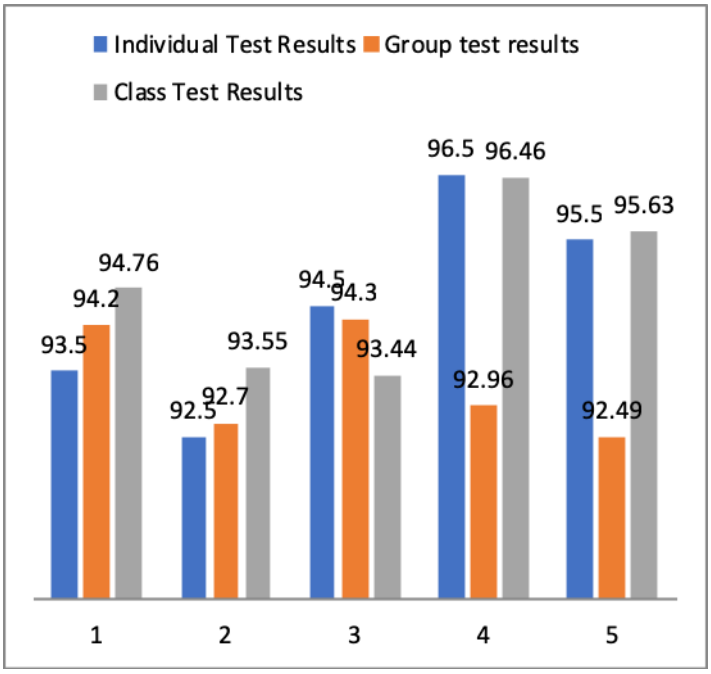


Figure 1.6 Class Test Result

Based on the mean or average value in the table above, we can see the difference between the results of *pretest* and *posttest* employing Teaching Media by using computer application with scientific approach. The *pretest* result obtains the average value of 57.44 and the *posttest* result obtains the average value of 80.60. Since the p-value of the t-test is 0.00 which means (<0.05), it can be concluded that Ho is rejected and Ha is accepted. This indicates that there is a significant influence on the *pretest* and *posttest* mean scores.

Effectiveness Test

Table 1.1

T Test, Pretest and Posttest Results

Descriptive Statistics

	Mean	td. Deviatio	N
Posttest	80,6000	12,93574	25
Aplication	9,5600	,86987	25

The table above shows the mean value and standard deviation of the posttest scores as the learning outcomes (dependent variable) and the Development of Teaching Media Design by Using Computer Application with Scientific Approach. The mean value of the posttest scores is 80.60 with a standard deviation of 12.93 while the mean value of teaching media development applied by the researcher is 9.56 with a standard deviation of 0.86.

R = 0.247 the magnitude of the coefficient. Correlation between Media Teaching mathematics material is broad and mobile (independent variables) with posttest learning outcomes (dependent variable)

R Square of 0.061 means 6.1%. It shows that the change in student learning outcomes is determined by Teaching Media with scientific approach of 6.1% while 88.66 improvement of student learning outcomes is determined by other variables outside the variables in this study. So that it can be interpreted that the Teaching Media with scientific approach is sufficiently influential on the learning outcomes of grade II students in MI Bahrul Ulum Wonoayu Sidoarjo.

B. CONCLUSION

Based on the results of the study it can be concluded that:

1. The implementation of Teaching Media Design Using Computer Applications with Scientific Approach produces Innovative Computer Based Learning Media product consisting of 3 stages; stage 1 is the planning steps, stage 2 is the data presentation of the trial results, namely content expert data, design expert data, data linguist, small group test, large group test, and product revision. Stage 3 is the product result, in the form of Teaching Media Design by Using Computer Application with Scientific Approach.
2. The results of this Media Feasibility 1) from content expert validation is 90% valid or feasible to use, 2) Design expert validation is 80% valid or feasible to use, 3) Language expert validation is 80% valid or feasible to use.
3. The effectiveness level of this media obtains the results of motivation and student achievement based on t test on the pretest value which is 57.44 and posttest which is 80.60 with a significance level of 0.05, showing that the p-value of the t-test statistic is 0.00 which means (<0.05). It indicates that there is a significant influence on the pretest and posttest mean scores. It also indicates that this Teaching Media is feasible and effective to be used in learning at MI Bahrul Ulum because it significantly influences student motivation and achievement.

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