



VALIDATION ANALYSIS OF CONTEXTUAL-BASED COMIC LEARNING MEDIA DEVELOPMENT ON TORQUE CONCEPT MATERIALS IN SMA

Normilawati ^{*1}, M Aulia², H Yuliani³, Jhelang Annovasho⁴, Mardaya⁵

^{1,2,3,4,5} Tadris (Education) Physics, Institut Agama Islam Negeri Palangka Raya,

Email: ^{*1}normila02wati@gmail.com, ²maryamaulia1120@gmail.com, ³hadma.yuliani@iain-palangkaraya.ac.id,

⁴jhelang.annovasho@iain-palangkaraya.ac.id, ⁵mardayampd123@gmail.com

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Abstract

Lack of student interest in studying physics because in addition to lessons that are considered difficult, learning media are also still less attractive so that learning media are needed that can make students interested in a pleasant learning atmosphere that is supported by learning that connects material with applications that occur in everyday life such as contextual based physics comics. The purpose of this research is to produce a product in the form of contextual-based comic media on torsional concept material in high school. The analytical technique used is descriptive qualitative analysis to be able to describe the validation of the questionnaire from the validators of material experts and media experts. This study uses Research and Development (R&D) research with a 4-D model consisting of define, design, development, and dissemination stages. The research is limited due to time constraints so that it only reaches the development stage. The results of the study obtained a material validity value of 4.05 or 81% which was included in the very feasible category and the media validity value of 4.5 or 90% which was included in the very feasible category. From the results of the study, it can be concluded that the development of contextual-based comic learning media on torsional concept material in high school is very feasible to be used as a learning resource.

Keywords: Validation, learning media, comic, and contextual

Abstrak

Kurang berminatnya siswa untuk belajar fisika karena selain pelajarannya yang dirasa sulit, media pembelajarannya pun juga masih kurang menarik sehingga diperlukannya media pembelajaran yang dapat membuat siswa tertarik dengan suasana belajar yang menyenangkan didukung dengan pembelajaran yang menghubungkan materi dengan penerapan yang terjadi dalam kehidupan sehari-hari seperti komik fisika berbasis kontekstual. Tujuan dari penelitian ini adalah menghasilkan produk berupa media komik berbasis kontekstual pada materi konsep torsi di SMA. Teknik analisis yang digunakan yaitu analisis deskriptif kualitatif untuk dapat mendeskripsikan angket validasi dari validator ahli materi dan ahli media. Penelitian ini menggunakan penelitian *Research and Development* (R&D) dengan model 4-D yang terdiri dari tahap *define* (pendefinisian), *design* (perancangan), *development* (pengembangan), dan *dissemination* (diseminasi). Penelitian dibatasi karena keterbatasan waktu sehingga hanya sampai tahap pengembangan. Hasil penelitian diperoleh nilai kevalidan materi sebesar 4,05 atau sebesar 81 % yang termasuk kategori sangat layak dan nilai kevalidan media sebesar 4,5 atau sebesar 90 % yang termasuk kategori sangat layak. Dari hasil penelitian dapat disimpulkan bahwa pengembangan media pembelajaran komik berbasis kontekstual pada materi konsep torsi di SMA sangat layak untuk digunakan sebagai sumber belajar.

Kata kunci: Validasi, Media Pembelajaran, Komik, Kontekstual

I. INTRODUCTION

Physics is a Natural Science (IPA) that studies phenomena that occur in the universe by discussing how these phenomena occur which are useful in everyday life (Yani & Wahyono, 2020); (Febriani, Ratu, & Rahman, 2020); (Wurwiarwin, Wahyono, & Werdiana, 2018). Physics is also a branch of science that studies natural events that can provide an overview of how to collect knowledge (Ainiyah, 2018). Physics learning is a process to develop abilities regarding natural phenomena in order to know the principles, concepts, discoveries, scientific attitudes, and facts that aim to master concepts and principles and can master skills in developing a science and technology effectively and efficiently (Nugrahani, 2018).

In physics learning, students are sometimes relatively less interested in learning because in addition to the lessons that are considered difficult, the learning media is also still less attractive (Zuhrowati, Abdurrahman, & Suyatna, 2018); (Sahida, 2020); (Putri, Noviandini, & Sudarmi, 2019); (Khasanah, Nurhidayat, & Ferawati, 2019). The inability of learning media used by teachers to motivate students is also one of the causes of students becoming less interested in learning physics (Salahuddin, Syahnaz, Wijaya, & Wahyuni, 2020); (Okryanida, 2018). In fact, the use of learning media can help teachers achieve learning goals, especially on material that is

classified as difficult to understand (Wicaksono, Irmade, & Jumanto, 2017); (Rahil, Yahya, & Walidain, 2019); (Rendi, Sumaryati, & Purwanti, 2020); (Pramadi, Suastra, & Candiasa, 2013); (Santoso & Putra, 2017). Therefore, in order to help students understand the learning material well, it is necessary to have appropriate learning media that can attract students' interest in learning so that good student learning outcomes can be obtained.

Learning media are tools that can physically be used to deliver learning materials such as television, photos, graphics, computers, slides, tape recorders, video recorders and books. (Arsyad, 2011). Learning media is also a tool that can convey or explain learning information that makes learning objectives achieve by generating student motivation to learn, increasing student creativity, and making it easier for students to understand lessons. (Rahil, Yahya, & Walidain, 2019); (Rosyida, 2019); (Jumini, Fatiatun, & Kholifah, 2019). In its application, learning media has a very important role in supporting the smooth interaction between students and teachers and the success of the learning process and the achievement of expected learning outcomes (Astiarini, 2016); (Rahil, Yahya, & Walidain, 2019). The types of media are audio, visual, audio visual, environmental, motion projection media, and three-dimensional media (Handarini, 2015). One of the learning media

that is considered interesting in the delivery of physics subject matter is visual learning media in the form of comics.

Comics are visual learning media in which there are ideas, information, and messages contained in images so that they can attract readers, both children and adults (Siregar, Siregar, & Melani, 2018). In addition, the stories contained in comics are also easier to digest and understand which are visualized in the form of images contained in them (Listiyani, 2012). Comics as learning media have a function to convey messages to readers in learning because they are seen as being able to develop creativity in the visual field (Soedarso, 2015).

The advantages of comics include being able to make it easier for readers to remember the contents in them by presenting a coherent and orderly storyline (Sari, 2017). In addition, comics have a visual language that is easy to understand because they are presented simply with illustrations and various characters in it. Comic learning media is proven to have a high effectiveness value because it can increase students' imagination and increase students' understanding of concepts. Besides that, comics can also help students in understanding physics material (Putri, Noviani, & Sudarmi, 2019).

The development of comic learning media is carried out in order to help students understand some physics material which is

considered quite difficult to understand implicitly such as the torsion concept material which by using comics as a medium, the concepts of torsion material can be related life, so it's easier to understand without having to memorize formulas (Wurwiawin, Wahyono, & Werdiana, 2018). Therefore, the contextual model is suitable for use in comic media (Wicaksono, Irmade, & Jumanto, 2017). Contextual model is a learning concept that connects learning material with situations that occur in everyday life because this model uses contextual problems that come from the student environment that can be presented both at the beginning, middle and at the end of learning (Kurniati, 2016).

Based on the students' problems in learning physics and seeing the advantages of comics learning media, the researchers were interested in developing contextual-based comic learning media on the torsion concept material in high school. The purpose of this research is to produce a product in the form of a contextual-based comic-based learning media on the torsion concept material for decent high school students.

II. METHODS

This research is a research and development research and development (R&D) with the aim of producing a certain product and the effectiveness of the product that has been made can be tested. (Sugiyono, 2019). The method

used for developing comics learning media on torsion concept material in SMA is a 4-D model consisting of the define, design, development, and dissemination stages. (Sugiyono, 2019).



Figure 1 Chart of the stages of R&D research using the 4-D method

The stages of R&D research with the 4-D method include:

a. *Define*

At this stage, the development of learning media in the form of comics with torsion concept material is carried out.

b. *Design*

At this stage, the design of the storyline in the comics is carried out, making discussion scenarios between characters in the comics and the process of making comics using a comic maker application found on Android in the Playstore section called Comic Page Creator.

c. *Development*

At this stage an assessment is carried out by a validator consisting of two experts (media experts and physics learning material experts).

d. *Dissemination*

At this stage, the comic product distribution that has been revised is carried out according to the suggestions submitted by the validator. However, this stage was not carried out in this study because the researchers limited it only to the development stage.

This study uses a qualitative descriptive analysis technique in which a data collection is carried out in a scientific setting which intends to interpret the events that occur to describe the results of the validator's assessment from both media experts and material experts (Anggito & Setiawan, 2018). On the validity rating scale, the validity sheet of the physics comic learning media can be seen in the following table.

Table 1 Media Validity Rating Scale

Scale	Criteria
1	Very Poor
2	Poor
3	Fairly Good
4	Good
5	Very Good

After the assessment score data is tabulated, then the average calculation is carried out and converted in the form of a percentage, which can be obtained by the following formula :

$$Persentase = \frac{T}{T_{maks}} \times 100\% \quad (1)$$

T : Total score obtained

T_{maks} : Maximum score

The percentage range and scale of media eligibility criteria can be seen in table 2 below:

(BSNP, 2014)

Table 2. Eligibility Criteria for Materials and Media

Percentage Range	Qualitative Category
<21%	Very Inappropriate
21% - 40%	Not Inappropriate
41% - 60%	Decent Enough
61% - 80%	Worthy
81% - 100%	Very Worthy

(Arikunto & Jabar, 2018)

The aspects of the assessment of material and media validation can be stated in table 3 below:

Table 3. Aspects of Material and Media Feasibility Assessment

No	Aspects of Assessment	Assessment Indicators	Grading Points
1	Material	Relevance	The suitability of the material with the competencies that must be mastered
			Depth of description
			Complete description
			The suitability of the material with the development of science
		Accuracy	Accuracy of facts
			Image and animation accuracy
Notation and symbol accuracy			

		Presentation equipment	Presenting competencies that must be mastered by students
		Serving systematics	Introduction part
			Contents section
			Cover part
			Breakdown of presentation
			The material description follows the flow of thought from simple to complex
		Conformity of presentation with learning demands	Encourage student curiosity
			Encouraging student interaction with learning resources
			Encouraging to seek more information
			Encourage students to build their own knowledge
			Encourage students to practice or follow the contents of the reading
		Language compatibility	Correct sentence structure
			The accuracy of the use of language rules
			Consistency of use of terms
			Consistency in Using Notation and Symbols
			Coherence and integration between learning activities
		Communicative	Message readability
			The suitability of making paragraphs with students' understanding
			Motivating ability
			Conformity to the intellectual development of students
			Conformity to the emotional level of students
2	Media	Writing display	Writing titles on comic media
			Comic text font size
			Use of words in comic dialogue
			Clarity of writing on comic media

			Ease of understanding the storyline through the use of language
	Image display		Image shape
			Image size
			The suitability of the image with the text
			Image variation
			Image composition
	Comic media function		Comic media as a learning resource
			The language of delivery used by comics learning media is easy to understand
			Learning media can attract reading interest
	Media benefits		Presentation of comic illustrations leads to understanding the concept
			The proportion of comics as entertainment and knowledge enhancing tools
			Comic media creates a sense of pleasure when reading it and encourages reading to read it completely

III. RESULTS AND DISCUSSION

This comic media was created using two applications, namely the character part using the comic page creator application and the frame in the conversation using Microsoft Office Word.

As for the comic part, it consists of an explanation of the concept of torque which can be seen in Figure 2 below:



Figure 2 Explanation of the Torque Concept

This comic is a contextual-based comic because it contains the relationship between the concept of torsion and its application in everyday life as shown in Figure 3 below:



Figure 3 The contextual part of comics

This contextual-based comic uses the concept of learning that makes students reason and feel at the same time because the events displayed are closely related to the environment around students so that students will easily understand learning well, especially supported by a pleasant atmosphere when reading comics. This is in line with research conducted by Nendasariruna, Masjudin, dan Abidin (2018); Wurwiarwin, Wahyono, dan Werdiana (2018) which states that comics with a contextual approach can bring students to learn to think about the actual events that occur around them (Nendasariruna, Masjudin, & Abidin, 2018); (Wurwiarwin, Wahyono, & Werdiana, 2018).

Other research, Chusniah dan Setianigsih (2019); Wicaksono, Irmade, dan Jumanto (2017); Sari (2017) states that learning by using comic media can make the atmosphere fun because it can display and explain difficult-to-understand material so that students become enthusiastic about learning (Chusniah & Setianigsih, 2019); (Wicaksono, Irmade, & Jumanto, 2017); (Sari, 2017).

After the comic media was created, the next step was to carry out a validation test in order to determine the feasibility of the comic media which was measured through a validation questionnaire by two material experts and two media experts. The results of this study are in the form of a validation questionnaire that has been filled in by the validator. Validators with material experts assess indicators of relevance, accuracy, completeness of presentation, systematic presentation, suitability of presentation with learning demands, language suitability, and communicativeness as outlined in the diagram below:

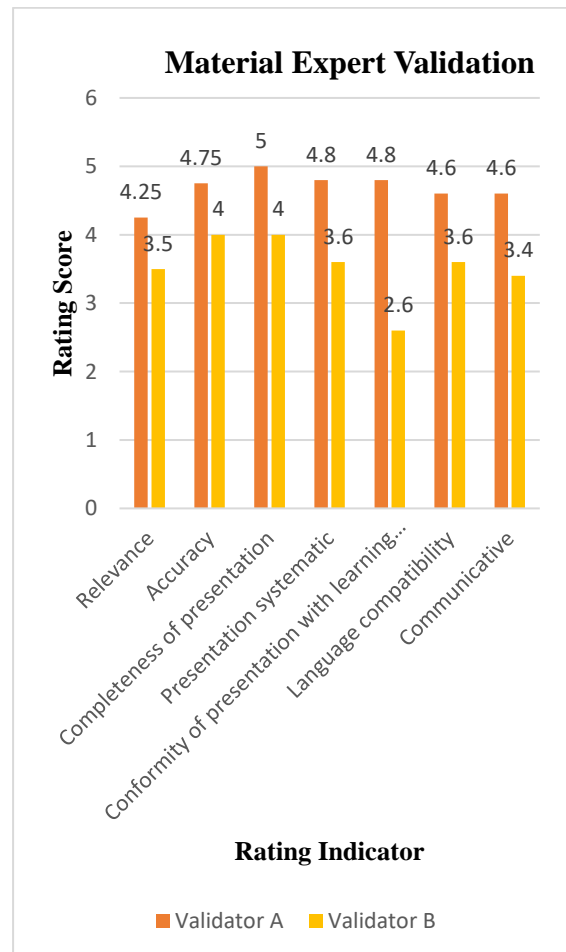


Figure 4. Material Expert Validation Diagram

Based on the material expert validation questionnaire as shown in Figure 4, it was obtained for relevance to validator A, namely 4.25 and validator B, namely 3.5. This is in line with Handayani (2018) which states that the need for conformity of competence with science, especially in the teaching materials used (Handayani, 2018).

In the accuracy indicator, validator A is 4.75 and validator B is 4, such as the accuracy of the comics shown in table 3 so that the comics are suitable for students to use. This is in line with Samsu's research (2016) which states that accurate comics are comics that are worthy of being used as student teaching materials (Samsu, 2016). In addition, the indicator of completeness of presentation with validator A is 5 and validator B is 4 because in the comic it presents competencies that must be mastered by students so that students will know the goals to be achieved. This is in line with Aslamiyah's research (2017) which states that in learning comics it is necessary to refer to both core and basic competencies, especially in the 2013 curriculum (Aslamiyah, Masturi, & Nugroho, 2017).

On the systematic indicator of presentation with validator A, namely 4.8 and validator B, namely 3.6, with the items shown in table 3 which presents material from simple to complex to facilitate students in learning. This is in line with Rikizaputra's research (2016) which states that the material from simple to complex makes it

easier for students to learn because it is in accordance with the level of student development (Rikizaputra, 2016).

On the indicators of suitability of presentation with learning demands with validator A, namely 4.8 and validator B, namely 2.6 with the items shown in table 3 where comics can build students' own knowledge so that they can practice the contents of the reading. The indicators of language suitability with validator A are 4.6 and validator B is 3.6 with the points shown in table 3 where good consistency in notation, terms and language rules is needed so as not to cause confusion, especially for students. This is in line with research conducted by Suherman (2016) which states that there is a need for consistency in setting the notation so that there is no confusion for readers. (Suherman, 2016).

The communicative indicator with validator A is 4.6 and validator B is 3.4 with the items shown in table 3 where comics can lead to motivating abilities so that students will be enthusiastic to learn. This is in line with the research of Indaryati and Jailani (2015) which states that good motivation is needed because it is related to students' learning abilities (Indriyati & Jailani, 2015).

So, it can be analyzed the validity results with the indicators shown in table 3, it is obtained that the average component of the material expert validation assessment for all assessment indicators is an average of 4.05 with a

presentation of 81% which is included in the very feasible category.

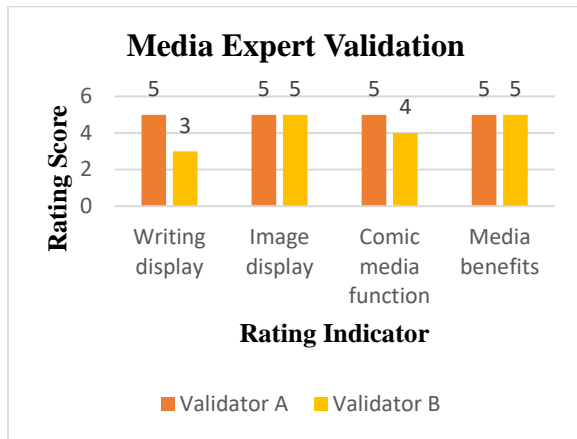


Figure 5. Media Expert Validation Diagram





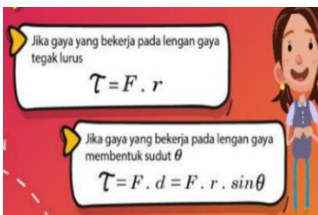
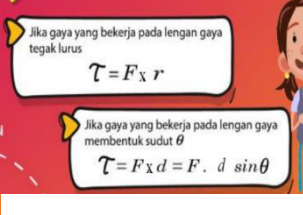
Based on the media expert validation questionnaire as shown in Figure 5, it was obtained for display with validator A, namely 5 and validator B, namely 3, the image display indicator with validator A was 5 and validator B was 5, the comic media function indicator with validator A was 5 and validator B was 4, and indicators of media benefits with validator A, namely 5 and validator B, namely 5. The four indicators have written clarity by adjusting between pictures and writing so that the language conveyed becomes more interesting and easy for students to understand because the presentation of comic illustrations leads to understanding concepts. This is in line with the research of

Pramadi, Suastra, and Candiasa (2013) which states that the use of comics by providing an understanding of the concept is very necessary because it is part of development for other higher abilities (Pramadi, Suastra, & Candiasa, 2013). Other studies, Septikasari and Kartiyani (2021); Hidayah, Yeni and Titin (2018) which state that the clarity of writing and images can attract the interest of readers and the message to be conveyed also becomes easier to understand (Septikasari & Kartiyani, 2021); (Hidayah, Yeni, & Titin, 2018).

Based on the media expert validation questionnaire which can be seen in Figure 5 above, it can be analyzed the validity results obtained by the average material expert validation assessment component for all assessment indicators obtained an average of 4.5 with a percentage of 90% which is included in the very feasible category.

During the comic validation process, in addition to providing an assessment of the validation questionnaire, the validator also provides constructive comments and suggestions that can later be used as learning resources. The suggestions from the validator can be seen in table 4 below:

Table 4. Before revision and after revision on comic media

Revised aspects	Revised components	Before Revision	After Revision
Content Feasibility (Conformity of the material with the competencies that must be mastered)	Adding competency achievement indicators on the start page of comics to find out the competencies to be achieved		
Feasibility of content (complete description)	Added an introduction to torque related quantities on the 16th and 17 frames		
Feasibility of presentation (content section)	The mathematical properties contained in the writing of the torque formula are by improving from the dot product to the cross product on the 18 frame		

The product has been revised according to input from the validator, it is hoped that students can easily understand the comic material in accordance with the writing rules in PUEBI.

IV. CONCLUSION

Based on the results and discussion above, it can be concluded that the

contextual-based comic learning media on the torsion concept material in high school is declared very suitable to be used as a source of student learning. The results of the material validity value obtained an average indicator of 4.05 or 81% which was included in the very feasible category and the media validity value obtained an average indicator

of 4.5 or 90% which was included in the very feasible category.

SUGGESTION

Further research is expected to be able to pay attention to the competencies that you want to highlight in learning media, especially in comics media and adjust to the criteria to be achieved.

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