

The Effect of Educative Comics on Traditional Ecological Knowledge Literacy about Corn Food Security in Elementary School

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ABSTRACT

Although the staple food of the Indonesian people is rice, some residents traditionally have non-rice staple foods. One of them is the people in Tawangmangu, Karanganyar Regency, Central Java, which used to be the staple food of corn. This can be seen from his traditional ecological knowledge (TEK), such as folklore, traditional ceremonies, offerings, and agricultural systems that were inherited from his ancestors. However, it is suspected that this knowledge is starting to disappear so that education in schools brings students closer to the real context. This study aims to determine the material and significant effects of the presentation of TEK on society, corn food consumption visually through educational comics on the level of knowledge literacy in cognitive and affective aspects. The research was conducted with a quasi-experimental design on sixth grade students from two elementary schools. The experimental group used comic media, while the control group used text. Tests and questionnaires were given before and after treatment in the experimental and control groups. The experimental results show that the use of comics has a significant effect on increasing knowledge and attitudes about the traditional ecology of corn food maintenance. Students understand the origin of the corn plant commodity, the procedures for cultivating corn, and processing traditional food made from corn. Students also have a pro-knowledge attitude towards traditional ecology, including supporting the consumption of food made from corn which is seen as "satanic" food.

CCS CONCEPTS

• General and reference~Document types~General conference proceedings

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KEYWORDS

Educative Comics, Traditional Ecological Knowledge, Literacy, Corn Food Security

1. Introduction

Food security in Indonesia is a very large and complex issue. This is not only related to the fact that food is a staple commodity necessary for survival, but also because of the emergence of various challenges and threats in ensuring adequate food supply for the welfare of the Indonesian people. The failure to deal with the food problem has the potential to trigger the spread of unrest, social upheaval and disintegration, and political chaos [1]. Therefore, a lot of research has been done to solve this food problem. However, generally it is only focused on the food production aspect, while another important aspect, namely the consumption aspect, has not been much addressed. Therefore this research intends to contribute in dealing with food problems from the aspect of consumption. The description of the framework is as follows.

From the research results of [2] it is suggested that Indonesia's failure in food security is due to excessive focus on rice or "food is identical to rice". Therefore, various efforts to achieve food security are more focused on the production aspect, so that the main target is increasing rice production, while the consumption aspect tends to be neglected. In fact, sustainable food security, one of which requires handling aspects of consumption systematically, so that the demand for staple food is not only concentrated in one food commodity, but also spreads to various other food commodities which actually have the potential to become a major menu component.

In the consumption aspect, the threat of food security appears in the form of a single food-based consumption pattern, namely rice. After the independence era, the development process of the food agriculture sector only further strengthened the consumption pattern of rice as its main element. The culture of rice consumption has even widened and expanded to areas that traditionally have a different staple food, on a non-rice food basis. What is well known is the staple food of tubers for the Papuan people, sago for the people of Maluku, and corn for the people of Madura. However, there are other groups of people in Java that

traditionally also have a dietary consumption pattern of corn, namely the people in the Tawangmangu area. This can be seen from their traditional ecological knowledge (TEK) includes (1) folklore about the origin of corn and vegetables, which events are believed to have actually occurred, (2) offerings provided at traditional ceremonies, and (3) crop commodities on agricultural land in Tawangmangu [3].

TK is an indigenous people use their strategies to manage the environment and those habits [4]. Researchers identified an important mandate in the TEK in Tawangmangu that other researchers had never made an issue of, namely the teachings of ancestors to preserve corn food, specifically in the folktale [3]. The teaching was conveyed by Narotama - the main character in the folklore of the origin of the maize plant in Tawangmangu - who invited residents to plant and consume corn as a staple food. Narotama also taught the residents how to grow corn and how to cultivate it. To honor the figure whose was later regarded as the village's *dhanyang* 'ancestral spirits', every 7 months the *Dhukutan* village clean tradition ceremony was held. The main offerings at the ceremony are corn food in the form of *tumpeng rakan* 'corn rice cone' and cakes made from corn, namely *tawonan*, punar, large *gandik* and small *gandik*. According to local beliefs, during the ceremony, the ancestral spirit only wants to receive offerings made of corn, while all processed rice will not be accepted and must be avoided.

The Tawangmangu area is at the foot of Mount Lawu, and is surrounded by hills. It can be said that this area is right in between the hills that surround it. Due to the sharp slope of the soil and high rainfall, rice cannot thrive in this land. That is the basis of Narotama's teachings so that people grow corn and consume corn rice as a staple food. To maintain this teaching, in ancient times there was a myth that there would be a 'plague' pagebug in Tawangmangu if they planted rice. This belief can be related to crop failure which will result in food shortages, allowing people to starve and get sick easily [5]. However, these ancestral teachings have been abandoned by the community and along with this, a shift in consumption patterns has emerged from corn to rice. Until then the Tawangmangu people processed corn only for offerings at traditional ceremonies. The effect is that some of the younger generations label "corn as devil's food" and prohibit their children from eating food made from corn.

The above phenomenon confirms the research results of [2] that more than 90% of Indonesia's population, which previously had a non-rice consumption pattern, is now gradually making rice their main consumption. With the shift in the pattern of consumption of staple foods like that, of course the pressure on the rice commodity will increase due to the increasing number of communities who consume it. In addition, the rejection of corn consumption certainly increases the economic value of rice, on the contrary it weakens the economic value of corn. As a result, the corn farming of the Tawangmangu residents cannot be a source of life for the farmers.

To achieve national food security, strengthening through the aspect of rice agricultural production is vital, but not sufficient. This can be linked to data from *Badan Ketahanan Pangan* [6] 'the National Food Security Agency' which shows that the realization of the achievement of the national rice procurement plan for rice until August 8 only reached 62.92% [6]. Therefore, handling the consumption aspect through the development of various food consumption patterns is very urgent to do. The Food Security Agency [7] has recently been increasingly encouraging Indonesian citizens to consume a variety of foods. However, with regard to the diversity of food consumption, there is a crucial aspect that tends to be ignored, namely the fact that food consumption is not solely related to biological needs, but also inseparable from cultural issues [1].

The above statement also occurs in the community in Tawangmangu, namely the phenomenon of shifting food consumption from corn to rice related to cultural factors [5]. Considering that cultural factors are the dominant factor driving a shift in food consumption patterns in Tawangmangu, the shift back is also possible culturally. This means that the invitation and encouragement is indeed impossible to shift completely from rice consumption to corn, but at least, from a single food (rice) to a diverse food consumption pattern (corn as an alternative). One of the cultural engineering strategies that is deemed crucial is to reintroduce the importance of ecological values regarding non-rice food preservation through learning in local elementary schools. It also refers to the recommendations of researchers that in order not to become extinct, TEK needs to be integrated into formal learning in schools [8].

Considering that the owner community has abandoned TEK on maintaining corn food in Tawangmangu, the teaching material about TEK concepts is something new for students so that the learning must be done as concretely as possible. One of the media for delivering teaching materials that allows for this is educational comics. This is related to the function of comics as a multimodal media, namely the combination of image modes, text, color, dialogue, etc. (Lauer,[9]). Therefore, the formulation of the research problem (1) Is there a significant effect of the use of educational comics on the mastery of traditional ecological material on corn food defense? and (2) Is there a significant effect of using educational comics on the pro-food attitude of corn?

2. Review Literatur

2.1. Maintenance of Food and Shifting of Food Consumption

Food needs are closely related to the concept of eating adopted by consumers. According to Paige and Morgan [10] in the book *Corn Meets Maize: Food Movements and Markets*, apart from being a biological need, food must also be understood in a cultural context. In the view of Paige and Morgan, perceptions, choices, and eating habits are closely related to socio-cultural factors that were formed historically. In line with this view, Jansens [11] also found that eating habits are formed as a result of cultural

adaptation to environmental conditions. Therefore, according to Jansens [11] eating habits must be understood in the context of three interrelated factors: techno-environment, social structure, and ideology so that the transfer of food needs is also associated with these three factors

Unlike the main concept of eating, which is to meet biological needs, the concept of shifting food consumption is more driven by symbolic nuances [12]. According to Lury, the shift in consumption patterns of goods, including food, for each individual or group is related to taste or taste. As for some of his studies, Jansens [11] concludes that shifting food consumption for society in general can be interpreted as an individual struggle to reach a social class position, not just a means of fulfilling biological or economic needs. In this case, taste is identified with social class. The difference in taste and taste is a strong indication of the different origins of social class. However, another finding of Jansen [11] that is considered encouraging is that the shift in food consumption based on appetite will not last long, but due to the drive for awareness towards a better environment, it is proven to last longer, even persist.

2.2. Empowerment of Comics as Educational Media

The fun element is contained in the story which causes comics, especially Japanese comics, which are popularly called manga, favored by all groups. Okita Kakimashu in Kulsum [13] conducted an analysis of 12 manga comic titles and found that the creative process originated from manga comic characters which contained a very dominant content of entertainment. In addition, comics can also have a didactic function, if the moral values in comics are truth values that the reader digests unconscious [13]. Publisher Erlangga, Jakarta has published two books entitled Physics Comics and Mathematics Comics since 2003. These comics explain Physics and Mathematical theories through pictures, thus conveying the suggestion that learning Physics and Mathematics is fun or fun. Didactic comics have appeared in Indonesia as moral learning materials for the community. The emergence of this comic is as a means of awareness and means of "preaching Islam" for the community. It is estimated that the authorities know that images are a powerful way to convey various ideas to an illiterate public, especially in the fields of information, education and advertising [14].

At present, there are not as many Indonesian comics as in the 90s. However, even though, in that era Indonesian comics were dominated by adult comics, while children's comics were only 1.70% of all comics in circulation [15]. Now, comics for children are very minimal and they are not native to Indonesia. Adult comics and children's comics are more dominated by manga comics from Japan [13]. The Kompas Pustakaloka bestselling book data shows that of the 40 volumes published every month, 70 percent are Japanese comics. If the average volume is printed 15,000-20,000, then every month M&C produces at least 420,000

copies of manga comics [13]. Therefore, efforts to empower classical manuscripts belonging to the nation into reading material that are easy for children to understand need to be done so that children's love for old literary works increases. new without leaving the repertoire of values in the old form. These texts can be used as a source of inspiration for the development of modern stories.

3. Method

3.1. Design

This research is the implementation of the testing phase as part of research and development which includes the needs analysis stage, the development of educational comics, and testing its effectiveness. This study uses a quasi-experimental method, with a non-equivalent pretest – posttest control group design [16]. In the experiment group, TEK materials on maintaining corn food were delivered through folktale-based comics, while in the control group, material was delivered folktale-based text.

3.2. Population and Sample

The population is grade 6 students from 32 elementary schools in Tawangmangu District. For the implementation of the experiment, students from 2 elementary schools, namely SD Amal Mulya and SD Negeri 01 Tawangmangu were assigned as samples. The determination was carried out by using cluster random sampling technique. Furthermore, through a lottery, SD Amal Mulya was selected as the experimental group, while SD Negeri 1 Tawangmangu was the control group.

3.3. Material

The material presented in the comics and texts was developed based on the folklore of Narotama, namely the story of the origin of the maize plant in Tawangmangu. The story material is separated into four episodes, namely (1) *Narotama: Brave Commander Renewal* which contains material about the famine in Tawangmangu, (2) *Narotama: Carrier of Renewal*, contains material on how to plant and process corn, (3) *Narotama: Civil War*, contains material on the effects of environmental destruction and the differences in the selection of plant commodities, and (4) *Narotama: Glorious Period*, contains material on agricultural procedures in accordance with the natural conditions of Tawangmangu. An example of a part of the comic that represents the episode can be seen in Figures 1 to 4.

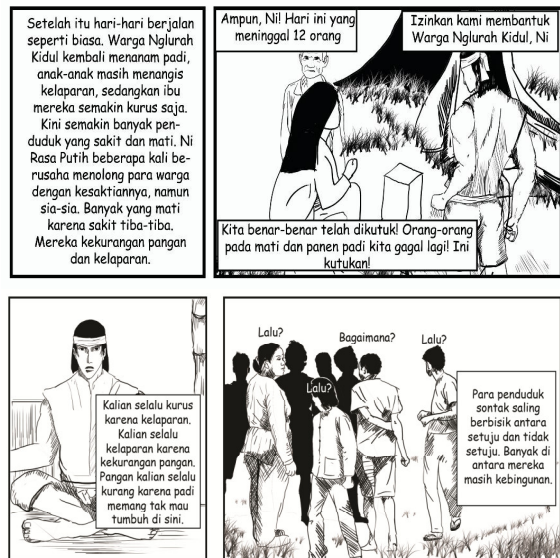


Figure 1 Famine disaster in Tawangmangu



Figure 3 Conflict of differences in crop selection between community groups

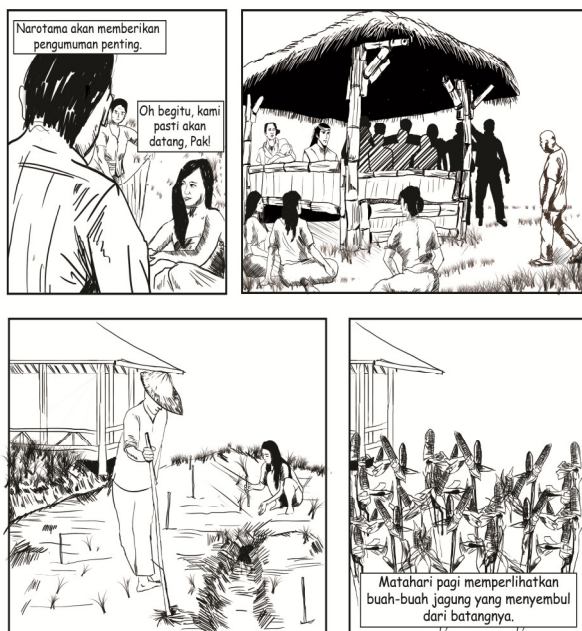


Figure 2 Procedures for planting and processing corn

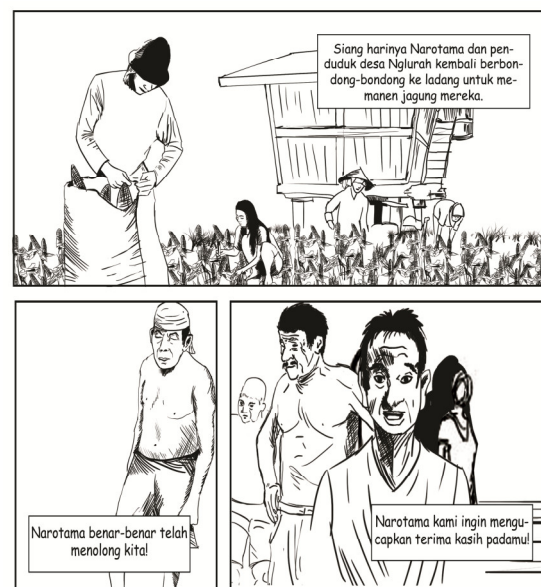


Figure 4 Agricultural according to the climate and geography of Tawangmangu

3.4. Data collection

Data were obtained from test and questionnaires instrument. Tests were held to measure the level of students' mastery of traditional ecological knowledge about maintaining corn food before and after treatment (pretest and posttest). The implementation is done using paper and pencil technique. The test material includes four subjects, namely (1) the causes and effects of the problems in selecting plant commodities in Tawangmangu in the past, (2) procedures for growing and processing food from corn, (3) overcoming the effects of environmental damage and differences

in the selection of plant commodities, and (4) agricultural systems according to the geographic climatic conditions of Tawangmangu. Data regarding students' understanding of the importance of food security and the use of corn as an alternative foodstuff was collected through written tests that consisted of 40 questions. Each correct answer received a score of 1, while each wrong answer got a score of 0; as such, scores ranged from 0 to 40.

The questionnaire aims to measure whether there is a difference in perceived value of maize food between the experimental and control groups. The measurement of the perception of value is carried out in relation to the view of the Tawangmangu residents that corn is Satan's food (because it is used as an ingredient for offerings), is not nutritious (because there are limited suitable side dishes), is not prestigious (because it is cheap), and is not modern (because it is only eaten by the parents from poor families). Measurement of students' perceptions of the value of corn food was carried out only after treatment.

According to Holbrook in Tjiptono [17], there are eight types of perceived value in the consumption experience, namely efficiency value (output /input ratio), excellence value (quality), political value (success), esteem value (reputation), play value (pleasure), esthetic value (beauty), morality value (virtue), and spiritual value (belief). Meanwhile, according to Adrian and Irawan [18] perceived value consists of four indicators, namely benefits derived from affective feelings or positive emotions arising from consuming products (emotional value), benefits obtained from the product's ability to improve self-concept (social value), benefits obtained from the quality of a product (quality value), and the benefits expected by consumers on product performance (value for money). Related to the purpose of this study, the perceived value indicators used include rationale value, quality value, social value, emotional value, participation value. The aspects measured include (1) the existence of corn as a human food ingredient, (2) the benefits of corn as a healthy and nutritious food, (3) the existence of corn as a modern and nutritious food ingredient, (4) the willingness to consume food from corn, (5) willingness to invite others to eat food made from corn, and (6) willingness to participate in maintaining the sustainability of food consumption from corn. The questionnaire which contains 24 question items uses the Guttman scale so that it provides two answer options, namely *yes* and *no*. The score for YES answers is 1 and those for NO answers are 0. Thus, the questionnaire ranges from 0 to 24.

3.5. Data analysis technique

The data obtained from the test and questionnaires were analyzed descriptively and inferentially. Descriptive analysis was conducted to obtain mean scores, modes, and standard deviations in the experimental and control groups. Inferential analysis was carried out to measure the significance of educational comic media effectiveness on the mastery of traditional ecological knowledge about corn food maintenance and perceptions of corn food by t-test compared to text media. Before the inferential test is

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analyzed, the data is subjected to a requirement test which includes tests for data normality, homogeneity, and balance. Data analysis was performed using the SPSS 16 program.

4. Results

4.1. Statistical Analysis of Students' TEK Mastery

Table 1 Summary of the Descriptive Statistics Analysis Result

Group	Experimental group (Folktale-based comics)		Control group (Folktale-based text)	
	Pre-test	Post-test	Pre-test	Post-test
N	22	22	23	23
Lowest score	7.00	20.00	6.00	16.00
Highest score	15.00	35.00	17.00	32.00
Mean	9.59	27.45	9.61	23.00
Mode	8	33	8	25
Std. Dev.	1.92	4.26	2.54	3.74

Table 1 shows that the pretest score ranges in the experimental and control groups did not show any differences, but the post-test scores were quite different. Post-test scores of the experimental group is 20 - 35, but the control group is 16 - 32. In the post-test, the mode of experimental group is 33 found in nine students. Meanwhile, the mode of the control group is 25 achieved by ten students. This means that the experimental group outperformed the control group.

The normality test used Saphiro-Wilk statistics, processed in SPSS 16. Based on the results of the analysis, the significance value of the experimental group is 0.481, while the significance value of the control group is 0.681. Both groups achieve the significance value that is higher than the significant value (0.05). Therefore, the data are in normal distribution.

In determining whether or not the data is homogeneous, the significance value of Levene Statistic should be or exceed the significant value that is 0.05 (5%). The result of the homogeneity test by using SPSS 16 is as follows. The Levene Statistic significance value is .319. The significance value is higher than 0.05, so the data are homogeneous.

To test the balance of the initial ability between the experimental group and the control group, it is necessary to test the balance with the t-test. The data were taken from the results of pre-test. The test results show the coefficient of $t_0 = -.026$ with a significance level of .979 so that it is greater than 0.05. Thus, the initial abilities between the two groups were not different or balanced.

Because all of the test requirements have been fulfilled, the null hypothesis of this study is tested which reads "There is no difference in the level of mastery of traditional ecological knowledge between the experimental and control groups". In the experimental group, learning materials were presented in the folktales-based comics. In the control group, folktale material is presented in text form. Hypothesis testing is done by using the t-test and the results can be read in Table 2.

Table 2 Independent Samples t-Test

Score		Levene's Test for Equality of Variances		t-test for Equality of Means					
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference Lower Upper
Equal variances assumed	Equal variances assumed	1.01	0.32	3.73	43	0.00	4.45	1.19	2.05 6.86
	Equal variances not assumed			3.72	41.73	0.00	4.45	1.20	2.04 6.87

Based on the output in Table 2, it is known that the significance value of Lavene's Test for Equality of Variance is $0.641 > 0.05$, which means the data variance of the experimental and control groups is homogeneous or the same. Therefore, the hypothesis is rejected or accepted at the coefficient t_0 in the column. Table 6 shows the t_0 coefficient in the Equal variances column with the assumption that the degrees of freedom (df) 54 are 5.849. In this column the value of Sig is $0.000 < 0.05$, so it can be accepted. Ho was rejected and H_a accepted. Thus it can be said that there is a very significant understanding of the understanding of TEK between the groups that take learning using comic and text media.

Since the results of the t-test showed that there was a significant difference in the level of TEK mastery on corn food maintenance between the experimental and control groups, it is necessary to measure the magnitude of this difference with Cohen's d. The results of the calculation are presented below.

$$d = \frac{M_{group1} - M_{group2}}{SD_{pooled}}$$

$$d = \frac{M_{group1} - M_{group2}}{\sqrt{(SD^2_{group1} + SD^2_{group2})/2}}$$

$$d = \frac{27.45 - 23.00}{\sqrt{(4.26^2 + 3.74^2)/2}}$$

$$d = \frac{4.45}{\sqrt{16.07}}$$

$$d = 1.11$$

The result of Cohen's d score is 1.11. Based on the Cohen's d effect size criteria (Table 3), this value is in the high category so that it can be stated that there is a large difference in the level of TEK mastery in the two groups of this study.

Table 3 Criteria of Cohen's d statistics

Size	Interpretation
$0.8 \leq d \leq 2.0$	large
$0.5 \leq d < 0.8$	medium
$0.2 \leq d < 0.5$	small

4.2. Statistical Analysis of students' perceptions of corn food security

Table 4 Summary of the Descriptive Statistics Analysis Result

Group	Experimental group (Folktale-based comics)		Control group (Folktale-based text)	
	Pretes	Postes	Pretes	Postes
N	22	22	23	23
Lowest score	7.00	15.00	7.00	12.00
Highest score	16.00	23.00	18.00	22.00
Mean	10.91	19.64	10.70	16.35
Mode	7.00	18.00	8.00	15.00
Std. Dev.	2.45	2.38	2.60	2.85

From Table 4, the range of perception scores on maize food between before treatment was not different, but after treatment it showed that there was a significant difference. This shows that the perception of corn food after the treatment is more positive than before. Post-test scores of experimental group is 15-23, but control group is 12-22. The mode of experimental group is 18 found in six students. Meanwhile, the mode of control group is 15 achieved by six students.

Prior to the inferential statistical analysis, a requirement test was carried out which included uni normality, homogeneity test, and balance test on post-test data. The data normality test was performed using the Saphiro-Wilk statistical formula. The results of the analysis showed that the coefficient of significance in the experimental group was 0.064, while in the control group it was 0.064. These data indicate the coefficient of significance of the two groups is greater than 0.05. Thus, the data distribution in the two groups can be stated as normal.

To measure whether the post-test data of students' perceptions of corn food in the experimental and control groups was homogeneous or not, a homogeneity test was carried out using SPSS 16. From the test results, the Lavene statistical significance value was 0.319 or greater than 0.05. The significance value of the homogeneity test results is greater than 0.05. Therefore, it can be concluded that the students' perception data in the two groups are homogeneous.

Furthermore, to measure whether the initial perceptions of the experimental and control groups were balanced or not, a balance test was carried out. For this reason, what is analyzed is the pretest data with the t-test. The data were taken from the pre-test score. The test results show the coefficient of $t_0 = .283$ with a significance level of .778 so that it is greater than 0.05. Thus, the initial perceptions of maize food between the two groups were not different or balanced.

After all the test requirements are declared to meet the criteria, the hypothesis test is carried out. The null hypothesis of this study is tested which reads "There was no significant difference in students' perceptions of the value of maize food between the experimental and control groups". Hypothesis testing is done by using the t-test and the results can be read in Table 5.

Table 5 Independent Samples t-Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						95% Confidence Interval of the Difference	
Score		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference		Lower	Upper
Equal variances assumed	Equal variances assumed	.59	.45	4.19	43	.00	3.29	.79		1.70	4.87
	Equal variances not assumed			4.20	42.24	.00	3.29	.78		1.71	4.87

The data in Table 6 shows the coefficient t0 in the Equal variances assumed column with degree of freedom (df) 43 is 3,290. In that column, the Sig value is 0.000 < 0.05, so it can be concluded that Ho is rejected and Ha is accepted. Therefore, it can be stated that there is a significant difference in students' perceptions of the value of maize food between groups who take lessons through the use of comic and text media. Furthermore, to measure the magnitude of this difference, the researcher conducted an effect size test with Cohen's d. The result of Cohen's d is 1.25. Based on the Cohen's d effect size criteria (Table 3), this value is in the high category so that it can be stated that there is a large difference in perceptions of the value of maize food between the two groups of this study.

$$d = \frac{M_{group1} - M_{group2}}{SD_{pooled}}$$

$$d = \frac{M_{group1} - M_{group2}}{\sqrt{(SD^2_{group1} + SD^2_{group2})/2}}$$

$$d = \frac{19.64 - 16.35}{\sqrt{(2.38^2 + 2.85^2)/2}}$$

$$d = \frac{3.29}{\sqrt{6.89}}$$

$$d = 1.25$$

5. Discussion

The results of the first hypothesis test show that there is significant evidence of the effect of the use of educational comics on literacy of traditional ecological knowledge about non-rice food preservation of primary school students on the cognitive aspect. Based on the results of the effect size test, it shows that the effectiveness is quite large. The assessment of the difference in the mean post-test, the experimental group was higher than the control group. Thus it can be displayed in the cognitive aspect, the traditional ecological knowledge of students who learn through

educational comic media based on folklore is better than students who learn through text media. If the words conveyed and the learning time in the two groups are the same, the difference is suspected to be caused by the visual elements in educational comics which become the media for the experimental group. Hypothesis test results show that comics about corn cultivation based on folklore are more effective than text media.

This finding is in line with Waluyanto's [19] conclusion that comics are a visual communication medium that has the power to convey information in a popular and easy way. This is possible because comics combine the power of images and writing which are assembled in a storyline, making the information easier to absorb. Channel text is bolder and the story line is easier to follow and remember. In addition, good and clear visuals can also describe and support verbal material and the way this information is stored [20].

The results of this first hypothesis test proved that comics were effective in increasing students' understanding of ecological values in their local wisdom. The use of comics as a medium is to encourage literacy and positive values in the students' traditional ecology of new material. Comics are believed to be a bridge to introduce knowledge to beginners, or even advanced ones [21]. In addition, various studies in the field of education regarding comics as picture books have shown that the combination of words and images is most successful in improving the quality of learning. The findings of Carney and Levin [21] also show that when text and images are combined, reading performance and student retention increases compared to those without pictures. This is relevant to the findings of Hosler and Booner [22] that for children images are an attractive visual medium and encourage them to improve their performance.

The existence of images facilitates understanding of folklore and perceptions of intrinsic elements, the mandate of food security and the use of corn as an alternative food material, processing procedures (both traditional and modern) for maize processing, and procedures (both traditional and modern) for presenting maize processing products. This can be seen from the results of the posttest which showed that most students from the experimental group did not come from corn farming families and ate food from corn, but they had a good understanding of this. The effectiveness of using pictures in comics as a learning medium has also been proven by previous researchers. Nugraha, Yulianti, and Khanafiyah [23] found that teaching materials presented through inquiry science comics can guide students to discover the concepts themselves learned through questions and inquiry lines.

Students' knowledge of corn cultivation and processing also improved; they can even explain how to make *tawonan* and *gandhik* (corn cake), which have been used only for traditional ceremonial offerings. In addition, after reading the comics, students can also recount the origin of the village clean in *Dhukutan* traditional ceremony. Previously, this folklore was no longer known, even by the elders. This finding supports the

findings of Wirth and Gamon [24] which show that pictures in comics can tell stories, so that the material presented is contextual and this makes the material easier for students to understand.

It turns out that in addition to being effective in improving the cognitive aspects, the use of comics as a traditional ecology learning medium on food preservation is also effective in increasing the affective aspects of students. This can be related to the results of the second hypothesis test showing that there is a significant difference in the perception of the value of maize food between the experimental and control groups. From the effect size test, it is obtained the magnitude of the effect of the treatment, including height. As for the evaluation of the pretest and posttest average scores, it shows that the experimental group's performance is better than the control group. This means that the use of educational comics as a medium for learning traditional ecology about corn food cultivation can improve the pro-food attitude of maize among students. The results of the questionnaire data analysis also showed a change in student acceptance of corn as an alternative food. They no longer see it as 'devil food', but as food that once saved their ancestors from lack of food and from the threat of various diseases. The results of this study are in line with Topkaya's [25] findings that the use of educational comics has a great influence on increasing awareness and awareness among students about environmental problems. Even before that, Dogan's findings [25] show that the goals of environmental education in the cognitive domain lead people towards environmental literacy while the goals in the affective domain lead people to develop values and attitudes towards the environment and environmental problems.

In general, the topic of this research is related to environmental problems, specifically the Tawangmangu local environment. However, today environmental issues are not only local but global in nature because they have a profound impact on everyone in society as well as all living and non-living things in nature. Therefore, the results of this study have contributed to efforts to develop environmental care attitudes and participation in solving environmental problems through education. Of course this can support the "environmental literacy or eco-literacy" program which is part of the School Literacy Movement program launched by the government [26]. Environmental knowledge and high environmental education are needed to understand current global environmental problems [27]. Therefore, it is very important to carry out environmental education effectively - among other things with comic media - which allows people to change the way people perceive nature and influence their values and attitudes positively with the aim of preventing environmental problems that state by Gokce, Kaya, Aktay, and Ozden [25]. This can be related to the findings of Marianna and Stefos [28] that images in comics are not only students' favorite for perceiving environmental messages, comic images are also students' choice to express their ideas to overcome environmental problems. Therefore, recently there has been a new term for this media, namely eco-comics [29].

6. Conclusion

The results of this study indicate that the presentation of material through comics is effective in increasing traditional ecological literacy about food security in elementary school students, both in cognitive and affective aspects. Even though the traditional ecological material on corn food preservation comes from its immediate environment, in reality this knowledge has been forgotten and abandoned by the community, even seen negatively by the younger generation. Therefore, for students, the knowledge of ecology which is a legacy of their ancestors becomes new, so that their introduction through pictures helps them to reconstruct their knowledge. With the increase in knowledge about corn food, the pro-food attitude of maize among students has also increased. The expected further effect of this research is the growing awareness and acceptance of the parents of students, even all Tawangmangu residents, of the value of maize food, which is no longer seeing it as Satan's food just because it is used as a material for making offerings at traditional ceremonies.

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