



Development of PjBL-based Digital Comic Media on student learning motivation for learning science in elementary school

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Abstract. This research is motivated by the limited variety of digital learning media in the science learning process, especially the material I grew up with. The lack of variety in learning media makes students less enthusiastic and difficult to understand the material when participating in learning activities. The aim of the research is to develop teaching variations through PjBL-based digital comic media so that it can increase student motivation and enthusiasm. This research uses the ADDIE development model. The research subjects consisted of a material and learning media expert, and 32 fifth grade elementary school students. Data collection was carried out using interview and questionnaire methods. The data analysis used is descriptive statistics. With the following research results. Valid digital comics with material expert review results reaching a score of 97% in the very good category, media expert review results reaching a score of 96% in the very good category, *one to one trial results* reaching a score of 94% in the very good category, *small group test results* reaching a score of 89% in the very good category, and the results of *the Field test* reached a score of 88% in the very good category. Thus, the results of the research concluded that the digital comic learning media based on PjBL in science learning material I grew up is very good for use in elementary schools and can foster enthusiasm and be effective in learning.

Keywords: Digital comic, PjBL, Learning motivation, Natural science

1. INTRODUCTION

The increasingly rapid development of the world has had a major impact on the development of education. Currently, Indonesia must be ready to implement 21st century education which is centered on students' abilities to think, collaborate and communicate critically and creatively. The progress of a country can be seen from the quality of its education, because education is one of the factors and indicators of a country's progress. Education is one of the most important tools for improving the quality and future generations of a country in order to ensure the country's sustainable development (Waisakanitri et al, 2023). Therefore, students need to have high personality, knowledge, skills and thinking abilities in accordance with their current learning characteristics, especially in science learning content (Acesta, 2020; Nugraha et al, 2020). In learning, motivation is a very important aspect. Motivation often influences student learning achievement, therefore student learning achievement is greatly influenced by the student's own motivation. The learning motivation that exists in students will determine the student's learning outcomes. Learning outcomes will be more optimal if they are based on high student motivation (Pratama, 2020).

At the elementary school education level there are many lessons taught, one of which is Natural Sciences (IPA). Natural science or science is a human effort to understand the universe through observation, procedures and reasoning to arrive at conclusions (Pinatih & Putra, 2021). Science learning is one of the lesson content that is directly related to students' environment because this learning places more emphasis on developing students' abilities to explore the natural environment scientifically, giving students access to become high-quality humans who are able to proactively respond to the challenges of the times. (Juniati & Widiyana, 2017; Jupriyanto, 2018). Science education does not only consist of memorized facts and theories, but also consists of an active process of using scientific thoughts and attitudes in studying natural phenomena (Pinatih & Putra, 2021). The science learning process in elementary schools so far tends to make students learn science material concepts by just memorizing them, this of course makes science learning boring for students, this is due to the lack of learning media that makes students actively construct their own knowledge. So the science learning process in elementary school must be designed to be interesting, fun, arouse students' curiosity, and pay attention to student development (Handayani, T. 2021).

Wrong One component The important thing that must be present in the science learning process is learning media. Learning media is a tool that functions to channel messages from teachers to students which aims to carry instructional messages from teachers to students that contain teaching purposes (Masturah et al., 2018). The use of learning media in the teaching and learning process can generate motivation and stimulation for learning activities, generate new desires and interests, and even have psychological influences on students (Karo-Karo & Rohani, 2018). With advances in science and technology, learning media should now be easily accessible to students through digital media. The definition of digital learning media is a learning material content format that can be accessed by digital devices.

Based on the results of interviews with teachers and class IV students at SDN 03 Rorotan, it shows that students feel bored and sleepy in class because teachers often only use YouTube videos. The teacher said that puberty material was considered taboo and there were limitations in the available resources. Around 70% of students face difficulties in understanding science learning material and concepts, so they have

difficulty drawing conclusions and applying them in everyday life. This shows that students' learning motivation at SDN 03 Rorotan is still low. Teachers and students stated that puberty material was considered difficult because it involved complex concepts. The teacher explains that there are limitations in the learning media used for learning so that students find it difficult to understand science material, especially puberty. This is in accordance with research conducted by Utami (2024), stating that students' learning motivation in science learning is still low, as evidenced by research results which show that students feel bored by monotonous learning in providing teaching materials and assignments, the use of learning media that has not yet been implemented. implemented optimally and no one has yet developed learning media, especially for class VI puberty material in Cluster I Abiansemal.

Education about puberty since elementary school has important reasons and can provide great benefits to students (Salsabila, 2023). Today's elementary age students are part of the Alpha generation who grew up in the digital era where access to information is very fast and easy. The digital era often provides great exposure to adult content and information that may not always be appropriate for children. Puberty education prevents children from engaging in acts of sexual violence, reduces feelings of guilt and shame, prevents underage adolescents from engaging in sexual relations, and reduces the incidence of infections associated with sexual activity. Understanding puberty aims to introduce body parts to students, so that they can learn how to care for and look after their body parts well (Muhimmah, 2020).

One of the digital media that teachers can use efficiently to support the delivery of material when carrying out learning is digital comics which can be accessed via gadgets or computer devices. However, learning media will not be meaningful if it is not accompanied by innovative learning models in the classroom, so this research wants to combine media involvement and learning models. There are many learning models that teachers usually apply when teaching and of course they are adapted to certain situations and conditions. Project based learning learning model can be interpreted as a learning model that is based on projects or producing products. Project based learning is able to improve students' critical thinking skills (Hidaya, 2017). The use of project based learning is known to be able to improve students' cognitive abilities. The application of the project method can also increase student learning motivation, student learning outcomes, learning achievement and student skills in science learning when compared to lecture and discussion methods (Adelsa et al. 2022).

Learning media can be used to facilitate interaction between teachers and students, provide access to diverse learning resources, and facilitate a more interactive and interesting learning experience. As the results of research conducted by Tri Handayani (2021) regarding "Development of STEM-based digital comic media to increase elementary school students' scientific literacy" prove that STEM-based digital comic learning media is suitable for use as learning media for class VI SDN 2 Rejang Lebong. The results of the data analysis obtained an average score of 3.24 in the very feasible category with little input. The development of STEM-based digital comic media to improve students' literacy skills in the dimensions of process, content and context. It was concluded that, the three dimensional aspects obtained an average response of 97.85%, so that STEM-based digital comic media was categorized as very practical and the media was very feasible and practical. used for learning. The results of other research also show the same thing, although there are differences because they

focus more on improving student learning achievement, as done by Kurniawati Unik & Koeswanti Henny Dewi (2021) regarding "Development of Kodig learning media to improve student learning achievement in elementary schools" proves that the Kodig learning media (digital comics) is suitable to be used to improve learning achievement for theme 6 subtheme 1 in class V students at SD N Mangunsari 02 Salatiga. The results of the data analysis obtained include getting a score of 84 with a percentage of 84% and can be categorized as very high in the material expert test. The validation results in the media expert test obtained results with a score of 77 with a percentage of 77%, and can be categorized as high. So from the results of the expert tests carried out, it can be concluded that comic media is suitable for use.

Based on the problems above, the solution that can be provided is to develop a science learning media in the form of digital comics based on project based learning for fourth grade elementary school students. Digital comic learning media is a form of media that can trigger interest in learning because the images are entertaining and interesting (Senjaya et al, 2022). Digital comics have the potential to improve learning by explaining concepts and being directed at building their own understanding through experience according to the student's developmental phase. Stories in digital comics can illustrate the application of scientific concepts in real situations, so that students can see the relationship between science and their lives. Digital comics can contain stories that describe the characteristics of puberty, how to care for reproductive organs, and how to respond positively to puberty so that they can strengthen students' understanding and increase students' learning motivation (Narestuti et al, 2021). Digital comics can be specifically designed for various ages and development levels of students, especially for understanding puberty issues. The use of digital comic media as a learning medium is in accordance with the development of the digital era, where students are close to technology. This is because digital comic media can be accessed via electronic devices such as laptops, tablets or smartphones which many students own. Therefore, the use of digital comic media can be an effective alternative in learning, especially in elementary schools. (Salsabila, 2023)

Based on this, researchers are interested in developing digital comics based on Project Based Learning. Digital comics based on Project Based Learning will help students to better understand puberty material, motivate them to find out more about puberty and be able to apply the knowledge gained in everyday life. The difference between this research and other research is that this research develops digital comic media based on Project Based Learning on the science content of puberty material which has not been developed before.

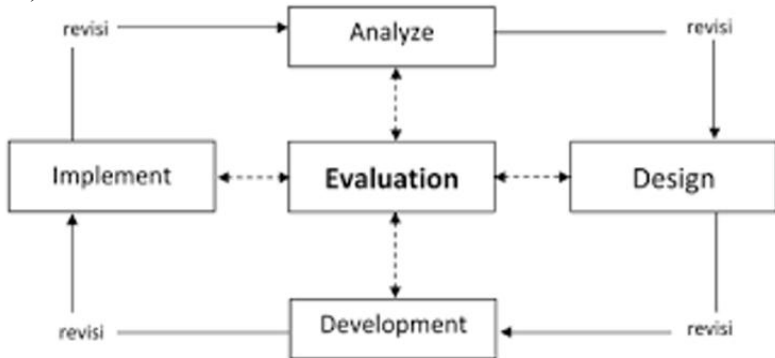
2. RESEARCH METHODS

2.1 Research Approach

The subjects involved in developing this media are class V students at SDN Rorotan 03 whose address is Jalan Rorotan XI No.30, RT.6/RW.6, Rorotan, Cilincing, RT.3/RW.6, Rorotan, Kec. Cilincing, North Jakarta, Special Capital Region of Jakarta 14140. Study This done through research and development approach or Research and Development (R&D). Research and Development (R&D) research method is an approach used to produce new products or innovations, as well as test the effectiveness of these products. The research and development method itself is a scientific method used in researching, designing and producing products, as well as testing the feasibility

of these products (Sugiyono., 2013:297). In this context, research and development methods are applied to develop digital comic media in order to improve the quality and effectiveness of the material Grow big .

Research and development of digital comic media on Growing Up material using the ADDIE development model. The ADDIE development model is one of the models used in designing and developing effective learning programs. This model consists of five stages, namely Analysis, Design, Development, Implementation, and Evaluation (Robert., 2009).



The ADDIE development model applied in the development of digital comic media on material about how to overcome puberty has the following steps:

1. Analysis

The analysis stage is carried out by conducting a literature review analysis by searching for related references such as the latest scientific articles and then analyzing problems that occur in the field. Field analysis was carried out through interviews with teachers and class V students related to natural science learning. The results of the needs analysis include: (1) students do not understand the material and have difficulty making conclusions; (2) lack of variety of interesting learning media (3) students' learning motivation is still low towards science learning; and (4) Puberty material in class V is one of the science materials that is difficult to teach without using learning media. Followed by curriculum analysis, namely CP, ATP, material and assessment. The researcher determined the CP for independent learning in elementary schools in this research, namely focusing on chapter 5 topic C. Next, the researcher determined the learning ATP and materials that were in accordance with the CP. CP and ATP of the growing material are explained in the table.

Table 1
Learning outcomes and flow of learning objectives for Growing Up material

Learning Outcomes	Flow of Learning Objectives
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Students carry out simulations using simple pictures/charts/tools/media about the human body's organ systems (respiratory/digestive/circulatory systems) which are related to how to properly maintain the health of the body's organs. Students investigate how the interdependent relationship between biotic-abiotic components can influence the stability of an ecosystem in the surrounding environment.	1. Students can describe the process of growing. 2. Students can identify whether they have entered puberty or not. 3. Students are ready to face puberty.
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2. Design

Digital comic development starts from preparing comic material, namely Growing Up material, followed by creating flowcharts and storylines to develop comic designs. The cover of this comic features the title "Lia and Leo I Grow Up," which depicts the theme of changes experienced during puberty. The illustration shows a family with a pair of twins who are the main characters in the comic story and will focus on their journey through puberty.

3. Development

At this stage, digital comics are developed based on a predetermined concept. The comic creation was assisted by an illustrator using the Canva application. Then the comic illustrations are compiled into the website. The digital comics that have been developed are tested for validity on digital comic learning media. The validity test was carried out by material experts and media experts using a questionnaire as a basis for media suitability for conducting product trials on students.

4. Implementation

The implementation phase began with testing digital comic learning media on several students to evaluate the suitability of the media. After being tested and declared feasible, this learning media was applied to small groups of students before field trials. In this stage, researchers can observe and record students' responses to digital comic learning media. Apart from that, in this implementation stage, researchers can also observe technical aspects of digital comic media such as *loading speed*, image quality and responsiveness. If there are technical problems, researchers can make improvements and revisions to the learning media

5. Evaluation

At the evaluation stage, the researcher carried out a formative evaluation with the results obtained from material experts, media experts and student trials. Then a summative evaluation is carried out to evaluate the product as a whole. This aims to perfect the product before it is distributed widely.

2.2 Data collection techniques

The data collection techniques used by researchers in developing digital comic media to collect data are interviews and questionnaires. Interviews and distribution of questionnaires were carried out to determine the analysis of students' learning needs. Meanwhile, to assess the feasibility of the product that has been developed, a questionnaire is used. The questionnaire in this research uses a Likert scale in its testing. This research scale is used to measure attitudes and opinions. With a Likert scale, respondents are asked to complete a questionnaire that requires them to indicate their level of agreement with a series of questions. A questionnaire is a data collection technique that is carried out by giving a set of questions or written questions to respondents for them to answer.

The questionnaire instrument is filled in by material experts, language experts, media experts and class V students. Questionnaires for material experts, language experts and media experts are used as a guide in product improvement and refinement. The learning motivation of fifth grade elementary school students was measured using a questionnaire regarding statements from several indicators. The questionnaire is about students in achieving external learning motivation. Thus, learning motivation can be seen through the measurement scores that students have obtained after answering questions that measure students' learning motivation variables referring to indicators: (1) strength of will to act; (2) The amount of time provided; (3) persistence in carrying out tasks; (4) there are hopes and aspirations for the future; (5) conducive learning environment (. The following is the form of a digital comic assessment questionnaire instrument by material experts, media experts, class V student responses and learning motivation.

Table 2
Data collection instruments

No.	Activities	Respondent	Amount	Instrument's Shape
1.	Needs Analysis	Class V teacher at SDN Rorotan 03	1 person	Interview
		Class V students at SDN Rorotan 03	32 People	Questionnaire
2.	Expert Test (<i>Expert Review</i>)	Materials Expert	1 person	Questionnaire
		Media Expert	1 person	Questionnaire
3.	One-on-one evaluation (<i>One to one evaluation</i>)	Class V students at SDN Rorotan 03	3 people	Questionnaire

4.	<i>Small Evaluation</i>	Group	Class V students at SDN Rorotan 03	10 People	Questionnaire
5.	Field Test (<i>Field Test</i>)		Class V students at SDN Rorotan 03	32 People	Questionnaire

Table 3
Instrument Grid for Materials experts

Aspect	Indicator	Instrument Number	Number of Items
Suitability	Suitability of material to Learning Outcomes (CP), Learning Objectives Flow (ATP), and Lesson Objectives	1	1
	Suitability of material to learning objectives	2	1
	Suitability of the material to the level of thinking of class V students	3	1
	Suitability of image to material	4	1
	Pictures can clarify the material	5	1
Completeness	Breadth of Material	6	1
	Coverage of Practice question types	7	1
Appropriateness	Material is easy to understand	8	1
	Material suitability	9	1
	Use of language is easy to understand and communicative	10	1
	The material is presented coherently and systematically	11	1
Competence	In accordance with the competencies that students must master	12	1

	Encourage student interaction with learning resources	13	1
Amount			13

Table 4
Instrument Grid for Media Experts

No.	Aspect	Indicator	Instrument Number	Number of Items
1.	Visual	Selection of font type	1	1
		Use of font size	2	1
		Display images according to the material	3	1
		Use appropriate colors	4	1
2.	Superiority	Student motivation	5	1
		Attention students	6	1
		Media interaction with students	7	1
		Understand and remember	8	1
		Communicative Language Use	9	1
3.	Usage	Practical media can be reused and durable	10	1
		Media is easy to use	11	1
		Simple media	12	1
		Instructions for use	13	1
Amount				13

Table 5
One to One Test Instrument Grid

No.	Aspect	Indicator	Instrument Number	Number of Items
1.	Visual	Image clarity	1, 2	3
		Use of color	3	
2.	Verbal	Student interest	4	2
		Clarity of language use	5	
3.	Media Operations	Ease of accessing media	6,7,8	3
4.	Superiority	Attention students	9	3
		Understand and remember	10	
		Student motivation	11	
Amount				11

Table 6
Small Group Trial Instrument Grid

No.	Aspect	Indicator	Instrument Number	Number of Items
1.	Appearance	Image Clarity	1	3
		Appropriate font size	2	
		Use of Color	3	
2.	Product Contents	Comic stories are easy to understand	4,5	2
3.	Usefulness	Comic media fosters learning motivation	6,7,8,9	4
Amount				9

Table 7
Field Test Instrument Grid

No.	Aspect	Indicator	Instrument Number	Number of Items
1.	Appearance	Clarity of material and images	1,4	8
		Attract students' interest	2,3,5,9	
		Makes it easier to understand the material	6,10	
2.	Media Operations	Ease of accessing media	7	1
3.	Superiority	Attention students	8	1
Amount				10

Table 8
Student Motivation Instrument Grid

No.	Variable	Indicator	Question		Number of Questions
			Positive	Negative	
1.	Motivation to learn	Persevere in facing tasks	1	2	2
		Tenacious in facing difficulties	3, 5	4	3
		Show interest	6, 8,10	7, 9	5
		Enjoy working independently	11, 13, 14, 15	12	5
		Get bored quickly with routine tasks	16, 18	17, 19	4

		Can defend his opinion	20, 21	22	3
		It's not easy to let go of something you believe in	25, 26	23, 24	4
		Enjoys finding and solving problems	27, 28, 29	30	4
Number of Items					30

2.3 Data analysis technique

Data obtained through research instruments were analyzed using descriptive statistics. Descriptive statistics are concerned with describing or summarizing data either numerically or graphically to get a glimpse of the data so that it is easier to read. Data analysis in this research was used to determine the quality or feasibility and effectiveness of digital comics as well as student learning motivation after using digital comic media.

To determine the feasibility of digital comic media, it was analyzed from data obtained from the assessment of a reviewer group consisting of expert lecturers and students. Data in the form of input, corrections, suggestions and criticism of what is produced. Then the researcher selects the relevance by consulting the supervisor. Suggestions that are considered relevant are then used as material to revise the product. Then the data obtained through questionnaires for experts and students in the form of a Likert scale were analyzed using the following steps:

1. Converting power results in the form of filling in a checklist into quantitative data in the form of scores using a Likert scale. The weighting rules for each statement item are carried out with the following conditions.

Table 9
Weighting Rules

Positive Questions		Negative Questions	
Criteria	Score	Criteria	Score
Very good/Strongly Agree	4	Very good/Strongly Agree	4
OK/Agree	3	OK/Agree	3
Less/Disagree	2	Less/Disagree	2

Very Less/Strongly disagree	1	Very Less/Strongly disagree	1
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(Ridwan, 2014: 39)

2. Calculate the total score for each aspect. Changing the score in percentage form using the formula (Sugiyono, 2013):

$$\begin{aligned} \% \text{ skor} &= \frac{\text{Jumlah yang diperoleh dikaitkan dengan bobot skor}}{\text{Jumlah skor ideal seluruh item}} \times 100\% \\ &= \frac{4n+3n+2n+1n}{4N} \times 100\% \end{aligned}$$

n = Amount obtained

N = Number of items

3. The percentage score for each research aspect obtained is converted back into a digital comic quality category so that conclusions can be drawn regarding the quality of digital comics. The digital comic score percentage is then based on the score interpretation criteria.

Table 10
Score interpretation criteria

Level of Assessment	Criteria
76% - 100%	Very Good/Strongly Agree
51% - 75%	OK/Agree
26% - 50%	Not Good/Disagree
0% - 25%	Very Less/Strongly Disagree

3. RESULTS AND DISCUSSION

3.1 Results

Learning media development is carried out using the ADDIE development model with 5 stages. The first stage, namely the analysis stage, is carried out to analyze the needs of students and create an instrument and to determine the needs of students. Analysis of student needs uses interview instruments and questionnaires. At this stage, a needs analysis, curriculum analysis, student book analysis and media creation requirements analysis are carried out. At the needs analysis stage, interviews were carried out with class V teachers at SDN Rorotan 03 and information was obtained that (1) students did not understand the material and had difficulty making conclusions; (2) lack of variety of interesting learning media (3) students' learning motivation is still low towards science learning; and (4) Puberty material in class V is one of the science materials that is difficult to teach without using learning media. Next, the curriculum analysis was carried out by analyzing CP, ATP, Material and Assessment as the basis for creating digital comic learning media. Analysis of students' books is carried out to determine the scope of material in the science content, so that material can be identified that can be developed. From the results of the analysis, it is known that the material

contained in chapter 5 of topic C I grow up includes: human growth and development and children's puberty. And the analysis of the conditions for making media is carried out in order to create appropriate and relevant learning media. From the analysis results, it is known that the media to be created must be in accordance with CP, ATP, and learning objectives.

The second stage, namely the design stage, at this stage a product development design will be designed based on the analysis data carried out. What is done at this stage is: creating a digital comic concept, creating a digital comic framework, determining the appearance design of the digital comic, creating a flowchart and storyline and compiling a questionnaire. The cover of this comic features the title "Lia and Leo I Grow Up," which depicts the theme of changes experienced during puberty. The third stage in this research is the development stage, at this stage the digital comic is developed into a complete product. The stages of developing digital comics are: creating characters and comic story images assisted by illustrators using the Canva application. The fourth stage, namely the implementation stage, at this stage the focus is on implementing activities that have been completed and have gone through the analysis, design and development stages. This stage carried out product trials including: material expert trials, media, *one to one trials*, *small group* trials and *field tests*. The fifth stage, namely the evaluation stage, at this stage is carried out to validate the product that has been made through expert product testing. Product validation tests aim to test how feasible and good the product that has been developed is. Formative assessments are carried out at each stage of development.

The quality of PjBL-based digital comics includes expert testing (material and media) and product trials (*one to one trials*, *small group* trials and field tests). The material and media expert test was carried out by an expert lecturer, namely Prof. Dr. Ika Lestari, M.Si as a lecturer at the Elementary School Teacher Education study program, Faculty of Education, Jakarta State University, who is competent according to the material presented. Based on the assessment results, in terms of learning material, Digital Comics obtained a very good percentage (97%) and in terms of digital comic media, they had a very good percentage (96%). *One to one* trials were carried out by three Class VC students at SDN Rorotan 03, all of these students had high, medium and low learning outcomes. Based on the results of the *one to one* assessment, digital comics obtained a very good percentage (94%). *Small group* trials were carried out by ten VC class students at SDN Rorotan 03. Based on the results of the *small group assessment*, digital comics obtained a very good percentage (89%). The *field test* was carried out by thirty-two VB class students at SDN Rorotan 03. Based on the results of the *field test*, digital comics obtained a very good percentage (88%).

Test Subjects	Validity Results (%)	Percentage Qualification
Material Expert Test	97	Very good
Media Expert Test	96	Very good
<i>One to One</i> trial	94	Very good
<i>Small group</i> trial	89	Very good
<i>Field test</i> trials	88	Very good

Based on the presentation of the analysis of the results of the validity of digital comic development, there are suggestions and input provided by material experts and media experts. Suggestions and input from material experts are that the font size be enlarged and the writing in the comic be made into upper and lower case letters so that students can learn good and correct language at the same time. Based on this, product revisions were carried out based on suggestions and input from experts. The following is a display of the application before and after being revised by researchers according to suggestions and input from material and learning media experts .



Figure 1. Digital comics before revision



Figure 2. Digital comic After Revision

Specification Product



Figure 3. Cover page

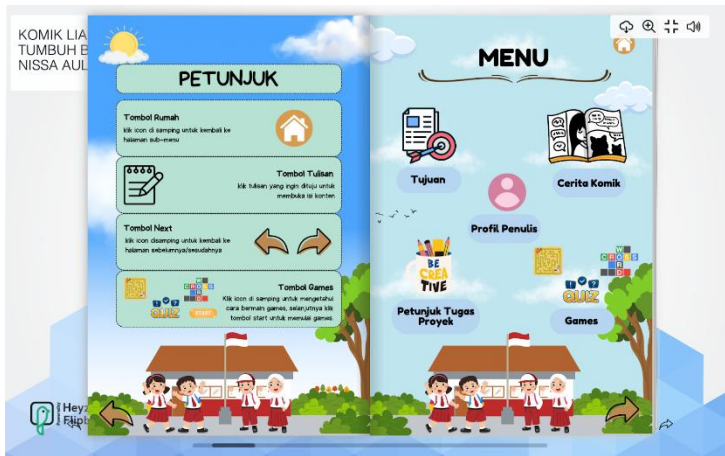


Figure 4. Instructions page and sub menu



Figure 5. Learning Objectives page and start story comic



Figure 6. PjBL page and educational games



Figure 7. Profile Page Writer

3.2 Discussion

Based on results data analysis of digital comic- based media development PjBL to motivation Study fifth grade elementary school students at SDN Rorotan 03 regarding material I grow big before developed his the digital comic student experience saturation as well as not enough understand material caused material This considered difficult Because involve complex concept . The teacher explains there is limitations in the

learning media used For learning so that student difficult understand science material in particular material I grow big . matter That proven with percentage obtained that is by 70% of students experience saturation in the learning process . Research result others also show that based on test results expert materials , media, one to one trials , small group trials and field tests are known that learning media based digital comics PjBL is at in Very good qualifications , so worthy For developed . appropriateness from the media being developed No regardless from use of appropriate development models . Where deep study This The ADDIE development model with 5 stages is used inside it . The stages of the ADDIE model consist of from Analysis, Design, Development, Implementation and Evaluation stages .

Appropriateness from the media being developed can seen from Assessment by experts material reviewed from aspect suitability , completeness , feasibility and achievements Learning in very good qualifications Because material in digital comics are presented with draft correct and clear science material in accordance with Achievements Learning , Goal flow learning , and goals learning . This matter can proven from results research (Sri Ayu Cahya Pinatih , 2021) shows that comic media the in accordance with characteristics need Study students and have Attractive design , so capable arouse desire knowledge and motivation Study students on science content in particular My material grows big . Proved with own Very good percentage . So, with exists this digital comic can influential to understanding Study student like learning I grew big as before learning packed with less media varies However with exists based digital comics PjBL student can return enthusiastic as well as can understand My material grows big with nice feeling as well as easy understood . Additionally , with using the PjBL model is also possible grow creativity and liveliness student Because learning student - centered , so implementation his learning involve student in a way active with do activity project . Work or activity loading project tasks concrete useful For investigate, integrate from theory, discuss, as well create solution to phenomenon social , fine in a way individual nor group .

With implementation of digital comic- based media PjBL , then show that student can Study in a way concrete so that can arouse desire knowledge and motivation Study student Because appearance Interesting comics and material easy understood , p This influenced from animations , videos, assignments project as well as educational games so that support mastery material . This matter in line with research conducted by Senjaya et al (2021) who stated that learning media digital comics on science learning at school base can grow enthusiastic and effective in learning . Statement the supported by research conducted by Syahmi et al (2021) who stated that digital comics can provide a sense of convenience , interest , and motivation to students in the learning process in class . Additionally , p This is also supported by research conducted Adelsa et al (2022) who stated that the media media learning based project based learning can increase ability cognitive students , results learning and achievement Study student . Through explanation above can said that based digital comics PjBL can used For support learning that can be done increase motivation Study student as well as involve student - focused learning . matter This because PjBL is one of learning model innovation 21st century through multi-strategy approach with use activity project as means learning . In addition , characteristics main PjBL model is as a learning model or strategy in develop ability think critical students for more creative , more skilled , more critical , and more cooperative (Daputro & Rayahu , 2020).

4. CONCLUSIONS AND SUGGESTIONS

Based on the results before implementing PjBL-based digital comic learning media in the material I grew up, students had a saturation level of 70%, which was in the high category. By developing PjBL-based digital comic learning media, a significant percentage was obtained, this is proven by the results of implementation in class V of SDN Rorotan 03 using a questionnaire, resulting in a result of 86% in terms of students feeling enthusiastic and motivated to learn because of the attractive appearance of the comic, and the material can be understood, this is influenced by animations, videos, project assignments and educational games so as to support mastery of the material. In this way, so that the teaching and learning process becomes more advanced and successful in improving the quality of education in learning, it is hoped that the role of educators can increase the variety of use of learning media again by using PjBL-based digital comic media accompanied by educational games so that students can feel enthusiastic again when learning. and learning becomes easier to understand.

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