Design Development Of Interactive Mathematics Learning Media Based On Character Education Using Macromedia Flash

Muh Suhuddinul Islam, Suparman

Abstract: The character of honesty is one of the core competencies students must possess based on the 2013 curriculum. Less honest students tend to take actions that are not commendable and harm others. Learning media that do not integrate honesty has an impact on not achieving one of the core competencies. This study aims to design learning media that can improve the character of student honesty. The subjects of this study were mathematics teachers and seventh-grade junior high school students. The instruments of data collection are questionnaires to determine product feasibility, observation guidelines, and interview guidelines. Interview guidelines are used to obtain information about student difficulties, student learning resources, media used, and student honesty levels. Observation guidelines are used to determine the behavior of students during the school environment both during the teaching and learning process in the classroom and when students are outside the classroom. Data analysis techniques used descriptive data analysis. This study uses the ADDIE method. The results of this study indicate that social arithmetic material is still considered difficult by some students, especially in translating story questions into mathematical models. Also, learning media that can support the character of honesty has not been developed. The study concluded that teachers and students need the development of mathematical interactive learning media with character education

Index Terms: Character Education, Design Development, Learning Media Interactive

————————————————   ◆   ————————————————

1. INTRODUCTION

Education is one of the efforts to develop every aspect of the human personality so that they can be formed into complete human beings, this is in line with what Waspodo stated that "National education functions to develop skills and form the character and civilization of a dignified nation in the context of the intellectual life of the nation, aims to develop the potential of students to be a man who is faithful and devoted to God Almighty, noble, healthy, knowledgeable, skilled, creative, independent, and become citizens of a democratic and accountable"[1]. For the purpose of education, every Indonesian human being must be given the widest opportunity to obtain an education. In order for education equity to be implemented, the education system should be able to serve all school ages so that they have the opportunity to enjoy education at least in the basic skills that are very necessary, namely reading, writing and arithmetic (mathematics). According to Berkowitz, and Grych that character education requires young people can judge what is true, very concerned about what is true, and then doing what is right, even in the face of external pressures and temptations from within [2]. The view is in line with Clark that character education is a disciplined approach to welfare; this approach must be conducted in a gentle, non-force to keep doing good [3]. "Character refers to a series of attitudes, behavior, motivation, and skill. Character includes some behaviors such as a wants to do the best, intellectual capacity like critical thinking and moral reason, behavior like being honest and responsible, maintain moral principles in full unfair situation, interpersonal and emotional intelligence that allows someone to interact effectively in various situation and commitment in order to

———————————————————————

- *Muh Suhuddinul Islam is currently pursuing master's degree program in Mathematics Education at Ahmad Dahlan University, Indonesia*
- *Suparman is an associate professor in mathematics education at Ahmad Dahlan University, Indonesia, PH-081328201198. E-mail: suparman@pmat.uad.ac.id*

contribute to the community and society" [4]. "An individual who has good character is the one who always tries to do the best" [5]. Stiff Williams that "character education must be integrated with field studies and continuous through all classes and taught by all teachers" [6]. Parallel to Lickona in (Lukman, 2015) recommends the class and the school as a context most easily observed for the study of character education [7]. Based on the formulation of core competencies that the character of honesty is one of the traits or characters that must be possessed by students based on the 2013 curriculum. Therefore researchers want to examine the character of student honesty because lately, the character of honesty has become something hard, as said by Irfan "that Honesty has now become a rare thing. Many people are willing to lie to make a profit" [8]. Honesty can be taught in learning mathematics. For example, when the teacher asks students, "Have students understood?" If students are not honest to say "understand" but it turns out they do not understand themselves, who will lose their possessions. When the ke-n material does not understand, the material n + 1 will not understand, because it is interrelated. When lying, it will bring other lies to cover up past lies. Then through mathematics learning, it is expected that by itself the goal to shape the character of student honesty can be achieved. Then we need a method that intentionally includes learning these character values into the planning of learning so that the goal to shape the character of student honesty through mathematics learning can be achieved, one of the ways is by using the medium of mathematics learning based on honesty characterMathematics is one of the sciences that develop as technology advances. Information and communication technologies are an indispensable part of our lives today and facilitate life in all areas of life [9]. The use of instructional technologies in the educational process has been included in the training programs and studies and discussions about the effective use of them have been done intensely [10, 11, 12]. By using instructional technologies in the educational process, students can learn according to their own pace, can make boring topics for the students interesting and fun; teachers can

use the time effectively and efficiently during the lesson [13] The development of science and technology has contributed greatly to progress in various fields of life. One of the obvious effects of technological development is advances in education, which has led to the term educational technology. In Indonesia, educational technology is used for the development of learning media, for example in learning mathematics by using multimedia technology to create a learning media. Puput argues that "Learning media is an intermediary used to convey information in order to stimulate students to learn. The existence of media is expected to be an easier learning process for students and teachers because learning media can overcome the limitations of space and time in learning"[14]. According to Sadiman in (Puput, 2019) the media is everything that can be used to channel messages from the sender to the recipient so that it can stimulate the mind, feelings, attention, and interests and attention of students in such a way that the learning process occurs [14]. Learning media has many benefits in the teaching and learning process as stated by sandra the benefits of learning media include: "supporting conceptualization and contextualization of the new material being presented, actively involving the learner in the learning process, and promoting internal reflection" [15]. Meanwhile, according to Ghulam, the function of learning media can be emphasized as follows: arouse the interest of learners and help the teachers to explain the concepts easily [16]. Learning media is very important to activate students during learning and teaching as Sri said: "messages or information brought by instructional media can be in the form of messages prepared to meet the learning needs and students' abilities so students can actively participate in the learning process" [17]. In addition, according to Nasutio in (sri, 2018) the learning media is "a component that is interconnected with other components in order to create expected learning situations, abstracts the abstract so as to reduce the occurrence of verbalism disease, increase student stimuli in learning activities, reduce misunderstandings of learners to the explanations given educators, The limited experience possessed by the learners, enabling direct interaction between learners with their In addition to good learning planning, the success of teaching and learning process is also influenced by the suitability between the subject matter and the level of students' thinking ability" [18]. Based on the results of observations conducted at Muhammadiyah 1 Middle School in Depok on 01 October 2018 it was found that the character of student honesty was still lacking, this was indicated by the majority of students who cheated when working on the training questions given by the teacher, besides being asked about understanding material mostly students will answer understanding, but when they are forward to work on the questions in front of them they cannot do it even though the questions are only changed from the questions that are used as examples at the beginning. Based on the results of interviews conducted with mathematics teachers and Muhammadiyah 01 Depok Middle School students on October 1, 2018, it can be concluded that mathematics learning is still considered difficult to understand, especially in social arithmetic learning, students are still difficult to translate story problems into mathematical models, other than Until now, teachers have never used character education-based learning media to help facilitate the teaching process and improve students' honesty character. According to Yplanita Safitri, S.Pd, Mathematics teachers at Muhammadiyah 1 Public High School in Depok "have never used interactive learning media based on character education, the media used are only textbooks and whiteboards, the method used is only the lecture method, question and answer and raising questions about practice, things that cause teachers to be more active than students besides the character of honesty which is one of the core competencies students must possess based on the 2013 curriculum have not been integrated with mathematics learning materials properly ". Based on these considerations, it is deemed necessary to have an interactive compact disk (CD) learning media that is innovative and helps mathematics teachers in teaching and is expected to attract students 'learning interest in learning and also be able to improve students' honesty character. In the development of interactive CDs, it must pay attention to the basic concepts of mathematics to be taught, students' initial abilities, aspects of interrelationship mathematical material using Macromedia Flash software. Because Macromedia flash is able to function as a medium for presenting information in the form of text, graphics, simulations, animations and exercises, quantitative analysis and direct feedback. This study aims to design mathematical learning media based on character education

2. RESEARCH METHOD

This type of research is included in the development research, namely the development of interactive learning media using professional Macromedia flash 8. The product produced in this study is the design of mathematics interactive media learning media based on character education using Macromedia flash 8. In the preparation of instructional media design, it is necessary to hold the basic principle known as instructional design (instructional design) which is a systematic process to produce learning material effective, detailed and detailed, including the process and form of evaluation that must be carried out. The development model used in this study is the ADDIE model, namely the model of analysis, design, development or development, implementation and implementation and evaluation [19, 20, 21, 22, 23, 24, 25, 26, 28]. remarked that: ADDIE model is one of the most common models used in the instructional design field a guide to producing an effective design. Visually the ADDIE stage can be seen in Figure 1
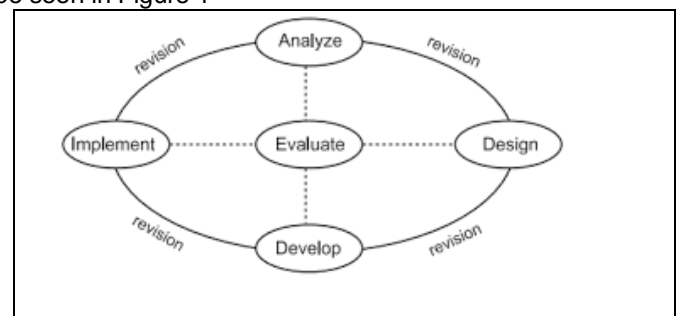

Figure 1. The EDDIE Concept [19]

However, in this study only limited in two stages, namely the analysis and design stages. The stage of analysis (analysis) carried out in this study is divided into 3 namely needs analysis, situation analysis, and technical analysis. The results of the analysis are used as a basis for developing products in the form of interactive mathematics learning media based on character education by using Macromedia Flash 8. The design

phase that is carried out in this study starts from designing a flowchart and designing the display. The third stage is development (development), the fourth stage is implementation (implementation) which is the application of the product that has been made, and the fifth stage is evaluation (evaluation) that is carried out to assess the overall product that has been made and implemented. The instruments of data collection are questionnaires to determine product feasibility, observation guidelines, and interview guidelines. The type of data produced is qualitative data in the form of the use of school curriculum, student characteristics, depth of material and input from media experts and material experts while quantitative data in the form of scores from the results of due diligence from material experts and media experts. The subjects in this study were seventh-grade students of Muhammadiyah 1 Depok Middle School. The data analysis technique used is descriptive data analysis techniques.

3. RESULTS AND DISCUSSION

This research was conducted by designing mathematics interactive learning media based on character education using Macromedia flash 8 professionals. The following are the results of the module development design through the analysis and design stages in ADDIE

1. Analysis phase

This stage the researcher conducted several analyzes to provide an overview of the learning media developed. The process of analysis is very important in terms of this development because the results of the analysis obtained are a reference in making learning media. The analysis carried out to support the development process is

a. Need analysis

To determine the analysis of learning media needs, interviews were conducted with teachers at Muhammadiyah Middle School 1 Depok. This aims to determine the learning process in the classroom by the teacher. The data obtained from the interviews are as follows:

1) Generally, teachers teach using lecture and question and answer methods
2) The need for mathematics learning media, to facilitate learning faced by students.
3) Mathematics learning, especially social arithmetic material requires learning media as an innovation in the use of learning media because arithmetic material contains many stories so that a learning media is needed so that students when learning do not get bored or even bored

b. Material analysis

This study researcher chose teaching material developed. The selection of the material developed was done by consulting with the seventh-grade mathematics teacher Muhammadiyah 1 Depok.The material chosen is Social Arithmetic, because this material requires clear visualization so that it is easier for students to understand the material.

c. Technology analysis

Technology analysis is done to find out the software that is in accordance with the ability of researchers and the development of learning media. In this study researchers used Macromedia flash 8 professionals because professional Macromedia Flash 8 is a software commonly used to create animations so that researchers make it easier to create learning media that can attract students' attention.

2. Design

After the next stage of analysis is the design/design stage. Steps to create a design that is

a. Design learning media

This process begins with compiling the flow of making learning media that is developed in the form of a navigation structure. The navigation structure in question is presented in Figure 2
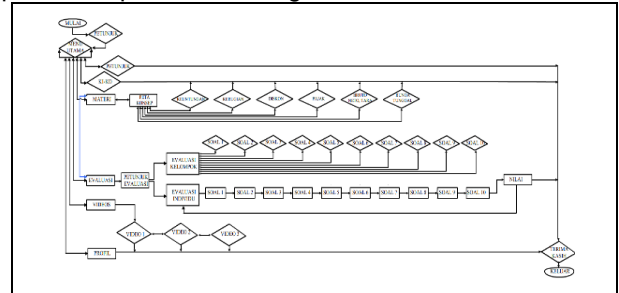

Figure 2. *Flowchart navigation structure*

After making the learning flow, then composing a learning media design that is used to facilitate researchers in developing learning media. The design of the learning media used is in the form of storyboards. The instruments used were interview interviews and questionnaire guidelines. Data analysis techniques used were analyzing each questionnaire item, both questionnaires of material experts, media experts, and quantified student responses.

b. Display design

Make the design of interactive mathematics learning media based on character education by using professional Macromedia flash 8 on the subject of social arithmetic.

1) Opening display design (Intro)

The visual display design is a display of learning media before the user will start using learning media. The opening display design (intro) can be seen in the figure below:
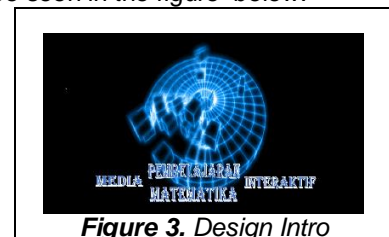

Figure 3. Design Intro

2) Design the main menu display

The main menu contains learning media menus, exit buttons, full-screen display buttons, and small, time and date, volume adjustment buttons. The following display the main menu before and after input from the validator
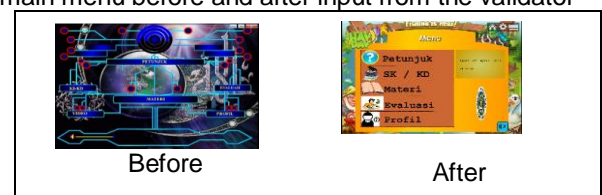

Before   After

Figure 4. Design main menu

3) Design display menu instructions

Display the instructions menu contains instructions for using interactive learning media design display instructions can be seen in the following:
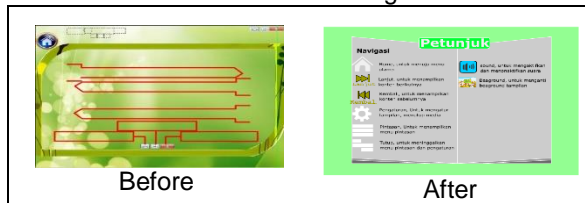

Figure 5. *Design menu instruction*

4) Design display menu material
The material menu display is a display of teaching materials for users that contain social arithmetic material to be taught. There are two views on the material menu, including the concept map display and material sheet display

    a) Design a concept map display
Concept map design is the initial display when entering the material menu in the concept map display there are several quick shortcut keys such as buttons to pages of losses, profits, taxes, and others. The design of the concept map display can be seen in Figure 6 below :

Figure 6. *Design a concept map*

b) Design of material menu displays in subtitles.
Material menu design in subtitles is a design where there is a board that contains social arithmetic material. The design of the material menu display in the subtitles can be seen in Figure 7 below

Figure 7. *Design of material menu display in subtitles*

    5) Design display menu KI-KD
The KI-KD display design contains a description of Core Competencies and Basic Competencies. The detachment of the appearance of KI-KD can be seen in Figure 8 as follows

Figure 8. *Design menu KI-KD*

    6) Design display menu evaluation
The evaluation menu display design contains exam questions that must be answered by students. The evaluation menu display design can be seen in Figure 9 below
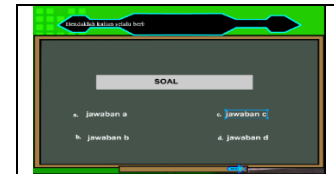

Figure 9. *Design menu evaluation*

7) Design profile menu display
The design of the profile menu display contains photos and biodata of researchers (learning media makers). Display profile menu can be seen in figure 10 as follows

Figure 10. *Design profile menu*

    8) Design display menu video
The design of the video menu display contains a design about the video that will be input into the learning media. The video menu display design can be seen in Figure 11:
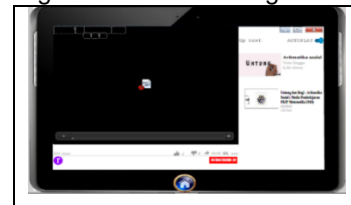

Figure 11. *Design menu video*

1. Input and Follow Up from the validator
    There are some suggestions and inputs from the validator related to the design of learning media that are developed including the following table 1:

Table 1. *Input from validator*

No	Input / Suggestion	Follow-up
1	The main menu display is too complicated	The appearance of the main menu has been made easier
2	Show material illustrations on the main menu	Material illustrations on the main menu have been added
3	Use a non-contrast background on the instructions menu	background on the instructions menu has been fixed

4. CONCLUSION

The results obtained indicate that the design of interactive mathematics learning media based on character education has been carried out at the analysis and design stages. At the analysis stage, the researcher grouped into three namely needs analysis, material analysis, and technical analysis. In the needs analysis, it is obtained that the teacher needs a medium of learning mathematics to support the learning process of teaching in class. In the material analysis, it was found that the material chosen was social arithmetic material because students were less skilled in translating story questions into mathematical models. Whereas in the analysis of technology, Macromedia Flash 8 was chosen as the main software in the development of learning media. At the design

stage, the researcher designed several parts including intro design, main menu, profile menu, KI-KD menu, evaluation menu, material menu, and video menu. After this research was carried out, the next research was the development of interactive learning media based on character education until the stages of developing, implementing and evaluating ADDIE were carried out

ACKNOWLEDGMENT

REFERENCES
[1] Subroto, and T. Waspodo, "Entrepreneurship Development Course To Foster Character Merchandise In Support Economic Growth," Asian Economic and Financial Review, pp. 762, 2013.

[2] M.W. Berkowitz, and J.H. Grych, "Early Character Development and Education", pp. 55-72, 2000.

[3] C. Clark, "Discipline in Schools," Department of Educational Studies, Goldsmiths College London, British Journal of Educational Studies., pp. 289-301, 2010.

[4] Eliasa, E. Imania, "Increasing values of teamwork and responsibility of the students through games: Integrating education character in lectures," Procedia-Social and Behavioral Sciences, pp. 196-203, 2014.

[5] Battistich, and Voctor, "Character Education," Prevention and Poditive Youth Development, Illnois, University Of Missouri, 2007.

[6] H.R. Stiff-Williams, "Widening the Lens to Teach Character Education Alongside Standards Curriculum" The Clearing House, A Journal of Educational Strategies, Issues and Ideas, pp. 115-120, 2010.

[7] A. Lukman, M. Mahani, H. Zainudin and Z. D. S. Siti, "How to Develop Character of Madrassa Students in Indonesia" Journal of Education and Learning. Vol. 9(1) pp. 79-86, 2015.

[8] M. Irfan, "Role of Learning Mathematics in the Character Building," Responding to Current Issues, Universitas Negeri Malang, 2016.

[9] H. Sarac, "Use of Instructional Technologies by Teachers in the Educational Process," Metaphor Analysis Study, European Journal of Educational Research, pp. 189-202, 2018.

[10] M. Akin, "Bilgisayar ve internet teknolojilerinden yararlanmanin uygulama alan bilgisi olusturma yonunde etkisi [Use of computer and internet technologies to create application knowledge]," Erzincan Education Faculty Journal, pp. 49-70, 2007.

[11] I. H. Demircioglu, and Turan, I. (Eds.), "Tarih ogretiminde ogretim teknolojileri ve material tasarimi [Instructional technologies and material design in history teaching]". Pegem Akademi, 2012.

[12] A. G. Ozyilmaz, "Ilkogretimde analojiler, kavram karikaturleri ve tahmin-gozlem-aciklamas teknikleriyle desteklenmis fen ve teknoloji egitiminin ogrenme urunlerine etkisi [The effect of science and technology education supported by analogies, concept cartoons and prediction-observation-explanation techniques in elementary education on learning products]," Unpublished Doktoral Thesis, DEU, Institute of Educational Sciences, Izmir, 2008.

[13] Er. T. Dede, O. F.Sen, U. Sari, and H. Celik, "Ilkogretim ogrencilerinin fen ve teknoloji dersi bilgilerini gunluk hayatla iliskilendirme duzeyleri [The levels of primary school students' knowledge of science and technology lessons in relation to daily life]," Journal of Education and Training Research, pp. 209-216, 2013.

[14] Septianingsih, and Puput, "The Difference of Student's Score in The Process of Image Capturing Between Macromedia Flash and PowerPoint Learning Media in Class XI of SMK 1 Samarinda," Educational Sciences International Conference (ESIC 2018). Atlantis Press, 2019.

[15] Cairncross, Sandra, and M. Mike, "Interactive multimedia and learning: Realizing the benefits." Innovations in education and teaching international, pp. 156-164, 2001.

[16] Shabiralyani, and Ghulam, et al. "Impact of Visual Aids in Enhancing the Learning Process Case Research: District Dera Ghazi Khan," Journal of Education and Practice, pp. 226-233, 2015.

[17] S. A. Widodo, "Selection of Learning Media Mathematics for Junior School Students," Turkish Online Journal of Educational Technology-TOJET, pp. 154-160, 2018.

[18] N. Aldoobie, "ADDIE Model," American International Journal of Contemporary Research, pp. 68-72, 2015.

[19] S. M. Alnajdi, "The Effectiveness of Designing and Using a Practical Interactive Lesson Based on ADDIE Model to Enhance Students' Learning Performances in University of Tabuk," Journal of Education and Learning, pp. 212-221, 2018.

[20] N.R. Wahyuaji and Suparman, "Development of STEM Integrated E-Learning Design to Improve Student's Creative Thinking Capabilities," International Journal of Scientific & Technology Research, vol. 8, issue 10, pp. 1164-1168, 2019.

[21] B.P. Syafina and Suparman, "Designing Student Worksheets to Improve Critical Thinking Ability Based on Problem Based Learning," International Journal of Scientific & Technology Research, vol. 8, issue 10, pp. 1194-1199, 2019.

[22] Isnaepi and Suparman, "Design of Moodle-Based Mathematics Learning to Improve Spatial Ability for Class XII High School Students," International Journal of Scientific & Technology Research, vol. 8, issue 10, pp. 1174-1177, 2019.

[23] L.F. Nuari and Suparman, "Designing Worksheets for the Mentally Retarded Student in Multiplication Operations," International Journal of Scientific & Technology Research, vol. 8, issue 10, pp. 3579-3584, 2019.

[24] M. Faulina and Suparman, "Design Guided Discovery Student Worksheets to Construct the Understanding of the Blind," International Journal of Scientific & Technology Research, vol. 8, issue 10, pp. 3685-3689, 2019.

[25] N.L. Fitri and Suparman, "Designing Worksheet Using the Context of Sugarcane," International Journal of Scientific & Technology Research, vol. 8, issue 10, pp. 3669-3672, 2019.

[26] Suhendri and Suparman, "Development Mathematics Modules Based on Guided Discovery Learning to Improve Creativity Skills of Blind Students," International Journal of Scientific & Technology Research, vol. 8, issue 10, pp. 1169-1173, 2019.

[27] S. Solihati and Suparman, "Design of Mathematics Module Development Based on PMRI to Improve Critical Thinking Ability Students of Class VIII Junior High School in Indonesia," International Journal of Scientific & Technology Research, vol. 8, issue 10, pp. 3673-3679, 2019.