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].
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.

\[ P = \frac{f}{N} \times 100\% \]

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

| 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.

| 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 |
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?          |
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.

![Digital Comic Design](image-url)

**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.

References
[1] Latifah S 2015 Pengembangan Modul IPA Terpadu Terintegrasi Ayat-Ayat Al-Qur’an Pada Materi Air Sebagai Sumber Kehidupan J. Ilm. Pendidik. Fis. Al-Biruni 4 155
[2] Saregar A, Giyoto G, Ariyani F, Pawe T I, Pricilia A and Astriawan D 2019 How to Design Physics Posters Learning Media with Islamic Values in Developing Learning Motivation and Student Character? J. Phys. Conf. Ser. 1155 1–9
[3] Yulianti D, Khanafiyah S and Sulistyorini S 2016 Inquiry-based science comic physics series integrated with character education J. Pendidik. IPA Indones. 5 38–44
[4] Mulyasa H E 2019 Manajemen Pendidikan Karakter (Jakarta: PT Bumi Aksara)
[5] Malawai I 2016 Implementasi Pendidikan Karakter Melalui Pembelajaran Dalam Mata Pelajaran Di Sekolah Dasar Prem. Educ. J. Pendidik. Dasar dan Pembelajaran 3 1–12
[6] Yulianingsih E and Ikhsan J 2018 Pengembangan Media Komik IPA Berbasis Karakter untuk Meningkatkan Pemahaman Konsep Peserta Didik SMP J. Pendidik. Mat. dan Sains 6 123–31
[7] Diani R 2015 Pengembangan Perangkat Pembelajaran Fisika Berbasis Pendidikan Karakter dengan Model Problem Based Instruction J. Ilm. Pendidik. Fis. Al-Biruni 4 243
[8] Priyadi A N W, Kuswanto H and Sumarma 2020 Android physics comics to train the mathematical representation ability on momentum and impulse of senior high school students J. Phys. Conf. Ser. 1440 012041
[9] Junaidi J 2019 Peran Media Pembelajaran Dalam Proses Belajar Mengajar Diklat Rev. J. Manaj. Pendidik. dan Pelatih. 3 45–56
[10] Sukri A, Rizka M A, Sakti H G, Harisanti B M and Muti’ah A 2020 The effect of local primacy-based comic media on students’ conservation attitudes J. Phys. Conf. Ser. 1521 042004
[11] Arsyad A 2020 Media Pembelajaran (Depok: Rajawali Press)
[12] Siswoyo S, Mustokoweni G and Muliyati D 2020 “Tempera-Tour”: Developing an Alternative Comic as Media Learning for Temperature and Heat Topics Through Traveling Story J. Phys. Conf. Ser. 1491 012060
[13] Arilaksmi N P G, Ummah S K and Utomo D P 2019 Development of mathematical comics with an Indonesian cultural background on comparative materials AIP Conf. Proc. 2194 020008
[14] Kurniawan Y, Muliyani R and Nassim S 2019 Digital Story Conceptual Change Oriented (DSCC) to Reduce Students’ Misconceptions in Physics J. Ilm. Pendidik. Fis. Al-Biruni 8 207–16
[15] Maharani L, Rahayu D I, Yuberti, Komikesari H, Sodaikin and Hidayah R 2019 Toondoo Application Based on Contextual Approach: Development of Comic Learning Media J. Phys. Conf. Ser. 1155 012023
[16] Sukri A, Rizka M A, Sakti H G, Harisanti B M and Muti’ah A 2020 The effect of local primacy-based comic media on students’ conservation attitudes J. Phys. Conf. Ser. 1521 42004
[17] Rozkosz E A and Wiorogórska Z 2016 “Bibliostory—Educational comic stories”. A social constructivist approach to media and information literacy education for children and adolescents Commun. Comput. Inf. Sci. 676 718–28
[18] Sari F P, Nikmah S, Kuswanto H and Wardani R 2019 Developing Physics Comic Media a Local Wisdom: Sulamanda (Engklek) Traditional Game Chapter of Impulse and Momentum J. Phys. Conf. Ser. 1397 012013
[19] Haroky F, Amirta P D and Handayani D P 2020 Creating physics comic media doi (a Bengkulu local wisdom musical instrument) in sound wave topic AIP Conf. Proc. 2215 050004
[20] Damayanti A E and Kuswanto H 2020 The use of android-assisted comics to enhance students’
critical thinking skill *J. Phys. Conf. Ser.* **1440** 012039

[21] Yuberti Y 2015 Online Group Discussion pada Mata Kuliah Teknologi Pembelajaran Fisika *J. Ilm. Pendidik. Fis. Al-Biruni* **4** 145

[22] Syafei I, Saregar A, Hairul, Tahir A, Sari P M and Anugrah A 2020 E-learning with STEM-Based Schoology on Static Fluid Material *J. Phys. Conf. Ser.* **1457** 1–9

[23] Irwandani I and Juariah S 2016 Pengembangan Media Pembelajaran Berupa Komik Fisika Berbantuan Sosial Media Instagram Sebagai Alternatif Pembelajaran *J. Ilm. Pendidik. Fis. Al-BiRuNi* **5** 33–42

[24] Suprapto S 2012 Peningkatan Kualitas Pendidikan Melalui Media Pembelajaran Menggunakan Teknologi Informasi di Sekolah *J. Ekon. dan Pendidik.* **3** 34–41

[25] Mm R Y, Irwandani, Asniati M, Anwar C and Subandi 2020 Development of Google Form Based on Scientific Literacy Principles for Junior High School Students in Heat Material *J. Phys. Conf. Ser.* **1467** 1–11

[26] Mustikasari L, Priscylio G, Hartati T and Sopandi W 2020 The development of digital comic on ecosystem for thematic learning in elementary schools *J. Phys. Conf. Ser.* **1469** 012066

[27] Huriawati F, Purawandari P and Permatasari I 2017 Pengembangan Buku Komik Fisika Pokok Bahasan Newton Berbasis Konstruktivisme Untuk Meningkatkan Motivasi Belajar Siswa *J. Pendidik. Fis. dan Keilmuan* **1** 81–9

[28] Ratnaningtyas L, Jumadi, Wilujeng I and Kuswanto H 2019 Android-based Physics Comic Media Development on Thermodynamic Experiment for Mapping Cooperate Attitude for Senior High School *J. Phys. Conf. Ser.* **1233** 012054

[29] Hidayah I N and Fathimaturzzahra 2019 Development of Math Comic Learning Media on the Subject of Algebraic Expressions for Seventh Grade of Junior High School Students *J. Phys. Conf. Ser.* **1227** 012029

[30] Rohaizati U, Mailizar and Hajidin 2020 Junior secondary school teachers and students’ needs for the use of digital comics in learning mathematics *J. Phys. Conf. Ser.* **1460** 012026

[31] Rahayu M S I and Kuswanto H 2020 Development of android-based comics integrated with scientific approach in physics learning *J. Phys. Conf. Ser.* **1440** 0–8

[32] Nikmah S, Haroky F, Jumadi, Wilujeng I and Kuswanto H 2019 Development of Android Comic Media for the Chapter of Newton’s Gravity to Map Learning Motivation of Students *J. Phys. Conf. Ser.* **1233** 012051

[33] Ryu S, Zhang H, Peteranetz M and Daher T 2020 Fluid Mechanics Education Using Japanese Anime: Examples from “Castle in the Sky” by Hayao Miyazaki *Phys. Teach.* **58** 230–3

[34] Maghfiroh A, Kuswanto H and Susetyo B 2020 The development of android-based physics comic on optical devices for high school students *J. Phys. Conf. Ser.* **1440** 012023