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Character education-based digital physics comic on newton's law: Students and teachers' perceptions

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Abstract. Character education is important in learning. The 2013 curriculum also promotes character education in the learning process. Therefore, character education is very important to be conveyed in the learning process. This study aimed to analyze the needs of teachers and students related to digital comic learning media based on character education on Newton's Law of Motion material. This research was qualitative descriptive research. The research sample was 66 eighth-grade students of junior high school. The research instrument was a questionnaire assisted by Google Form distributed to students and teachers. The results of student questionnaires showed that 75.75% of students had never used character education-based digital comics and 60.6% of students needed character education-based digital comics in learning. Based on the results of the needs analysis, character education-based digital comic learning media are needed in learning physics in junior high schools.

Keywords: Digital comics, character education, students' perceptions.

1. Introduction

Education has a great influence on individual development [1]. One of the goals of education is to develop students' character values [2]. The character values are the key to success in building quality education [3]. Therefore, character values must be developed optimally so that students could possess good characters to create good quality education. Character education can be applied to the learning process [4–6]. Physics learning discusses physics phenomena so that character values can be integrated into the learning process [7].

The development of students' character values requires learning media to deliver character values messages to students [2]. By using learning media, conveying character values becomes easier so that learning is not just conveying material, but also can insert character education values in it. However, learning media that contain character education values are rarely found [7]. The instructional media and books at schools only contain learning material without inserting character values. Thus, it is necessary to develop learning media to convey the character values to students.

Learning media helps teachers to deliver learning material [8–10]. Currently, there are many kinds of learning media, one of which is visual media. Visual media plays an important role in learning [11]. It is widely used in the learning process. For example, the visual media used are pictures, PowerPoint slides, paintings, and prints [12]. Another example of visual media is comics [13,14]. The comic is known as a learning media that presents images and has a storyline [15,16], so that the material can be easily remembered [17]. Therefore, comics can be adapted to the learning process [18–20].



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Along with the rapid development of technology, current learning is expected to optimally use technology [21,22]. Technology is expected to simplify the learning process [23–25]. The digital comic media is also a form of learning application that utilizes technology in the era of the industrial revolution of 4.0 [26]. Digital comics can be reserved for android smartphone users [27]. The digital comic is expected to be an effective medium in learning physics. Also, digital comics are very easy for students to use anytime and anywhere [20,28]

In previous studies, comics have been very effective to be used in the learning process [29]. The digital comics based on Android is effective to be used in learning [26,30] Comic can be used as an independent learning media on temperature and heat material [12], thermodynamics [28,30], momentum and impulse [31], sound waves [19], Newton’s law of gravity [32], fluid mechanics [33], and optical devices [34]. However, digital comics on Newton’s law material have not been developed yet. Therefore, this research analyzed the need for digital comics based on character education on Newton's Law material.

2. Research Method

This research employed was the descriptive qualitative method. This research was conducted at several junior high schools (SMP) in Lampung Province. The sample consisted of 66 eighth-grade students and 5 teachers of junior high schools. The data had been collected by distributing questionnaires through Google Form. The results were calculated using the percentage formula. The calculation formula is as follows.

$$P = \frac{f}{N} 100\%$$

Based on the formula, P is the final percentage result, f is score from the questionnaire results and N is the maximum total score. The criteria for the analysis are presented in table 1.

Table 1. Criteria for Media Needs Analysis

Interval (%)	Positive Statement	Negative Statement
75 < x ≤ 100	Strongly agree	Strongly disagree
50 < x ≤ 75	Agree	Disagree
25 < x ≤ 50	Disagree	Agree
0 < x ≤ 25	Strongly disagree	Strongly agree

3. Result and Discussion

The results of data collection using the questionnaires assisted by Google Form can be seen in Table 2.

Table 2. Questionnaire Results Analysis of Learning Media Needs for Students.

No.	Question	%	Result
1	I like physics	69.69	Agree
2	I am not happy with physics	64	Disagree
3	I am always diligent in doing physics homework from the teacher	80.3	Strongly agree
4	I rarely do physics homework from the teacher	78.78	Strongly disagree
5	Teachers use media in learning	89.39	Strongly agree

No.	Question	%	Result
6	Teachers teach without learning media	84.84	Strongly disagree
7	I have difficulty understanding physics learning material	74.24	Agree
8	I understand the lesson better using learning media	74.24	Agree
9	I use a smartphone in the learning process	95.45	Strongly agree
10	I use learning media in the form of digital comics	16.66	Strongly disagree
11	I have never used learning media in the form of digital comics	75.75	Strongly agree
12	I need digital comics for the physics learning process	60.60	Agree
13	Teachers teach the character values in the learning process	95.45	Strongly agree
14	Teachers do not teach the character values in the learning process	93.93	Strongly disagree
15	The learning media I use are based on character education	84.84	Strongly agree
16	The learning media I use is not based on character education	80.3	Strongly disagree

Based on table 2, most students like learning physics. They stated that they are diligent in doing the assignments given by the teacher. According to the students, when learning takes place, teachers are already using learning media. However, most students still have difficulty understanding physics learning. This proves that the learning media used by teachers are not yet fully able to help students understand physics learning. Students need appropriate learning media to help understand physics learning.

In the learning process, most students use smartphones. However, the use of smartphones has not been fully maximized because the use of learning media has not been integrated into students' smartphones. This can be seen from the absence of the use of digital media. The students have never used digital comic media in the physics learning process.

Character values have been taught to students and the learning media used are based on character education. However, there are no learning media in the form of digital comics based on character education. Most students require the use of character education-based digital comics.

Besides distributing the questionnaires to students, the questionnaires were also distributed to teachers. The following is a list of the teacher's initials.

Table 3. Teacher's Initials and Identities

No	Initials	Gender
1	GA	Female
2	RAP	Male
3	ES	Male
4	MYL	Female
5	RDP	Female

The following is the list of questions addressed to teachers:

Table 4. List of Questions for Teachers

No	Question
1	So far, how his students' interest in learning physics?
2	What is the attitude of students when learning physics is taking place?
3	What learning media are used when delivering physics material?

No	Question
4	Does the use of these learning media make physics learning run as expected?
5	Is the learning media you use based on character education?
6	Do you need character education-based learning media?
7	Have you used learning media that uses Android technology in the learning process in class?
8	Do you think that motion material is easier to convey to students through a learning media?
9	Do you need digital comic media based on character education on the subject of Newton's law about motion in the learning process?

Teachers provided different answers to the questions listed in Table 4. Students' interest in learning physics is still considered lacking (ES, MYL) and even students consider physics learning as difficult (RDP). There are only a few interesting materials that can have an impact on the enthusiasm of students (GA, RAP). Based on the students' interests, they are generally passive and even hard to understand the lesson (MYL, RDP) although some others follow the learning carefully (GA, RAP).

The learning media used are visual media such as PowerPoint (GA, RAP, MYL), learning videos, websites (RAP), textbooks (MYL, RDP), and electronic modules (RDP). However, all teachers argue that the use of instructional media has not fully supported the learning process because the learning media used are not based on character education. These statements contradict the students' answers. Most of the students revealed that the learning media used were based on character education. However, in reality, they do not know with certainty the meaning of character education.

The 2013 curriculum prioritizes character education for students. Besides the cognitive aspects, the affective aspects have not been fulfilled. The five teachers argued that they needed character education-based learning media.

Some teachers have used Android-based learning media (RAP, ES, RDP) while some have not (GA, MYL). However, when asked about the need for character education-based digital comic media on Newton's Law of motion, all teachers agreed that they needed it. Comics are considered familiar for junior high school age range (ES).

The following is the character education-based digital comic design.

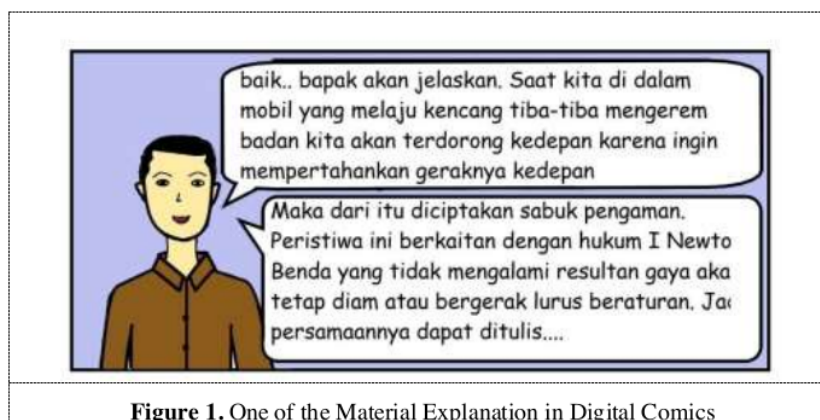


Figure 1. One of the Material Explanation in Digital Comics



Figure 2. An Explanation of the Newton's First Law Phenomenon During a Sudden Brake



Figure 3. The Display of the Character Values Delivery in Digital Comics

Students and teachers need character education-based digital comic learning media to convey the character values through conversations between characters in comics.

4. Conclusion

Based on the research results, the instructional media used by teachers are not yet diverse and fairly general. Besides, the learning media have not been integrated with character education. The teachers have not fully utilized Android-based technology into learning. Based on the above statement, character education-based digital comic learning media are needed. In this research, digital comics are devoted to Newton's Law of motion.

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