



Development of Science Digital Comics as a Learning Media of Human Digestive System to Improve Students' Reading Interest

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Abstract: The low score of MAN 1 Medan students in Biology material is due to the low interest in reading. The purpose of this study is to find out how to develop digital comic-based learning media and the influence of the use of digital comics on reading interest in human digestive system material. This type of research uses the ADDIE development model. Which consists of five stages, namely Analysis, Design, Development, Implementation, and Evaluation. Based on the results of material expert validation, the assessment achieved on average is very feasible with a percentage of 100%. Based on the validation results of media experts, the assessment achieved on average is very feasible with a percentage of 94%. And obtained an N-Gain score of 0.56 with a moderate category. It can be concluded that the applied digital comic learning media is effectively used to increase students' interest in reading with a moderate effectiveness category.

Keywords: interest in reading, digital comics, ADDIE models, human digestive system

Abstrak: Rendahnya nilai siswa MAN 1 Medan pada materi Biologi dikarenakan rendahnya minat baca. Tujuan penelitian ini adalah untuk mengetahui cara mengembangkan media belajar berbasis komik digital dan pengaruh penggunaan komik digital terhadap minat baca pada materi sistem pencernaan manusia. Jenis penelitian menggunakan model pengembangan ADDIE. Yang mana terdiri dari lima tahapan, yaitu Analisis (Analysis), Desain (Design), Pengembangan (Development), Implementasi (Implementation), dan Evaluasi (Evaluation). Berdasarkan hasil validasi ahli materi, penilaian yang dicapai rata-rata adalah sangat layak dengan persentase 100%. Berdasarkan hasil validasi ahli media, penilaian yang dicapai rata-rata adalah sangat layak dengan persentase 94%. Dan diperoleh skor N-Gain sebesar 0,56 dengan kategori sedang. Dapat disimpulkan bahwa media belajar komik digital yang diterapkan efektif digunakan untuk meningkatkan minat baca siswa dengan kategori efektivitas sedang.

Kata kunci: minat baca, komik digital, model ADDIE, sistem pencernaan manusia

▪ INTRODUCTION

Education is an effort to prepare the younger generation to welcome and face developments in the global era. So education must be carried out as well as possible so as to produce quality education and improve the quality of human resources (Nurrita, 2018). However, since the Covid-19 pandemic attacked the world of education, the impact of this pandemic is no exception. The change in learning from face-to-face to online learning occurred quickly (Damopolii, Lumembang, & İlhan, 2021). In carrying out online learning, of course, you cannot be separated from the use of information and communication technology or ICT, especially smartphones. Nowadays, it is very important to prepare materials used in education by integrating them into the digital era in accordance with the times (İlhan, Gamze, & Maide, 2021). Advances in mobile

technology have opened up a myriad of learning opportunities for students who need to cope with complex learning environments (Hussin et al., 2012).

Along with the online learning process, there are certainly positive and negative aspects of using technology in carrying out online learning activities (İlhan, Gamze, & Maide, 2021). The presence of a smartphone as a medium to support the learning process is very much needed for the implementation of the system. Accompanied by the internet, the sophistication of smartphones to access various kinds of information will be faster and easier. The learning process between teachers and students will also be more interactive (Maknuni, 2020). Apart from the positive side, online learning during the Covid 19 pandemic increased the use of gadgets which had a negative impact, namely students were stimulated to access other applications, this increased the risk of addiction for students (Bintari, 2020). It is undeniable that the use of devices for learning must have full control from parents. Because there is so much content that students can access through gadgets, they forget their reading activities (Fahmy et al., 2021). The main problem of smartphone addiction is that the reading culture is getting weaker so how to improve a more interesting and constructive learning system for the future.

Reading activity is the acquisition and understanding of ideas, reading activities accompanied by the outpouring of the soul in living the reading text. Interest in reading refers to awareness, concern, and curiosity about subjects, activities, pursuits, people, ideas or places that are achieved through reading (Dai, 2013). The low reading interest of Indonesian students generally has a negative effect on student learning outcomes. So the teacher must be creative and innovative in using learning media that are appropriate to the learning material and the psychological aspects of students. Student learning interest can be grown for example by using interesting learning media. With interesting learning media, students can learn in a fun way and the learning that is created is also more meaningful. Fun and meaningful learning results in increased student achievement (Purnama, Mulyoto, Ardianto, 2015). Therefore it is necessary to develop learning media that are more interesting, efficient and effective, taking into account the characteristics of students who like learning media in the form of images (Kanti, 2018). Media itself comes from the Latin *medius* which linguistically means intermediary or introduction. Learning media means everything that can be used to convey messages (learning materials), as a result it can stimulate attention, interest, thoughts, and feelings of students in learning activities to achieve learning goals (Nurdyansyah, 2019).

One of the alternative media that can be used is digital comics. Digital comic media is the visualization of a story in the form of an arranged and meaningful cartoon image in the form of computer software. The advantage of using comic media in learning is that the learning that is created becomes more interesting, thus fostering students' interest in learning (Koeswanti, et al., 2020). In accordance with previous research conducted by Handayani & Koeswanti (2020) which was published in the *Basicedu Journal* that comic media can increase students' interest in reading using comic media. This is evidenced by the media obtained an average of 3.75 with a percentage of 79 which is included in the "high" category, which means the media is feasible to use. In line with research conducted by Narestuti, Sudiarti, & Nurjannah, (2021) that the use of this learning media can improve learning outcomes because students can more easily remember and understand the material being studied. Based on

the results of observations and interviews with biology teachers conducted in class XI, the main problem of MAN 1 Medan is the low student scores due to low reading interest in Biology material. This is in line with Listariono (2009) which states that reading interest can encourage students to actively broaden their knowledge. The higher the interest in reading in students, the higher the learning outcomes received, so that they can achieve optimal learning goals. Almost all of the students use smartphones so that with comic media it will be a good learning medium to increase students' interest in reading.

Therefore the researcher is interested in designing digital comic-based learning media to find out the use of digital comic media on students' reading interest. By using smartphone media students can access material anywhere and anytime. Also, with this media learning will be more interesting and fun

▪ **METHOD**

The type of research used in the development of digital comic-based learning media to increase reading interest in the Human Digestive System material was carried out using the ADDIE development model. The ADDIE model is an approach that emphasizes an analysis of how each owned component interacts with one another by coordinating according to the existing phases. The development model in the ADDIE model consists of five stages which in their application are interrelated and systematically structured. ADDIE's steps consist of five stages, namely: Analysis, Design, Development, Implementation, and Evaluation (Rachmadyanti, 2020: 83-93).

Place and Research Duration

Research was carried out in class XI at MAN 1 MEDAN Jl. Willem Iskandar No. 7 B, Kec. Medan Tembung, Medan City, North Sumatra. The research was carried out in the even semester of the 2021/2022 academic year from August to September 2022.

Instruments

This development research used several instruments including interviews, documentation, observation, and questionnaires. Observations were made to make direct observations of the learning process to analyze the learning media used by the teacher during the teaching and learning process. Observations were made on teachers and students of class XI Man 1 Medan. Interviews are used when you want to know things from respondents in more depth and the number of respondents is small. In this study, conducted interviews with Biology teachers and students of class XI Man 1 Medan in order to find out and obtain in-depth data and information about problems at school. Questionnaire/questionnaire is a way of collecting data by giving a series of questions or written statements to respondents. In the appropriate question or statement, the respondent only needs to put a tick mark on the item. The questionnaire was given to students of class XI Man 1 Medan. The indicators for assessing students' interest in reading are: (1) Focusing attention, (2) Utilization of time, (3) Emotions in reading, (4) Interest in reading digital comics, (5) Motivation to read (Desi, 2021).

Research Procedures

Procedures As for media research and development procedures that are carried out, namely the ADDIE model, the ADDIE steps consist of five stages, namely: (1)

Analysis, namely analyzing the problems that arise in high school students, by determining the causes and solutions that have been applied. The problem that arises is the high use of smartphones which makes students addicted to technological sophistication coupled with the many social media applications today. This has a negative impact on students' reading interest which is decreasing. The results of the problem analysis found that there was no use of digital comic media in any subject. So it is necessary to develop teaching materials in the form of digital-based comic media to increase students' interest in reading. (2) Design, literature and field studies are carried out in this step. Literature study was carried out by collecting information and literature data regarding the development of comic media as a medium in the learning process. Collect reference data or literature regarding research and development related to digital-based comic media as a learning medium from various sources, journals, books, and articles. This is used as a benchmark for developing products that researchers will make. Then prepare all data related to research and development of digital-based comic media as learning media. Then create a grid of assessment instruments that are tailored to each category of experts who will assess them, for example media experts, material experts, biology teachers, and class XI students. (3) *Development* ibisPaint X application. ibisPaint X is an application that can be opened on Android or iOS which can be used to make comics and coloring. Furthermore, the application is tracing and given a color to add text to the image. The final product will be in the form of a pdf file. (4) *Implementation*, which is after the comic is finished, the comic is validated. Validation is carried out to assess the feasibility of a learning media product. Validation was carried out by media experts and material experts. Data generated from the validation is used to be tested or repair product. (5) *Evaluation*, this activity is carried out by filling out a questionnaire / questionnaire before and after to ask for student responses. This stage was carried out by MAN 1 MEDAN in class XI where respondents were given a questionnaire before and after they finished reading the comic.

Data Analysis Technique

The data analysis technique uses a Likert Scale, which changes qualitative data to be quantitative with the provisions of the score. The Likert scale is used to measure attitudes, opinions, and perceptions of a person or group of people about social phenomena. In research, this social phenomenon has been specifically determined by researchers, which are hereinafter referred to as research variables. With a Likert scale, the variables to be measured are translated into variable indicators. Then these indicators are used as a starting point for compiling instrument items which can be in the form of statements or questions. The answer to each instrument item that uses a Likert scale from very eligible to very not eligible (Sugiyono, 2016). The eligibility category is based on criteria in the form of a score in percent %, where < 21% is in the very ineligible category, 21-40% is in the ineligible category, 41-60% is in the fairly eligible category, 61-80% is in the eligible category and 81-100% is in the very eligible category (Arikunto, 2009: 35).

N-Gain Score

Analysis of reading interest using the n-gain score formula. pretest is a reading interest score before using comic teaching materials. Posttest is a reading interest score

after using digital comic teaching materials, and then the data is classified to obtain reading interest levels using digital comics. The n-gain Score Test Criteria is expressed by the average Gain Score, namely $(g) > 0.7$ in the High category, $0.3 \leq (g) \leq 0.7$ in the Medium category and $(g) < 0.3$ in the Low category.

▪ RESULT AND DISSCUSSION

The development of digital comic-based learning media on human digestive system material is carried out in the stages of Analysis, Design, Development, Implementation, and Evaluation.

Analysis

Based on the results of the analysis conducted at MAN 1 Medan in class XI IPA 9 during learning, students listened more. And based on the results of interviews with the Biology teacher, the learning outcomes of class XI IPA 9 students were very low, as can be seen from the results of daily tests. This is caused by reduced interest in reading which affects student learning outcomes. Since the pandemic, the use of smartphones among students has increased dramatically. The high use of smartphones makes students addicted to technological sophistication coupled with the many social media applications today. This has a negative impact on students' reading interest which is decreasing. In this regard, it is necessary to develop interesting learning media to help overcome these problems. There is no use of digital comic-based media in any subject at MAN 1 Medan. Furthermore, it is necessary to develop teaching materials in the form of digital-based comic media to increase students' reading interest in material on the human digestive system.

Design

Researcher collects reference data or literature regarding at this stage. This is used as a benchmark for developing products that researchers will make. The digital comic media that will be used has been adapted to the learning objectives. What will be included in the comic will be in the form of story design, plot, characters, giving dialogue to comics and coloring.

Development

Storyline

The first stage is that the researcher looks for material that will be summarized in the comic. After that, the storyline and illustrations are arranged. The shape of the text is arranged according to the activity in the picture. The storyline developed is in the form of MC (Main Character) activities along with supporting characters in tracing the human digestive system directly by entering the human body.

Designing storyboard

Making illustrations drawn manually on white HVS paper which is then extracted to the ibisPaint application. ibisPaint is an application that can be used on electronic devices such as smartphones, tables, laptops and computers. ibisPaint has all the features you need to easily create manga and illustrations, including a Screen Tone function that you can draw and paste, a Frame Separator to adjust a frame with one

finger, and Text Input with a choice of fonts. The steps for making a comic storyboard with ibisPaint are: (a), all sketches are drawn on hvs paper, (b) extracted to the ibisPaint application, (c) re-tracing from the results of the image extracted earlier. It looks like the image below.

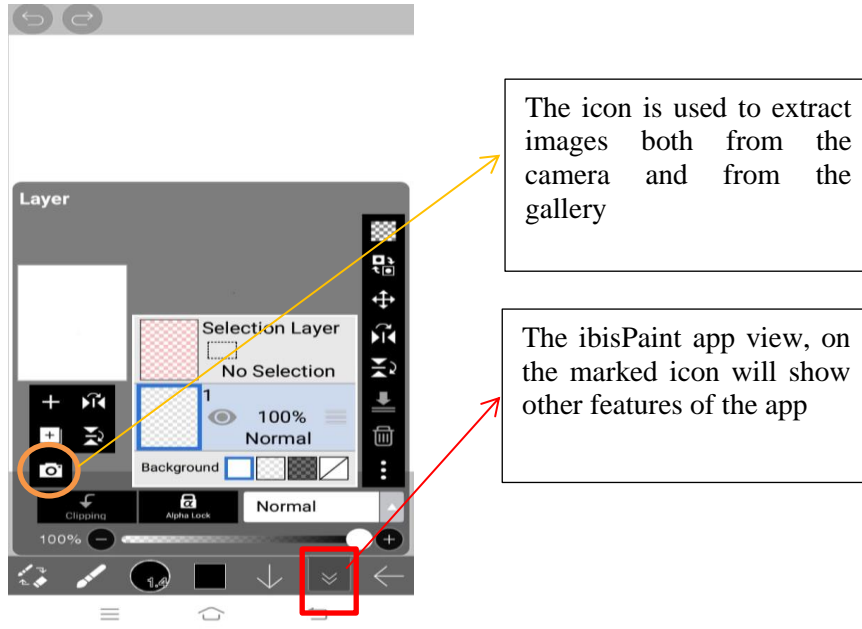


Figure 1. Screenshot of ibisPaint app



Figure 2. Sketches on paper



Figure 3. Sketches after tracing from app

Designing character

Characters are drawn with their own uniqueness. There are two main characters and one supporting character in the comic, the first is Deni and Ray as the main characters and Deni's father as a supporting character.

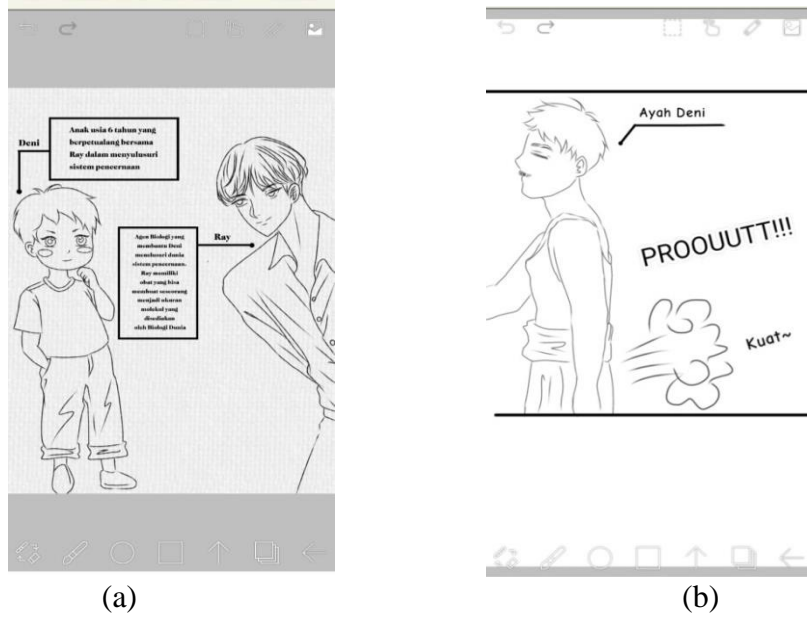


Figure 4. (a) main character, (b) supporting character in comics

Completion

At this stage the sketch is given dialogue and color to make it perfect. After all the sketches have been drawn, the next step is to combine all the comic pages so that they become a complete digital comic. The end result is a pdf file. The appearance of the comic after being given dialogue and coloring is as follows.



Figure 5. Screenshot of completion stage

Implementation

After the comic is finished, the comic is validated. Validation is carried out to assess the feasibility of a learning media product. Validation was carried out by media experts and material experts. The data generated from the validation is used to revise or improve the product. Based on the results of the material expert validation, the average rating achieved is very feasible with a total rating of 60 and a percentage of 100%. The

total percentage validation on the objective aspect gets a percentage of 100% with very feasible criteria, then on the presentation aspect of the material with a percentage of 100% with very feasible criteria as well, and the suitability aspect of the material gets a percentage of 100% with very feasible criteria. Based on the results of media expert validation, the average rating achieved is very feasible with a total rating of 55 and a percentage of 94%. The details of the percentage can be seen in the table above. The total percentage of validation on the objective aspect gets a percentage of 100% with very feasible criteria, then on the visual aspect with a percentage of 87.5% with very feasible criteria as well, and on the usage aspect with a percentage of 95% with very feasible criteria.

Evaluation

At this stage it is seen to see the influence of comic learning media to increase reading interest using the N-Gain Score. The results of the N-Gain Score test for MAN 1 Medan students in class XI IPA 9 who used digital comic learning media based on the questionnaire are presented below.

Table 1. Students' reading interest in human digestive system

Pretest			Posttest		
Score	F	F _{relative} (%)	Score	F	F _{relative} (%)
10-15	1	2.77	37-40	1	2.77
16-21	4	11.11	41-44	0	0
22-27	4	11.11	45-48	4	11.11
28-33	7	19.44	49-52	20	55.55
34-39	13	36.11	53-56	6	16.66
40-45	7	19.44	57-60	3	8.33
			61-64	2	5.55
Sum	36	100	Sum	36	100
Average	32.58		Average	51.55	
Stdev	8.09		Stdev	5.05	

Table 1 shows that MAN 1 class XI IPA 9 students in the material on the human digestive system obtained a questionnaire score for an average reading interest of 32.58 on the pretest. As for the posttest itself, it obtained a questionnaire score for an average reading interest of 51.55. This shows that there is an increase in students' reading interest questionnaire scores.

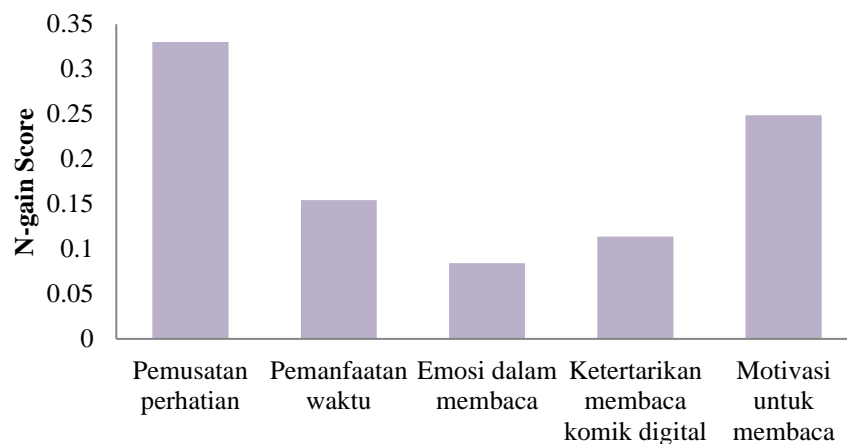


Figure 6. The average of n-gain score for all indicators of reading interest

Based on figure 6, the results show that the N-gain score for each indicator of students' interest in reading in class XI IPA 9, namely, on the attention focus indicator, the N-gain score is 0.33, the time utilization indicator is 0.15, the emotion indicator in reading is 0, 08, an indicator of interest in reading digital comics is 0.11 and an indicator of motivation to read with an N-Gain Score of 0.24.

▪ CONCLUSION

The developed media is suitable for use in classroom learning. Based on the results of the material expert validation, the average rating achieved is very feasible with a total rating of 60 and a percentage of 100%. Based on the results of media expert validation, the average rating achieved is very feasible with a total rating of 55 and a percentage of 94%. The N-Gain Score results show an increase, where the questionnaire score for the average interest in reading is 32.58 in the pretest. As for the posttest itself, it obtained a questionnaire score for an average reading interest of 51.55. This shows that there was an increase in students' reading interest questionnaire scores with the N-Gain score obtained at 0.56 in the medium category. It can be concluded that the digital comic learning media that is applied is effective in increasing students' reading interest in the medium effectiveness category. The researcher hopes that the results of digital comic research on the Human Digestive System material can be used in the learning process at school so that the overall quality of digital comics is more useful and other researchers should be able to develop digital-based comic media with different material, and can be developed in the web version.

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