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**THE DEVELOPMENT OF GRAVITY COMIC LEARNING MEDIA
BASED ON GORONTALO CULTURE**

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ABSTRACT

The aim of the study was to develop Gravity comic learning media based on Gorontalo culture for V grade Elementary School students. The type of the research was developmental referring to the design of 4-D model according to Thiagarajan, Semmel, and Semmel (1974) which consisted of 4 stages; define, design, develop and disseminate. The results of this study indicated that the developed gravity comic are valid and could increase students' responses to learning. This cultural-based comic introduces Gorontalo regional cultures. The percentage of the students' active participation was 93.27% for limited trial and the average students' active participation in field trial was 94.94%. The students' learning result gave 86.75% of classical completeness data for the limited test class, while the field test class obtained an average percentage of 87.37%, and categorized as very good. Therefore, the developed Comic of Gravity materials was declared valid, practical and effective. In sum, it was useful for science learning process in grade V of Elementary School.

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Keywords: comic, gravity, Gorontalo culture

INTRODUCTION

Learning media is one of the tools that affect the learning process. To improve students' learning interest, it is necessary to support an interesting learning medium. The approach of using digital technology as a learning medium has a better and more effective impact than others (Adnan et al., 2017).

According to Putra et al. (2013), the learning process will run effectively and efficiently if supporting media are available. Good elementary level learning media should be tailored to the stages of the students' development. In general, elementary school students are characterized by their liveliness and attraction to colors. Therefore,

in the process of Science learning, it requires enchanting supporting media that encourage students to do an independent activity. One of them is the comic learning media.

Comic as a learning medium is a tool that serves to convey instructional messages which can function well as a visual communication learning medium, in which this learning context refers to a communication process between students and learning resources (comics). Referring to Rasiman & Pramasdyahsari (2014) stated that e-comic is a transformation of technologies media comic originated in a printout form into a digital electronic format. Thus, it concludes that a certain storyline in the digital electronic format that has a role as a learning media for students.

One of the advantages of comics is to motivate students during the learning process. Consisting of images, it could improve the quality of

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learning. A comic is a permanent reading prompt that directs students to read curiously especially those who dislike reading. Besides, a comic is a part of popular culture (Wurianto, 2009). Children, including the elementary age, generally like illustrative pictures as well as comics as they found it entertaining. Children would more easily remember the characters and stories of the comics they read. Empirically, the students tend to like colorful picture books visualized in both realistic and cartoon forms (Daryanto, 2010). Comics can present various natural events illustrated concretely for the students.

The V grade children of Elementary School are in the stage of concrete operational thinking. At this ¹⁷it, they can perform concrete operations and reason logically as long as the reasoning is applicable to specific or concrete examples (Santrock, 2012). Therefore, the use of comic learning media is very appropriate for students in elementary school level to be able to improve learning outcomes and responses in following science learning process.

Previous research by Ambayyani & Airlanda (2017) on the development of comic as learning media to increase cognitive learning achievement on physical environment change, revealed that comic could increase elementary students' cognitive learning achievement. Another study by Azizi & Prasetyo (2017) on the contribution of comic learning media for natural science subject with character education on natural resource topic for elementary students found that it could increase students' learning achievement.

Regardless of the findings that comic could improve students' learning outcome, the usage of science-learning comics within the learning process itself is limited¹⁶ and not yet optimized. Therefore, it requires the development of science comic based on Gorontalo culture on gravitation topic as an alternative solution to the limited availability of science comic in increasing the students' responses and learning outcomes, which at the same time optimizing the utilization of comic in science learning on gravitation topic.

METHODS

This study is a developmental research using the 4-D Models developed by Thiagarajan and Semmel¹¹ (Wurianto, 2009). The research steps including: (1) define; (2) design; (3) develop; and (4) disseminate. The developed product

was Gravity comic based on Gorontalo culture to increase students' responses, activities and their learning achievement as well as strengthening the local culture for grade V students. This research has been done in January 2018, in which the stage trials were conducted to 15 students, while the field trials were done in three elementary schools situated in Gorontalo, they are SDN 30 Kota Selatan, SDN 80 Kota Tenganand SDN 71 Kota Utara.

The instruments applied in this research were: (1) Expert Validity Sheet to score the Gravity comic, in which the validation was done by four experts including two Physics education experts and two learning media experts; (2) Interview guideline to obtain the response data in the form of learners' interest and motivation about the Gravity comic; (3) Observation sheet on the use of Gravity comic in learning; (4) Observation sheet on the learners' activities; and (5) Test of the learning outcomes.

The data analysis in this research is explained as follows:

Validation analysis was performed by calculating the average score of ¹⁵four validators then converting it to the criteria as shown in Table 1.

Table 1. The Validity Criteria

Average	Validity criteria
4,00 – 3,75	Very Valid
3,75 – 3,00	Valid
3,00 – 2,25	Fair
2,25 - 1,50	Less Valid

(Sukardi, 2013)

Based on the above table 1, the comic media in the learning was valid if it meet the 'valid' or 'very valid' based on the experts' judgment.

The Interviews resulted in the response data. The data of the interviews with teachers and students were analyzed, and a conclusion was drawn up from the result of the interview for each indicator. Assessment of the learning implementation was done by matching the average result of the total score given with the following criteria:

Table 2. The Learning Implementation Criteria

Range	Interpretation
86% - 100%	Very Good
76% - 85%	Good
66% - 75 %	Fair
56% - 65%	Low
0% - 55%	Very Low

(Sukardi, 2013)

The assessment of learners was performed by matching the average results of the total score to the criteria in Table 2. Similarly, the learners' learning results were analyzed referring to the 80% for individual mastery and 85% for classical completeness, while the achievement results were then converted to criteria as shown in Table 2.

RESULTS AND DISCUSSION

The development of comic as learning media for natural science subject in gravity topic was preceded by designing the comic. In general, it contains the gravity materials including the notion of gravity, the benefits of gravity, and object motion due to the gravity. The materials are delivered in a simple way and supported by interesting drawings and cultural contents such as Gorontalo historical attractions, Otanaha Fortress, traditional transportation of Bentor, and Gorontalo's traditional house of Dulohupa. In addition, the characters are named after native Gorontalo names for girls and boys.

**Figure 1.** The Gravity Comic

This research relates to comic and culture. A similar study has been done by Honarvar and Rahimi (2011) in which they tried to investigate cultural problems from children's comic translation.

The experts' validation included Gravity comics validation and other learning devices used to implement comics in the learning process. The Gravity comics validation covered several assessment parameters seen from the construction, content, language, readability, and layout. The obtained validation results were in the form of qualitative suggestion and assessment sheet. The qualitative suggestion became the reference to revise the science comic learning media and other learning tools. After the revision has done, the experts filled in the assessment sheet as presented below.

Table 3. The Validation Results of The Learning Devices

No	Instruments	Category	Feasibility Yes / No
1	Comic	Valid	Yes
2	Syllabus	Very Valid	Yes
3	Lesson plan	Very Valid	Yes
4	Students Activity Sheet	Very Valid	Yes
5	Learning Materials	Valid	Yes
6	Learning Outcome Test	Valid	Yes

Table 3 indicates that the science learning media of gravity comic belonged to the 'valid' category. Thus, it is feasible to be applied in learning processes since it has met the criteria validated by the experts. Those criteria are: the correctness of concepts based on the gravity scientific aspect; the clarity of topic; the correct sequence of the materials; the compatibility of sample materials with the surrounding environment; the compatibility of learning materials with the learning objectives; the compatibility of dialogue or story with the diction in material explanation; showing variety of students' cognitive level; the compatibility of vocabulary with the students' language use; the use of communicative language; the compatibility of theme with the level of students' thinking.

The developed learning tool consists of a syllabus, lesson plans, students' activity sheets, learning materials, and learning outcome test which all included in the very valid and valid category. The syllabus, lesson plans, and students' activity sheets were in the valid category, whereas the learning materials and learning outcome test belonged to the very valid category. This means that the developed comic learning media for gravity topic and its learning tools is favorable for science learning process.

The interview results with the teachers and students indicate that science learning medium of Gravity Comis was applicable in science learning process. The interview with students revealed that the Gravity Comic could increase students' interest and motivation. This is supported by the research conducted by Arini et al. (2017) stating that the use of comic as learning assistance could enhance students' interest regularly.

Moreover, Norsalisa (2013) stated that students' are motivated to learn using comic in their learning process. This result is also echoed by Zain et al. (2013) who said that comic could increase students' learning motivation. In fact, students enjoy reading comics and it has motivational values (Wright, 1979). Since students already have the motivation to use cartoon materials, it should not be ignored by educators as a potential aid in the classroom. The percentage of the Gravity Comic implementation is as shown in Table 4.

Table 4. The Average Percentage of the Learning Implementation

Class	Average Percentage (%)	Criteria
Limited trial class	86.75%	Very good
Field trial class	87.7 %	Very good

Table 4 shows that the implementation of gravity comic was in 'very good' category, in which each learning syntax generally had a pleasing flow. The average score of the limited trial was 86.75%, while the average score of the field trial was 87.37%. These results were due to the practicality of comic, hence, the teacher found no difficulty in implementing each learning syntax. Furthermore, the knowledge was well-delivered considering comic's comprehensive aspect. A research conducted by Negrete (2013) show that

comic is a narration favorable for conveying certain information. Therefore, through interesting delivery, difficult materials could be easily understood by students, and the learning process would be smoothly implemented. Aslamiyah et al. (2017) state that comic can be easily used in the learning process as students love to read comic and this helps them in understanding the learning materials. This is in line with Fedotova et al. (2015) who explained that a comic is a language for the readers to think, muse, and analyze so that it is recommended as a medium to deliver information in the learning process.

The students' activities in the learning process consisted of 7 aspects; listening, reading, writing, asking, answering, solving questions, and making a conclusion. The results of the observed activities are in the following Table 5.

Table 5. The average percentage of the student's activities

Class	Percentage of the Student's Activities (%)	Criteria
Limited trial class	93.27 %	Very good
Field trial class	94.94 %	Very good

Table 5 tells that the students' activity in the learning process using comic was in the 'very good' criteria, in which during the limited trial, the percentage of students' activity was 93.27% and slightly increased to 94.94% in the field trial. This was due to the students' happiness in studying the materials. Hence, it impacted on the increase of the students' activity during the science learning.

This indicates that the utilization of comic could increase the students' participation as revealed by Adinata et al. (2015) who stated that comic is effective in increasing students' activities and learning outcomes. This is also supported by Wahyuningsih (2012) who found that the utilization of comic learning media could increase students' participation in learning.

The students' learning outcomes depend on learning design and student participation (Wardani et al., 2017). Through such learning design using comic and the activity criteria as shown in Table 5, therefore, the learning outcomes obtained are as stated in Table 6. According to the results of the formative learning test, it was obtained the data as seen in Table 6.

Table 6. The Average Percentage of the Students' Learning Outcomes

Class	Mastery of Classical Learning Outcomes (%)	Criteria
Limited trial class	93,27 %	Very good
Field trial class	94,94 %	Very good

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Table 6 indicates that the percentage of the students' learning outcomes was in 'very good' criteria, in which the percentage of students' learning achievement during the limited trial was 93.27%. This percentage arose to be 94.94% on the field trial. It means that the application of comic in the learning process granted positive contribution to the enhancement of the students' learning results. This is in line with the study conducted by Buchori & Setyawati (2015) who revealed that employing comic learning media could increase students' learning achievement.

The ³search results by Yulianti et al. (2016) show that learning science by inquiry-based science comic could improve the cognitive achievement of primary school students. A similar result is also shown by Fatimah & Widiyatmoko (2014) who found that the utilization of science comic could increase students' learning achievement. Referring to those studies, gravity comic is feasible in science learning inasmuch as it could increase students' interest, motivation, participation, and learning outcomes.

CONCLUSION

Based on the findings and discussion above, we conclude that: (1) comic media for science subject on gravity topic developed in this study are proven to be very valid by the experts; hence, it is suitable to be utilized in learning process; (2) the students provided positive responses to the utilization of gravity comic, and the implementation of learning using the comic was regarded as very good in which each learning syntax was carried out well or very well, seen from the average score of 87.37% on the limited trial and 87.37% on the field trial; and (3) the students' active participation during the learning process using this comic was in very good category, in which the average students' participation score was 93.27% on the limited trial, and 94.94% on the field trial.

In addition, the students' learning achievement was in very good criteria, seen from the average score of 93.27% during the limited trial and 94.94% during the field trial.

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