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Analysis of Multimedia Physics Learning in Integrated Package Learning Tools on Senior High School

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ABSTRACT

Use of multimedia Learning physics is a must for a physics teacher so that learning can take place well . This research aims to develop and analysis of multimedia physics learning integrated with packing preparation of learning tools in senior high school by using adobe animate application. This research method used is Research and Development (R & D) with ADDIE's model. Method steps include analysis, design, development, implementation and evaluation and then empirical analysis with use it in limited class. The instrument of learning device validity developed consisted of aspect of planning, pedagogic, content and technique. The result of multimedia validation in aspect of planning got the average mark was 0.91 with high category, aspect of pedagogic is 0.94 with high category, aspect of content is 0.96 with high category and aspect of technique is 0.90 with high category empirical analysis show that $\alpha = 0.82$ so multimedia in this research was declared valid and reliable to use as physics learning media for senior high school.

1. Introduction

Physics is one of the subjects that definitely learn about the natural order. One branch of physics is kinetic. Kinetics is a branch of physics that studies the motion of an object without taking into account the forces that cause the object to move. Physics is generally studied with simple physics training tools whose measurements are still done manually. In physics training, the ease and simplicity of doing the task is one of the demands that need to be considered because in addition to being able to boost training progress, it also optimizes training time.

The main purpose of the learning process is to achieve the learning objectives supported by various components of learning. Students and teachers are a major component of the learning process Setyawan et al., (2020). Physics as one of the lessons is considered essential, but the phenomenon of physics is one of the lessons

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that found as painful lessons (Nasir et al., 2018). There are three main causes of students having difficulty learning physics Erinosho (2013), teacher factors, natural factors and curriculum factors. Students find it difficult to understand physics lessons that are determined by the curriculum, which only provides a numerical example and gives a minimum real example.

Physics is an empirical science. Experimental results should support physics. The results of experiments used to explore information form further theory Mayub (2014), however, Setiabudi (2005) limited laboratory use due to lack of available labor tools. According to (Nasir, 2017; Jasmy et al., 2014), media is needed that can help students understand physics learning. While the previously available learning media still seem monotonous, (Nasir, 2017), so that the learning interest of students in physics is less high. It also causes physics material difficult for students to accept because of the lack of available interactive learning media. Latief (2010), in Kompas.com said that less attractive learning process makes the absorption of students in the lesson not optimal. The results of the study "The Portrait of Professionalism of Yogyakarta City Teachers in Teaching and Learning Activities" conducted by the Yogyakarta City Education Research Network (JP2KY) in early 2010 showed that 75 % of the teachers in the study participants had not used teaching and learning media. It is consistent with the results of research (Nasir, 2018).

External factors that are quite influential on students' learning difficulties in the aspect of teacher methods are precisely on indicators of the use of instructional media, the use of instructional media by teachers is the most challenging indicator of students' physics learning. In general, the teachers of Pekanbaru State High School have not used instructional media which should be able to help teachers in explaining physics concepts to students. According to Hamdani (2017) actually, the teachers have known a lot of different types of learning media, but lack time to explore one of the tools in making learning media. As a result, teachers are more comfortable by just downloading from the internet.

Rahmah (2014), states that the teacher has used media in the form of PowerPoint, but the media used is still not attractive, this is because the display of the media can not motivate students to follow the learning process, lack of images or animation, no musical instruments, and there are no interactive evaluation questions. Teachers often neglect to prepare learning tools Pradnyana (2016), Preparations for teaching must have usually been developed by teachers before the lesson. However, not a few teachers are sometimes reluctant to make teaching preparations. It is possible because of busyness at home or individual problems. Teachers also often forget to bring learning tools when teaching even though they have or have prepared it well; it based on the observations of Tomi et al., (2010), at the same time, other learning tools such as syllabus, lesson plans and others not carried by the teacher.

Oemar Hamalik said, in Alwi (2017), the teacher responsible for carrying out educational activities in schools means providing guidance and teaching to students. This responsibility has realized in the form of implementing curriculum coaching, guiding students to learn, fostering students' personal, physical and physical

characteristics, analyzing learning difficulties and assessing students' learning progress.

The role of teachers is the key to success in developing the mission of education and teaching in schools in addition to being responsible for managing, directing and creating a conducive atmosphere that encourages students to carry out activities in the classroom. Haris (2015), given the very complex goals of education, how big and heavy the task of an educator is in creating quality educational outcomes. While HM. Arifin in (Bakri et al., 2020), states that teacher's teaching skills are the most dominant factor in transferring knowledge to students. It can overcome students boredom in learning, create creativity and enjoyable learning atmosphere. Shana & Abulibdeh (2020), stating the use of instructional media in the teaching and learning process can generate new desires and interests, create motivation and stimulation of learning activities, even able to bring psychological influence on students. Based on the above explanation, it is necessary to build and analyze engaging learning media that integrated with learning tools.

The formulation of the problem in this study is "How to analysis and what result of analysis multimedia of physics learning as tool of learning media?" The purpose of this study is to be able to analysis media that can increase students' self-efficacy at the high school level. It is hoped that this research can be used as a solution to face the low self-efficacy of students, provide input in the selection of learning media and can be a reference for various parties, especially teachers in the field of physics to be more innovative. . So that learning materials that are difficult and reduce students' self-efficacy can be helped to facilitate their understanding using mobile augmented reality better.

2. Methodology

Research method that were used is research and development (R&D). Object in this research is a counting parabolic motion app. The research procedure refers to ADDIE steps. But in this research the ADDIE steps were not done completely. The steps taken are analytics, design, development, and tools testing. This research was conducted at SMA Muhammadiyah 1 Pekanbaru, SMA PGRI Pekabaru, MAN 2 Model Pekanbaru, SMA N 1 Pekanbaru, SMA N 8 Pekanbaru, SMA Plus Bina Bangsa Pekanbaru, MA Ihsan Boarding School and SMK Aviation Pekanbaru in a span of four months, namely in March to June 2019. This research is a research and development (Research and Development) using the ADDIE type of instructional media design model

The subject of this research is three-dimensional animation learning media with Blender application on the subject matter of atomic nuclei. The data needed in this study is the respondent's assessment score through the research instrument in the form of a media assessment questionnaire sheet. Respondents consisted of 30 students of class XI SMA from SMA Muhammadiyah 1 Pekanbaru (User), 20 Physics Teachers (Expert User) and 11 physics teachers teaching over 10 years (Expert). The grid of the questionnaire sheet (Nasir et al., 2018) for this user

consists of 5 indicators, namely motivation, display design, interaction design, atomic nucleus material and ease of use. As for the expert, it consists of 4 indicators, namely learning strategies, appearance and aesthetic design, interaction design and motivation. The data analysis technique used in this research is descriptive statistics. Descriptive statistics are used to analyze data by describing or describing the data that has been collected (Nasir et al., 2019; Nasir et al., 2018). Data processing is done by editing, coding and tabulation. The validity test analysis was carried out as follows: First, using the average formula [19] for expert respondents (Expert) as follows: a. Determine the average score of each item from all validators: = Average of the i-th indicator = Score of the j-th validator's assessment results against the i-th criterion = Number of validators b. Determine the average value of the average item for each indicator: = Average of the i-th aspect = average of the i-th indicator = Number of validators c. Determine the average value of the four assessment indicators: = Average total validity of the media = Average aspect of the i = Number of validators d. Categorization of the average value of validity based on the Likert scale (Nasir et al., 2018).

The current research used the ADDIE instructional design (ID). The design model of ADDIE consists of 5 stages: Analysis, Design, Development, Implementation, and Evaluation (Nasir et al., 2018). This approach based on research objectives, which are to design, to create, and to validate physics learning media. Detail implementation ADDIE ID Models as show Figure 1.

The data of this study are assessment scores from questionnaires by experts (lecturers) and expert users (teachers). The instrument for collecting data in the study is a validation questionnaire. The empirical questionnaire analysis of the use of multimedia used adapted (Shana & Abulibdeh, 2020) with the indicators presented in Table.1 and the validity category of each aspect in Table 2.

Table 1. Empirical Analysis Questionnaire Indikator

No	Indicator	Number of Item Quest	Item Number
1	Design	10	1,2,3,4,5,6,7,8,9,10
2	Pedagogy	4	11,12,13,14
3	Content	7	15,16,17,18,19,20,21
4	Technical	8	22,23,24,25,26,27,28,29

Table 2. Instrument Assessment Category

Score (r)	Validate
$0.8 \leq r \leq 1.0$	Valid
$0.6 \leq r < 0.8$	Valid
$0.4 \leq r < 0.6$	Valid
$0.2 \leq r < 0.4$	Not Valid
$0.0 \leq r < 0.2$	Not Valid

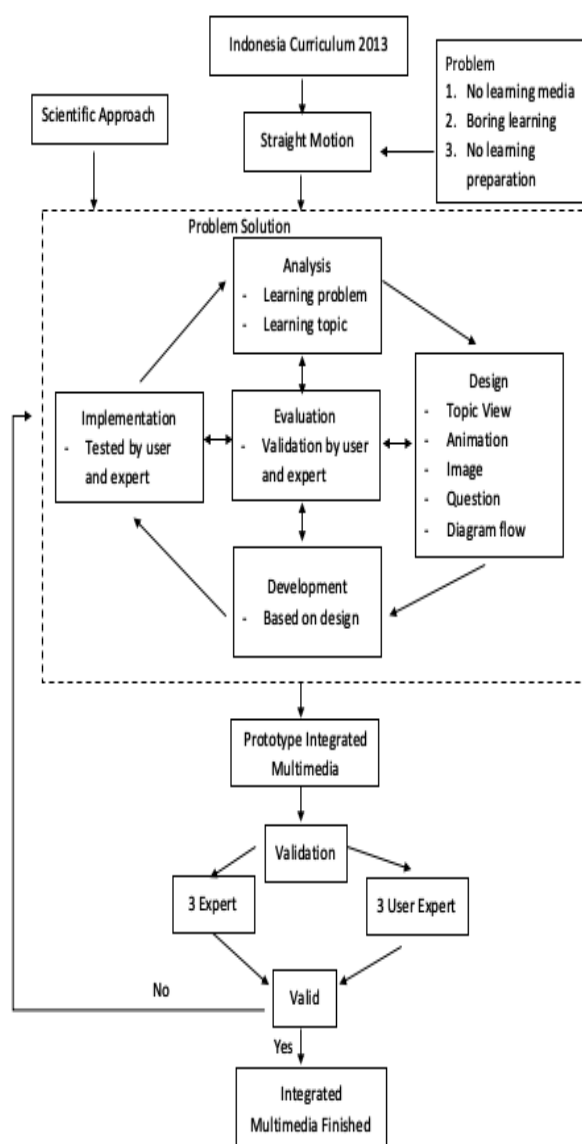


Figure 1. Step of using ADDIE – ID Model

3. Results and Discussion

Learning media designed with learning theory, learning behaviorism, Learning cognitivist and learning constructivism. The approaches and strategies used were scientific, versatile and active. These approaches choose to assist the teacher in carrying out the learning of vector. Learning media is made using a computer in good specs for blender application, with dual core Processor and 2GB RAM. Based on Blender specifications this part of the computer is in good standing to run application. Many changes occur during the media process development. The changes are good in terms of form, or in terms of performance improvement.



Figure 2. Main Menu



Figure 3. Sub-Menu Competence or Indicator

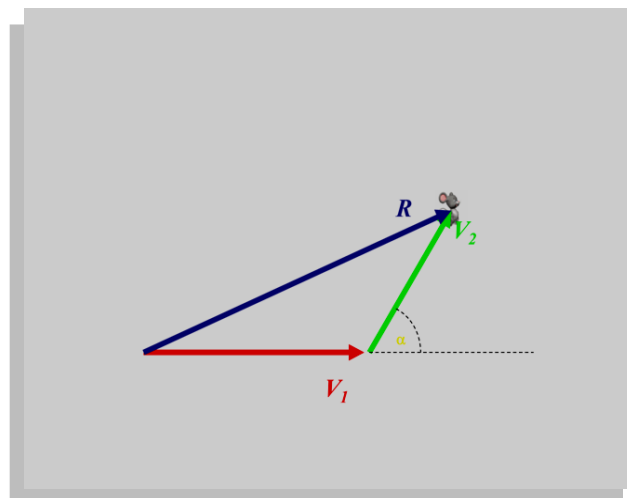


Figure 4. Simulation and Analysis Vector

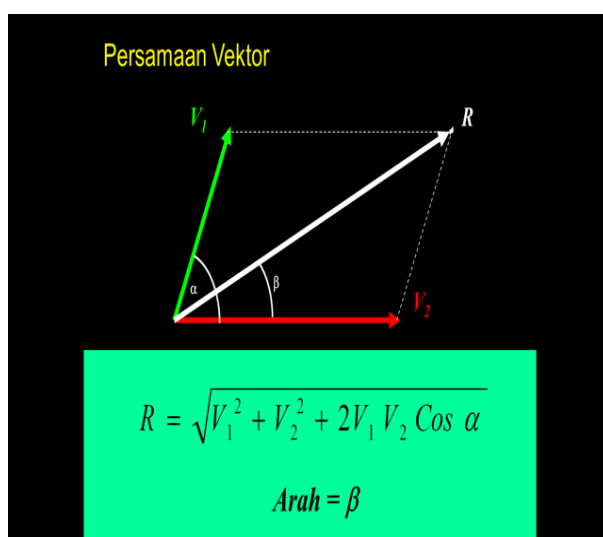


Figure 5. Solution of Vektor Componen



Figure 6. Sub-Menu Evaluation

Display of integrated physics learning media as fig 2, fig.3, fig.4, fig.5, fig.6, and fig.7. Each item showed the final product of learning media. The results of the learning multimedia validation are valid with the values to show Table 3.

Table 3. Validation of Media by Aspect

No.	Aspect	Score	Category
1	Design	0.904	Valid
2	Pedagogy	0.906	Valid
3	Content	0.908	Valid
4	Tecnical	0.904	Valid
Mean Validity		0.96	

4. Conclusion

Based on the results of the analysis of the development of integrated physics learning multimedia with the preparation of packaging of learning devices in high school about straight motion is made by performing the stages of Analysis, Planning, Development, Implementation and Evaluation. The results of media validation on each aspect that has been done get an average validation value of 0.96, then this multimedia is declared valid and feasible to be used as a learning media for high school physics.

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References

- Setyawan, A., Aznam, N., Paidi, P., & Citrawati, T., (2020). Influence of the use of technology through problem based learning and Inkuiri models are leading to scientific communication students class VII. *J. Technol. Sci. Educ.*, vol. 10, no. 2, p. 190, doi: 10.3926/jotse.962.
- Nasir, M., Prastowo, R.B., & Riwayani, (2018). An analysis of instructional design and evaluation of physics learning media of three dimensional animation using blender application. in *Proceedings - 2018 2nd International Conference on Electrical Engineering and Informatics: Toward the Most Efficient Way of Making and Dealing with Future Electrical Power System and Big Data Analysis, ICon EEI 2018*, pp. 36–41, doi: 10.1109/ICon-EEI.2018.8784309.
- Erinosh, S.Y., (2013). How Do Students Perceive the Difficulty of Physics in Secondary School? An Exploratory Study in Nigeria. *Int. J. Cross-Disciplinary Subj. Educ.*, vol. 3, no. Special 3, pp. 1510–1515, doi: 10.20533/ijcdse.2042.6364.2013.0212.
- Mayub, A., (2014). *e-Learning Fisika Berbasis Macromedia Flash MX*. Yogyakarta: Graha Ilmu.
- Setiabudi, N.W., (2005). Pengembangan Media Pembelajaran Berbasis Multimedia Untuk Mata Pelajaran Fisika Bahasan Kinematika Gerak Lurus. *Fak. Tek. Univ. Negeri Semarang. Semarang*.
- Nasir, M., (2017). Design and Empirical Analysis Visualization Motion And Vector Analysis Program As Interactive Multimedia Physics Learning at Senior High School, Pekanbaru, Indonesia. *Appl. Sci. Technol.*, no. 1, pp. 240–247, [Online]. Available: <http://estech.org/index.php/IJSAT/article/view/41>.
- Jasmy, M., Arif, M., & Nasir, M., (2014). Development and evaluation of the effectiveness of computer-assisted physics instruction. *Int. Educ. Stud.*, vol. 7, no. 13, pp. 14–22, 2014, doi: 10.5539/ies.v7n13p14.

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- Nasir, M., (2017). Design and Empirical Analysis Visualization Motion And Vector Analysis Program As Interactive Multimedia Physics Learning at,” *Appl. Sci. Technol.*, vol. 1, no. 1, pp. 240–227, 2017, [Online]. Available: <http://www.estech.org>
- Latief, (2010). Ah, Pengajaran Guru Masih Membosankan! Artikel ini telah tayang di Kompas.com dengan judul ‘Ah, Pengajaran Guru Masih Membosankan!’, Klik untuk baca: <https://edukasi.kompas.com/read/2010/05/25/11123511/Ah.Pengajaran.Guru.Masih.Membosankan>. Download aplikasi, *edukasi.kompas.com*, Jakarta, p. Kompas.com-25/05/2010, 11:12 WIB Artikel ini tel, 2010
- Nasir, M., (2018). Efforts to Improvement Learning Results Though Use Integrated Physics Learning Multimedia in the Senior High School (SMA) 12 Pekanbaru. *J. Geliga Sains J. Pendidik. Fis.*, vol. 6, no. 2, pp. 105–113.
- Hamdani, RM., (2017). Seminar Intenasional Penerapan Ilmu Pengetahuan dan Teknologi. in *Buku 4 Hamdani., Reni Marlina*, pp. 41–48.
- Rahmah, F.J., (2014). Pengembangan Media Pembelajaran Multimedia Interaktif pada Kompetensi Dasar Jurnal Penyelesaian Perusahaan Dagang Kelas X AK,” *J. Pendidik. Akunt.*, vol. 2, no. 2, [Online]. Available: <https://ejournal.unesa.ac.id/index.php/jpak/issue/view/714>
- Pradnyana, R., (2016). Pentingnya Persiapan Mengajar dan Jangan Diabaikan. <https://www.riyanpedia.com/2016/11/pentingnya-persiapan-mengajar-dan-jangan-diabaikan.html> (accessed Mar. 20, 2020)
- Tomi, T.P., & Afriliani, D., (2010). Penggunaan Perangkat Pembelajaran Matematika di SMP Negeri 12 Padang, Padang.
- Alwi, S., (2017). Problema Guru dalam Pengembangan Media Pembelajaran. *J. Itqon*, vol. 8, no. 2.
- Haris, M., (2015). Pendidikan Islam Dalam Perspektif Prof. H.M Arifin, VI, No 2, September 2015, *J. Ummul Qura*, vol. 6, no. 2.
- Bakri, F., Permana, H., S. Wulandari, S., & D. Muliyati, D., (2020). Student Worksheet with AR Videos: Physics Learning Media in Laboratory for Senior High School Students. *J. Technol. Sci. Educ.*, vol. 10, no. 2, p. 231, Jul. 2020, doi: 10.3926/jotse.891
- Shana, Z., & Abulibdeh, E.S., (2020). “Science practical work and its impact on students’ science achievement,” *J. Technol. Sci. Educ.*, vol. 10, no. 2, p. 199, Jul. 2020, doi: 10.3926/jotse.888
- Nasir, M., Z. Fakhruddin, Z., & Prastowo, R.B., (2019). Development of Physics Learning Media Based on Self-Efficacy Use Mobile Augmented Reality for Senior High School,” in *Journal of Physics: Conference Series*, 2019, vol. 1351, no. 1, doi: 10.1088/1742-6596/1351/1/012018

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