

**Development of comic page creator media based on
Tumbuhkan, Alami, Namai, Demonstrasikan, Ulangi, Rayakan (TANDUR) learning
for elementary school students**

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Abstract: *The demands of a teacher in this modern era in educating the nation's generation must be able to master IT to support effective learning activities. Data collection techniques used in this study were interviews, preliminary studies, observation, questionnaire collection, and documentation. This development research has gone through the validation stage with the acquisition of an average score of 96.36% from media experts with the criteria of "Very Eligible", material experts of 95% "very feasible", and linguists of 94.54% "very feasible". In the limited trial the results were obtained, namely, for students at SDN Cikahuripan 01 the percentage of the questionnaire was 88% "very good" and SD Bojong Nangka 02 the percentage of the questionnaire was 90% with the "very good category". So that the comic page creator media based on TANDUR learning can be declared feasible to be tested on students.*

Key Words: *Learning Media; TANDUR Learning Model*

Introduction

The demands of a teacher in this modern era in educating the nation's generation are getting heavier. Besides having to master IT to support learning activities so that they are interesting, a teacher needs teaching media so that the subject matter delivered by the teacher can be understood by students properly. The learning media must attract students to carry out more meaningful learning activities. The reality found in the field is that many teachers still need to utilize the media to assist in learning. Learning activities still use the old way. Teachers use makeshift teaching materials, namely package books at school, without other teaching media to help students understand the material. If teachers are more creative in developing learning media, these tools can be of great use to add insight and understanding to students in understanding a subject matter.

In learning, sometimes a teacher needs a tool to clarify the material presented if it has limitations. This is called learning media, which means "Learning media is a means of delivering learning materials that are more straightforward and interesting so that there is a good reciprocal relationship between teachers and students" (Luthfi, Rochmadi, Daryono, & Pajr, 2021). The comic page creator platform itself is an application that provides various image features that make it easier for writers to be creative according to the storyline that has been created. The comic page creator application also provides various characters in animated form so that users can design according to the story created (Rohani & Anas, 2022). Comic Page Creator media that will be developed is packaged with science learning, namely TANDUR. The TANDUR strategy is part of innovative learning, namely Quantum Teaching. Quantum Teaching is an innovative form of changing the interactions in and around learning moments (Udin, 2008). The TANDUR learning strategy has been applied to an international

education company, SuperCamp. In this program, students gain learning experience on how to take notes, memorize, write, speed read, create, communicate and build relationships, and improve their ability to master everything in life. The results show that students who attend SuperCamp get better grades, participate more, and feel more proud of themselves (Hernowo, 2000).

Quantum Teaching in learning includes six steps reflected in the Tandur Learning Model, an acronym for *tumbuhkan, alami, namai, demonstrasikan, ulangi, rayakan* (DePorter, 2013). The explanation is as follows: **Tumbuh** means that in early learning activities, the teacher must try to grow/develop students' interest in learning; **Alami** means that the learning process will be more meaningful if students experience direct or real material to be learned; **Namai** means naming with the intention that teachers teach concepts, thinking skills, and learning strategies; **Demonstrasikan** means that teachers must provide opportunities for students to show that they know. **Ulangi**, Show students how to repeat material effectively. **Rayakan**, The successes and achievements achieved by students, no matter how small, must be appreciated by the teacher. For students the celebration will encourage them to strengthen their sense of responsibility.

The TANDUR learning model has many benefits in learning, including: (1) Providing opportunities for students to learn according to what students want through extracting experiences owned by students and utilizing these experiences as initial information to carry out further learning, (2) can foster student interest, empathy, sympathy, motivation, and self-esteem (3) can provide opportunities for students to learn according to their abilities, (3) can provide opportunities for students to learn according to their abilities, how to use an interactive process to assess what they know, identify what they want to know, evaluate what students do, (4) provide opportunities for students to be actively involved in the learning process, interacting both with material, friends, and teachers, and (5) provide a sense of comfort for students through structuring the learning environment by arranging the position of tables and chairs in a dynamic format (Ratnadewi, Dantes, & Sudana, 2013).

Based on preliminary studies and interviews at the research site, several problems and needs were obtained at the school, including The lack of utilization of technology in learning, lack of motivation in students to take part in learning, the limited ability of teachers to develop IT-based media, students look bored when listening to teachers deliver material with the lecture method. Based on these problems, researchers are looking for references whose results are accurate to solve existing problems.

Research conducted by Alia Rohani and Nirwana Anas with the title Comic Media Development Using Comic Page Creator Application to improve reading skills of grade II elementary school students. From this research, it was found that comic media as learning media was effectively used to improve the reading skills of grade 2 elementary school students (Rohani1 & Anas, 2022). In line with that, research conducted by Nurafiah Rizkiyani, A. Syachruroji, and Sigit Setiawan with the title Development of Brilliant Comic Media based on Multiliteracy Learning on the Concept of Force and Motion Relationships. The research utilizes the Comic Page Creator platform in its media development, with the results of the

development of Multiliteracy Learning-based Brilliant Comics media, declared feasible to be developed and used in grade IV elementary school students. It can be scientifically accounted for (RIZKIYANI, SYACHRUROJI, & SETIAWAN, 2022). In addition, research related to the application of TANDUR learning by Dian Sri Anggardini Panunggul with the title The Effect of the TANDUR Learning Model on the Narrative Writing Skills of Grade V Students of SDN Kedungrejo Megaluh Jombang found that the TANDUR learning model has a significant effect on the narrative writing skills of grade V students of SDN Kedungrejo (Panunggul, 2018).

Based on the previous research references above, researchers developed Comic Page Creator media based on TANDUR Learning for fifth-grade elementary school students with several novelties that researchers developed. The media in this study was made for science subject content by applying the TANDUR learning model (Tumbuhkan, Alami, Namai, Demonstrasikan, Ulangi, Rayakan); the research model uses 4D according to Thiagarajan with the stages of define (defining); design (planning); develop (development); and disseminate (dissemination); the material packaged in this comic is Ecosystem (Food Chain). The purpose of this research is to develop comic page creator media based on TANDUR learning in Natural Science content. In addition, there is a specific objective in this study, namely to test the feasibility of the media that has been developed by comparing the results of student questionnaires from two elementary schools.

Method

This development research aims to develop comic page creator learning media based on TANDUR learning for grade IV elementary school students. In this study, the media was made with the Comic Page Creator platform. The subjects of this research are fifth-grade students of elementary schools, namely SDN Cikahuripan 01, located at Kp. Palahlar Rt.19 Rw.08, CIKAHURIPAN, Kec. Klapanunggal, Kab. Bogor, West Java, with a zip code of 16877, and SD Bojong Nangka 02, located at Jl. Raya Bojongnangka RT. 15 RW 07, Bojong Nangka, Gunung Putri sub-district, Bogor district, West Java, with the zip code 16963.

In this study, the instruments used were student questionnaires and expert validation questionnaires. The process of data analysis through the stages of interviews, observation and documentation. This research uses a Research and Development (RnD) approach. The data collection techniques used in this research are interviews, preliminary studies, observation, questionnaire collection, and documentation. The research model used in the 4D development model, according to Thiagarajan (1974). The 4D development model consists of 4 stages of development, which consist of define or often called the needs analysis stage; Design, namely preparing the conceptual framework of the model and learning devices; Develop or the development stage, which involves validation testing or assessing the feasibility of the developed media; until the last stage Disseminate, namely implementation to the actual target, namely the research subject.

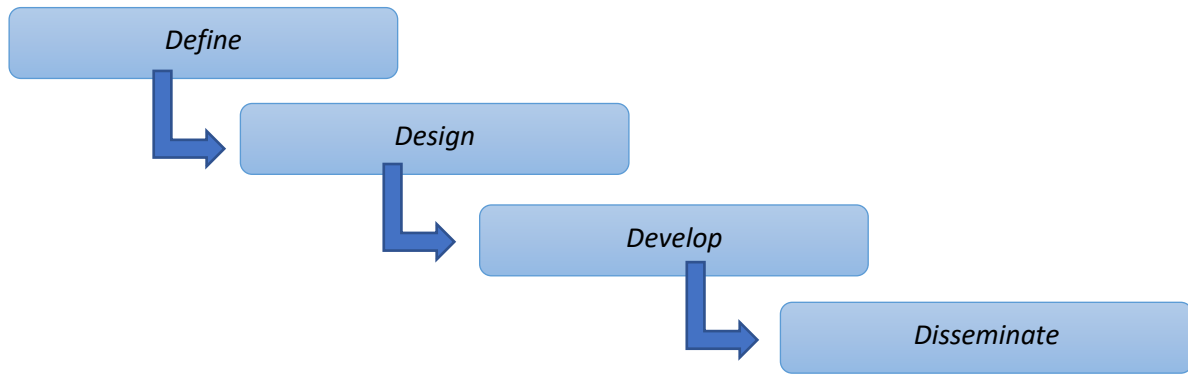


Figure 1. 4D Development Steps

The explanation of the 4D development stage according to Thiagarajan (1974) from the chart above : **Define Stage**, The define stage is the earliest in the 4D model by defining related development requirements, or it can be called a needs analysis. In developing a product, it is necessary to refer to the development requirements and analyze and collect information by seeing how far the development needs are. At this stage, it can be done through previous research and literature studies where information can be obtained through observation to interviews. Thiagarajan (1974) mentions that five activities can be done at the defined Stage, namely: (1) Front-end Analysis; (2) Learner Analysis; (3) Task Analysis; (3) Concept Analysis; 4) Specifying Instructional Objectives.

Design Stage. At this stage, four steps must be passed, namely : a) constructing criterion-referenced tests (preparation of standard tests). Preparing the standard test in question is a step that connects the defining Stage with the design stage. The preparation of standard tests is based on analyzing the specifications of learning objectives and analyzing students; b) media selection, broadly speaking, media selection is carried out to identify learning media that are appropriate/relevant to the characteristics of the material. Media selection is based on the results of concept analysis, task analysis, characteristics of learners as users, and a deployment plan using a variety of diverse media; c) format selection and format selection in the development of learning tools aims to formulate the design of learning media, selection of strategies, methods, approaches used, and learning resources; d) initial design. The Develop stage is the overall design of learning devices that must be done before the trial is conducted.

Develop Stage, The third stage in developing the 4D model learning device is development (develop). This Stage is the Stage to produce a development product that has been designed. This Stage consists of two steps: expert appraisal, revisions, and developmental testing.

Disseminate Stage, The last stage in the development of the 4D model is the dissemination stage. At this stage, final packaging, diffusion, and adoption are important things that should be considered due to several limitations. This dissemination stage is carried out to promote the developed product so that users accept it as individuals, groups, or

systems. The product that has been revised at the development stage is then implemented on the real target or target. After that, researchers/developers need to observe the results of achieving goals. Goals that have yet to be achieved must be explained so that the solution continues after the product is disseminated. Some things that need to be considered in carrying out dissemination/dissemination are user analysis, selection of dissemination time, strategy and theme, and selection of dissemination media.

Results and Discussion

In this research and development, researchers developed a product in the form of learning media Comic Page Creator based on TANDUR learning for fifth-grade elementary school students on the subject of Food Chain Theme 5 Class 5 Sub Theme 22 Learning 1 with two research subjects, namely fifth-grade students of SDN Cikahuripan 01 and SD Bojong Nangka 02. This research and development were carried out based on Thiagarajan's proposed research flow or model (1974), called the 4D model. The followings are the results and discussion of the research steps that researchers have carried out with the 4D model:

The first one is **Define Stage**. At this stage, researchers have conducted preliminary and literature studies to find information about research needs. Based on the results of observations and interviews with the headmaster and related school principals, the results of the conclusion regarding the analysis of the needs of the two schools include: lack of utilization of technology in learning, lack of motivation in students to take part in learning, the limited ability of teachers to develop IT-based media, students look bored when listening to teachers delivering material with the lecture method, lack of training for teachers to develop learning media with technology, student boredom with monotonous learning methods. From some of these problems and needs, researchers take the problems that will be solved, namely regarding learning media to overcome student boredom, and will inform class teachers about how to make. This research aims to develop comic page creator media based on TANDUR learning for fifth-grade elementary school students.

Design Stage. At this stage, researchers design the media to be developed by collecting some data that will be used, namely by identifying the material to be packaged in learning media, collecting important components for designing product designs such as background images, images of objects, and reading accompaniment music that will be included in the media. Testing the use of the product by paying attention to whether or not the product is easy to use. To choose the learning model whose syntax will be used to explain the material in the developed learning media.

Stage Develop (Development). After the media design is complete, the next stage is developing comic page creator media. This media is made with a comic page creator platform available at the google play store. In this media, the material is packaged in the 5th-grade student book Theme 5 Subtheme 2 Learning 1 on Food Chain material with TANDUR learning syntax (Grow, Experience, Name, Demonstrate, Repeat, Celebrate). The following are the results of the media developed by researchers.



Figure 2. Results of Product Development

At this stage, researchers have followed the procedure according to Thiagarajan (1974), namely through the stages: a) Expert appraisal, experts who participate in validating this research product include media experts, namely elementary school class teachers in the city of Serang who often participate in learning media competitions, then elementary school class teachers from the city of Serang as graduates of the Indonesian Language Education study program and material experts from elementary school class teachers whose students will be used as research subjects. Based on the assessment of several experts, the results of validation of the comic page creator media based on TANDUR teaching that has been developed are as follows:

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Table 1 : Assessment Data by Media Expert

No	Criteria	Assessment Score
1	Curriculum	5
2	Graphics	34
3	Presentation	14
Total Score		53
Percentage score %		96,36%

Based on the table of validation assessments by media experts, the percentage score is 96.36%, which is included in the "very feasible" assessment criteria. Furthermore, there are also the results of validation by material experts, namely:

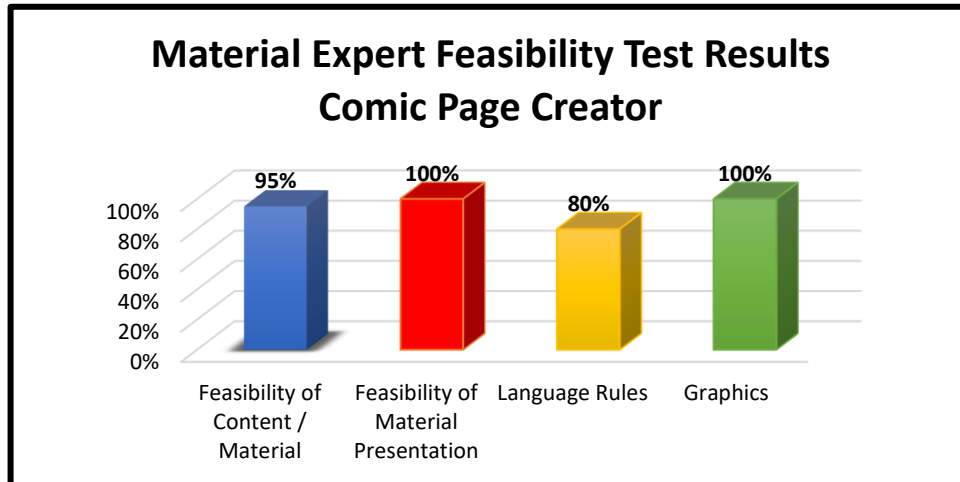


Figure 3. Assessment Data by Material Expert

For the language aspect, a score of 4 is obtained as a percentage, as in the figure above, with the acquisition of an average percentage of the assessment score of the four aspects of the assessment of 94%. The Comic Page Creator media based on TANDUR learning is **declared feasible** from the material expert assessment category. So that Comic Page Creator media based on TANDUR learning on the material of the relationship between living things in the ecosystem can be used as learning media in class V in learning theme 5 subthemes 2.

Table 2. Assessment Data by Linguist

No	Criteria	Assessment Score
1.	Straightforward	13
2.	Communicative	10
3.	Dialogical and Interactive	10
4.	Conformity with Language Rules	9
5.	Use of terms, symbols, or icons	10
Total Score		52
Percentage Score		94,54%

Based on the table of validation assessment by linguists, the percentage score is 94.54%, which is included in the "very feasible" assessment criteria.

Developmental testing. at this stage, researchers conducted product trials involving 2 groups of research subjects from different schools to find out the comparison and level of feasibility of the products that were developed. The subjects were fifth-grade elementary school students from SDN Cikahuripan 01 and SD Bojong Nangka 02. This product trial was carried out by distributing questionnaires and product implementation to research subjects to assess the product or media comic page creator based on TANDUR learning. Based on the results of the calculation of the questionnaire value of the positive statements that have been collected, the following results are obtained:

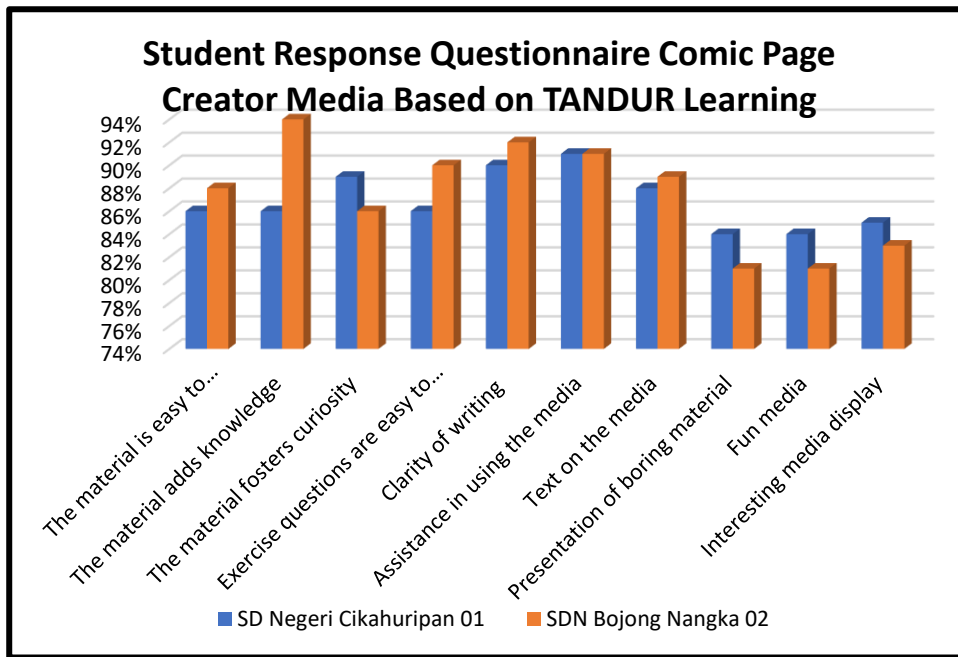


Figure 4. Graph of Student Response Results to Comic Page Creator Media

Based on the graph above, the results of the feasibility trial of Comic Page Creator media with a total assessment score based on large group trial data for 53 fifth-grade students of SD Negeri Cikahuripan 01 Klapanunggal District, Bogor Regency obtained a total assessment score of 2299 with an average assessment of 86.75% with an interpretation of "very good" when applied to classroom learning. The results of the feasibility trial on 31 Class V students of SDN Bojong Nangka 02, Gunung Putri District, Bogor Regency, on Comic Page Creator media obtained a total assessment score of 1352 with an average assessment of 87.23% with an interpretation of "very good" when applied to classroom learning. With the average results of the acquisition of student responses in the two schools getting the predicate "very good," then Comic Page Creator media based on TANDUR learning can be used as a learning media in the classroom. The following are the results of student responses in graph form:

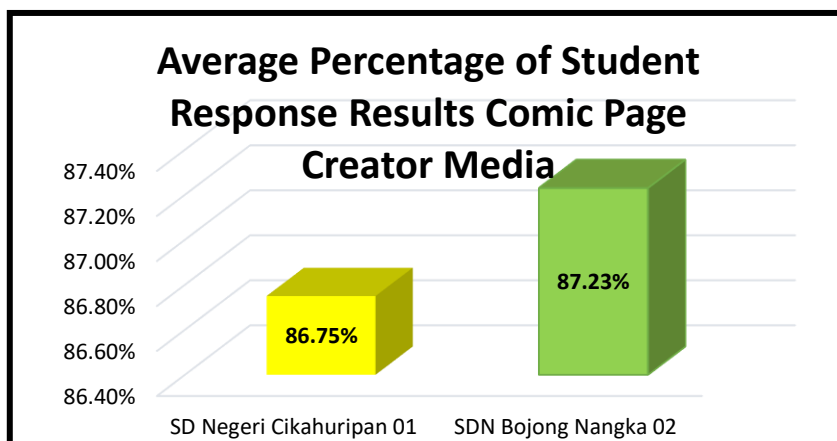


Figure 5 Graph of the average percentage of student response results

Based on the acquisition of validation scores from the three experts, namely: Media expert validation with a percentage score of 96.36% with the category "very feasible," linguist validation with an average score of 94.54% with the category "very feasible." This can prove that the media as a means of delivering learning material is more straightforward and interesting so that there is a good reciprocal relationship between teachers and students (Luthfi, Rochmadi, Daryono, & Pajr, 2021).

In addition, TANDUR learning packaged in this media helps provide opportunities for students to learn according to what students want through extracting experiences owned by students and utilizing these experiences as initial information for carrying out further learning, fostering students' interest, empathy, sympathy, motivation, and self-esteem, providing opportunities for students to learn according to their abilities, how to use an interactive process to assess what they know, identify what they want to know, evaluate what students do, provide opportunities for students to be actively involved in the learning process, interact both with material, friends, and teachers, and provide a sense of comfort for students through structuring the learning environment by arranging the position of tables and chairs in a dynamic format (Ratnadewi, Dantes, & Sudana, 2013). This is evidenced by the acquisition of material expert validation scores that get the "very feasible" category with an average score of 94% and the results of student questionnaires from both research subjects with an average score of 86.75% and 87.23% with the category "very feasible."

The results of this study are in line with previous research by Alia Rohani and Nirwana Anas (Rohani1 & Anas, 2022) and research by Nurafiah Rizkiyani, A. Syachruroji, and Sigit Setiawan (RIZKIYANI, SYACHRUROJI, & SETIAWAN, 2022) with the acquisition of scores resulting from development comic media that is good and proven to be feasible to apply and gives satisfactory results to the TANDUR-based science content learning process based on student opinion acquisition.

Conclusion

Based on the results of research that has been conducted by validating the products developed and limited trials on two research subjects, namely fifth-grade students of The conclusion should be accompanied by suggestions for further research. SDN Cikahuripan 01 and Bojong Nangka 02 Elementary School on comic page creator media based on TANDUR learning on Food Chain Theme 5 Subtheme 2 Learning 1 material has met the eligibility standards with the acquisition of scores from each expert having a "very feasible" category and overall student questionnaire assessment from two subjects obtained a score of 86.75% for SD Negeri Cikahuripan 01 and 87.23% for SDN Bojong Nangka 02. Which score can solve problems and meet research needs related to the lack of technology-based learning media used by teachers in the classroom and overcome the boredom of students when following the class, and overcome the boredom of students when participating in learning.

Based on the acquisition of these scores, it can be concluded that the results of the development of comic page creator media based on TANDUR learning (Grow, Experience, Name, Demonstrate, Repeat, Celebrate) on Theme 5 Subtheme 2 Learning 1 material in class V can be stated that the media is suitable for use and dissemination to research targets.

For further research, this digital comic media would be better if implemented in other lesson content. So that it gives a lot of descriptions for students to reason further about what is being studied.

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