International Journal of Elementary Education
Volume 6, Number 2, Tahun 2022, pp. 245-258
P-ISSN: 2579-7158 E-ISSN: 2549-6050
Open Access: https://dx.doi.org/10.23887/ijee.v6i2

Interactive Digital Comic Teaching Materials to Increase Student Engagement and Learning Outcomes

Husnul Khotimah[1*], Nandang Hidayat [2]

[1] Institut Pembina Rohani Islam Jakarta, Jakarta, Indonesia
[2] Universitas Pakuan, Bogor, Indonesia

ARTICLE INFO

Article history:
Received January 02, 2022
Accepted April 13, 2022
Available online May 25, 2022

Kata Kunci:
Hasil Belajar, Intensitas Keterlibatan Siswa, Komik Digital Interaktif, Pembelajaran Daring

Keywords:
Learning Outcomes, Students' Engagement, Interactive Digital Comics, Online Learning

ABSTRAK

Era digital dan internet of thing telah berdampak pada pola interaksi dalam kegiatan pembelajaran. Pembelajaran secara online dan bahan ajar yang dikemas dalam bentuk digital sudah menjadi kebutuhan. Guru pada level sekolah dasar secara umum belum siap dengan tuntutan perubahan tersebut, terutama dalam mengembangkan bahan ajar digital. Penelitian ini bertujuan meningkatkan keterlibatan siswa dalam proses pembelajaran mandiri secara online dan hasil belajarnya dengan menggunakan bahan ajar komik digital interaktif. Metode penelitian yang digunakan adalah metode penelitian pengembangan model ADDIE (Analyze, Design, Develop, Implement, dan Evaluate). Penelitian ini melibatkan partisipan sebanyak 1373 siswa, 8 Kepala Sekolah, dan 20 guru dari 9 sekolah dasar yang terpilih sebagai tempat uji coba di Kecamatan Tapos Kota Depok, Jawa Barat. Pengumpulan data dilakukan menggunakan instrumen berupa tes hasil belajar dan angket untuk siswa, guru, dan orang tua yang dikirim melalui link google form. Teknik analisis data menggunakan analisis statistika deskriptif dan statistika inferensial yaitu ANOVA satu jalur. Penelitian ini menyimpulkan bahwa penggunaan bahan ajar yang dikemas dalam bentuk komik digital interaktif tema "Organ Gerak Hewan dan Manusia" subtema "Manusia dan lingkungan" teruji efektif dapat meningkatkan intensitas keterlibatan siswa dalam pembelajaran mandiri secara daring dan capaian hasil belajarnya. Implikasi hasil penelitian ini adalah bahwa bahan ajar komik digital interaktif direkomendasikan untuk digunakan dalam pembelajaran mandiri secara daring untuk siswa sekolah dasar.

ABSTRACT

The digital era and the internet of things have had an impact on interaction patterns in learning activities. Online learning and teaching materials packaged in digital form have become a necessity. Teachers at the elementary school level are generally not ready for the demands of these changes, especially in developing digital teaching materials. This study aims to increase student involvement in the online independent learning process and learning outcomes by using interactive digital comics teaching materials. The research method used is the ADDIE model development research method (Analyze, Design, Develop, Implement, and Evaluate). This study involved 1373 students, 8 principals, and 20 teachers from 9 elementary schools who were selected as the pilot site in Tapos District, Depok City, West Java. Data was collected using instruments in the form of learning outcomes tests and questionnaires for students, teachers, and parents sent via a google form link. The data analysis technique used descriptive statistical analysis and inferential statistics, namely one-way ANOVA. This study concludes that the use of teaching materials packaged in the form of interactive digital comics with the theme "Movement Organs of Animals and Humans" sub-theme "Humans and the environment" has been proven to be effective in increasing the intensity of student involvement in online independent learning and the achievement of learning outcomes. The implication of the results of this study is that interactive digital comics are recommended for use in online independent learning for elementary school students.

1. INTRODUCTION

The rapid development of information and communication technology (ICT) has an impact on changes in all aspects of life, including the field of education (Bohak Adam & Metljak, 2022; Hu et al., 2021; Starkey, 2020). ICT gives students and teachers more opportunities to adapt their learning activities as needed, school culture must adapt appropriately to these technological advances (Albini et al., 2016; Hu et al., 2021). Digital technology has strategic potential and opportunities to play a role and support the success of education and learning (Hills & Thomas, 2020; Nindya, M & Dafit, 2022). Digital technology can also be a solution to provide a new learning experience outside the classroom and express a more meaningful form of understanding (Bolliger & Shepherd, 2017; Hills & Thomas, 2020).

*Corresponding author.
E-mail addresses: husnul.khot1978@iprija.co.id (Husnul Khotimah)

The development of ICT with its digital technology which is very dynamic at this time, should be used by teachers to transform the learning process to be more innovative and creative, so that learning becomes more interesting and varied (Baloran, 2020; Karademir et al., 2021). The use of reference teaching materials towards digital technology can encourage students to learn actively, constructively, investigatively, and exploratory (Jahnke et al., 2022; Lieberman et al., 2009; Mercer et al., 2019; Nkomo, L. M., Daniel, B. K., & Butson, 2021). Further advances have resulted in digital technologies that have the potential to change the work of an educator. But in fact, there are still relatively many elementary school teachers who have not utilized digital technology optimally to improve the quality of their teaching and learning activities (Rivalina, 2015; Starkey, 2020; Starkey & Eppel, 2019). Innovative teaching materials can improve the quality of learning and create a more meaningful learning process for students (Barbara, N. K. R. & Bayu, G. W. 2022). The use of digital technology can motivate and inspire students to learn actively and achieve the expected competencies, regardless of background, language, or disability so it is imperative for teachers to harness the power of technology to support lifelong and sustainable learning (Peters & Araya, 2011). Meanwhile, the facts from the preliminary study show that in general elementary school teachers still use textbooks or conventional learning media, while the demands of the current digital technology era require teachers to make more use of ICT and digital teaching materials. This means that there is a gap between expectations and the reality on the ground. This is caused by the low digital literacy of teachers. This condition is suspected to be one of the causes of the low involvement of students in the learning process which has an impact on the low competence of their learning outcomes. This is also the main reason why it is necessary to develop teaching materials packaged in the form of interactive digital comics.

ICT can be used as a source and medium of learning in elementary schools (Ghavifekr & Rosdy, 2015; Nindya, M. & Dafit, F., 2022). The completeness of facilities for internet access in the school environment where teachers work greatly impacts the quality of their work (Ghavifekr et al., 2006; Madden, Ford, Miller, & Levy, 2005). Based on the results of interviews with a number of elementary school teachers in the Tapos sub-district, Depok City, it was obtained that in general Sekolah Dasar (SD) were equipped with computer facilities and internet networks, although they were limited. In addition to the internet network provided by the school, all teachers also have sufficient internet quota so that it is possible to apply learning using ICT. The main obstacle felt is that generally they, especially senior teachers, find it difficult to understand how to use digital technology and utilize the internet for online and face-to-face learning activities in class. One of the reasons is that teachers lack knowledge/experience and familiarity with ICT (Nomsa Mndzebele, 2013; Salehi & Salehi, 2012). Teachers have difficulty using ICT to support the implementation of their duties because of the rapid development of technology while their competence related to the use of ICT is relatively low. This shows that learning using teaching materials in the form of comics can stimulate students' learning motivation and can improve students' positive character from an early age so that they can succeed in further education.

Comics are a form of presenting teaching materials through illustrated stories that combine images, written text, and dialogue. Comics present a strong visual message in conveying meaning deeply and directly, which conventional texts cannot (Park et al., 2011). The use of comics as teaching aids will stimulate students and make them focus on the topic in achieving the planned targets (Tuncel & Ayva, 2010), feel happy, relaxed and not tense in participating in learning, and affect the achievement of learning outcomes (Buchori & Setyawati, 2015), and the best way to encourage children to think creatively (Koutníková, 2018). Comics can achieve concrete results in learning such as triggering debate and reflection in students (Silva, Santos, & Bispo, 2017). This shows that the educational learning model through comics can stimulate students' learning motivation and can improve student character education from an early age so that they can succeed in further education.

Comic digital teaching materials are teaching materials that are included in the category of interactive teaching materials, this is due to the combination of text, images, and animations (Jazuli, M., Azizah, L. F., & Meita, 2018). Digital comics contain descriptions of teaching materials through dialogues accompanied by pictures. Explanations in the learning process are easier for students to understand if the explanation of the material presented is accompanied by pictures (Manalu Amin, M., Hartono, Y., & Nyimas, 2017; Maufur, S., & Lisnawati, 2017). Teaching materials in the form of digital-based comics are proven to be valid for use in learning and effective in increasing student learning independence (Kusumadewi et al., 2021; Şentürk, 2021), it is easy to access learning materials via smartphones (Handayani, 2016), and help students in directing their learning and promote student learning and assist in the achievement of academic goals and objectives (Kumar, 2017).

A number of studies that develop teaching materials in the form of interactive digital comics are relatively widely carried out. Among them, Development study of digital comics teaching materials for mathematics (Kusumadewi et al., 2021; Mamolo, 2019; Nurfitriyanti et al., 2021). Development study of comics teaching materials in physics (Chercules, L. Hakim, & Lefudin, 2021). Development of comics

teaching materials in biology (Samosa, 2021). Development study of comic teaching materials in the field of the social studies (Şentürk, 2021). Experimental study on the effectiveness of using digital comics media in learning for grade IV elementary schools on the theme of always saving energy (Riwanto & Wulandari, 2018). Development study of interactive e-comic multimedia in the field of language (Siti Ainun Nazhiroh, Muhamad Jazeri, 2021). Various studies as described above, studies on the development of digital comics teaching materials focus more on the topic of teaching materials in certain fields or subjects. It is still rare to develop digital comics, especially for elementary schools that are thematic and interactive. In this development research, the digital comics teaching materials developed refer to the learning themes and sub-themes according to the curriculum and are interactive. The interactive nature allows students to reflect on their learning achievements.

This study aims to develop teaching materials packaged in the form of Interactive Digital Comics Teaching Materials (DCTM Interactive) and test their effectiveness on student involvement in learning and achievement of learning outcomes. This research is urgent and the results will have a significant impact on the transformation of the quality of online learning carried out by teachers. Elementary school teachers and students will be motivated to improve their digital literacy, because the use of Interactive DCTM can facilitate the formation of habits of using digital technology and the internet as learning media. In addition, they can also be motivated to be able to create digital teaching materials that are designed by themselves and upload them on the internet to be accessed by teachers and students. The development and utilization of interactive digital comics teaching materials developed in this study is one example of the efforts that elementary school teachers must make in improving the quality of learning processes and outcomes as well as digital literacy of teachers and students. A study of a number of research results that have been carried out by previous researchers confirms the truth of the thesis (Hockly, N. and Dudeney, 2015; Hockly & Dudeney, 2018).

2. METHOD

The development research method used is a product-oriented development model, namely the ADDIE model (Analyze, Design, Develop, Implement, dan Evaluate) (Walling, 2015). The operational design of activities at each stage of development is presented in Figure 1.

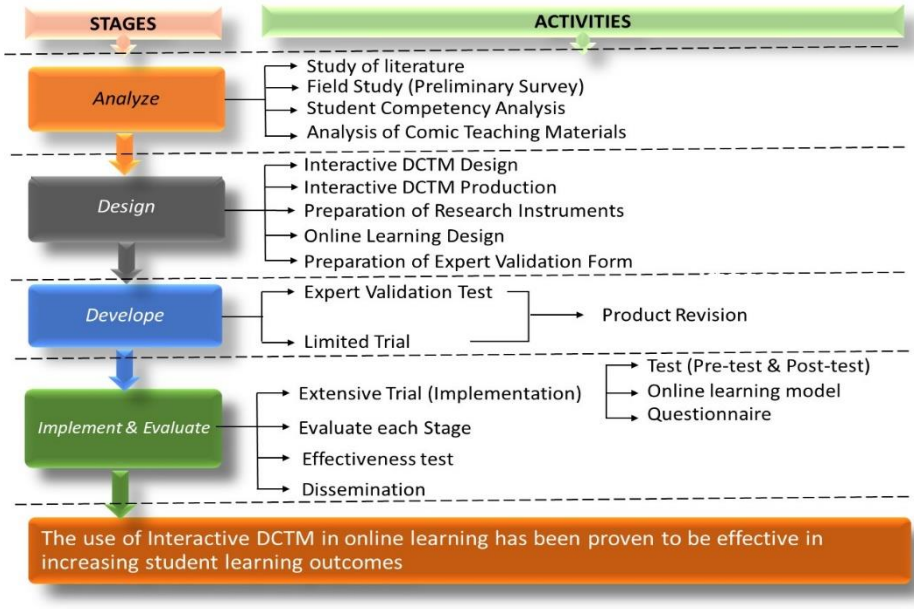

Figure 1. ADDIE Conceptual and Operational Model

This study involved 12 elementary schools that were randomly selected from 117 elementary schools in Tapos District, Depok City, which consisted of 40 State Elementary Schools (SES) and 77 Private Elementary Schools (PES). The research subjects were fifth grade elementary school students. Limited field trials were carried out in 1 class from 1 selected school with 27 students. A wider field trial was carried out in 19 classes, namely 12 classes from SES with 456 students and 7 classes from PES with 141 students so that the total number of students involved in the wide trial was 597 people. The effectiveness test was carried out in 4 classes taken from 2 classes each from 2 elementary schools that were not used in both

limited and wider field trials. The number of students involved in the effectiveness test was 152 people. Thus, the total number of students involved in the research was 776 fifth grade students. The sampling framework is presented in Table 1.

Table 1. Sampling Framework

No.	Sample	School Category	Population	Number of Samples		
				Schools	Clases	Students
1.	Limited field trials	SES	40	1	1	27
2.	Wider field trials	SES	40	6	12	456
		PES	77	3	7	141
	Total		117	9	19	597
3.	Effectiveness test	SES	40	2	4	152

An extensive trial in this study involved 8 principals and 20 teachers from 9 selected primary schools, 1 of whom did not respond when the questionnaire was sent. The demographic data of principals and teachers are presented in Table 2.

Table 2. Principal and Teachers Participant Demographic Data

No.	Demographic Aspects		Principals (N = 8)	Teachers(N = 20)
1.	Gender	M	6	2
		F	2	18
2.	School Origin	SES	5	13
		PES	3	7
3.	Teaching experience	< 5 years	-	4
		5 – 10 years	-	6
		10 – 15 years	2	6
		15 – 20 years	3	2
		> 20 years	3	2

Data collection uses 4 (four) instruments, namely: 1) Learning Outcomes Test, 2) Questionnaire for students, 3) Questionnaire for Principals and Teachers, and 4) Questionnaire for Parents. Grid of learning outcome test instruments is presented in Table 3. The learning outcomes test instrument was tested on 75 students. Test the validity and reliability of the learning outcomes test instrument using the Rasch Model analysis technique using the Winstep application. By using this analysis technique, the results show that the average logit value (logarithm odds unit) of respondents in the learning outcomes test instrument is 0.61 from the dichotomous scale range 0 and 1. The reliability value of the person (respondent) is 0.81 which means it is in the good category, while the item reliability is 0.93 which means it is in the "very good" category. The reliability value of Cronbach's Alpha (KR-20) which shows the interaction between respondents and the instrument items as a whole is 0.83 or can be categorized as "good".

Table 3. Grid of Learning Outcome Test Instruments

Subjects	Competencies	Level						Number of Items
		C_1	C_2	C_3	C_4	C_5	C_6	
Sains	3.1 Explain the organs of motion and their functions in animals and humans as well as how to maintain the health of the organs of human movement.	2	4		4	2		12
	4.1 Make simple models of human and animal movement organs.	1					1	2
Social science	3.1 Identifying the geographical characteristics of Indonesia as an archipelagic/maritime and agrarian country and their impact on economic, social, cultural, communication and transportation life.	1	2	1	2			6
	4.1 Presents the results of the identification of the geographical characteristics of	1	3	2	3		1	10

Subjects	Competencies	Level						Number of Items
		C_1	C_2	C_3	C_4	C_5	C_6	
	Indonesia as an archipelagic/maritime and agrarian country and their impact on economic, social, cultural, communication and transportation life.							
Pancasila and civic education	1.1 Thank God Almighty for the values of Pancasila in everyday life.			1		1		2
	2.1 Be responsible, love the homeland, and be willing to sacrifice according to the values of the precepts of Pancasila.				1	1		2
	3.1 Identify Pancasila values in everyday life.					1		1
	4.1 Presenting the results of the identification of Pancasila values in everyday life.				1			1
Art, Culture, and Craft	3.1 Understanding story images.			1				1
	4.1 Create story pictures.					1		1
Indonesian	3.1 Determine the main idea in spoken and written texts.		1					1
	4.1 Presenting the results of the identification of main ideas in written and oral texts orally, in writing, and visually.				1			1
Total		**5**	**10**	**5**	**13**	**5**	**2**	**40**

Questionnaires for students were used to collect data about their views on the Interactive BAKBD, seen from the ease of opening, the suitability of language/sentence use, font size, link functionality, fluency of interactive practice questions, and attractiveness of Interactive DCTM. The questionnaire grid for students is presented in Table 4.

Tabel 4. Questionnaire Grid for Students

No.	Aspects	Number of Items
1.	Ease of opening DCTM	1
2.	Ease of understanding sentences and conversations in DCTM	1
3.	Font size used	1
4.	Link functionality in DCTM	1
5.	Smooth use of buttons in working on practice questions	1
6.	The attractiveness of the DCTM serving format	1
Total Items		**6**

Questionnaires for principals and teachers were used to obtain data on the suitability of the interactive DCTM with the curriculum and the needs of teachers in learning activities. The questionnaire grid for principals and teachers is presented in Table 5.

Tabel 5. Questionnaire Grid for Principals and Teachers

No.	Indicators	Number of Items
1.	DCTM content conformity with curriculum	2
2.	DCTM motivates learning and attracts students' attention	2
3.	The suitability of the DCTM content with the level of development and learning needs of students	2
4.	Supporting teachers optimize student involvement in learning	2
5.	Supporting teachers in improving learning outcomes and digital literacy of students	2
Total Items		**10**

Questionnaires for parents of students were used to collect data on whether the developed Interactive BAKBD really functions to motivate students' learning as well as to assist parents in guiding their son/daughter's independent study at home. Questionnaire grids for parents of students are presented in Table 6.

Tabel 6. Questionnaire Grid for Parents

No.	Indicators	Number of Items
1.	DCTM helps children's independent learning	2
2.	DCTM motivates and increases children's attention in independent learning at home	2
3.	DCTM is easily accessible for children	2
4.	DCTM Helping parents in guiding their children to study at home	2
5.	DCTM is suitable as a learning resource for children to learn independently	2
	Total Items	**10**

The data analysis technique used descriptive and inferential statistical techniques. Descriptive statistics include the calculation of statistical values which include measures of central tendency, namely the mean, median, and mode, as well as the magnitude of the distribution, namely the standard deviation and variance of all distributions of research data. Inferential statistical techniques were used to test the effectiveness of using interactive digital comics teaching materials in online learning on student learning outcomes. Inferential statistical analysis used is the One-way Analysis of Variance (Anova) technique.

3. RESULT AND DISCUSSION

Result

Description of Product: DCTM Interactive

The interactive DCTM was developed by referring to the results of a theoretical study on the concept of comics, a review of the 2013 Curriculum, and existing teaching materials in the form of printed books and e-books. The chosen theme is theme 1 on “Moving Organs of Animals and Humans” and the selected sub-theme is sub-theme 2 on “Humans and the Environment”. According to the explanation in the curriculum, learning for theme 1 subtheme 2 is translated into 6 (six) learning activities, so that the interactive DCTM developed in this study were 6 DCTM with different topics according to the learning subtheme, namely: 1) DCTM 1 with the topic "Benefits of Sport ”, 2) DCTM-2 with the topic “Human Movement Tools”, 3) DCTM-3 is a teaching material for learning activities 3 with the topic “Map of Indonesia”, 4) DCTM-4 with the topic “Natural Appearance”, 5) DCTM- 5 is teaching material for learning activities 5 with the topic "Muscles in Humans", and 6) DCTM-6 is teaching material for learning activities 6 with the topic "Maintaining and Caring for Human Muscles". The use of interactive DCTM in learning activities uses thematic and contextual approaches, so that each learning activity involves more than one subject in an integrated manner with the content of teaching materials related to the context of students' daily lives. The six DCTM research products are presented in Figure 2.

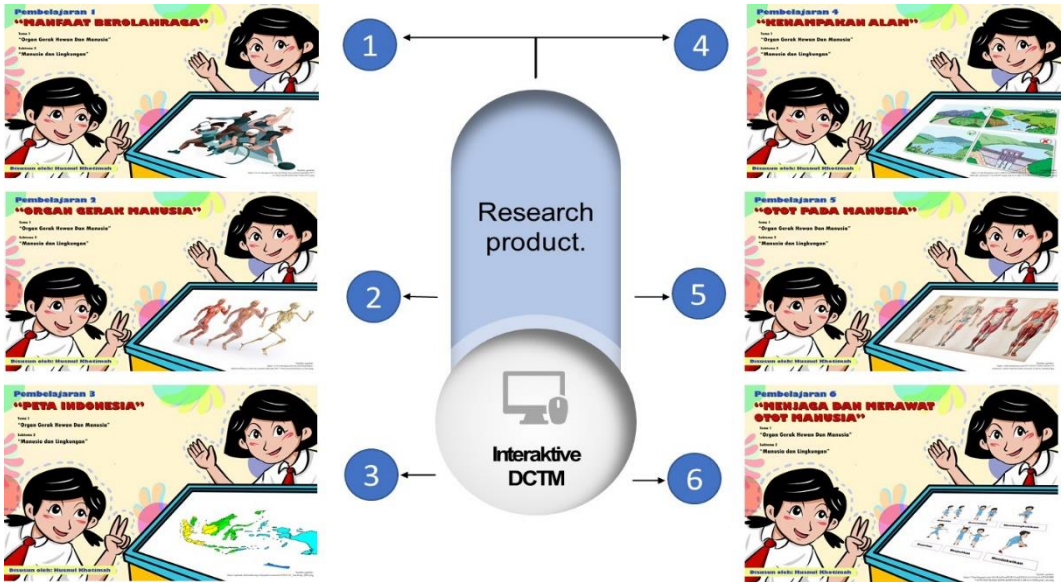

Figure 2. Interactive DCTM as Research Products

Description of Limited Trial Results

This limited field trial aims to test the ease with which students can open DCTM (using a Laptop, Personal Commuter, or Android Phone), readability of DCTM (Language aspect), link functionality with other learning resources, interactive questions at the end of each DCTM section, and student interest in online learning using interactive DCTM.

Table 7. Limited Trial Results Data

No.	Aspects Observed	Frequency of Parent/Student Assessment			Mode
		1	2	3	
1.	Ease of opening DCTM using a Laptop, Personal Commuter, or Android Mobile Phone		2/6	33/21	3/3
2.	Readability and language use			35/27	3/3
3.	Link functionality on DCTM		2/0	33/27	3/3
4.	Functionality of interactive practice questions			35/27	3/3
5.	Interactive DCTM attraction		4/0	31/27	3/3

Notes: 1 = Unfavorable; 2 = Sufficient; 3 = Favorable

After students finished studying online at home using the interactive DCTM, parents and students were asked to fill out a questionnaire containing questions according to the purpose of the limited trial. The number of parents who filled out the questionnaire was 35 people, but only 27 students succeeded in filling out the questionnaire. The results of parent and student assessments of the six interactive DCTMs are presented in Table 7. Based on the table, the mode of the five aspects observed in the limited trial is 3 from a rating scale range of 1-3. Thus, it can be concluded that the six DCTMs can be declared valid so that they can proceed to the next validation stage, namely validation through wider field trials.

Description of Wider Field Trial Results

The wider trial aims to test the interactive DCTM function in increasing student involvement in independent learning activities through online learning modes, both synchronously and asynchronously. The interactive DCTM trial was conducted for 6 days. After students have completed online learning using interactive DCTM, then teachers, principals, and parents of students fill out a questionnaire. The questionnaire for principals and teachers consists of 10 items related to the suitability of the interactive DCTM with the learning needs of students and teachers in teaching. The assessment score uses a scale of 1 to 3. A score of 1 if it is considered not good, a score of 2 if it is considered sufficient, and a score of 3 if it is considered good. Thus, theoretically the minimum score is 10 and the maximum score is 30. Descriptive statistics on the results of principals and teachers' assessments of interactive DCTM after being piloted in their schools are presented in Table 8. Based on the table, it can be seen that empirically the minimum value is 17, the maximum is 30, and the average is 27.21. Thus, the average teacher and principal assessment of the interactive DCTM is close to the theoretical maximum value, so it can be categorized as good.

Table 8. Descriptive Statistics of Principal and Teacher Assessments

	N	Minimum	Maximum	Mean		Std. Deviation
	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic
Principal and Teacher Assessments	28	17	30	27.21	.739	3.910
Valid N (listwise)	28					

The questionnaire for parents consists of 10 questions regarding the suitability of the interactive DCTM with students' learning needs for independent study at home. Descriptive statistics on parental assessment of interactive DCTM after their son/daughter learns independently online at home using interactive DCTM are presented in Table 9.

Table 9. Descriptive Statistics of Student Parents Questionnaire Data (N =356)

	N	Minimum	Maximum	Mean		Std. Deviation
	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic
Parents Assessments	356	14	30	24.58	.287	5.420
Valid N (listwise)	356					

Based on descriptive statistics of parental assessment data after their son/daughter learns independently online at home using interactive DCTM, it is obtained that the minimum score is 14 and the maximum is 30. The empirical average is 24.58 and the standard deviation is 5.42. When compared with the ideal or theoretical average of 30, the empirical average is close to the ideal average. Thus, based on these data, parents assess the interactive DCTM can be categorized as good. This means that parents consider that interactive DCTM can help them guide and direct their son's/daughter's learning, thereby reducing the difficulties they experience in replacing part of the teacher's role in guiding their daughter's learning. Thus, based on the results of the questionnaire data analysis of students' parents, this development research concludes that interactive DCTM can increase the intensity of the involvement of elementary school students in the online independent learning process.

The learning outcomes achieved by students were measured using a test consisting of 40 questions with a duration of 120 minutes. Descriptive statistics on learning outcomes data are presented in Table 10. From the table it appears that the smallest score is 25.00, the highest score is 100. This means that there are students who get perfect scores. The mean (mean) of learning outcomes achieved by students is 68.68 from a scale or range of values from 0 to 100 with a relatively small standard deviation of 15.90. Meanwhile, the median is 70.00 and the mode is 75.00.

Table 10. Descriptive Statistics of Learning Outcome Data

Statistics	Learning Outcomes
Mean	68.68
Median	70.00
Mode	75.00
Std. Deviation	15.91
Variance	253.00
Minimum	25.00
Maximum	100.00

Based on the middle values, namely mean, median, and mode, it appears that the value of mode > median > mean. This shows that the distribution of learning outcomes data tends to skew or shift to the right. This means that there is a tendency for more values that are above the median and mean than those that are below it. This fact illustrates that the learning outcomes achieved by students in online learning trials using interactive DCTM can be categorized as moderate to high with the deviation of values from the mean not too far. The average learning outcomes achieved by students based on their gender are presented in Table 11. The average achieved by male students is 68.04 with a standard deviation of 15.80. The average achieved by female students is 69.30 with a standard deviation of 16.02, while the total average is 68.68 with a standard deviation of 15.91. The statistical value shows that the average learning outcome of female students is slightly higher than that of female students.

Table 11. Average Learning Outcomes by Gender

	Learning Outcomes		
Gender	**Mean**	**N**	**Std. Deviation**
Male	68.04	191	15.80
Famale	69.30	200	16.02
Total	68.68	391	15.91

To test the significance of the difference between the two mean learning outcomes of male and female students, a different mean test was performed, the results of which are presented in Table 12. From the table, it can be seen that the value of F = 0.616, the significance level of p = 0.433, which means the two means are not significantly different. significant. Thus, there is no difference in the average learning outcomes of male and female students after they complete online independent learning using interactive DCTM.

The average learning outcomes achieved by students based on school origin are presented in Table 13. The average achieved by SES students is 67.01 with a standard deviation of 16.08. The mean achieved by PES students is 76.36 with a standard deviation of 12.60, while the total average is 68.68 with a standard deviation of 15.91. The statistical value shows that the average learning outcomes of students from PES are greater than students from SES.

Table 12. Anova Learning Outcomes by Gender

Source of Variance		Sum of Squares	df	Mean Square	F	Sig.
Between Groups	(Combined)	155.932	1	155.932	.616	.433
Within Groups		98515.743	389	253.254		
Total		98671.675	390			

Table 13. Average Learning Outcomes Based on School Origin

	Learning Outcomes		
Asal Sekolah	**Mean**	**N**	**Std. Deviation**
SES	67.01	321	16.08
PES	76.36	70	12.60
Total	68.68	391	15.91

To test the significance of the difference in the two mean learning outcomes of participants from SES and students from PES, a mean difference test was performed, the results of which are presented in Table 14. The results of the analysis of the two-mean difference test using Fisher's exact test obtained the value of F = 20.86, the significance level p = 0.00 which means the two means are very significantly different. Thus, there is a difference in the average learning outcomes of students from SES with the average learning outcomes of students from PES after they complete independent online learning using interactive DCTM. In this case, the average learning outcomes of students from PES are greater than the average learning outcomes of students from SES.

Table 14. Anova Learning Outcomes Based on School Origin

Source of Variance		Sum of Squares	df	Mean Square	F	Sig.
Between Groups	(Combined)	5021.63	1	5021.63	20.86	.000
Within Groups		93650.04	389	240.75		
Total		98671.68	390			

Description of Effectiveness Test Results

Descriptive statistics on learning outcomes for the experimental class and control class are presented in Table 15. Based on the table, it appears that the average learning outcome for the experimental class is 69.14, higher than the control class, which is 62.66. The significance test of the difference between the average learning outcomes of the experimental class and the control class was carried out using one-way ANOVA. Before the one-way ANOVA test was carried out, the analysis requirements test was first carried out, namely the distribution normality test and the homogeneity of variance of the learning outcomes of the experimental class and control class.

Table 15. Descriptive Statistics of Learning Outcomes

Statistics	Descriptive	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Min.	Max.
						Lower Bound	Upper Bound		
Learning Outcomes	Experiment	67	69.14	11.98	1.46	66.22	72.06	37.50	95.00
	Control	76	62.66	17.22	1.97	58.73	66.60	27.50	97.50
	Total	143	65.70	15.29	1.28	63.17	68.23	27.50	97.50

The normality test of the data distribution used the Kolmogorov-Smirnov normality test technique. The test criteria are if the significance value (sig.) p > 0.05 then the research data is normally distributed, otherwise if the p value is 0.05 then the research data is not normally distributed. The results of the normality test using this technique showed the Kolmogorov-Smirnov statistical value for the experimental class was 0.093 with a significance level of 0.200, while the control class was 0.092 with a significance level of 0.177. The second level of significance is greater than 0.05. Thus, the experimental and control class learning outcomes data are both normally distributed. Test the homogeneity of variance of both

experimental and control distributions using the Levente test technique. The test criteria are if the significance value (sig.) p > 0.05 then the decision is to accept Ho which means the variance of the experimental class and control class is homogeneous, on the contrary if the p value ≤ 0.05 then the decision is to reject Ho which means there is a difference in variance between classes. experiment and control. The results of the homogeneity of variance test showed that Levene's value for learning outcomes was 11.704 with a significance value (sig.) p = 0.01. Thus, H_0 is accepted which means that the variance of the distribution of learning outcomes data between the experimental class and the control class is homogeneous.

The results of the one-way ANOVA test are presented in Table 16. The test criteria are if the significance value (sig.) p > 0.05, the decision is to accept H_0 which means there is no difference in average between the experimental class and the experimental class. On the other hand, if the p ≤ 0.05, the decision is to reject H0 which means that there is a difference in the mean between the experimental class and the control class. It can be seen that the F value is 6.65 with a significance value (sig.) p = 0.011. Thus, H_0 is rejected, which means that there is a significant difference in average learning outcomes between the experimental class and the control class.

Table 16. One-Way Anova of Learning Outcomes and Digital Literacy

Variable		Sum of Squares	df	Mean Square	F	Sig.
Hasil Belajar	Between Groups	1493.97	1	1493.97	6.65	0.011
	Within Groups	31698.60	141	224.81		
	Total	33192.57	142			

Based on the results of the two-average difference test using the one-way ANOVA technique as described in Table 16, it can be concluded that the use of interactive DCTM in online independent learning is effective in improving student learning outcomes. Thus, the interactive DCTM developed in this study meets the criteria and can be recommended for use in learning activities in elementary schools.

Discussion

Based on the results of data analysis of the results of limited and wider field trials, it was found that interactive DCTM significantly improved student learning outcomes. Interactive DCTM is estimated to have a positive effect on student academic achievement because its use in online independent learning activities can increase the intensity of student involvement in the learning process, learning motivation, and thinking ability. Several similar studies in various fields support this result (Affeldt et al., 2018; Chen et al., 2018; Enteria & Casumpang, 2019; Khaira, N., Yusrizal, Y., Gani, A., Syukri, M., Elisa, E., & Evendi, 2020; Şentürk, 2021; Sipayung et al., 2020). The use of interactive DCTM is predicted to have a positive effect on student engagement in learning by positively influencing students' attitudes and motivation towards lessons, increasing their desire to learn, encouraging creative learning, and supporting audio, visual, and audiovisual learning. Several studies in various fields support this result (Ilhan, G. O., and Oruc, 2019; Ulfa, 2018).

This development research found that the use of interactive DCTM in online independent learning for fifth grade elementary school students was effective in significantly improving student learning outcomes. That is, with the presentation of teaching materials packaged in the form of interactive DCTM, the achievement of learning outcomes as the main effect expected from the learning process can be effectively increased. This finding is supported by research results which show that the use of comics is effective for transferring information or communicating concepts, especially abstract concepts, and improve science competence (Caldwell, 2012; Hidayat & Rostikawati, 2018; Tuncel, G., & Ayva, 2010). Digital comics have unique characteristics for critical reflection of texts, as the comic genre encourages multiple meanings, juxtaposing ideas, humor, and counterintuitive lines of direction (Sockman et al., 2016). The two results of this study are strong rational and empirical reasons to explain why the use of interactive DCTM developed in this study is effective in improving student learning outcomes.

The results of the effectiveness test comparing the average learning outcomes of groups of students who learn to use interactive DCTM with groups of students who use conventional textbooks provided by schools show that there is a significant difference. In this case, the use of interactive DCTM is more effective than conventional textbooks on student learning outcomes. Several similar studies show the same findings (Nindya, M & Dafit, 2022; Puspitorini, R., Prodjosantoso, A.K., Subali, B., 2014; Şentürk, 2021). The more positive effect of interactive DCTM on student learning outcomes is predicted to be related to the presentation of interactive DCTM features that are more suitable for elementary school age children. This is based on the reason that interactive DCTM is designed by considering student characteristics, including

learning styles, interests, interest in picture stories, and learning speed, so that interactive DCTMs have more impact than conventional textbooks. The use of interactive DCTM makes it easy for students to control the study time for each sub-theme of the lesson they are studying. Interactive DCTM provides opportunities for students to repeat lessons without being boring compared to conventional textbooks. The interactive practice questions provided at the end of each interactive DCTM allow students to assess their own learning outcomes, and they will be encouraged to repeat that part of the lesson if they feel they have not understood it well. When students learn to use the interactive DCTM, they can return to the section they need. They can also carry out learning activities independently without influencing or being influenced by other students. Therefore, the use of interactive DCTM is more effective in directing and controlling student learning. By using interactive DCTM, teachers can control all students remotely, and students can control their own teaching process.

The results of the analysis of the assessment data of teachers, school principals, parents, and students who were netted using a questionnaire, it was concluded that teachers, principals, parents, and students gave positive assessments of interactive DCTM. They responded that the use of interactive DCTM in online independent learning is appropriate for students to direct their learning, for teachers to control their students' learning, and for parents to guide their children to study at home. The results of the analysis of the data from the three questionnaires indicate that interactive DCTM can increase the intensity of student involvement in lessons, make lessons more interesting, make students more productive, make lessons easier to understand, make it easier for teachers to direct their students' learning, make it easier for parents to guide their children, and improve the achievement of student learning outcomes. These statements are in line with the results of several studies on the effects of using digital comics which were investigated in terms of different variables (İlhan G. O. & Oruc, S. 2019; McNicol, 2017).

The intensity of the involvement of students in the learning process increases because the presentation of teaching materials in the form of digital comics can trigger the involvement of their imaginations. The presentation of teaching materials in the form of colorful and contextual image visualizations combined with short narratives in a storyline that is not boring and in context can hypnotize them to be more involved in the storyline presented in the comics. In the comics developed in this study, instrumental music was also integrated which was selected according to the age of the students, which turned out to help their minds to be more carried away by the presentation of teaching materials that were packaged in the form of stories. Even the presentation of teaching materials in the form of comics can encourage the imagination of students to become comic writers (Vassilikopoulou et al., 2011). The findings of this study illustrate the importance of elementary school teachers to develop teaching materials that are packaged by themselves and adapted to the characteristics of elementary school-aged children. This study suggests that the teaching materials in question be designed and packaged in the form of interactive digital comics, which are equipped with interactive practice questions and are linked to other relevant learning resources.

The discussion of the research results as described above gives confidence to the researcher that the interactive DCTM theme 1 on "Movement Organs of Animals and Humans" sub-theme 2 on "Humans and the environment" for elementary school grade V semester 1 which was developed in this development research meets the criteria for use in learning practice. The findings of this study also signal the importance of developing interactive DCTM for all themes and sub-themes at each grade level in elementary schools that are adapted to the age of the students. Based on the findings of this study, it is suggested: First, teaching materials for elementary schools should be designed and packaged in the form of interactive digital comics to attract interest and motivate students to learn. Second, teachers and other researchers are advised to develop interactive DCTM for all themes and subthemes at each grade level in elementary schools that are adjusted to the age of students. Third, the principal of each elementary school is advised to develop a capacity building system for teachers related to digital literacy and competence in the field of ICT.

4. CONCLUSION

This study resulted in two conclusions: First, interactive DCTM can increase the intensity of student involvement in learning, assist teachers in directing and controlling student learning activities, and help parents guide their children in learning at home. Second: the interactive use of DCTM in online independent learning, has been proven to be effective in improving student learning outcomes than using conventional textbooks.

5. REFERENCES

Açikalin, M. (2009). Pre-service elementary teachers' beliefs about use of the Internet in the social studies

classroom. *European Journal of Teacher Education*. https://doi.org/10.1080/02619760802553030.

Affeldt, F., Meinhart, D., & Eilks, I. (2018). The use of comics in experimental instructions in a non-formal chemistry learning context. *International Journal of Education in Mathematics, Science and Technology*, *6*(1), 93–104. https://doi.org/10.18404/ijemst.380620.

Albini, F., Liu, X., Torlasco, C., Soranna, D., Faini, A., Ciminaghi, R., Celsi, A., Benedetti, M., Zambon, A., Di Rienzo, M., & Parati, G. (2016). An ICT and mobile health integrated approach to optimize patients' education on hypertension and its management by physicians: The Patients Optimal Strategy of Treatment(POST) pilot study. *Proceedings of the Annual International Conference of the IEEE Engineering in Medicine and Biology Society, EMBS*, *2016-October*, 517–520. https://doi.org/10.1109/EMBC.2016.7590753.

Baloran, E. T. (2020). Knowledge, Attitudes, Anxiety, and Coping Strategies of Students during COVID-19 Pandemic. *Journal of Loss and Trauma*, *25*(8), 635–642. https://doi.org/10.1080/15325024.2020.1769300.

Barbara, N. K. R.; Bayu, G. W. (2022). Powtoon-Based Animated Videos as Learning Media for Science Content for Grade IV Elementary School. *International Journal of Elementary Education*, *6*(1). http://dx.doi.org/10.23887/ijee.v5i4.39821.

Bohak Adam, T., & Metljak, M. (2022). Experiences in distance education and practical use of ICT during the COVID-19 epidemic of Slovenian primary school music teachers with different professional experiences. *Social Sciences & Humanities Open*, *5*(1), 100246. https://doi.org/10.1016/j.ssaho.2021.100246.

Bolliger, D. U., & Shepherd, C. E. (2017). An Investigation of Mobile Technologies and Web 2.0 Tools Use in Outdoor Education Programs. *Journal of Outdoor Recreation, Education, and Leadership*, *9*(2), 181–196. https://doi.org/10.18666/jorel-2017-v9-i2-8228.

Buchori, A., & Setyawati, R. D. (2015). Development model of charactereducation through e-comic in elementary school. International Journal of Education and Research. *International Journal of Education and Research*.

Caldwell, J. (2012). Information comics: An overview. *IEEE International Professional Communication Conference*. https://doi.org/10.1109/IPCC.2012.6408645.

Chen, G. D., Fan, C. Y., Chang, C. K., Chang, Y. H., & Chen, Y. H. (2018). Promoting autonomy and ownership in students studying English using digital comic performance-based learning. *Educational Technology Research and Development*. https://doi.org/10.1007/s11423-018-9597-7.

Chercules, Hakim L., L. (2021). Development of Teaching Materials in The Form of Comics Based on Local Wisdom Wave Material. *Berkala Ilmiah Pendidikan Fisika*, *9*(3), 349–359. https://doi.org/10.20527/bipf.v9i3.9512.

Enteria, O., & Casumpang, P. F. H. (2019). Effectiveness of Developed Comic Strips as Intructional Materials in Teaching Specific Science Concepts. *International Journal for Innovation Education and Research*, *7*(10), 876–882. https://doi.org/10.31686/ijier.vol7.iss10.1835.

Ghavifekr, S., Kunjappan, T., Ramasamy, L., Anthony, A., & My, E. (2006). *Teaching and Learning with ICT Tools: Issues and Challenges from Teachers' Perceptions*. *4*(2), 38–57.

Ghavifekr, S., & Rosdy, W. A. W. (2015). Teaching and learning with technology: Effectiveness of ICT integration in schools. *International Journal of Research in Education and Science*, *1*(2), 175–191. https://doi.org/10.21890/ijres.23596.

Handayani, R. D. (2016). Pengembangan Bahan Ajar Elektronik Berbasis Mobile-Learning Pada Mata Kuliah Optik Di Fkip Universitas Jember. *Ta'dib*, *17*(1), 81. https://doi.org/10.31958/jt.v17i1.262.

Hills, D., & Thomas, G. (2020). Digital technology and outdoor experiential learning. *Journal of Adventure Education and Outdoor Learning*, *20*(2), 155–169. https://doi.org/10.1080/14729679.2019.1604244.

Hockly, N., & Dudeney, G. (2018). Current and Future Digital Trends in ELT. *RELC Journal*. https://doi.org/10.1177/0033688218777318.

Hu, B., Noman, S. M., Irshad, M., Awais, M., Tang, X., Farooq, U., & Song, C. (2021). A pilot study of Global ICT strategy applications in sustainable continuing education. *Procedia Computer Science*, *183*, 849–855. https://doi.org/10.1016/j.procs.2021.03.009.

Ilhan, G. O., and Oruc, S. (2019). Comic books use in social studies lesson: Texas history. *Education and Science*, *44*(198), 327-341. http://doi.org/10.15390/eb.2019.7830.

İLHAN G. O., O. Ş. (2019). Comic Books Use in Social Studies Lesson: Texas History. *Egitim Ve Bilim-Education And Science*, *44*(198), 327–341. http://doi.org/10.15390/eb.2019.7830.

Jahnke, I., Meinke-Kroll, M., Todd, M., & Nolte, A. (2022). Exploring Artifact-Generated Learning with Digital Technologies: Advancing Active Learning with Co-design in Higher Education Across Disciplines.

Technology, Knowledge and Learning, *27*(1), 335–364. https://doi.org/10.1007/s10758-020-09473-3.

Jazuli, M., Azizah, L. F., & Meita, N. M. (2018). Pengembangan Bahan Ajar Elektronik Berbasis Android Sebagai Media Interaktif. *LENSA (Lentera Sains): Jurnal Pendidikan IPA*, *7*(2), 47–65. https://doi.org/10.24929/lensa.v7i2.22.

Karademir, T., Alper, A., Soğuksu, A. F., & Karababa, Z. C. (2021). The development and evaluation of self-directed digital learning material development platform for foreign language education. *Interactive Learning Environments*, *29*(4), 600–617. https://doi.org/10.1080/10494820.2019.1593199.

Khaira, N., Yusrizal, Y., Gani, A., Syukri, M., Elisa, E., & Evendi, E. (2020). Development of Student Worksheets Based on Comics to Improve Students' Motivation and Learning Outcomes on Material Vibration, Waves and Sound. *Jurnal Penelitian Pendidikan IPA*, *6*(2), 143–151. https://doi.org/10.29303/jppipa.v6i2.424.

Koutníková, M. (2017). The application of comics in science education. *Acta Educationis Generalis*, *7*(3), 88-98. https://doi.org/10.1515/atd-2017-0026.

Huda, K. M., Banu, M. S. A., Garg, B., Tula, S., Tuteja, R., & Tuteja, N. (2013). Os ACA 6, a P-type IIB Ca2+ ATP ase promotes salinity and drought stress tolerance in tobacco by ROS scavenging and enhancing the expression of stress-responsive genes. *The Plant Journal*, *76*(6), 997-1015. https://doi.org/10.1111/tpj.12352.

Kusumadewi, R. F., Islam, U., & Agung, S. (2021). Developing electronic teaching materials through comic mathematics media to increase student learning independence during the Covid-19 pandemic in Indonesia. *İlköğretim Online*, *20*(1), 708–716. https://doi.org/10.17051/ilkonline.2021.01.61.

Lieberman, D. A., Bates, C. H., & So, J. (2009). Young children's learning with digital media. *Computers in the Schools*, *26*(4), 271-283. https://doi.org/10.1080/07380560903360194.

Madden, A., Ford, N., Miller, D., & Levy, P. (2005). Using the Internet in teaching: The views of practitioners (A survey of the views of secondary school teachers in Sheffield, UK). *British Journal of Educational Technology*, *36*(2), 255-280. https://doi.org/10.1111/j.1467-8535.2005.00456.x.

Mamolo, L. A. (2019). Development of digital interactive math comics (DIMaC) for senior high school students in general mathematics. *Cogent Education*, *6*(1). https://doi.org/10.1080/2331186X.2019.1689639.

Manalu Amin, M., Hartono, Y., & Nyimas, A. (2017). Pengembangan Media Komik Matematika Berbasis Nilai Karakter pada Materi Trigonometri di Kelas X SMA Negeri 1 Indralaya Utara. *Jurnal Elemen*, *3*(1), 35. https://doi.org/10.29408/jel.v3i1.305.

Maufur, S., & Lisnawati, S. (2017). Pengaruh Penggunaan Media Gambar Berseri Terhadap Keterampilan Berbicara Bahasa Indonesia Siswa Kelas III MI Al-Washliyah Perbutulan Kabupaten Cirebon. *Al Ibtida: Jurnal Pendidikan Guru MI*, *4*(2), 189. https://doi.org/10.24235/al.ibtida.snj.v4i2.1888.

McNicol, S. (2017). The potential of educational comics as a health information medium. *Health Information and Libraries Journal*, *34*(1), 20–31. https://doi.org/10.1111/hir.12145.

Mercer, N., Hennessy, S., & Warwick, P. (2019). Dialogue, thinking together and digital technology in the classroom: Some educational implications of a continuing line of inquiry. *International Journal of Educational Research*, *97*(July 2018), 187–199. https://doi.org/10.1016/j.ijer.2017.08.007.

Nindya, M & Dafit, F. (2022). Utilization of Information and Communication Technology on the Learning Process in Elementary School. *International Journal of Elementary Education*, *6*(1). http://dx.doi.org/10.23887/ijee.v6i1.42049.

Nkomo, L. M., Daniel, B. K., & Butson, R. J. (2021). Synthesis of student engagement with digital technologies: a systematic review of the literature. *International Journal of Educational Technology in Higher Education*, *18*(1), 34. https://doi.org/10.1186/s41239-021-00270-1.

Nomsa Mndzebele. (2013). Challenges Faced by Schools when Introducing ICT in Developing Countries. *International Journal of Humanities and Social Science Invention*, *2*(9), 1–4. http://www.ijhssi.org/papers/v2(9)/Version-3/A02930104.pdf.

Nurfitriyanti, M., Suhendri, H., & Nurhayati. (2021). *Effectiveness of Mathematical Comics as the Development of Teaching Material*. *512*(Icoflex 2019), 380–385. https://doi.org/10.2991/assehr.k.201230.071.

Park, J. S., Kim, D. H., & Chung, M. S. (2011). Anatomy comic strips. *Anatomical Sciences Education*, *4*(5), 275-279. https://doi.org/10.1002/ase.224.

Peters, M. A., & Araya, D. (2011). Transforming American education: Learning powered by technology. *E-Learning and Digital Media*, *8*(2), 102-105. https://doi.org/10.2304/elea.2011.8.2.102.

Puspitorini, R., Prodjosantoso, A.K., Subali, B., & J. J. (2014). Penggunaan Media Komik dalam Pembelajaran IPA untuk Meningkatkan Motivasi dan Hasil Belajar Kognitif dan Afektif. *Jurnal Cakrawala Pendidikan*, *33*(3), 413–420. https://doi.org/10.21831/cp.v3i3.2385.

Rivalina, R. (2015). Kompetensi Teknologi Informasi Dan Komunikasi Guru Dalam Peningkatan Kualitas

Pembelajaran. *Jurnal Teknodik*, *4*, 165–176. https://doi.org/10.32550/teknodik.v0i0.121.

Riwanto, M. A., & Wulandari, M. P. (2019). Efektivitas Penggunaan Media Komik Digital (Cartoon Story Maker) dalam pembelajaran Tema Selalu Berhemat Energ. *JURNAL PANCAR (Pendidik Anak Cerdas dan Pintar)*, *2*(1). https://ejournal.unugha.ac.id/index.php/pancar/article/view/195.

Samosa, R. C. (2021). Cosim (Comics Cum Sim): an Innovative Material in Teaching Biology. *European Journal of Research Development and Sustainability*, *2*(4), 19-28. https://www.ijams-bbp.net/wp-content/uploads/2021/07/RESTY-C.-SAMOSA.pdf.

Şentürk, M. (2021). Educational comics and educational cartoons as teaching material in the social studies course. *African Educational Research Journal*, *9*(2), 515–525. https://doi.org/10.30918/aerj.92.21.073.

Sharples, M., Graber, R., Harrison, C., & Logan, K. (2009). E-safety and web 2.0 for children aged 11-16. *Journal of Computer Assisted Learning*. https://doi.org/10.1111/j.1365-2729.2008.00304.x.

Silva, A. B. Da, SantoS, G. T. Dos, & Bispo, A. C. K. D. A. (2017). The comics as teaching strategy in learning of students in an undergraduate management program. *RAM. Revista de Administração Mackenzie*, *18*, 40-65. https://doi.org/10.1590/1678-69712017/administracao.v18n1p40-65.

Sipayung, T. N., Simanjuntak, S. D., Wijaya, A., & Sugiman, S. (2020). The effect of comic-based realistic mathematics approach on students' learning motivation and conceptual understanding. *Journal of Physics: Conference Series*, *1538*(1), 0–9. https://doi.org/10.1088/1742-6596/1538/1/012111.

Siti Ainun Nazhiroh, Muhamad Jazeri, B. M. (2021). Pengembangan Multimedia Interaktif E-Komik dalam Meningkatkan Hasil Belajar Bahasa Jawa. *Jurnal Ilmiah Profesi Pendidikan*, *6*(3), 405–411. http://jipp.unram.ac.id/index.php/jipp/article/view/193.

Sockman, B. R., Sutton, R., & Herrmann, M. (2016). Comic relief: Graduate students address multiple meanings for technology integration with digital comic creation. *TechTrends*, *60*(5), 475-485. https://doi.org/10.1007/s11528-016-0083-y.

Starkey, L. (2020). A review of research exploring teacher preparation for the digital age. *Cambridge Journal of Education*, *50*(1), 37–56. https://doi.org/10.1080/0305764X.2019.1625867.

Starkey, L., & Eppel, E. (2019). Digital data in New Zealand schools: Policy reform and school leadership. *Educational Management Administration and Leadership*, *47*(4), 640–658. https://doi.org/10.1177/1741143217745881.

Tuncel, G., & Ayva, Ö. (2010). The utilization of comics in the teaching of the "human rights" concept. *Procedia - Social and Behavioral Sciences*, *2*(2), 1447–1451. https://doi.org/10.1016/j.sbspro.2010.03.216.

Tuncel, G., & Ayva, Ö. (2010). The utilization of comics in the teaching of the "human rights" concept. *Procedia-Social and Behavioral Sciences*, *2*(2), 1447-1451. https://doi.org/10.1016/j.sbspro.2010.03.216.

Ulfa, F. (2018). Teaching Vocabulary Using Cartoon Movie. *Journal of Languages and Language Teaching*, *5*(1), 23. https://doi.org/10.33394/jollt.v5i1.330.

Vassilikopoulou, M., Retalisa, S., Nezi, M., & Boloudakis, M. (2011). Pilot use of digital educational comics in language teaching. *Educational Media International*. https://doi.org/10.1080/09523987.2011.576522.

Walling, D. R. (2015). *Survey of Instructional Development Models* (D. R. Walling (ed.); Fifth Edit. Association for Educational Communications and Technology.