

Development of Biology Learning Comic Based on The Tidung Tribe's *Gasab* Philosophy (an Ethnoecological Perspective of *Yadu Usuk* Folklore Study)

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ABSTRACT

Environmental attitude needs to be instilled in every student. One of the effective ways is to integrate it into the local culture. Every folklore in the culture of the tribes in Indonesia always has a message or advice in it. The Tidung tribe is one of the tribes that has folklore in which advice to care for the natural environment is in it. One of the philosophies of loving nature is reflected in *Gasab*. *Gasab* is non-violent behavior to animals and always cherishes them. The folk tale of the Tidung Tribe which tells of abstinence from being rude to animals is the story of *Yadu Usuk*. Introduction to ethnoecology through folklore is something that can be done in learning biology because it is very closely related to biodiversity conservation activities. To make it more interesting, the introduction of ethnoecology through folklore can be developed into a comic learning media to strengthen the storyline. This study developed a biology learning comic based on the *Gasab* philosophy taken from the *Yadu Usuk* story. This study uses a mixed-methods approach through the Borg & Gall development model. Comics that have been developed get valid results based on expert judgment.

Keywords: *Biology learning comic, Ethnoecology, Environmental attitude, Tidung Tribe, Gasab.*

1. INTRODUCTION

Indonesia is one of the countries with the largest biodiversity in the world. Three of the 17 mega biodiversity countries in the world are Indonesia, Malaysia, and the Philippines (Southeast Asia Big 3)[1]. Biodiversity is important for human life because it is a source of raw materials for food, clothing, medicine, and industry. However, every day, the life of flora and fauna is increasingly threatened. The current extinction rate is 100 times that of before humans evolved, and at least two species have been extinct every day since 2010 [2]. The main causes of biodiversity loss include habitat destruction, climate change (global warming), overexploitation, environmental pollution, accidents, and the arrival of foreign species [3].

Apart from being a country with the largest biodiversity in the world, Indonesia is also a country that has the cultural wealth of various ethnic groups. Each tribe has local wisdom, including local wisdom in maintaining the sustainability of nature. The Tidung tribe is one of the original tribes of North Kalimantan which has local wisdom in the form of love values for

the natural surroundings. The value of love for the natural surroundings is well wrapped in a folk tale that tells the story of *Yadu Usuk* and her grandson. The main point of this folklore is when the grandson collects a lot of crabs to play around with until finally, heavy rain comes along with lightning. *Usuk* (*Yadu Usuk*) was carrying her grandson and trying to save her grandson from the rainstorm, but suddenly both of them were struck by lightning and turned into a stone or the local community called it *batu menggendong* or a *mambin* stone. The message of this story is that we are prohibited from playing with animals, including small animals such as crabs. The prohibition against playing with these animals in the Tidung Tribe is called the *Gasab* tradition [4]. Although this story only mentions one type of animal in it, namely the crab, the message that is stored is an appeal to protect nature as a whole. Protecting nature or protecting the environment also means loving the animals and plants in it.

The high rate of species extinction and the increasing loss of biodiversity can be prevented by cultivating a love for the natural environment. The habit of caring for the environment is an effort that needs to

be done so that small behaviors that may be underestimated but which are quite influential on environmental damage can be avoided. Attitude is considered to be one of the most important influences on behavior. A person's attitude to the environment (Environmental attitude) is a person's attitude or concern for the environment. In this context, environmental attitudes can be considered as positive or negative feelings that are relatively permanent towards certain aspects of an object or environmental problem [5]. One of the effective means of fostering a positive environmental attitude is through formal education. Biology is one of the subjects in formal learning that is suitable for cultivating an environmental attitude. An attitude of love or care for the environment and the flora and fauna in it needs to be built through learning, especially biology learning.

Folklore is a form of oral literature that contains a lot of local wisdom values [6]. The story of Yadu Usuk in the folklore of the Tidung Tribe is one of the folk tales that are very rich with messages to build an environmental attitude. Folklore and the Gasab tradition can be integrated with content in biology learning, especially for ecology (ethnoecology), environmental education, ethnobiology, conservation, and other suitable materials. To integrate the values of the Yadu Usuk story and the philosophy of the Gasab tradition, a strategy is needed so that its delivery can be more effective. One strategy that is considered interesting is transferring the story into a biology comic with an ethnoecological perspective. Stories in the comic form will be an interesting and effective learning medium for cultivating an environmental attitude as well as introducing the richness of local culture. One of the advantages of comics is that they are more interesting to read compared to textbooks and stimulate reading interest, especially for students who don't like reading [7]. Comics is one of the learning materials. Learning materials are designed to help students to assist the learning objectives individually [8].

The purpose of this research is to develop a biology learning comic based on the Gasab philosophy of the Tidung Tribe and test its validity. The final product of this research is the production of a biology comic based on the philosophy of the Tidung Tribe of Gasab, with an

2. METHOD

This research is a type of research and development that adapted the development model of Borg and Gall [9]. Overall, Borg and Gall's model has 10 stages. However, the research only stopped at the third stage. The stages start from the Research and Information collection and end at the Develop Preliminary form of Product. The details of the activities carried out at each stage are as follows:

a. Research and Information collection

This first step includes needs analysis, literature study, literature study, small-scale research, and required reporting standards. The story of Yadu Usuk was adapted from reference [10] and is also based on the results of interviews with the Tidung Tribe Community.

b. Planning

Develop a research plan, including the abilities needed in media development. Includes a developed comic model. Comics are developed using a comic book format with a minimum of 4 panels per page.

c. Develop Preliminary form of Product

This step includes the comic design. This stage is also the preparation of an expert appraisal instrument, both for content experts and media experts. At this stage, an expert appraisal is also conducted regarding the comics that have been developed. If there are suggestions from experts, the suggestions will be used as material for comic revision.

The results of the experts' appraisal were divided into quantitative data in the form of a Likert scale based on the assessment criteria. The results of the Likert scale assessment are then graded and grouped based on the percentage value in Table 1 [11]. Meanwhile, the assessment instrument by experts also has a suggestion column for improvement which becomes qualitative data. These two data will later be used to revise the learning comics. If the data from the assessment results in a percentage value of > 67.18%, the learning comics are not revised.

Table 1. Validity Criteria for Assessment Questionnaire Data

Value Scale	Description
85.94-100%	Valid (not revised)
67.18-85.93%	Quite valid (not revised)
48.44-67.17%	Less valid (revised)
25-48.43%	Invalid (revised)

ethnoecological perspective, which is valid according to expert appraisal.

3. RESULT AND DISCUSSION

The story of Yadu Usuk is folklore that originates from Tidung Tribe, North Kalimantan. This folklore tells the story of Grandma Usuk (grandmother named Usuk) who lives with her nosy granddaughter. One day his grandson teased his grandmother by putting crabs on rice seeds that were dried by his grandmother. When the grandchildren place the crab on the rice ore, the sound from the crab street is similar to that of a chicken pecking rice. Grandma Usuk plans to expel the chicken. However, he did not find the chicken but the crab that had been put by his grandson. The crab that is placed on the rice feels confused because it cannot find water. As a result, Grandma Usuk ordered her grandson to return the crab to the river. Unfortunately, at night, Grandma Usuk and her grandchildren were struck by lightning as a result of being rude to animals [10].

The story of Yadu Usuk is a role model for the people of the Tidung Tribe for not being rude to animals. In the philosophy of life, the Tidung tribe should never act harshly to animals and should not disturb them, for example moving the animal to another habitat so that it has an impact on the death of the animal. This philosophy is called Gasab. This philosophy is currently starting to disappear among the younger generation and only a handful of people know this philosophy.

Broadly speaking, this philosophy is closely related to traditional animal conservation so that it can be appointed as one of the contents of ethnoecology courses. Conservation by local communities makes a very large contribution to conservation practices, compared to conservation that is carried out in a modern way by the government [12]. In fact, it is not uncommon for modern zoologists to refuse to cooperate with local communities who have their own way of doing conservation [13] [14].

The philosophy of community life and conservation always runs straight. Not only in the Tidung Tribe, but traditional conservation efforts are also found in several other tribes in Indonesia. For example, in the Paser area, East Kalimantan is an area with various ethnic groups. The tribes that inhabit the area include the Dayak, Banjar, Madurese, Javanese, Bugis, and Kutai tribes. All tribes have unique ways of clearing agricultural land. A person who is considered a community leader must first check the area that will be used as agricultural land to observe the types of plants or animals that inhabit the area. If in the area some animals and plants are considered rare by these community leaders, they must look for other agricultural lands [15]. Another example in Papua, Indonesia, to avoid the extinction of several species of animals in the area, the community created a hunting system. The community together with traditional leaders began to formulate regulations related to hunting techniques and equipment, hunting locations, hunting seasons, and hunting targets [16].

Introducing Gasab's philosophy requires a special approach to classroom learning. Therefore, learning comics were developed by the research team to provide an overview of traditional conservation in the community's philosophy of life. The type of comic that is composed is a comic strip. Comic strips are comics with only a few pictures. There are only a few pictures that are presented with the ideas in the comic. Even though it only uses a few pictures and also writing, it describes a complete idea. Before this comic was used in the learning process, experts judged it based on the content and suitability of the media. Learning comics can be seen in Figure 1.

Assessment by content experts covers content feasibility and presentation feasibility. The results of the content expert's assessment are illustrated in Table 2. Meanwhile, the media expert's assessment includes media size and content design. The results of the assessment from media experts are illustrated in Table 3

Table 2. Percentage of Ratings by Content Expert

No.	Criteria	Percentage (%)
1	Content feasibility	95
2	Presentation feasibility	92.5

Table 3. Percentage of Ratings by Media Expert

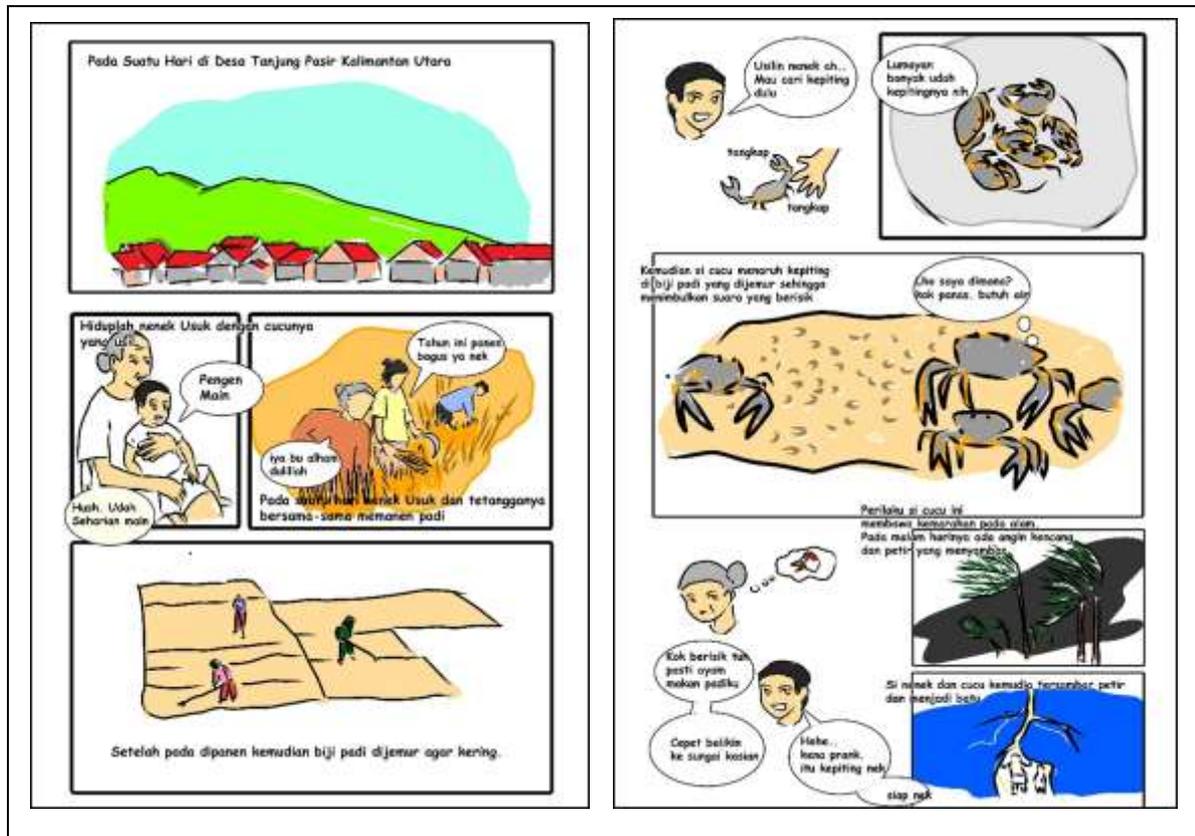
No.	Criteria	Percentage (%)
1	Comic size	100
2	Content design	92.5

Based on the content expert assessment, the percentage value for the two criteria obtained a value of > 90%. Assessment related to content feasibility is

related to the suitability of content in comics with learning objectives. In the content feasibility section, it is also seen the relationship of the concept to be presented with the storyline in the learning comic. This linkage is of course very important so that the stories in

the comics continue with what will be taught [17]. An important element in the content is also the accuracy of illustrations in comics in depicting stories in comics. Reference [18] stated that images are supportive

used on each page so that the image is not too small or large. Content design is very important in psychologically influencing readers. Therefore, the developed comic is made in such a way, the balance between the image in the panel and the speech balloon



elements that will be the core in explaining the concept.

Figure 1 Biology Learning Comic based on the Tidung Tribe's Yadu Usuk Folklore

Comics as a medium that focuses more on images must have a high percentage of content feasibility. Accurate images in comics according to the storyline will increase student motivation [19].

Meanwhile, presentation feasibility determines the quality of the image in a learning comic. Based on this, all the illustrations in the comics are developed by researchers themselves. The researcher also arranged on each page a minimum of 4 image panels to ensure better image quality. Besides, comics as a medium that emphasizes images rather than text are a must to have good images so that the message in comics is conveyed [20][21]. Comics also has different characteristics from other media, where images on other media are more inclined to strengthen text. In the comic, the image is the main element because it describes the storyline [22].

Based on an assessment by media experts. All criteria for both comic size and content design get a value > 90% which means valid. The comic size developed is A4 (210 x 297 mm). At least 4 panels are

(for dialogue between characters) is made based on the balance element as in comic strips [23].

4. CONCLUSION

Comics developed based on the study of Suku Tidung's Gasab philosophy through the adaptation of the Yadu Usuk story obtained valid criteria with assessments from content experts and the media getting a percentage of > 90%. The comic that was developed also contained ethnoecological aspects related to traditional conservation efforts by the Tidung people based on the Gasab philosophy.

It is hoped that the developed comics will not only be applied in Ethnoecology subjects but can also be introduced to other subjects. This comic has the potential to be introduced to courses in biological studies related to modern conservation, or courses in the field of culture. Comics are also expected to be able to provide an image to society or conservationists that traditional societies also have their own way of protecting nature

Further research related to the effectiveness of this comic in lectures certainly needs to be done by further

researchers. Besides, it is necessary to study the responses of students and teachers related to comics as an effort to improve comic content.

AUTHORS' CONTRIBUTIONS

All authors have contributed in this study.

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