

# Comic Strip Media Assisted by Digital Gamification: Increasing Student Behavior Targets and User Engagement in the Learning Process

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# 1 Comic Strip Media Assisted by Digital Gamification: Increasing Student Behavior Targets and User Engagement in the Learning Process

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**Abstract.** Comics multiplying must become the center of attention for educators, especially educators at the elementary school (SD) level. Seeing this, the world of education began to approach the comic media. Comic media has already started to be developed in the field of education, an expert in psychology who is famous for behavioristic theory, Edward Lee Thorndike, has researched comics, the results of this study reveal that a child is accustomed to reading comic books more than usual, for example within one month, the child reads a minimum of 1 comic book, this is the same as the child reading several textbooks every year, of course, this will affect reading skills/abilities for children and will increase mastery and vocabulary which is far more than usual. A child who doesn't like reading comics. It is by the expression. One picture is worth a thousand words, meaning that one page has the same value as a thousand words. Educational comic media is an innovative media that can be used as an alternative media to overcome learning difficulties for children, primarily covering matters related to material interests and understanding. Based on the distribution of learning outcomes in the experimental class, which obtained an average value of 73.79 (high) learning outcomes. While the results of the distribution of learning outcomes for the control class received an average value of learning outcomes of 47.75 (moderate). Based on the research conducted, the researcher obtained a value (Sig. (2-tailed)) of 0.000 <0.05, which means that comic strip media has a significant effect on student learning outcomes.

## 1 Introduction

Who is not familiar with comics? Comics are reading items that are familiar in people's lives. Comic reading books have always been an attraction for various groups, both young and old. Different comic titles are widely offered in Indonesia. Comic books in Indonesia had experienced their heyday in the era of 1968 to 1970s and experienced a decline in the 1980s. Since the beginning of their existence, comics by the Japanese and American

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countries have offered the most stories with capable characters [1]. Exciting and enchanting readers mostly favour children because they think their reading is considered more appreciative and creative in terms of pictures, stories, and themes. That's why they are starting to leave Indonesian comics.

Japan writes comic books. Another term for manga is the most popular comics read by most people in Indonesia, such as Naruto, Bleach, Doraemon, Detective Conan, and others. The increasingly rapid existence and development of comics in Indonesia is starting to be looked at by the world of Indonesian education to create innovations, namely educational comics. The ease of accessing comics through technology is an important factor for the development of children's thinking, therefore the world of education is looking at this to develop it into educational comic media [2]. Educational comics present quality reading sources. This is by the level of cognitive development / knowledge of the child and can foster talent and interest in reading in children, especially children in the classroom [3]. Many phenomena often occur when we encounter children who often imitate scenes in comics, such as fights and battles. The use of comic media can stimulate students' critical and creative skills to solve complex problems in their lives [4]. But if the use is wrong, it will have a negative impact.

This harms children's behaviour. We all know that most Indonesian people still think that reading comic books is useless, and they believe that they will only waste their time and only give children dreams that are unreal fantasy in nature [5]. Comic books cannot provide knowledge to children that are useful for their lives and become a provision for their future, especially children, because this is not what they get if they read general textbooks.

This is not entirely wrong. It has its advantages in the comic world because it is close to the world of children. Many think that comic books are read for children. Parents would certainly be worried because reading comics are seen as a disruptor to children's learning motivation, and therefore they don't want to read textbooks anymore. Besides, being too absorbed in reading comics can make children's priorities in reading decrease, which should require children to read more readers, so what happens in several schools in Indonesia often confiscates comic books. This contrasts with major countries such as Japan and the United States, which view comic books as a positive and motivating thing. Quality comic books have been widely used and used as school textbooks in these countries.

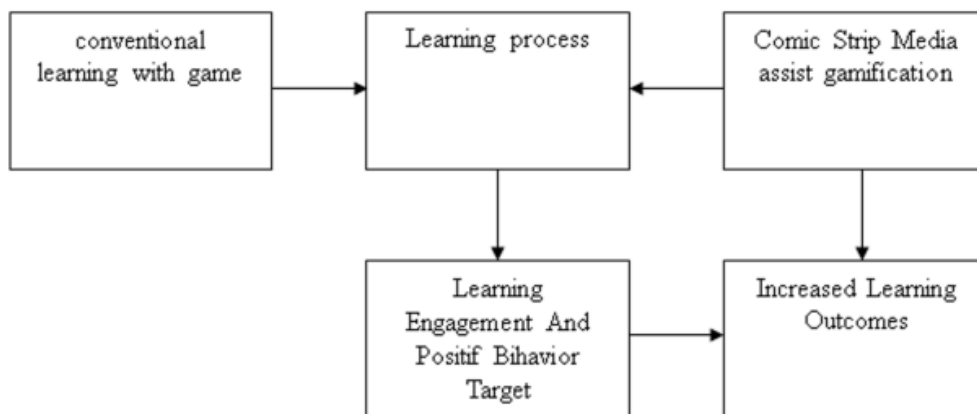
Moreover, in the current technological era, the development of comic media has become very diverse, even someone who cannot make comics can make them instantly with the help of applications that are provided for free. This was then seen by researchers to develop comic media by combining it with digitalization, in this context the researchers collaborated using digital-based gamification. The application of gamification and its principles in designing learning experiences offers something, namely the involvement of users (students) in learning and overcoming student motivation problems, thereby enabling behavior change [6]. Therefore, the existence of comic strip media can reduce all forms of conflict and resolve learning problems because problem-solving abilities are useful in developing potential knowledge and skills [7] in solving student problems that will later be faced in the educational environment. or society [8]. Through problem solving skills, students are expected to discover the mathematical concepts they

are studying and understand the use of these concepts in solving problems [9]. thereby increasing student engagement and forming students' positive attitudes in learning [10].

## 2 Method

### 2.1 Research design

The research method used in this research is the experimental method, which is divided into two classes: the practical course and the control class. This study uses comic strip media learning to assist gamification in experimental and conventional learning with games in the control class. The research design that will be used is the Posttest-Pretest Control Group Design [11]. The research design is as follows:



**Fig. 1.** The flow of the relationship between comic strip media assisted by gamification and user engagement

Based on the research design described above (Fig 1.), the purpose of this study is to determine the effect of using comic strip media in learning, which can stimulate critical and creative abilities and improve learning outcomes [12].

### 2.2 Participants

The research sample was students of the 6th-semester PGMI class, which consisted of an experimental course with 24 students as a group receiving treatment in the form of learning media comic strip media learning assist gamification (Tabel 1.) and a control class with 24 students who received conventional learning (teacher-centered learning with game) namely by lectures and group discussions with interactive game.

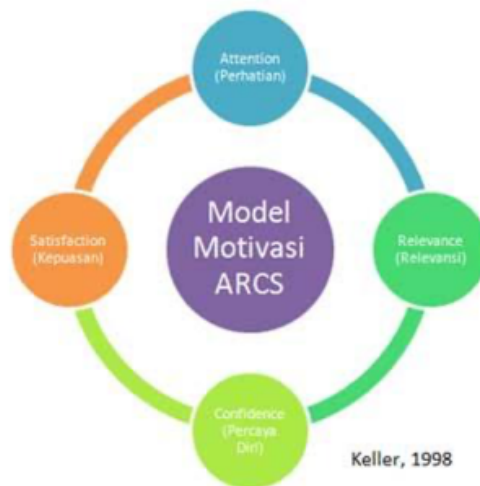
**Table 1.** Description of participants

Subject	Class	Student	Learning Method
Experimental Group	A	24	Comic Strip Media Assist Gamification
Control Group	B	24	Conventional Learning with Game

**3**  
**2.3 Data collection**

Data collection techniques in this study were used to test and documentation techniques. This study used a test instrument to use comic strip media strip media assist gamification. Before testing the hypothesis, a prerequisite test was carried out on students in each treatment class.

This research also uses instruments from the ARCS Model (The Attention, Relevance, Confidence, and Satisfaction), which means that lessons must attract and maintain students' attention. The ARCS model (Fig. 1) is a systematic ten-step design process for developing motivational elements in instructional settings: obtain information only, obtain learner information, analyse learners, analyse existing materials, list objectives and assessments, list potential tactics, select and design tactics, integrating with instruction, selecting and developing materials, and evaluating and revising [13].



**Fig. 2.** ARCS Model [14]

The following is an explanation of 4 conditions to increase user engagement and positive target behaviour in students (Table 2.).

**Table 2.** 4 Types of Conditions in the ARCS model [15]

No	Condition	Explanation
1	First condition	Lessons must attract and retain students' attention (A). There is curiosity, passion, and boredom
2	Second condition	to establish relevance (R). Gamas games are played because of intrinsic motivation and competence in students
3	Third condition	trust (C). By using interactive games, students have the confidence to choose the tasks to be done. If this game is played often, students will develop reasoning and thought patterns in terms of visualisation to create their own games
4	Fourth condition	satisfaction (S). Students feel happy when they successfully complete an assignment and can carry it out to completion

**3**  
**2.4 Data collection**

The data analysis process begins by collecting quantitative data in the form of initial test scores and final tests with the following steps:

They are determining the Cognitive Learning Outcomes Test Score. The score is calculated from each student's correct answer. The score obtained is then converted into a value provided that:

Student Score = (Student Score / Expected Score) × 100%. Calculation of Normalized Gain (N-Gain), calculating the normalized Gain score [16]. based on the formula **N – Gain = (Posttest Score – Pretest Score/ Maximum Score – Pretest Score) × 100**. The results of the Normalized Gain score are divided into three categories (Table 3.), namely [16]

**Table 3.** Criteria for Normalized Gain

Percentage	Classification
N-gain > 70	High
30 ≤ N-gain ≤ 70	Middle
N-gain < 30	Low

### 3 Result and discussion

#### 3.1 Result

**Table 4.** Tests of Normality

Class		Kolmogorov-Smirnov <sup>a</sup>			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
Learning result	Pretest Experiment	.176	24	.142	.919	24	.055
	Posttest Experiment	.304	24	.065	.822	24	.001
	Pretest Control	.157	24	.136	.924	24	.072
	Posttest Control	.227	24	.068	.893	24	.015

<sup>a</sup>. Lilliefors Significance Correction

Based on the results of the normality test (Table 4.) on the pretest and posttest values of the experimental class and the control class, the p value (Sig.) > 0.05 was obtained, so it can be concluded that the data was taken from a normally distributed population.

This study's results came from tests of students' reflective thinking skills and problem abilities tested in the experimental class (the class that applies the SSCS learning model) and the control class (class using conventional learning models) shown in Table 5. The following is a description of the ability to think reflective Test data and problem abilities that have been obtained:

**Table 5.** Control class

No	Student Initials	Score Pretest	Posttest Score	Posttest - Pretest	100 - Pretest	NGain Score	NGain Percentage
1	ACYS	50	75	25	50	50	50.00
2	AM	55	80	25	45	56	55.56
3	AIK	65	85	20	35	57	57.14
4	AN	60	80	20	40	50	50.00
5	AH	55	75	20	45	44	44.44
6	A	50	85	35	50	70	70.00
7	DP	65	85	20	35	57	57.14

No	Student Initials	Score Pretest	Posttest Score	Posttest - Pretest	100 - Pretest	NGain Score	NGain Percentage
8	E	60	80	20	40	50	50.00
9	ES	50	75	25	50	50	50.00
10	FN	55	80	25	45	56	55.56
11	FW	45	70	25	55	45	45.45
12	HUA	50	75	25	50	50	50.00
13	IP	50	75	25	50	50	50.00
14	KPA	55	80	25	45	56	55.56
15	KN	60	85	25	40	63	62.50
16	M	55	60	5	45	11	11.11
17	MS	60	75	15	40	38	37.50
18	NAH	50	65	15	50	30	30.00
19	NQFH	55	70	15	45	33	33.33
20	RC	45	75	30	55	55	54.55
21	SA1	60	80	20	40	50	50.00
22	SA2	60	75	15	40	38	37.50
23	SHA	55	75	20	45	44	44.44
24	TW	65	80	15	35	43	42.86

**Table 6.** Experiment class

No	Student Initials	Score Pretest	Posttest Score	Posttest - Pretest	100 - Pretest	NGain Score	NGain Percentage
1	EB	50	85	35	50	70	70.00
2	ES	60	85	25	40	63	62.50
3	G	55	90	35	45	78	77.78
4	HH	55	85	30	45	67	66.67
5	IMS	50	90	40	50	80	80.00
6	IR	50	85	35	50	70	70.00
7	IS	55	85	30	45	67	66.67
8	IZ	60	90	30	40	75	75.00
9	IS	50	85	35	50	70	70.00
10	JS	60	95	35	40	88	87.50
11	KD	65	95	30	35	86	85.71
12	K	60	90	30	40	75	75.00
13	MRB	55	85	30	45	67	66.67
14	NAH	60	95	35	40	88	87.50
15	P	55	85	30	45	67	66.67
16	RA	60	85	25	40	63	62.50
17	SAR	60	90	30	40	75	75.00
18	S	55	85	30	45	67	66.67
19	SQ	50	80	30	50	60	60.00
20	SRA	45	85	40	55	73	72.73
21	SAAM	65	95	30	35	86	85.71
22	UH	55	85	30	45	67	66.67
23	WNC	50	90	40	50	80	80.00
24	ZAQ	55	95	40	45	89	88.89

Based on the explanation above, the data obtained from the normalized average gain (N-gain) score of the experimental class was 73.79 (high) while the control class was 47.75 (moderate). These results were used to compare the difference in influence between the levels using comic strip media and studies using conventional media. Testing the

difference between the two means <sup>3</sup> between the experimental class (**Table 6.**) and the control class (**Table 5.**) was carried out by using the "t-test" [17]. As the requirements for "t-test" data between the experimental class and the control class must be normally distributed and have the same (homogeneous) variant. The type used is the independent sample t-test or "t-test".

**Table 7.** T-Test

Group Statistics					
	Treatment	N	Mean	Std. Deviation	Std. Error Mean
Learning Result	Comic Strip Media	24	.7379	.08787	.01794
	Conventional Media	24	.4775	.12019	.02453

**Table 8.** Independent Samples Test

		t-test for Equality of Means		
		Sig. (2-tailed)	Mean Difference	Std. Error Difference
Learning result	Equal variances assumed	.000	.26042	.03039
	Equal variances not assumed	.000	.26042	.03039

Based on the hypothesis testing results using SPSS (**Table 7.**),  $H_0: \mu_1 = \mu_2$  (there is no difference in learning outcomes between classes using comic strip learning media and studies using conventional media).  $H_1: \mu_1 \neq \mu_2$  (there are differences in learning outcomes between studies using comic strip learning media and conventional media).  $\alpha = 0.05$ , critical area,  $H_0$  is rejected if the p-value (Sig. (2-tailed))  $< 0.05$ , Test Statistics., P-value (Sig. (2-tailed)) = 0.000, it can be concluded that the p-value (Sig. (2-tailed))  $< 0.05$ , so  $H_0$  is rejected, so it can be supposed that there are differences in learning outcomes between classes using comic strip learning media and those using conventional media.

Based on the distribution of learning outcomes in the experimental class (**Table 8.**), which obtained an average value of 73.79 (high) learning outcomes. While the results of the distribution of learning outcomes for the control class received an average value of learning outcomes of 47.75 (moderate).

### 3.2 Discussion

Based on the results of the analysis above, the effect of learning outcomes is that, in implementing the learning process with Strip Comic Media in the experimental class that is applied to comic learning media, students are tried to be active in the learning process. Students' impression is more profound and embedded in memory, which in turn has an impact on the student's improvement in the mastery of the material given [18].

Whereas in the implementation of the learning process carried out, this impacts students regarding mastery of the material provided. On the Comic Media Strip, students play an active role in learning, both in determining the topic of the problem and how to solve it. The success of Strip Comic Media learning media is also proven in this research [19]. It turns out that with the application of Strip Comic Media, students can be more active in the learning process and affect the seriousness of students in the teaching and



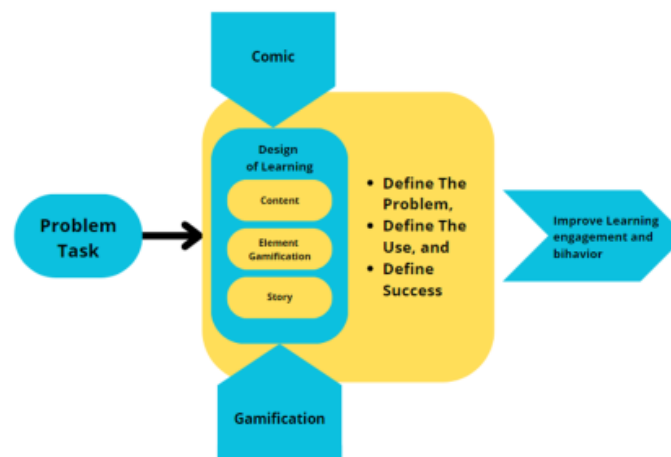
learning process. This can be seen from students' average learning outcomes through the tests that have been given.

Learning media are all tools and materials that can be used for educational purposes, such as radio, television, books, newspapers, magazines, etc. Whereas comic learning media is a cartoon form, the same representation forms the story in a sequence of closely related pictures designed to entertain the readers.

Moving on from these things, comic media in Indonesia should be used as a medium in building children's motivation, presenting comic books in textbooks as learning media. The use of comics in learning helps increase reading motivation and shape children's character and enthusiasm [12]. They are thus improving children's motivation and learning outcomes because learning by utilizing comic media is a form of learning that involves children's active participation in following lessons [20]. The use of comics is an option because of its existence as the most popular reading material. Besides that, comic book media also produces quite effective results in motivating many people to like reading. The presentation of educational comics is made very interesting in terms of characters and stories to make children feel at home reading them [3]. So, this must be fully realized by the community which is devoted to parents and teachers to pay more attention to children's reading material, in this case, comics, choose comics that contain educational content, where the range of the stories given to children can generate ideas, criticism, their feelings, interpretations, analyzes, appreciation, and insights [12]. With educational comics, it is an alternative media for reading that is educational and able to motivate children in learning.

Educational comics act as a tool or media, which has a function to convey messages/learning materials and is a compelling communication medium. Some of the tasks utilized are comic media to provide educational information, both characters, stories, and designs specifically designed to convey and explain educational messages or information (**Fig. 3.**). The children must accept the essence of the message in comics. For example, comic messages' content should produce good messages as much as possible and avoid solving problems using violence.

However, comics also have to keep a storyline that is interesting and not boring for children. If not, then the comic will feel bland and boring. Comic media claims that media cartoons can convince students to gain current knowledge of events and show understanding to develop higher-order thinking, thereby maximizing the learning process [21]. The value of comic media education in teaching and learning activities is no longer in doubt. Learning with comic media helps students solve problems [22]. So it is very fixed if comic media becomes an alternative media that teachers/educators can use as an innovative medium. The development of comic media innovation has been carried out and has had a tremendous impact on cognitive development. The addition of gamification in comic media will provide color and challenge for students, they will be motivated by the final goal of a story, and will indirectly involve themselves in all learning activities. This is in line with C. Cheng's research which explains that gamification can shorten feedback cycles to maintain engagement, give students a low-stakes way to assess their own abilities, and create an environment where mastery is rewarded [23].



**Fig. 3.** Learning design flow using comic media assisted by gamification

The use of comics as part of innovative learning media has been done for a long time. Currently Japan has combined textbooks with manga comics. Another advantage of comic media has been proven by the results of research conducted by Thorndike. In this study, the results showed that children who read more comic books in their daily lives, for example, in one month at least reading one comic book, are the same as reading textbooks. Every year, this will undoubtedly impact children's motivation and reading ability. This is indicated by vocabulary mastery is far more than children who do not like reading comics [24].

Comics in education must be developed according to the learning material and objectives. The pictures given in educational comics are usually in the form of funny cartoons. This has a specific purpose and purpose. Using cute cartoon pictures and being liked by children makes children happier and more interested in reading these comics. Besides that, the comic's images' function is part of the comic story's illustration, which is, of course, adjusted to the teaching material to be discussed. In its application, comic media is not taught in its entirety but is conducted per sub-chapter to convey the core of the message correctly (**Fig. 4.**). The characters that have been made are the ones that deliver the news. The presentation of educational comics contains vital visual and story elements. It is as if the child (the reader) feels the storyline. This is what became the inspiration for making comics that contain subject matter [25].



**Fig. 4.** The benefits of comic media on user engagement and positive behavior

## 4 Conclusion

The learning process will run smoothly and according to the desired objectives if the teacher makes students understand the material. There are several solutions offered in overcoming learning problems in class. But sometimes it still makes children still have difficulty learning, so with the presence of comics as an alternative media in solving issues, educational comics here are different from comics in general because the target is elementary school children, the storyline is also different from comics in general where the storyline contains Existing subject matter in schools The existence of comics is getting more potent in terms of learning media because many in the field it is found that the presence of textbooks that are not accompanied by comic images makes children quickly bored, even though empirically children prefer cute pictures, color and have a storyline so that educational comics can provide motivation and improve children's learning outcomes.

The use of comic media provides many great opportunities for teachers to teach reading for the lazy to read, besides that critical information provided in comics makes comics more targeted. This is by the phrase. One picture is worth a thousand words, which means that images can provide information and convey messages appropriately.

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