Development of Kamosu Learning Media for Rotation Dynamics Materials

Susi Badriyah[1], Muhammad Minan Chusni[1*], Endah Kurnia Yuningsih[1]
[1]*Department of Physics Education, UIN Sunan Gunung Djati Bandung, Jl. AH Nasution No. 105 Bandung, Indonesia*

Keyword: Kamosu, Media, Rotational Dynamics.

Abstract: This research aims to determine the feasibility of learning media in the form of Kamosu (Kayu Momentum Sudut) practicum tools. The development of Kamosu practicum tools refers to previous research conducted by Sri Jumini and Lilis Muhlisoh. This type of research is a development research with ADDIE model. This research procedure follows the steps of the ADDIE model, namely Analysis, Design, Development, Implementation, and Evaluation. Data collection techniques in this study are by distributing expert assessment questionnaires and student questionnaire responses. Based on the results of the expert assessment, Kamosu practicum equipment is suitable for use in the learning process with a percentage of 90.48% feasibility. The results of the questionnaire responses of students that amounted to 81.90% stated that students responded well to the use of Kamosu practicum tools. Based on the research that has been done, it can be concluded that the Kamosu practicum learning media is suitable for use in the learning process.

1 INTRODUCTION

Natural Science, especially physics is a physical and cyclic knowledge which includes processes, products and scientific attitudes that are interconnected and explain the measurement of natural symptoms through observation and research (Yuliani, 2012). One of the most important goals of science education is to teach students to be directly involved in the investigation process (Zeidan & Jayosi, 2015). A teacher as an educator must carry out the learning process in the classroom with a pleasant, interactive atmosphere and involve students directly. The interactive learning process can be done by the teacher by using assistance including approaches, methods, models, and learning media. Learning methods that are supported by instructional media and innovative practicum kits are one of the potential to create an interesting learning process, so as to motivate students to be more active in the learning process (Wicaksono, 2016). Physics learning is more fun and easily understood by students if the process uses practical tools (Hamdani, Kurniati, & Sakti, 2012).

Material in physics is generally abstract and difficult to understand including material dynamics of rotation. Rotational dynamics is one of the physics material that becomes a difficulty for students (Rimoldini & Singh, 2005); (Álvaro, Moreira, & Sahelices, 2009). Therefore, learning media is needed to help the learning process become more interactive and fun for students so that they are able to receive and understand material easily. The design of learning media based on a development model in an effort to facilitate the teaching and learning process is an alternative to improve the learning process (Nurjanah, Sukarmin, & Rahardjo, 2014) (Yuningsih, Chusni, & Sidik, 2018).

2 METHOD

The type of research used is the development research with ADDIE model. The ADDIE model stages are Analyze, Design, Development, Implementation, and Evaluation (Aldoobie, 2015) (Sugiyono, 2010). The analysis phase is to find problems by means of needs analysis, media analysis, curriculum analysis and literature study. The design stage is done by designing learning media and selecting materials. Kamosu learning media is developed from a pre-existing practicum tool (Jumini & Muhlisoh, 2013). The development process was carried out to make Kamosu learning media and validated by three

Badriyah, S., Chusni, M. and Yuningsih, E.
Development of Kamosu Learning Media for Rotation Dynamics Materials.
DOI: 10.5220/0010025300002917
In *Proceedings of the 3rd International Conference on Social Sciences, Laws, Arts and Humanities (BINUS-JIC 2018)*, pages 595-598
ISBN: 978-989-758-515-9

experts. The implementation process is carried out by the application of Kamosu learning media in the learning process of rotational dynamics at Yadika Cicalengka High School, Bandung Regency. The implementation process is also used by the Student Activity Sheet to find out the practicum process and the student questionnaire is distributed to Kamosu learning media. Evaluation or evaluation is done at the end of each ADDIE phase.

This research was conducted at Yadika Cicalengka High School, Bandung Regency with participants two expert lecturers, one physics teacher and 20 MIPA students who were divided into four practical groups. Expert validation and field testing using a questionnaire with a number of statements based on guidelines for making physics teaching aids (Jumini & Muhlisoh, 2013). The statement on the expert validation questionnaire consists of seven aspects, namely: linkages with teaching materials, suitability with the intellectual development of students, equipment durability, accuracy of tools, efficiency of tools, safety for students, and aesthetics. The statement on the field test questionnaire consists of four aspects, namely: implementation, continuity, suitability, and acceptance (Depdikbud, 2011). These four aspects produce nine indicators, namely: ease, clarity, efficiency, maintenance of tools, durability of tools, intensity of use, compatibility with the environment, attractiveness, and acceptance. In addition to using questionnaires, the field test also used student activity sheets as practical instructions made according to the guidelines for making instructional materials (Hikmah, 2017).

The expert validation test data analysis technique is done by calculating the average score of each aspect (Depdikbud, 2008). The average score obtained was changed to the eligibility criteria according to Wisdom (Depdikbud, 2011). The eligibility criteria for learning media according to Wisdom are found in Table 1.

Table 1: Feasibility Categories of Learning Media

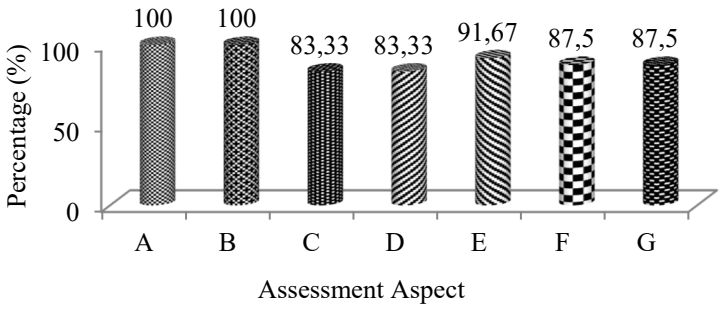
Percentage Score	Category
80% - 100%	Valid / Feasible
60% - 79,9%	Quite Valid / Quite Feasible
40% - 59,9%	Less Valid / Less Feasible
0 - 39,9%	Invalid / Infeasible

3 RESULTS AND DISCUSSION

Kamosu is a learning media in the form of practical equipment made of wood. This learning media can be used to measure the number of turns and the time required for a homogeneous rod to rotate so that the moment of inertia, angular velocity and angular momentum of the homogeneous rod can be calculated. the homogeneous rods used in Kamosu numbered three homogeneous stems with different masses. Kamosu development results can be seen in Figure 1.

Figure 1: Kamosu Practicum Tool

Based on the results of expert validation, every aspect of the feasibility of the learning media is the aspect of linkages with teaching materials, the value of education, equipment durability, accuracy of tools, efficiency of tools, safety for students, and aesthetics included in the feasible category. The results of expert validation can be seen in Figure 2.



Information:
A. Relation to teaching materials
B. Value of education
C. tool durability
D. The accuracy of the tool
E. Efficiency of the tool
F. Security
G. Aesthetics

Figure 2: Results of Validator Assessment

Based on the assessment given by the expert, it can be stated that this Kamosu practicum tool can explain the phenomenon related to the angular momentum of a homogeneous rod well, can provide direct experience to students so that the acquired knowledge is more meaningful. The use of practicum tools in the learning process will facilitate students in understanding the explanation of the material being learned and the learning process becomes more enjoyable (Sukarno & Sutarman, 2014).

Kamosu practicum tool is strong enough, can be used for a long time, efficiently used in the learning process. This practicum tool is made of materials that are safe to use by students. In addition, the components of this tool are quite strong and the design of this practicum tool is attractive with an unobtrusive color.

The responses of students for each indicator include good and even very good, namely indicators of ease, clarity and compatibility with the environment (Depdikbud, 2011). The results of the student response questionnaire can be seen in Figure 3.

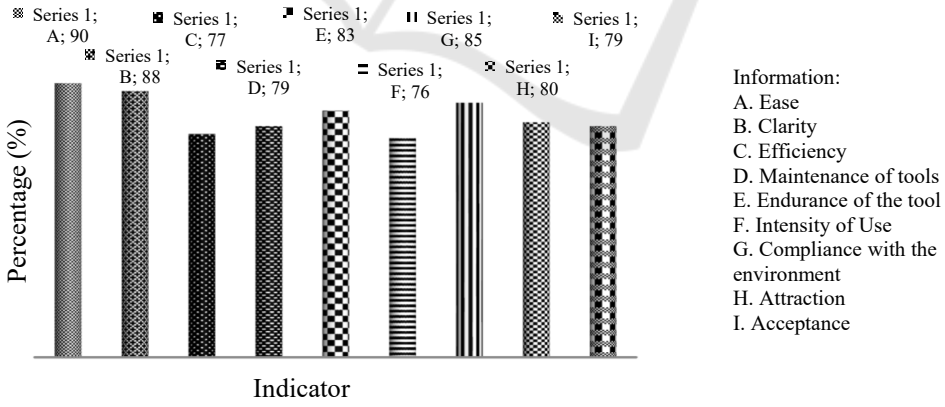


Figure 3: Results of Questionnaire Responses of Students

Based on the students' responses, Kamosu practicum tools are easy to use and can clarify the learning material, namely the rotational dynamics of angular momentum. In addition, the use of Kamosu practicum tools makes the learning process more efficient. Kamosu practicum tool is easy in terms of maintenance and durable in any condition. In addition, the Kamosu practicum tool can be used for a long period of time not only for one use. This practicum tool is suitable for use in high school and

has been able to become an interesting practicum tool that is accepted as a learning media in schools.

4 CONCLUSIONS

The conclusion of this research is that the Kamosu practicum learning media is suitable for use in the learning process of rotational dynamics material.

ACKNOWLEDGMENTS

The author would like to thank the physics teacher and students of the 11th grade of Mathematics and Natural Sciences at Yadika Cicalengka High School, Bandung Regency, two lecturers as validators, and all parties involved in this research.

REFERENCES

Aldoobie, N. (2015). ADDIE Model Analysis Phase. *American International Journal of Contemporary Research*, *5*(6), 68–71.

Álvaro, C. E., Moreira, M. A., & Sahelices, M. C. C. (2009). A research on undergraduate students' conceptualizations of physics notions related to non-sliding rotational motion. *Latin-American Journal of Physics Education*, *3*(1), 1.

Depdikbud. (2008). *Panduan Pengembangan Bahan Ajar*. Jakarta: Direktorat Jenderal Pendidikan Dasar dan Menengah Kementerian Pendidikan Dan Kebudayaan.

Depdikbud. (2011). *Pedoman Pembuatan Alat Peraga Fisika untuk SMA*. Jakarta: Direktorat Jenderal Pendidikan Menengah Kementerian Pendidikan Dan Kebudayaan.

Hamdani, D., Kurniati, E., & Sakti, I. (2012). Pengaruh model pembelajaran generatif dengan menggunakan alat peraga terhadap pemahaman konsep cahaya kelas VIII di SMP Negeri 7 Kota Bengkulu. *Exacta*, *10*(1), 79–88.

Hikmah, I. N. (2017). *Pengembangan alat peraga Seven In One pada materi fluida statis untuk siswa SMA*. Jakarta.

Jumini, S., & Muhlisoh, L. (2013). Pengaruh perbedaan panjang poros suatu benda terhadap kecepatan sudut putar. In *Prosiding Seminar Nasional Sains dan Pendidikan Sains VIII Fakultas Sains dan Matematika, UKSW Salatiga* (Vol. 4, pp. 133–138).

Nurjanah, J. R., Sukarmin, S., & Rahardjo, D. T. (2014). Pengembangan Media Pembelajaran Interaktif E-Magazine Pada Materi Pokok Dinamika Rotasi untuk SMA Kelas XI. *Jurnal Materi Dan Pembelajaran Fisika*, *4*(1).

Rimoldini, L. G., & Singh, C. (2005). Student understanding of rotational and rolling motion concepts. *Physical Review Special Topics-Physics Education Research*, *1*(1), 10102.

Sugiyono. (2010). *Statistika untuk Penelitian,*. Bandung: Alfabeta.

Sukarno, D., & Sutarman. (2014). The Development Of Light Reflection Props As A Physics Learning Media In Vocational High School Number 6 Tanjung Jabung Timur. *International Journal of Innovation and Scientific Research*, *12*(2), 346–355.

Wicaksono, A. H. (2016). Pengembangan Trainer Kit Sensor sebagai Media Pembelajaran Mata Pelajaran Sensor dan Aktuator di SMK Negeri 2 Pengasih. *Jurnal Pendidikan Teknik Mekatronika*, *6*(2).

Yuliani, H. (2012). Pembelajaran Fisika dengan Pendekatan Keterampilan Proses dengan Metode Eksperimen dan Demonstrasi Ditinjau dari Sikap Ilmiah dan Kemampuan Analisis (Studi pada Materi Pembelajaran Fluida Statis untuk Siswa Kelas XI Semester 2 SMA Negeri 1 Jakenan Pati T. UNS (Sebelas Maret University).

Yuningsih, E. K., Chusni, M. M., & Sidik, R. (2018). Electrical fall (EFA) as a learning media for electromagnetic induction. In *IOP Conference Series: Materials Science and Engineering* (p. 012287). IOP Publishing.

Zeidan, A. H., & Jayosi, M. R. (2015). Science Process Skills and Attitudes toward Science among Palestinian Secondary School Students. *World Journal of Education*, *5*(1), 13–24.