Effectiveness of Media and Communication Forms to Promote a Positive Behavior of the Society around Untirta New Campus toward Environmental Preservation

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Abstract. The vision of the University of Sultan Ageng Tirtayasa (UNTIRTA) as a Green Campus shows its sensitivity to the importance of environmental quality and quick response to developing living behaviours that prioritize environmental sustainability. This study aimed to describe the issues and actions of environmental preservation that are considered important by the community around the Untirta new campus and to analyze the media and forms of effective environmental communication messages to build positive attitudes towards environmental care actions. This research used a quantitative approach with survey and quasi-experimental design. The results showed that for the community around the Untirta new campus, the main environmental issue was the environment that felt arid and maintaining trees around the home environment as the most important environmental care action considered. The community showed a pro-environmental attitude in the neighbourhood where they live, while the media and forms of environmental communication messages that are most effective in increasing this attitude were banners with positive message forms.

1. Introduction
The establishment of Untirta's vision, one of which is a Green Campus, shows Untirta's sensitivity to the importance of environmental quality and behaviour that prioritizes environmental sustainability. Achieving this vision requires support from the community around Untirta's new campus because maintaining the environment around the campus is the responsibility of the entire community around the campus. Primarily, this is because the formation of a community that understands environmental conservation requires cooperation between stakeholders who are directly related to educational institutions, such as parents, local communities, to cleaning workers [1].

Field conditions show that environmental preservation is still an issue that has not been paid attention to or is an ambiguous question for most communities around the new Untirta campus, regardless of how critical and urgent this issue is according to academics. The rise of tree cutting and sand mining is some examples of economic activities that cause environmental damage, which is more often caused by human (anthropogenic) activities than by natural variables. The factors that influence community
participation in maintaining the quality of the settlement environment include the socio-economic conditions of the community, the availability of infrastructure, understanding of the community's environment, the role of the government, and exploitation of natural resources by capital owners to meet high market demand.

The development of a positive community attitude towards environmental management around Untirta is the first step needed to realize Untirta's Green Campus vision. Through this positive attitude, the community is expected to participate in improving the quality of the environment in the form of providing thoughts/ideas, assets/money, energy, skills and others [2]. According to Karim [3], one of the efforts to develop public awareness is increasing the attitude of humanism through the socialization of environmental conservation materials.

Nowadays, people pay more attention to information that is attractively and creatively composed but does not reduce the message of the information conveyed. This research attempted to design media and forms of environmental communication messages as an effective way to develop positive attitudes of the community around the Untirta new campus. Thus, the right application and media to convey information about environmental problems is an application in the form of infographics [4]. This study is essential because it provides recommendations regarding an effective environmental communication strategy for Untirta as a Green Campus. This strategy is necessary to increase community participation in maintaining the environment around Untirta's new campus.

2. Method
This research was carried out as a descriptive survey using a quasi-experimental design with a quantitative approach. The location was chosen purposively according to the research objectives. This study was conducted from June to November 2020. The survey involved 251 respondents drawn using accidental sampling to determine environmental care issues and actions considered necessary for the community and figure out their pro-environmental attitude. Data were collected using a questionnaire and analyzed descriptively through a single table based on a composite score distributed in the low, medium and high categories following the normal data distribution with a range of half a standard deviation [5].

Quasi-experimental 2 x 3 factorial design was applied to message media (banners, flyers, and posters) and message designs (positive and negative). Each treatment group involved 30 respondents who lived around the new campus Untirta. Partial differences among the treatments could be found through the Student t-statistical test:

\[
T = \frac{x - \mu_0}{s_x} \quad (1)
\]

\[
T = \frac{x - \mu_0}{s/\sqrt{n}} \quad (2)
\]

with n-1 degrees of freedom, where:

- \( x \) = the sample mean
- \( \mu_0 \) = the theoretical/population mean
- \( s_x \) = the sample standard deviation
- \( n \) = the sample size

3. Results and Discussion

3.1. Characteristics of Research Sites
Pabuaran sub-district is located west of the capital city of Serang Regency with an area of 4,335 ha which is dominated by rice fields (997.28 ha) and 1,088 ha of non-paddy agricultural land [6]. Based on its area, Pabuaran District is divided into eight villages with the largest villages in sequence, namely
Sindangsari, Pabuaran, Sindangheula, Tanjungsari, Kadubeureum, Pancanegara, Pasanggrahan, and Telagawarna [6].

Pabuaran district is located at 100-250 m above sea level, with a plain, hilly and undulating topography with a land slope of <25%. This region includes a wet climate with 8 months of wetness, which is classified into the climate classification zone A [8]. Furthermore, according to Schmidt and Ferguson [9], it has an average temperature of 22.8 - 32˚C with an average rainfall of 2,108 mm / year with type B rainfall.

The population of Pabuaran sub-district is 40,461 people, consisting of 20,917 male residents (51.69%) and 19,554 female residents (48.32%). Most residents live in the villages of Sindangsari (8,495 people), Sindang Heula (6,967 people) and Pabuaran (6,539 people) because these villages are close to the national highway, provincial government centre and new settlements of many migrant communities. In contrast, the village with the least population is Talagawarna (1,305 people) because it is the smallest area and located the tip of Pabuaran District [6].

Based on the current education level, 885 children are in playgroups (early childhood education) while 91 children are in kindergarten. In the primary school, the student is currently studying elementary school, junior high school, and senior high school by 4,893 people, 2,177 people, 2,136 people respectively. Meanwhile, around 30,279 people have not yet gone to school [6]. Based on the type of work, most of the working population in Pabuaran District work in the agricultural sector, including farming, plantation, animal husbandry and aquaculture. Then the trading, communication and transportation sector are following. Agriculture is still the main activity of the community. It has essential roles in the economic and social growth of the people of Pabuaran District. This condition is meaningful because the agricultural has a multifunctional role. In the production aspect, agriculture provides food security, increases farmer's welfare to alleviate poverty, and preserves the environment as a crucial role. Availability of traditional markets and access to the urban area support the economic activities of the community. The distance to get trading centre is about 17 km. It makes farmers easier to access production factor, marketing place and financial facilities.

3.2. Characteristic of Respondents

3.2.1. Age
The mean age of the respondents was 36.80 years in the range of 16 to 69 years. Most of the respondents belong to the categories of adults and productive age. This data is in accordance with the condition of the population based on the age group in Pabuaran District who is dominant in adulthood [6].
Table 1. Distribution of respondents by age

| Age (year) | Category | Number (People) | (%)  |
|------------|----------|-----------------|------|
| 12 – 25    | Remaja   | 42              | 16.6 |
| 26 – 45    | Dewasa   | 149             | 59.6 |
| > 46       | Tua      | 60              | 23.8 |
| Total      |          | 251             | 100.0|

3.2.2. Gender
The proportion of male and female respondents is almost equal. This ratio will strengthen the
generalizability of the research results because sampling sufficiently represents both genders. According
to Indonesia Statistic of Serang Regency [6], the gender ratio of the Pabuaran population is almost
balanced.

Table 2. Distribution of respondents by gender

| Gender  | Number (people) | (%)  |
|---------|-----------------|------|
| Female  | 123             | 49.0 |
| Male    | 128             | 51.0 |
| Total   | 251             | 100.0|

3.2.3. Education level
Only very few respondents have a higher education. This condition is related to the fact that most
respondents come from low and middle-income families, so that family members can only attend the
required secondary level school. Therefore, most respondents prefer to go to work rather than continue
their education to higher education.

Table 3. Number and percentage of respondents based on education level

| Education level | Category         | Number (people) | (%)  |
|-----------------|------------------|-----------------|------|
| Elementary      | Basic Primary    | 72              | 28.7 |
| Junior high school | Middle Primary | 55              | 21.9 |
| Senior high school  | Middle Primary | 101             | 40.2 |
| College/university | Higher       | 23              | 9.2  |
| Total           |                  | 251             | 100.0|

3.2.4. Type of work
Pabuaran Subdistrict is an area with agricultural potential, so most of the respondents work as farmers.
The second-largest profession is as a housewife. Based on the survey results, they have side job s a
seasonal farmer during the planting and harvest seasons that much involved female workers.

Table 4. Number and percentage of respondents based on type of work

| Type of work         | Number (people) | (%)  |
|----------------------|-----------------|------|
| Labor                | 33              | 13.1 |
| Government employees | 12              | 4.8  |
| Trader/entrepreneur  | 31              | 12.3 |
| Farmer               | 92              | 36.3 |
| Company employees    | 8               | 3.8  |
| Does not work        | 60              | 23.9 |
| Not yet working      | 11              | 4.3  |
| Student/student      | 4               | 1.6  |
| Total                | 251             | 100.0|
3.3. The Environmental Problems Surrounding Untirta New Campus

3.3.1. Environmental issues that are considered important
Respondents stated three issues were considered the most important for the community around the Untirta Sindangsari campus such as the felt arid environment, the less clean air and often experienced drought.

Table 5. The Environmental issues surrounding Untirta new campus, Sindangsari Campus

| No | Environmental Issues                                | Proportion of Responden (%) |
|----|-----------------------------------------------------|------------------------------|
| 1  | Arid environment (lots of unused land)              | 22.7                         |
| 2  | The air feels less clean                            | 20.5                         |
| 3  | Drought                                             | 17.3                         |
| 4  | Lots of plastic waste                               | 14.5                         |
| 5  | Scattered garbage                                   | 13.1                         |
| 6  | Floods and landslides                               | 11.9                         |
|    | Total                                               | 100.0                        |

The major environmental problems in the vicinity of the respondents' homes are mostly caused by small-scale sand mining activities on community-owned land in Pabuaran District. This mining has long been carried out by the local community as well as several sand and rock-mines that have the legality of C mining which is supposed to manage environmental impacts due to mining activities and post-mining activities [10]. The reality shows that conservation activities are often not carried out by the miners. Especially local miners on their land, because they think that mining is carried out on their land and increase costs, along with lack of concern for environmental conservation. Likewise, Miners who have legality still don't care about conservation activities. This mining activity change in land use and productivity, decrease water and air quality, increase erosion and sedimentation, and rise noise due to truck mobilization during the transportation of the materials during the construction of supporting mining facilities and mining operation. This is in line with the explanation of the Ministry of Environment and Forestry [10] that the transportation of minerals during operation is most dominant in decreasing air quality and increasing noise.

3.3.2. Environmental preservation actions that are considered important
Maintaining trees around the home environment is the most important environmental maintenance action for most respondents. This assessment shows the suitability between environmental issues and environmental preservation actions that are considered important by respondents.

Table 6. Environmental actions that are considered important

| No | Environmental Maintenance Action                      | Proportion of Responden (%) |
|----|-------------------------------------------------------|------------------------------|
| 1  | Maintain trees surrounding the home                   | 73.30                        |
| 2  | Managing trash                                        | 72.90                        |
| 3  | Reducing the use of plastic packaging                 | 67.33                        |
| 4  | Keep the animal husbandry away from home              | 38.21                        |
| 5  | Developing organic farming                           | 25.49                        |

3.3.3. Attitudes towards environmental preservation actions
Various environmental preservation actions are currently carrying out include planting a million trees, recycling waste, not littering, and many more. In general, respondents showed a supportive attitude towards environmental preservation actions in the neighbourhood where they live. For example, by rejecting sand mining activities that are considered to be the cause of environmental problems. However, there are still quite many respondents who have not fully supported environmental preservation actions. For this reason, efforts are needed to form and improve the positive attitude of the community around
the new campus Untirta towards environmental preservation actions, especially those by environmental issues and actions that are considered important for the surrounding environment.

Table 7. Attitudes towards environmental preservation actions

| Score       | Attitudes     | Number | (%)  |
|-------------|---------------|--------|------|
| > 34,02     | Very support  | 61     | 24.30|
| 30.17 – 34.02 | Support      | 120    | 47.80|
| < 30.17     | Less support  | 70     | 27.88|
| Total       |               | 251    | 100  |

3.3.4. The effectiveness of the media and the form of communication messages to build positive attitudes towards environmental care actions

Building a positive attitude towards environmental care actions in this study is the positive difference in the median score of positive attitudes of respondents towards tree maintenance in the environment around the house between before (pretest) and after (posttest) receiving environmental communication messages through flyers, posters, and banners for both of positive and negative messages form. For this reason, a pretest of the respondent's initial attitude towards tree maintenance in the environment around the house was carried out. Furthermore, respondents were grouped according to a combination of treatments and given treatment to measure their final positive attitude. The median posttest score for the respondent’s attitude was calculated for the difference with the median pretest score for the respondent's attitude as the baseline.

Figure 2. Median score of respondents’ attitudes towards the tree maintenance before and after being treated

Figure 2 shows that before being given treatment, the largest median of respondents’ attitudes towards tree maintenance in the environment around the house was in the group of respondents who were given environmental communication messages through poster media in the form of positive messages and banner media with negative messages. After being given the treatment, the respondent's attitude towards tree maintenance in the environment around the house generally increased. It is indicated by the higher median score of the respondents in each treatment group, except for those who received negative messages through posters and banners. The highest positive difference occurred in the group of respondents who received environmental communication messages through banners in the form of positive messages.
To find out the influence of the media and the form of environmental communication messages towards the respondents' positive attitude, we analyzed the comparison of the post-test and pretest measurements results of the tree maintenance in the environment around the house. The median pretest and post-test score for treatment via flyer media in the form of negative messages were 34 and 38, respectively, which means there was a positive difference in the median score of 4.

Table 8. Difference in median score of respondents' attitudes towards tree maintenance in the surrounding environment after and before treatment

| Media of message | Form of message | Negative | Positive |
|------------------|----------------|----------|----------|
| Flyer            | 4              | 2        |
| Poster           | 1              | 2        |
| Banner           | -4             | -2       |

The table above shows the most significant median difference found in respondents who receive environmental communication messages through flyer media with negative messages form, which is 4. It was followed by respondents in the group who receive environmental communication messages through banner media with negative messages form. Meanwhile, the smallest median difference was obtained in the group who received communication messages through posters with negative messages, which was 1.

The treatment combination between the media and the form of communication messages is analyzed simultaneously. Therefore, the analysis result obtained is an analysis of the interaction between the communication messages media and shape, as presented in Table 10.

| Analysis of Variance Table |
|----------------------------|
| Response: difference       |
| Df | Sum Sq | Mean Sq | F value | Pr(>F) |
|-----|--------|---------|---------|--------|
| media | 2 | 120.0 | 60.02 | 2.6103 | 0.0763905 |
| message | 1 | 634.7 | 634.69 | 27.6044 | 4.312e-07 *** |
| media:message | 2 | 360.8 | 180.41 | 7.8463 | 0.0005462 *** |
| Residuals | 174 | 4000.7 | 22.99 | --- | |

Figure 3. Result of Variance Analysis

The data above shows a real interaction between the media and the form of environmental communication messages. Therefore, the further analysis focuses on the interaction between the media and shape of environment communication messages, where there are six treatment combinations as the primary concern, as seen from the results of further tests with Tukey.
Figure 4. Result of Tukey Test

Tukey test results of six treatment combinations, there were six pairs of significantly different comparisons, namely flyer media with negative message form and banner media with negative message form, poster media with negative message form and banner media with negative message form, poster media with negative message form and banner media in the form of positive messages, banner media in the form of negative messages and flyer media in the form of positive messages, banner media in the form of negative messages and banner media in the form of positive messages.

| media | message | difference | pval       |
|-------|---------|------------|------------|
| m2-m1 | p2-p1   | 3.755556   | 2.344758   | 5.166353   | 4.3e-07 *** |

Figure 5. Pair comparison of treatment groups

The figure above shows flyers in the form of positive and negative messages tend to give same impact on respondents' attitudes regarding tree maintenance in the environment around their house as well as environmental communication messages through posters and banners with negative messages. Meanwhile, environmental communication messages through posters and banners with negative message forms have a different impact on respondents' attitudes regarding tree maintenance in the neighborhood around the house. Thus, the media and forms of environmental communication messages that are most effective in shaping positive attitudes of community members around the campus regarding
environmental maintenance through the maintenance of trees around their home environment are banner media with a positive message form. These findings complement several media were previously known to be effective in delivering environmental messages, such as books, posters, e-books, stickers, and mugs that have their respective functions and are effective in conveying environmental information [4], as well as group activities as a communication media to formulate the causes of environmental damage, and to find solutions to problems through religious education [3].

4. Conclusion
The environmental issue that is considered the most important by the community around the new Untirta Sindangsari campus is the environment that feels arid. Therefore, maintaining trees around the home environment is considered as the most important environmental maintenance action. In general, the community around the new Untirta Sindangsari campus shows a supportive attitude towards taking care of the environment around where they live. The media and forms of environmental communication messages that are most effective in building positive attitudes of community members around Untirta's new campus regarding environment preservation through the maintenance of trees around the home environment are banner media with a positive message form. The findings complement several media were previously known to be effective in delivering environmental messages, such as books, posters, e-books, stickers, and mugs which have their respective function and are effective in conveying environmental information, as well as group activities as a communication media to formulate the causes of environmental damage, and to find solutions to problems through religious education.

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