Jurnal Penelitian Pembelajaran Fisika
Vol. 15 Issue 4 – October 2024, p434-441
p-ISSN 2086-2407, e-ISSN 2549-886X
Available Online at http://journal2.upgris.ac.id/index.php/JP2F
DOI: 10.26877/jp2f.v15i4.1143

A Comic-Based Learning Approach Grounded in Islamic Constructivism: Utilizing Canva to Explore Solar System Concepts

Vandan Wiliyanti[1,2], **Yuberti Yuberti**[1] **and Evi Nur Ramadhani**[1]
[1]Program Studi Pendidikan Fisika Universitas Islam Negeri Raden Intan Lampung

[2]E-mail: vandanwiliyanti@radenintan.ac.id

Received: 1 August 2024. Accepted: 26 September 2024. Published: 31 October 2024.

Abstract. The purpose of this research endeavor is to evaluate the feasibility of comic-based educational media grounded in an Islamic nuanced constructivist framework, employing Canva applications for the instruction of solar system content. The study was carried out in accordance with Thiagarajan's 4D model, engaging seventh-grade students from SMP/MTs. Data were gathered from the feedback of both students and educators, in conjunction with validation from subject matter specialists, media professionals, and religious authorities. The outcomes of the investigation reveal that the material validation from experts achieved a score of 91%, media experts assigned a score of 86%, while religious authorities contributed a score of 82%. These findings signify a commendable degree of validation. In summary, drawing upon the assessments from experts and the affirmative feedback from educators and students, it can be inferred that the comic-based learning media, rooted in an Islamic constructivist paradigm utilizing Canva applications, serves as an efficacious and stimulating educational instrument for imparting knowledge regarding solar system concepts.

Keywords: islamic, canva, comics, constructivism approach, solar system

1. Introduction

The development of learning in the world of education is increasingly rapid, following the rapid development of information and technology. A teacher needs to innovate the learning system of physics in order to change the bad thinking about physics [1]. Innovative learning systems include students being able to develop their understanding through the impulse of teachers, teachers creating tools to facilitate students, and students finding their own ways of solving problems [2]. Learning media are divided into four categories: media with printed technology (books or static visual material), audio-visual, computer-based, and combined (combining several types of media with computer control) [3]. Every student needs a textbook to support their learning. The learning medium used throughout this time is a large and thick package book. Books and learning media limitations can affect students' understanding of material concepts. The use of incorrect and less-than-optimum learning media can cause students to suffer from misconceptions. Difficulty in understanding the concepts of physics correctly will hinder the learners in associating concepts that are interrelated, which can lead to misunderstanding of concepts [4].

The ability to understand mathematical concepts is a very important thing in the learning process of physics because it is a form of the ability of students to understand the material of knowledge in another form that is easy to understand in its application [5]. Several studies have been carried out in developing learning media including the Development of Physics Comic Learning Media Using Toondoo Application Based on Contextual Approach on the Topic of Circular Motion [6]. Development of Physics Science Comics as Learning Media for Students on the Subject of Motion [7]. Development of Digital Comic Media (MEKODIG) in Efforts to Increase Learning Interests of Elementary School Students [8]. Development e-comic Based on Canva Assisted Contextual Approach on Buffer Solution Material in High School [9]. Development of Learning Media for Mathematical Comics with Islamic

Nuances Assisted by Instagram [10]. However, this has not been found in research related to the development of comic media based on the approach of Islamic constructivism, which includes an understanding of the material physics of the solar system for students of SMPs and MTs. In addition to mathematical understanding, it also contains character guidance (honesty, hard work, self-reliance, social care, curiosity, religion, and responsibility) [11]. The goal is to understand the wisdom obtained through learning physics. (the physics of life). Students should be encouraged to think at the advanced levels beyond which they can construct and make their own understanding of the definition of physical imagery. Learning physics is not enough only at the level of understanding mathematical concepts; it is also necessary for character education so that the physics learned can be applied in a good way [12].

The development of visual learning media in this study was comical as an attempt to increase the interest of students in the study of physics. The reason is because there are some problems in students, including a lack of ability to understand physical concepts; learning is still packed with government books that are less flexible (one of the writing about comparative stories that makes students easy to get bored, lazy to read, and as a result do not understand what is presented in the book); teachers and students need learning media as a supporter of the process of teaching activities. Comics is a constructivist approach that emphasizes students ability to construct or build their own knowledge through the learning experience they have with the help of comic media. Development not only emphasizes the understanding of physical concepts alone but also requires a balance with character education through the Islamic nuances present in comic media. The aim of this study is to find out the level of compatibility of comic learning media based on the approach of Islamic constructivism using Canva applications on the material of the solar system.

2. Method

The method of this research is research and development, better known as Research and Development (R&D). According to [13], Research and Development is a research method that can be used to develop or validate a product used for the learning process. This research refers to the 4-D procedural model that consists of 4 stages: define (defining), design (design), develop (development), and decimate (distribution) [14]. The inquiry conducted in this investigation was confined to the initial three phases of the 4-D model (define, design, develop) owing to an emphasis on meticulously validating the educational media prior to its extensive distribution. By focusing on these phases, the investigation sought to ascertain that the media was thoroughly developed and rigorously assessed for efficacy and pertinence, thereby establishing a robust groundwork for prospective dissemination initiatives. This methodology permitted a more comprehensive evaluation of the media's feasibility and congruence with educational aims before contemplating broader implementation.The definition level includes needs analysis, student analysis, task analysis, concept analysis, and goal formulation. The design stage includes format selection and initial design. The development phase includes expert validation tests, media revisions, and comic book tests.

The procedure of this research and development starts from the initial stage, namely the analysis, design, and development stages, as follows:

1. *Define*
   The phase of analysis includes the analysis of needs, the analysis of learners, the analysis of tasks, concept analysis, and the formulation of goals. Students were analyzed based on the results of the questionnaire filling provided by the researcher at the time the researchers completed the preliminary study.
2. *Design*
   After the analysis stage is completed, continue with the product design stage that will be used in the research. The product design that will be made based on this research is a form of comic learning media. The comic is expected to be a source of learning at the same time as an educational tool in delivering learning materials, and it can also be useful for students in understanding the materials learned. The design stage includes format selection and initial design.
3. *Development*
   The product design results will then be tested, including expert validation tests, media revisions, and comic book tests.

This research has been conducted in the semester of the 2022–2023 academic year. Subjects of the study are students of grade VII of SMPs and MTs in SMP Negeri 7 Mesuji, SMP Negeri 8 Mesuji, and MTs Rouhdotul Huda Kec, Mesuji of the East.

The techniques used in instrument validation in this study are as follows:

1. Material Expert Validation Instrument
   This instrument is a validation draft related to content qualification, presentation qualification, and language qualification.
2. Media Expert Validation Instrument
   This instrument is a validation tool related to comic size, comic cover design, and comic content design.
3. Religious Expert Validation Instrument
   This instrument is a validation draft related to content, language, and emphasis on the material.

Research data is collected with expert validation sheets, educator assessment sheets, and student response sheets, as well as data analyzed using a Likert scale. The formula for calculating a qualifying presentation of each aspect is as follows:

$$P = \frac{\Sigma x}{SM1} \times 100\% \quad (1)$$

where P as presentation, Σx as total score and SM1 as ideal maximum score. The formula for calculating the presentation of the subjects is as follows:

$$P = \frac{F}{N} \quad (2)$$

where F as total number of subjects, N as many subjects and P as presentation number [15].

Lift the response to the use of five product options according to the content of the question. Changes in the results of the assessment of media experts, material experts, religious experts, educators, and student respondents from letters to scores according to the provisions of the following table.

Tabel 1. Likert scale for instruments [16].

Literacy	Definition
SB (Very Good)	5
B (Good)	4
C (Enough)	3
K (Less)	2
SK (Very Less)	1

Angket validators are used to know the qualifications of the developed media. Thus, the final value was obtained using the average analysis of the elements concerned in the height, that is, with the calculation of the value of the feasibility of each aspect divided by many questions.

The conversion of the score to this rating statement can be seen in the following table:

Tabel 2. Criterion Interpretation Scale [17].

Literacy	Definition
$0\% < x \leq 20\%$	Very Not Worth It
$40\% < x \leq 40\%$	Not Worth It
$40\% < x \leq 60\%$	Decent Enough
$60\% < x \leq 80\%$	Worthy
$80\% < x \leq 100\%$	Very Worth It

With the presence of the scale table of interpretation of the criteria, the researchers can know the presentation of the valuable or inappropriate assessment of the comic learning media based on the approach of Islamic constructivism using the application of Canva on the material of the solar system. Based on these criteria, the media is said to be worthwhile when presented in all aspects.

3. Result and Discussion

In this review, the researchers symbolized comic learning media based on an Islamic nuanced constructivism approach using Canva applications on the material of the solar system. This research uses a 4-D model consisting of four steps of development that are reduced to 3-D: define (defining), design (planning), and develop (development), so that it becomes a useful learning medium to use.

At the defining or preliminary stage, researchers obtain data from interviews and dissemination that shows that students are less interested in IPA lessons, in particular physics, because they are considered difficult and boring. In addition, the media used only guides, power points, and LKS. From several schools that have conducted preliminary research, it has been revealed that the learning media used is still limited due to the lack of time and cost of learning media renewal. Even one educator stated that she has never used the media because of the limitations in terms of networking and technology.

After obtaining problems and data collection while conducting preliminary research, the researchers began to design a medium that can help students with the difficulty of learning physical materials, namely by developing learning media in the form of comics based on an Islamic nuanced constructivism approach using the Canva application on the material of the solar system.

Figure 1. Display of comic media based on constructivism approach islamic nuance.

Figure 1 is an early appearance in the comic media based on the approach of Islamic constructivism. The process of media creation is done with the help of the software Canva. The next step after designing comic media based on the Islamic nuance constructivism approach is to validate the media with material experts, media experts, and religious experts and obtain the results of revisions or advice in order to improve the media so that it is appropriate and can be discarded in the learning process.

Tabel 3. Results of comic media validation based on constructivism approach.

No	Validation Results	Amount (%)
1	Material Expert	91%
2	Media Expert	86%
3	Religious Expert	82%

Based on Table 3, it is known that the material validation results showed a score of 91% in the category, which was highly qualified; the media expert validation result of 86% in the Category was very qualifying; and the religious validation outcome of 82% in the category was excellent. The findings of media experts and materials above 80% in this study align with the outcomes of the prior research

entitled "Digital Comic Media Based on Canva in the Indonesian Language Subject Matter of Energy Sources," which was generated using the ADDIE framework[18].

Thus, the whole of the comic learning media based on the approach of constructivism with Islamic nuances has highly deserved to be used as a physical development medium.

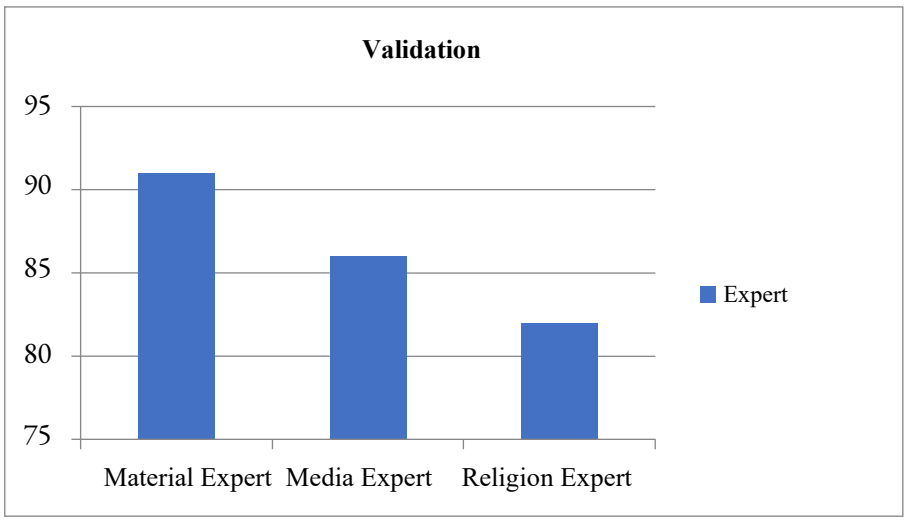

Figure 2. Comic media validation results diagram.

Based on Figure 2, the results of the validation of comic learning media based on the approach of Islamic constructivism using the application of Canva on the material of the solar system can be seen.

After the comic media based on the Islamic-nuanced constructivism approach was validated by validators of material experts, media experts, and religious experts and considered laya, the product was tested on the subject of the test. The product is tested to obtain a viable response. Subjects of the test used are Physics and Student Teachers of Class VII of SMP State 7 Mesuji, Physics Teachers and Students of Grade VII of SMA State 8 Mezuji, and Physics Teachers and Students of Class VII of MTs RDH Kec.Mesuji East. Students are tested in large and small groups.

Tabel 4. Results of comic media trial based on constructivism approach.

No	Trial Results	Total (%)
1	Educator	82%
2	Group Student Small	89%
3	Group Student Big	90%

Based on Table 4, the results of the test of comic media based on the approach of constructivism with Islamic nuances and the response of educators showed a figure of 82% and belonged to a very interesting category. A small group student test result showed an 89% score in a very interesting category, and a large group student trial showed a 90% score in an extremely interesting category. Based on the results, comic learning media based on the Islamic nuance constructivism approach are acceptable for all students and can be used in the learning process of physics. According to the study by Flynn et al. (2019)[19], employing humorous or narrative media in physics instruction can be beneficial, particularly for students lacking sophisticated comprehension of the subject. Furthermore, Shute et al.'s (2021) [20]findings demonstrate that physics animations in instructional games effectively enhance physics subjects' comprehension. Consequently, this e-comic educational medium might render learning more engaging and pleasurable.

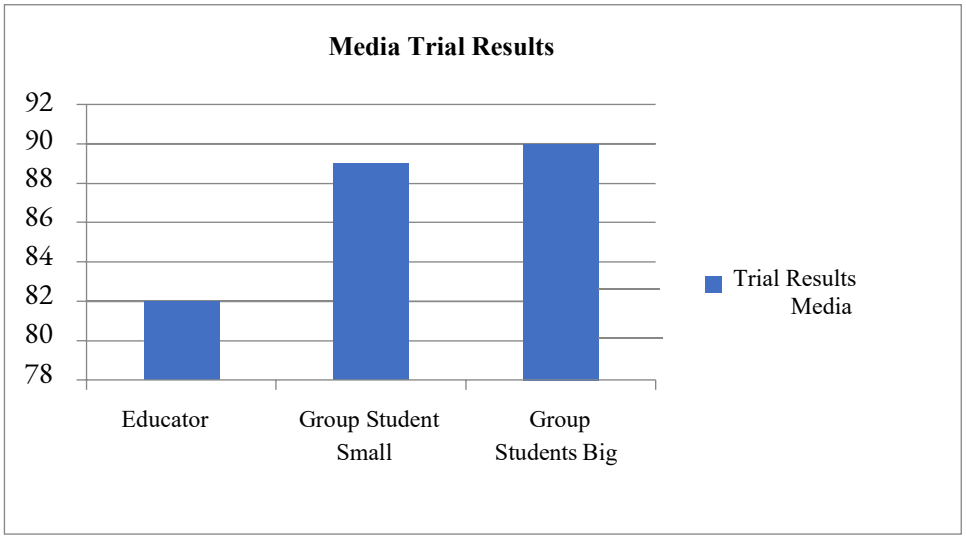

Figure 3. Diagram of comic media trial results.

According to the diagram below, it can be research which leads to learning media in form of comic that use Islamic-DLC constructivist method. It is developed in the Canva application to be placed in material on the solar system through evaluation by teacher and also school students with small classes and large classes groups.

The result of research in this study has the same meaning with the study by Tri Sutrisno (2018) [7], who created a science comic media as a science learning tool in teaching motion language and the study by Reni Hidayah (2018) [6]that use the Toondoo application that applies a contextual approach in the development of physics learning comics with circular motion as its topic. The main variant in this study is the addition of an Islamic-themed constructivist approach and the use of Canva software in the development of comics.

It hopes to enrich comic media with Islamic dimensions of understanding and appreciation in order not only to motivate Muslim students to continue studying physics for the sake of the world but also to impart new dimensions of understanding through transformative learning experience, as well as to provide Muslim students with value-added Islamic insights of living the daily life. Overall, research shows that integrating Islamic ideas into physics education can effectively engage students through interdisciplinary learning. Numerous prior studies that have demonstrated an improvement in student enthusiasm, engagement, and academic achievement—including those that use problem-based learning[21], STEAM-based teaching[22], and the integration of physics into physical education—support this claim[23].

In terms of similarity in contrast to some other studies which have been carried out previously, there are some resemblances especially in the context because the researchers also use comics as a learning media. However, the difference can be seen in the aspect of Islamic values and the utilization of Canva as a development tool. The research conducted by and Reni Hidayah stresses more thevisual and contextual dimensions. Looking at a few research, this study tends to make a bigger dimension by giving a foothold on some religion values that are meaningful for the characters of students in an Islamic environment. The novelty of this research is found in the utilization of Islamic character education values, besides the use of media.

However, there are several limitations of this study that should be considered, including the small sample size, restricting the study to a single learning material (the solar system) that was created with the help of comic strips, which may limit the generalisation of results. Further technical challenges with using the Canva application to create comics and the burden of class time that was required to implement this activity also limit the viability of classroom application and require more research.

4. Conclusion

The findings from this research prove that the learning materials involving comic format, designed to enhance students' comprehension of physics topics, particularly the solar system, during the Islamic constructivism learning framework with the Canva app, exhibit a significant decrease in students' difficulties in understanding the concept. According to the validation assessment results, the materials ranged between the level of validation by media experts, subject matter experts, and religious experts with a high qualification level. It can be described as an average of 92%, and 86% for subject and religious experts. These results suggest that comic-based pedagogical tools present great potential to be used as supplementary teaching resources to assist physics education in optimizing learning outcomes – bringing learners 'bodies and souls into the classroom, to learn in a most engaging and culturally relevant way. For educators or curriculum makers, the message is to include some media like this and make your classrooms more dynamic. This can inform future research to extend this methodology to other areas of physics. Educators who wish to create similar media should adapt the materials to their special educational contexts to match their student's needs and learning goals.

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