Development Of *Webtoon*-Based Comic Learning Media On Human Respiratory System Topic For Class VIII Middle School

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Abstract

The low learning motivation of junior high school students can be improved through media with lots of colors and pictures. This study aims to develop Webtoon-based comic electronic learning media on the material of the human respiratory system to increase the learning motivation of grade VIII junior high school students that is valid, practical, and effective. Media development uses the ADDIE model strategy. Media validation is based on the assessment of 4 expert validations. The practicality test is based on the opinion of the teacher and student representatives. The effectiveness test was carried out at class VIII SMPN 11 Jember with 32 students. Statistical test of data processing using Paired Sample t-test. The results of the research cover the validity test by 4 expert validators with an average percentage of 91.5% with very valid criteria, the practicality test by students has an overall average percentage of 91.4% with a very practical category, and the effectiveness test with the ARCS questionnaire before and after implementation has consistently increased the average value in 4 aspects, namely the aspect of gaining attention increase of 0.22, Relevance gets 0.23, Confident gets 0.20 and Satisfaction gets 0.14, the difference in the total mean of the ARCS questionnaire is 0.20. Seeing the enthusiasm of students in learning to use comics is very large, it is suggested that electronic comics can be made in other learning materials.

Kata kunci: E-Comic, Webtoon, Human Respiratory System, Learning Motivation.

Pengembangan Media Pembelajaran Komik Berbasis Webtoon Pada Materi Sistem Pernapasan Manusia Untuk Meningkatkan Motivasi Belajar Siswa SMP Kelas VIII

Abstrak

Rendahnya motivasi belajar siswa SMP dapat ditingkatkan melalui media yang diperbanyak warna dan gambarnya. Penelitian ini bertujuan untuk mengembangkan media pembelajaran elektronik komik berbasis *Webtoon* pada materi sistem pernapasan manusia untuk meningkatkan motivasi belajar siswa SMP kelas VIII yang valid, praktis dan efektif. Pengembangan media menggunakan strategi model ADDIE. Validasi media didasarkan pada penilaian 4 validasi ahli. Uji kepraktisan didasrkan pada pendapat guru dan perwakilan siswa. Uji efektifitas dilakukan di SMPN 11 Jember kelas VIII dengan 32 siswa. Uji statistic pengolahan data mengunakan *Paired Sample t-Test*. Hasil dari penelitian melingkupi uji validitas oleh 4 ahli validator ahli dengan persentase rata-rata sebesar 91,5% dengan kriteria sangat valid, uji kepraktisan oleh siswa memiliki presentase rerata keseluruhan sebesar 91,4%

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dengan kategori sangat praktis, dan Uji Efektivitas dengan angket ARCS sebelum dan sesudah penerapan mengalami kenaikan nilai rerata secara berurutan dalam 4 aspeknya adalah aspek *Attention* mendapatkan kenaikan 0.22, *Relevance* mendapatkan 0.23, *Confident* mendapatkan 0.20 dan *Satisfaction* mendapatkan 0.14, selisih total rerata angket ARCS adalah 0.20. Melihat antusiasme siswa dalam pembelajaran menggunakan komik sangat besar, maka disarankan agar komik elektronik dapat dibuat pada materi pembelajaran lainnya.

Kata kunci: E-Comik, Webtoon, Sistem Pernapasan Manusia, Motivasi Belajar

INTRODUCTION

Material on the human respiratory system explains the systematics of gas exchange in humans, the organs involved, respiratory system disorders and ways to deal with them (Daeli et al., 2022). This material can be studied directly by practicing surgery but with the risk of relatively expensive costs, psychological constraints, risks of harm and others plus learning by using book media alone is considered less interesting and less interactive (Aji et al., 2019). The above constraints were found through preliminary research of the MGMP IPA Forum for the Central Region of Jember Regency to find out problems related to the material of the human respiratory system. The forum was attended by 1 science teacher representative from each of 17 schools and encountered problems in the learning process on the topic of the human respiratory system, namely that the material for the human respiratory system is relatively difficult with several obstacles that are in accordance with several similar studies, namely material that tends to be abstract or complex (Syaifa et al., 2023), especially in the section on systems, mechanisms and gas exchange, terminology of Latin names which are difficult to memorize (Mago et al., 2022). abdominal and chest breathing mechanisms that tend to cause misinterpretation (Puspita et al., 2023) and misconceptions about gas exchange/diffusion in the alveoli due to processes that cannot be seen directly (Miranda & Wibowo, 2023).

Learning with monotonous learning media and illustrations that are less attractive than conventional printed books makes students experience difficulties in understanding the material (Kurniawan et al., 2017). Especially in respiratory system material which contains many visual components and terms, if the learning process uses inappropriate media it can cause students' reasoning to decrease (Argina et al., 2017). Therefore teachers are expected to utilize media with interesting visual components, so as to be able to provide new learning experiences, study motivation, and increase absorption and

retention in the learning process so as to influence student learning motivation and student learning outcomes (Ramadhani, 2019). Therefore media is needed that aims to generate interest and motivation for students to learn new things, besides that interesting learning media can stimulate the learning process (Nurrita, 2018).

There are already many types of media that are able to overcome the above problems, one of which is comic media, for example in research by Lisa et al., (2020) regarding increasing motivation and cognitive learning outcomes of students through the use of comics. Comic media has developed according to the development of science and technology, namely from print to digital, besides that digital comic media has become an effective and efficient learning medium in the era of science and technology development (Amba, 2021), especially when online learning during the Covid-19 pandemic showed a decrease in learning motivation which is less than optimal because the use of media is less visual and seems monotonous (Sujarwo et al., 2022).

Previous research related to the development of digital comic media, such as by Ntobuo et al., (2018) with the title The Development of Gravity Comic Learning Media Based on Gorontalo Culture and Lesmono et al., (2018) with the title The Instructional-Based Andro-Web Comics on Work and Energy Topic for Senior High School Students explained that the use of comic media regularly increases students' interest, is motivated to learn to use comics in their learning process and is easy and safe to use as a tool to understand, remember, and repeat what has been learned. In using digital comics, they have many advantages over conventional printed comics, which are more durable (not easily damaged), portable and easily accessible (Cahyono et al., 2023). The offer by researchers is comic media developed using Web Comic with the concept of Vertical Scrolling and Presenting Sequence such as the LINE Webtoon platform which is quite popular, as evidenced by data around 70% of Indonesian respondents like LINE Webtoon because it is able to present an interesting story and appearance (Lestari & Irwansyah, 2022). The research was confirmed by a direct survey at SMP Negeri 11 Jember through the Teaching Assistance program for grades IX A to Class IX F, showing that around 57.1% of the 28 students who were spread out preferred reading digital comics on the LINE Webtoon platform. Based on the analysis of research articles conducted in the last ten years, research has not/rarely been conducted on the development of learning media in the form of electronic comics that can be used in Android applications for online and offline learning on the webtoon-based human respiratory system. material and contextual

issues. So that the purpose of this research is to develop Webtoon-based comic electronic learning media on the material of the human respiratory system which has validity, practicality, and effectiveness on the learning motivation of grade VIII junior high school students.

RESEARCH METHODS

This research is R&D (Research and Development) with the design of the ADDIE model development which consists of five phases, namely Analysis, Design, Develop, Implementation and Evaluate. The media developed is in the form of Webtoon-based comics material on the human respiratory system. The research instruments used included: validation sheets (material experts, media, development and users/teachers), media readability questionnaires, media practicality, student responses and ARCS motivational questionnaires (before and after implementation). The media validation test was carried out by 4 validation experts with the range of scores specified in table 1.

Table 1. Likert Scale Validity Standards

Category	Score
Very Good	4
Good	3
Less Good	2
Not Good	1

Source: Akbar (2013)

Table 1 states that the assessment by each expert validation is in the range with the lowest score 1 in the not god category and the highest score 4 in the very good category. Then use the validation calculation formula as follows:

$$V = TSe/TSh \, x100\%$$

Information:

    V   : Percentage of validity

    Tse : Total score achieved

    TSh : Maximum total score

Decision making is based on the validity level criteria in table 2.

Table 2. Validity Criteria

Criteria	Validity Level
81,00% - 100,00%	Very Valid
61,00% - 80,00%	Valid
41,00% - 60,00%	Less Valid
21,00% - 40,00%	Not Valid

Source: Al-Tabany (2014)

Table 2. Provides information that validation decisions from several validators are based on the percentage of validator assessment results with the lowest criteria not valid and very valid. Analysis of practicality test data which includes media readability tests, media practicality tests and student responses obtained through distributing questionnaires in small-scale learning simulations (small group tests) with 9 class VIII students, then analyzed using the formula:

$$P = A/B \ x \ 100\%$$

Information:

Q : Assessment Percentage

A : The number of students who chose

B : Total number of students (participants).

Once the P value is known, then the results/criteria for media readability, media practicality and students' responses to the media can be seen in the following table:

Table 3. Media Readability and Practicality Assessment Criteria

Percentage	Criteria
$25\% \leq P < 43\%$	Negative
$44\% \leq P < 62\%$	Less Positive
$63\% \leq P < 81\%$	Positive
$82\% \leq P < 100\%$	Very Positive

Source: Sudjana (1991)

Table 3 is a practicality test guide used in this study using the percentage of ratings of several respondents. The specified criteria are the highest very positive and the lowest negative. The effectiveness test of the electronic comics developed was carried out on 32 students at SMPN 11 Jember. The process of testing the hypothesis to determine the effectiveness of media on learning motivation from completing the ARCS motivational questionnaire before and after implementation can be presented in Figure 1 below:
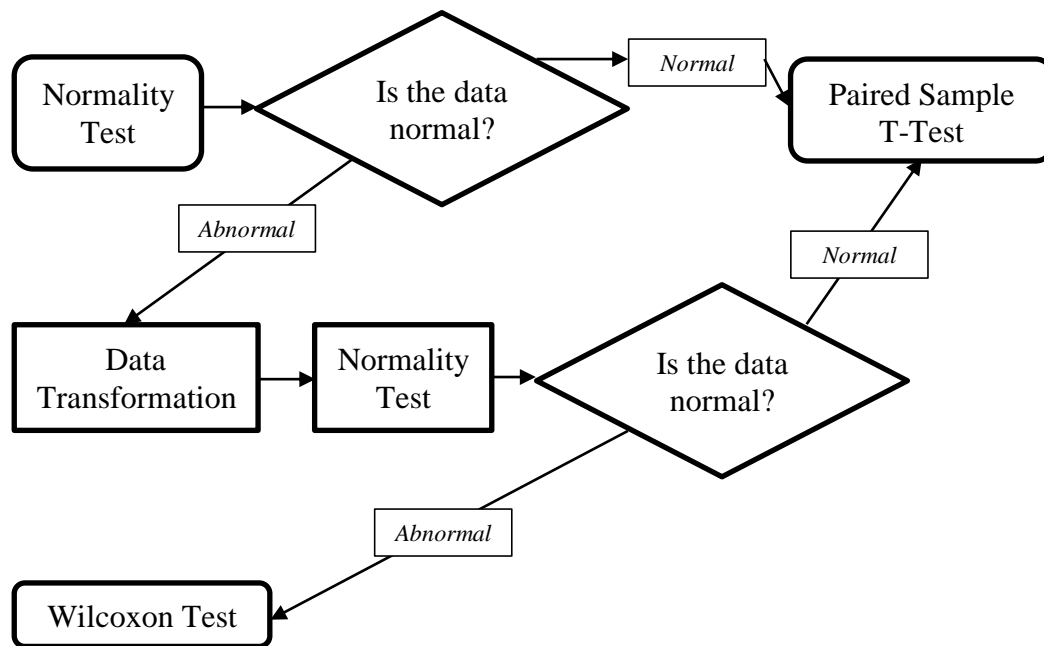
Figure 1. Hypothesis Data Analysis Flow

Figure 1 describes the process of statistical data processing carried out in obtaining information about the effectiveness test of the developed comic electronic media. There were 4 stages of analysis carried out, namely the normality test, data transformation, paired sample t-test and Wilcoxon test, each of which used the SPSS and Ms. applications. Excel. For the first time, the Normality Test was carried out with Shapiro Wilk, before using the Paired Sample t-Test which must be fulfilled, namely normally distributed data. However, it is an option if the data obtained from research/development is not normally distributed, then a data transformation is carried out first and then a re-test of normality is carried out. If the data still does not meet the normal distribution requirements, then the Wilcoxon test will be applied. Then the data used is the state before and after the media treatment. From the results of the analysis it can be seen that at a sig value > 0.05, it means that H0 can be accepted, then it can be concluded that with a significance level of 5% there is sufficient evidence to state that the data is normally distributed. The following is the analysis hypothesis for the Paired Sample t-Test and Wilcoxon Test, The hypothesis in this study is:

H0: There is no effect of differences in the treatment of learning media on students' final motivational scores of students at SMPN 11 Jember

H1: There is an influence of differences in the treatment of learning media on students' final motivational scores of students at SMPN 11 Jember

Conditions: If Probability > 0.05 then H0 is accepted and If probability < 0.05 then H1 is accepted The overall development of Webtoon-based comic media is described in the chart in the figure 2 in the next page.
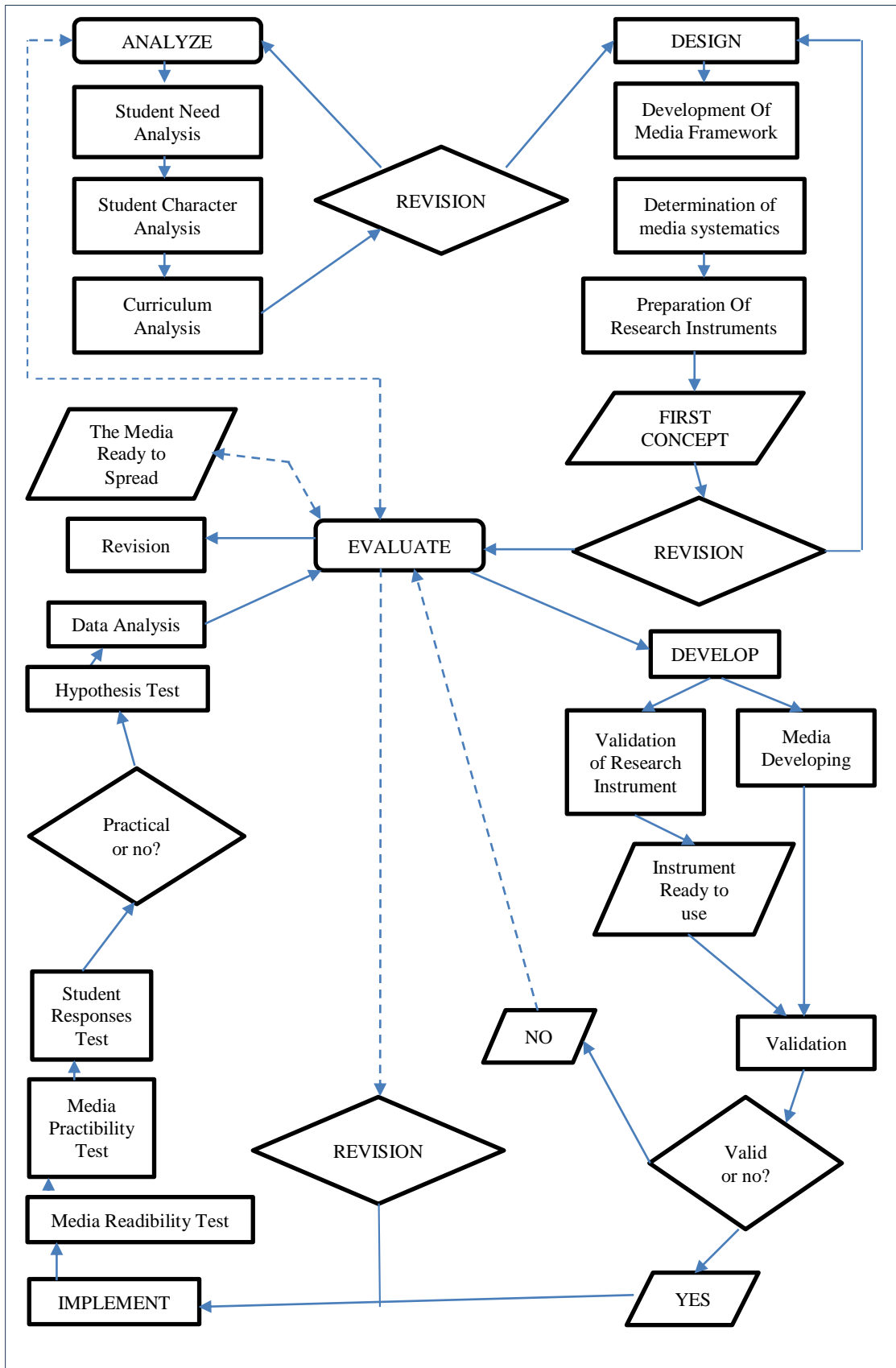
RESULTS AND DISCUSSION

The benchmark for a product/media to be declared of quality is when the product has fulfilled 4 aspects, namely: 1) content and purpose of the media; 2) use of language; 3) visualization and graphics; and 4) media presentation (Gogahu & Prasetyo, 2020). The average results of the media validity test by 4 experts are presented in Table 4 below:

Table 4. Validator Assessment Results

Assessment aspects	Percentage (%)	Category
Media Expert	91,6%	Very Valid
Content Expert	94,4%	Very Valid
Development Expert	96,87%	Very Valid
User/ Teacher	83,33%	Very Valid
Sum of all scores	**91,55%**	**Very Valid**

Table 4 provides information on the media development validation percentage score of 91.55% in the very good category so that Webtoon-based comic learning media developed by researchers have used good language, the accuracy of using sentence structures, consistency in the use of terms (scientific and non-scientific). As well as the consistency of using good symbols and signs so that teaching materials are at an appropriate stage (Wahyuni & Yokhebed, 2019).

The results of the overall assessment of STEM-based LKPD by the two validators obtained an average of 4.04 equivalent to an eligibility percentage of 80.9% so they are included in the valid category or can be used with minor revisions. Here's a look at STEM-based LKPD.

Figure 3. Main Menu Page

Figure 4. Example of Webtoon contents

Figure 5. Example of Webtoon contents   Figure 6. Example of Webtoon contents

Figure 3 is the main menu of *Webtoon Comic* learning media providing information about all the segment of comic chapter. Figures 4, 5 and 6 provide information about the contents of the *Webtoon Comic* which explains the topic of the human respiratory system from organs, systems, mechanisms and respiratory disorders/diseases using the point of view of a covid-19 virus agent that is invading the body of a naughty young man who violates health protocols named Eddie. In accordance with the results of Gaghaube's research (Gaghaube, 2021), which states that the disease caused by Covid-19 disrupts the respiratory system of humans.

One of the materials in the electronic comic is the dialogue between character 1 (Commander Covid-19) and character 2 (Warrior Covid-19) who are in discussion preparing for the invasion of the human body, the whole story describes an explanation of the flow of gas exchange in humans starting from the outermost organ, namely the nose to the very end, namely alveoli. In chapters 3 and 4 there is a Post-Test of 5 multiple choice questions to challenge users/students and evaluate students' understanding of the human respiratory system after reading Webtoon-based comics. At the Implementation stage, after conducting a validity test and obtaining valid Webtoon-based comic learning media, then proceed with the practicality test conducted on small-scale learning (small group test) which includes 9 class VIII students of SMPN 11 Jember with the data presented in table 5 :

Table 5. The Results Of The Questionnaire Scatter Assessment In The Small Group Test

Assessment aspects	Percentage (%)	Category
Media Readability Questionnaire	92,42%	very practical
Media Practicality Questionnaire	91,43%	very practical
Student Response Questionnaire	92,59%	very practical
Sum of all scores	**92,14%**	**very practical**

Table 5 provides information that in the practicality test a percentage score of 92.14% is obtained in the very good category. The results of the readability test and practicality of the media explained that the developed media had good quality and was ready to be used in large-scale learning. This result is reinforced by student responses in very good category, which shows that Webtoon-based learning media gets a positive response from students and is ready to be used in large-scale learning. The results of testing the effect of webtoon-based comic learning media on learning motivation in conditions before and after the application of learning using webtoon-based comic learning media to 32 class VIII A students at SMPN 11 Jember are presented in Table 6 below;

Table 6. The Analysis of ARCS Questionnaire

Aspect	Before Using	After Using	The Average Difference
Attention	2,81	2,89	0,08
Relevance	2,89	2,95	0,05
Confidence	2,68	2,70	0,02
Satisfaction	2,97	2,90	0,06
Sum of all scores	**2,84**	**3,86**	**0,02**

Based on Table 6. it can be seen that there is an increase in the value of motivation before and after the application of Webtoon-based learning media. Data from the results of the ARCS questionnaire before and after the previous application were subjected to a normality test through the SPSS statistical analysis application to find out whether the data obtained from the study had a normal distribution or not as evidenced by a significance value > 0.05. Knowing that the ARCS questionnaire before implementation had a significance value of 0.039 and the ARCS questionnaire after implementation had a significance value of 0.631, the data was not normally distributed, then subjected to the data transformation method with the aim of making the data normal. The normality test was again carried out after the data was successfully transformed, then it was found that the significance value of the ARCS questionnaire before and after application was

sequentially 0.053 and 0.597, so the data was normally distributed. The third step is the Paired Sample t-test via SPSS to look for a significant influence on the application of the developed media provided that the significance value is <0.05. Data from the ARCS questionnaire both before and after the application that has been transformed are subjected to the Paired Sample t Test and produces a significance value of 0.000 so that it can be stated that the application of media has an effect on student learning motivation. In line with the research results of several experts (Khadar, 2022; Cahyono, 2016; Kusumadewi, 2020) digital comic media can be a solution to overcome a problem of learning motivation and improve learning outcomes, especially in schools where the majority of students own and are proficient in operating smartphones. In addition, based on a similar study by Puriasih (Puriasih, 2022) development of PBL-based digital comic learning media in science subjects, animal life cycle material for grade IV elementary schools, animal life cycle material can increase student learning motivation. Buchori (2015) in his research stated that learning using character-based e-comic media was able to foster student learning motivation at elementary level schools.

CONCLUSION

The development of comic electronic media that was carried out was declared feasible to use because it met the valid, practical and effective criteria. The results of the effect of using Webtoon comic media material on the human respiratory system of grade 8 junior high school students on each ARCS motivation indicator, showed a significant effect on the Relevance and Satisfaction aspects, and had no significant effect on the Attention and Satisfaction aspects. Aspects of confidence. However, if seen from the difference in the average ARCS questionnaire before and after the application of media in learning, it can be seen that there is an influence on learning motivation only in 3 aspects, namely Attention, Relevance and Confident, but in the Satisfaction aspect there is a decrease of: 0.06. Seeing the enthusiasm of students in learning to use comics is very large, it is suggested that electronic comics can be made on other learning materials.

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