DIFFUSING NEW MEDIA AS KNOW-HOW DIGITAL COMMUNICATION IN TROUBLESHOOT MAINTENANCE OF PICO HYDRO TECHNOLOGY IN BENGKULU, INDONESIA

Naldo Naldo
Communication Study Program, Vocational Education Program, Universitas Indonesia, naldo19@ui.ac.id

Hardika Widi Satria
Communication Study Program, Vocational Education Program, Universitas Indonesia,
hardika.satria@ui.ac.id

Dendy Adanta Departement of Mechanical Engineering, Faculty of Engineering, Universitas
Indonesia
06101012018@student.unsri.ac.id

Warjito Warjito
Departement of Mechanical Engineering, Faculty of Engineering, Universitas Indonesia,
warjito.sph@ui.ac.id

Follow this and additional works at: https://scholarhub.ui.ac.id/jabt

Part of the Accounting Commons, Business Administration, Management, and Operations Commons, Economic Theory Commons, and the Human Resources Management Commons

DIFFUSING NEW MEDIA AS KNOW-HOW DIGITAL COMMUNICATION IN TROUBLESHOOT MAINTENANCE OF PICO HYDRO TECHNOLOGY IN BENGKULU, INDONESIA

Naldo [a], Hardika Widi Satria [a], Dendy Adanta [b], Warjito [b]

[a] Communication Study Program, Vocational Education Program, Universitas Indonesia
[b] Departement of Mechanical Engineering, Faculty of Engineering, Universitas Indonesia
Email: naldo19@ui.ac.id, , hardika.satria@ui.ac.id, 06101012018@student.unsri.ac.id, warjito.sph@ui.ac.id

Abstract

Communication has an important role for spreading messages and ideas through various mediums. This research explains the important role of new media in community engagement activities and the dissemination of new information, innovations and technologies that have been done in 2017, especially for the graphic design via the internet on Pico Hydro's information technology in Batu Roto village, Bengkulu province, Indonesia. Community involvement itself is based on a special multidisciplinary perspective of communication and engineering. Pico Hydro is commonly used worldwide to generate electricity in rural areas, making it very useful for rural electrification. We conduct research to meet the needs of our plans in community engagement and use the theory of communication development to support the outcomes of this program. Communication development theory has a focus on dissemination of innovation. This research method is desk research of new media. This research argues that the application of Pico Hydro technology will have more impact on Batu Roto village community when combined with the method of social communication science development through digital media. The information contained in the infografic is expected to spread the idea to train the community in applying Pico Hydro technology for many homes in Batu Roto village so that it can solve the problem of electricity shortage in Bengkulu Province.

Keywords: communication development; diffusion of innovations; infografic; pico hydro; psychology of colour; typographic; rural electrification; new media; digital communication.

Abstrak

Komunikasi memiliki peran penting untuk menyebarkan pesan dan gagasan melalui berbagai media. Penelitian ini menjelaskan peran penting media baru dalam kegiatan pelibatan masyarakat dan penyebaran informasi baru, inovasi dan teknologi yang telah dilakukan pada tahun 2017, terutama untuk desain grafis melalui internet pada teknologi informasi Pico Hydro di desa Batu Roto, provinsi Bengkulu, Indonesia. Keterlibatan masyarakat itu sendiri didasarkan pada perspektif multidisiplin khusus komunikasi dan teknik. Pico Hydro umumnya digunakan di seluruh dunia untuk menghasilkan listrik di daerah pedesaan, sehingga sangat berguna untuk elektrifikasi pedesaan. Kami melakukan penelitian untuk memenuhi kebutuhan rencana kami dalam pelibatan masyarakat dan menggunakan teori pengembangan komunikasi untuk mendukung hasil program ini. Teori pengembangan komunikasi memiliki fokus pada penyebaran inovasi. Metode penelitian ini adalah desk research dari media baru. Penelitian ini berpendapat bahwa penerapan teknologi Pico Hydro akan lebih berdampak pada masyarakat desa Batu Roto jika dikombinasikan dengan metode pengembangan ilmu komunikasi sosial melalui media digital. Informasi yang terkandung dalam infografik diharapkan dapat menyebarkan ide untuk melatih masyarakat dalam menerapkan teknologi Pico Hydro untuk banyak rumah di desa Batu Roto sehingga dapat menyelesaikan masalah kekurangan listrik di Provinsi Bengkulu.

Kata kunci: pengembangan komunikasi; difusi inovasi; infografik; pico hydro; psikologi warna; berkenaan dgn percetakan; elektrifikasi pedesaan; media yang baru; komunikasi digital.

BACKGROUND / OBJECTIVES AND GOALS

Bengkulu Province is one of the provinces in Sumatra that experienced the lowest electrification ratio, although there have been attempts by the government to increase electricity supply to households, but the distribution is still not evenly distributed. Recorded until 2017 the lowest distribution of electrification was found in North Bengkulu, amounting to 75.4% or 53 villages out of 215 villages still experiencing an electricity crisis. Ironically the electricity crisis experienced by Bengkulu is inversely proportional to the fact that Bengkulu has tremendous natural potential from the water sector due to its hilly topography and has many waterfalls of 3 GW. This water potential should be used optimally to build electrical networks for household needs in particular such as the technology of Pico hydro. The application is very beneficial for people in rural areas that have no access to electricity because have short life cycle cost, low investment and operational cost, easy manufacture and large efficiency than others source (wind turbine and solar Photo Voltaic (PV)) (Ho-Yan, 2012; Williams & Simpson, 2009). This is the reason some researchers recommend pico hydro as an independent power plant to rural electrification (RE) such as Cameroon, Nepal, Laos, Rwanda, Honduras, Bolivia and Peru (Ho-Yan, 2012; Adhikari, 2013; Vicente et al. 2012; Pigaht et al., 2019; Thomas, 2012).

However, there are some obstacles in the implementation of pico hydro turbine: the distribution of the plant that is difficult geographical condition, and low level of public awareness (Warjito et al., 2018). To ensure the Pico hydro program is well received by the community of village, a proper communication approach is needed so that the message of community service will accepted and its goal of community empowerment can work properly. Development and communication are two things that are closely related. Communication in the context of development is "as an integral part of development, and communication as a set of variables of instrumental in bringing about development" (Roy in Jayaweera and Anumagama, 1987). In addition, the role of development communication has been widely discussed by experts and they generally agree that communication has an important role to play in development. Everett M. Rogers (2003) states that development is simply a useful change towards a social and economic system that is decided as the will of a nation, and communication is the basis of social change. Thus the role of communication in development must be linked to the direction of change where communication activities should be able to anticipate the movement of development. Those communication media were effective considering the population setting at that time, with relatively smaller communities. As the population began to spread out geographically and new technologies developed, a need arose for more suitable communication media. However, even these mass communication media are gradually losing their effectiveness (Brownlee, 2013). In the communication community there is a widespread assumption that recent advances in internet technologies, particularly social media, have transformed the pattern of communication including development and communications (Chou et al., 2009). For example, Sumatera island is dominated with DSL broadband internet connection. In Jambi most users use DSL access (71.43%). While in Bengkulu is dominated with cellular access (33.33%). Dial-up access is commonly used in Bengkulu (66.67%) (APJII, 2013). In addition, 72 per cent of all internet users are now active on social media (Bullas, 2014).

Despite this rapid adoption of new media, very little research has been carried out to examine the impact of these new digital technologies on the effectiveness of communication development. Development messaging is an area that has been relatively ignored in the literature and almost no research focusses on the effectiveness of social media and other new technologies as tools for sending communication development messages, particularly in developing countries. Considering the decline in the effectiveness of traditional media and the dramatic increase in the usage of internet in the region, particularly social media, it is important for researchers to explore the effectiveness of communication development media.

METHODS

This community engagement program is used secondary data to develop answer for the existing problem in Batu Roto. The technique we use for this methodology is desk research. Desk research technique is mainly acquired by sitting at a desk. It is involved in collecting data from existing resources. This research is considered a low-cost technique compared to field research. We gathered data and information mainly through online, thus it is considered as online desk research. We use this method due to financial limitation of program. The cost for set up pico hydro in Batu Roto is expensive even though we have collaborator from Faculty of Mechanical Engineering, Universitas Bengkulu. Nevertheless, the remaining budget is still insufficient for us to conduct field research.

We seek information mainly from the internet, particularly the concept of typography and the psychology of color. These concept supports the idea of innovation diffusion where idea can spread through infographic. Given the culture of Malay exist in Bengkulu, we found that yellow is the dominant color of Malay culture, so we embed it into infographic. The creative process of designing infographic is through brainstorming session within social sciences member of this community engagement program.

After brainstorming session, we finally have some ideas to be put the messages in the infographic. Last step before finalization of infographic we did interview through telephones with one of key person in Batu Roto to confirm the idea and the contrast color approach we used based on cultural perspective. Those kind of insight is very useful in the process of making the idea of innovation diffusion happen since we believe community-based perspective. Murphy (2014) breaks the community-based perspective from the traditional view of social existence and organizational life and instead is comparable with the outlook of critical community practice that emphasizes solidarity and social inclusion. He also added persons who participate in this creation are responsible for giving the community and its needs meaning.

Goggin and Newell (2003) defined new media as new digital communications technologies that include the internet and broadband networks (fast, high-capacity data services), advanced telecommunications networks (offering services such as caller ID, digital mobile phones, third-generation mobile telecommunications, video telephones), and digital broadcasting (with digital television). The internet is the "electronic network of networks that links people and information through computers and other digital devices allowing person-to-person communication and information retrieval" (DiMaggio et al., 2001).

In addition, communication refers to how people share views and thoughts with others. Effective ways to communicate, such as reading, writing, speaking, through the media and so on. Communication itself has benefits in all fields. Not only that, good communication skills can also change a person's life. In a series of processes for delivering information or messages to other parties there is visual communication, namely communication through vision with the use of imaging media which is only read by the sense of sight.

Good communication guarantees the right exchange of thoughts and views so that there is no confusion. If a thing is not communicated well, then people will find it difficult to understand. If left unchecked, problems will arise as a result. And along with the progress of the era and human civilization, these forms turned to verbal or writing such as inscriptions, books, and others. Thus, the form of writing is also growing as well because of the creativity of someone who is increasingly advanced. This form of writing has become a more communicative and effective form of communication than before. Then, this form of communication can use media such as visual communication, graphic design, or infographics.

In general, visual communication uses body language or non-verbal language. And this visual communication is often used by creative people in conveying messages through the illustrations they make to give messages to people who see. So that many people who call this term are infographics. As the times and civilizations develop in visual communication there are three basic functions, namely Identification Means, Information Facilities and Instructions, Presentation Facilities and Promotions

Typography is a science in selecting and arranging letters with the arrangement of their spread in available spaces, to create a certain impression, so that it can help readers to get the maximum reading comfort. There are 4 types of typography

1. Serif, with the characteristic of having fins / feet / serifs that are pointed at the ends.

Approaching the end of the letters, both at the top and bottom, there is a widening that resembles a support or stalk. The impression is classic, graceful, and feminine. According to history, the origin of this form of letters is to follow the shape of the pillars of buildings in Ancient Greece. Use of serif stalks. In small text sizes, such as the size of text in a newspaper or book, generally the handles on the legs of the serif font help to make the writing easy to read. Because serif fonts help form invisible lines that guide us to follow a line of text. That's why a lot of books are layout with serif.

2. Sans Serif, with features without fins / serifs, and has the same or almost the same thickness. The impression caused by this type of letter is modern, contemporary and efficient. In the following conditions such as very small letters (such as the writing of ingredients on food labels), very large letters (such as on brand signs) that must be seen remotely, on the monitor screen. Sans serif letters are sometimes easier to read because actually the fonts of the serif font complicate the shape of the letters so they are a little longer to read. If very small letters or at low resolutions such as on the monitor screen, serif feet can appear overlapping and obstruct the view.

3. Script, connecting letters or scripts you can also call "handwriting letters" (handwriting) because it resembles people's handwriting. Or it could also be called "invitation letter" because it is almost always present on invitation cards because they are considered beautiful and graceful. There are various scripts and handwriting letters, ranging from the ancient to the modern, from the slightly straight to the sloping and very "circular". The impression that is caused is personal and intimate nature.

4. Miscellaneous/Decorative, is the development of existing forms. Plus ornaments and ornaments, or decorative lines. The impression is decorative and ornamental.

There are 4 Principles of Typography from Legibility, namely the quality of letters making the letters readable; Readibility is the use of letters by paying attention to their relationship with other letters so that they are legible; Visibility is the ability of a letter, word, sentence in a visual communication work can be read within a certain distance; and Clarity, namely the ability of the letters in the design work can be read and understood by the intended observer.

Color is known to have an influence on psychology, emotions and how humans act. Color is also a form of non-verbal communication that can express messages instantly and more meaningfully. Each color emits different energy wavelengths and has different effects. The existence of color is not merely a natural result, but meaningful and "interpreted" by humans. Today, we find many interpretations of color meaning in many sectors. Starting from film, photography, graphic and interior design, even though health.

RESULTS

The combination between engineering and social sciences creates a comprehensive solution to tackle the problem in Batu Roto especially electricity problem. Those two different perspectives are advantages in creating an integrated solution within the community engagement program. From the point of view engineering it can be seen that Batu Roto has a potential resources to be maximalized in the energy of water. The abundance water flowing through the village and based on the calculation it is enough to produce electricity with the help of pico hydro turbine. The turbine generates electricity from the water flow in the waterways near residents' houses on a small scale electricity i.e 5KW.

Fig. 1: Community takes part during installation
process of pico hydro
Source: Dendy Adanta (2017)

On the other hand, the point of view from social science manage to support the idea of pico hydro and its implementation. We try to put the idea into real one by creating infographic with intention to educate community on general troubleshooting of the pico hydro within Batu Roto area. The enthusiasm from the people is high to pico hydro particularly during the installation phase where a lot of people join to help the process. This can be seen as engagement process in the community and the transfer knowledge to them. The relationship between university and the community is thus positive and it is in line with the purpose of our community engagement program which are transfer knowledge from university to community, community empowerment, and in the end is disengagement.
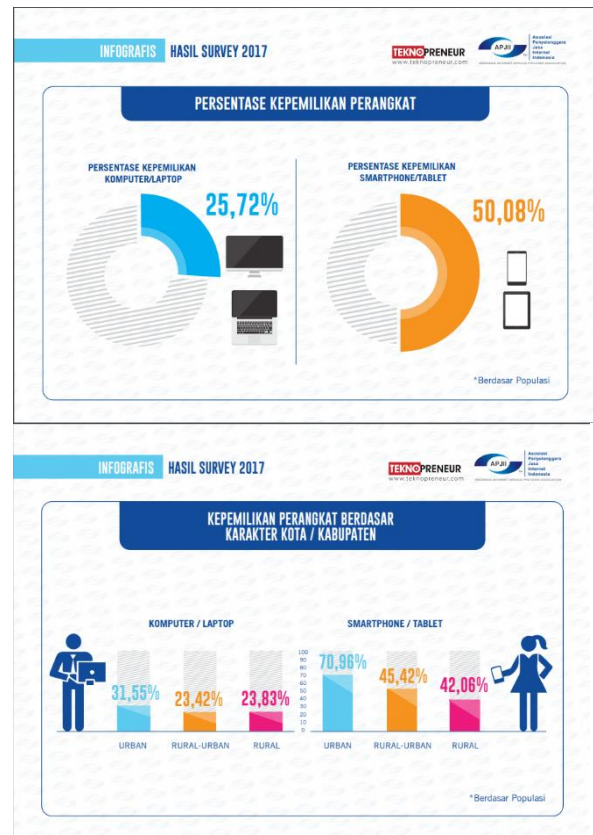

Fig. 2: Internet Device Ownership in Indonesia
Source: APJII (2017)

In Indonesia, according to 2017 survey data, the percentage of devices owned by the community to access the internet is smartphone / tablet, amounting to 50.08%, especially for the community based on the character of the district / rural community, 42.06% using smartphones / tablets and 23.83% using computers / laptop.
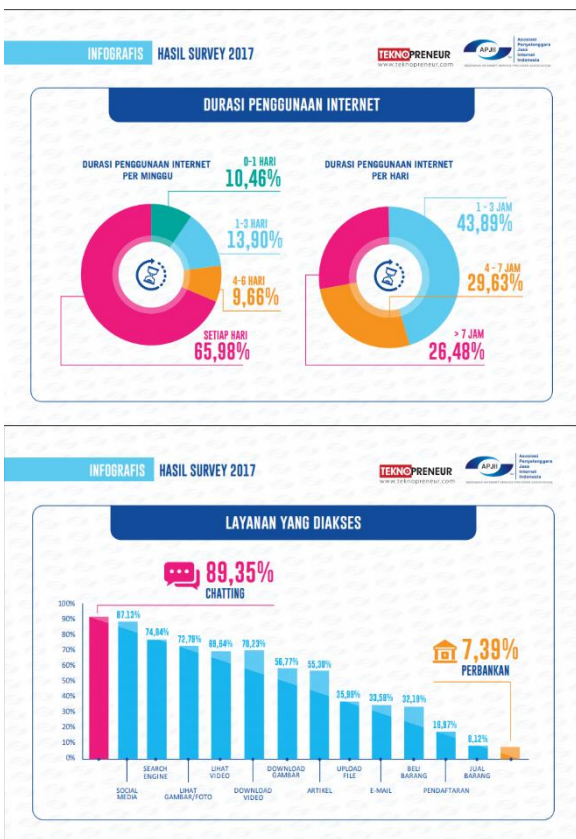
Fig. 3: Duration and Access to Internet Services in Indonesia
Source: APJII (2017)

Fig. 4: Use of the Internet in the Field of Education and Social Politics in Indonesia
Source: APJII (2017)

From these data, it can be concluded that 65.89% of the people use the internet every day. In everyday life the average community uses the internet within 1-3 hours, which is 43.89%. The biggest service used by the community is using the internet for chat services, amounting to 89.35% and social media 87.13%.
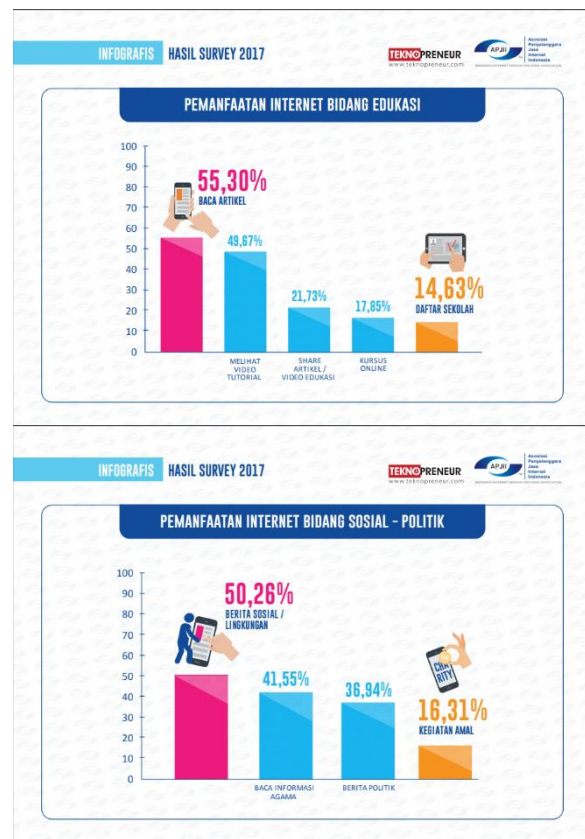
The community utilizing the internet in the field of education is using it to read 55.30% articles and utilization in the socio-political field is reading social or environmental news in the amount of 50.26%
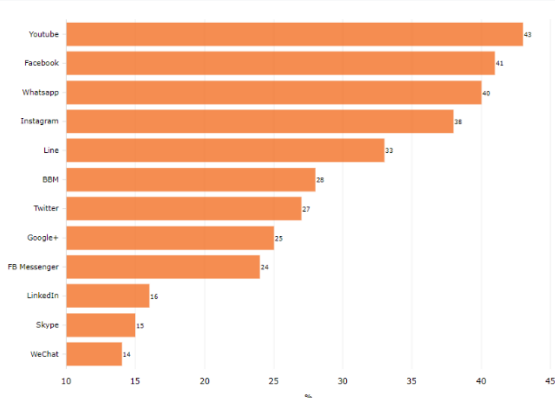
Fig. 5: Use of Social Media in Indonesia
Source: Kata Data Indonesia

Based on data from WeAreSocial.net and Hootsuite (2017), the development of internet use in Indonesia is very rapid, which is growing by 51% in one year. With a growth rate that far exceeds the growth rate of internet usage in the world, which is 10%, Indonesia ranks the second largest universal internet user. The results of the globalwebindex survey on internet users in Indonesia in the age range of 16-64 years, indicate that there are several social media platforms that are actively used by the people of Indonesia. The platform is divided into two categories of social media, namely creator content and social networking media/messenger. In the focus of our research on Facebook ranking with a percentage of usage of 41% and Whatsapp with a percentage of usage of 40% is a suitable medium for use in development communication applications in Batu Roto village, Bengkulu.
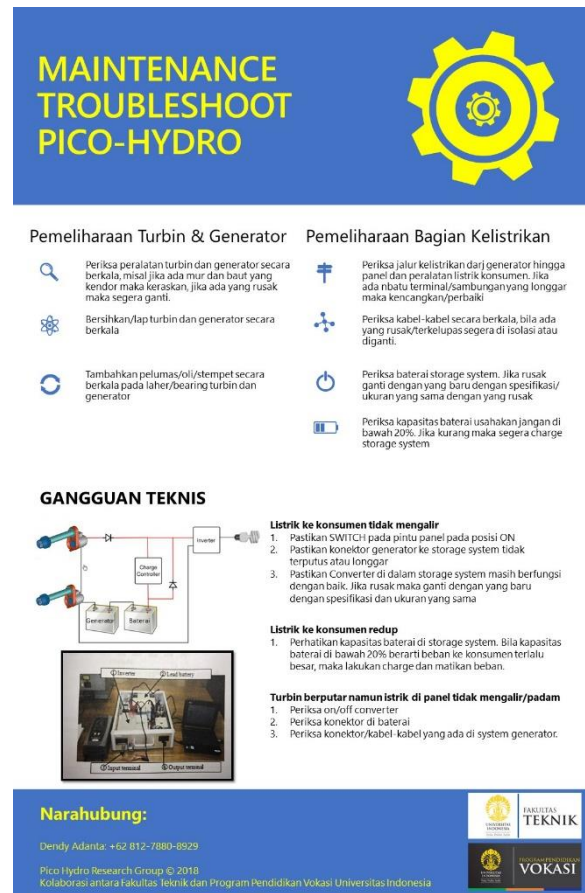

Fig. 6: Infografic Design
Source: Naldo (2018)

The selection of new media as an infographic distribution medium in this community service program is Facebook and Whatsapp based on survey data from the Association of Indonesian Internet Service Providers (APJII, 2017), namely the character of rural communities in Indonesia using 42.06% smartphones / tablets. Furthermore, it was also explained that 65.89% of the Indonesian people use the internet every day with a 1-3 hour period of 43.89%.
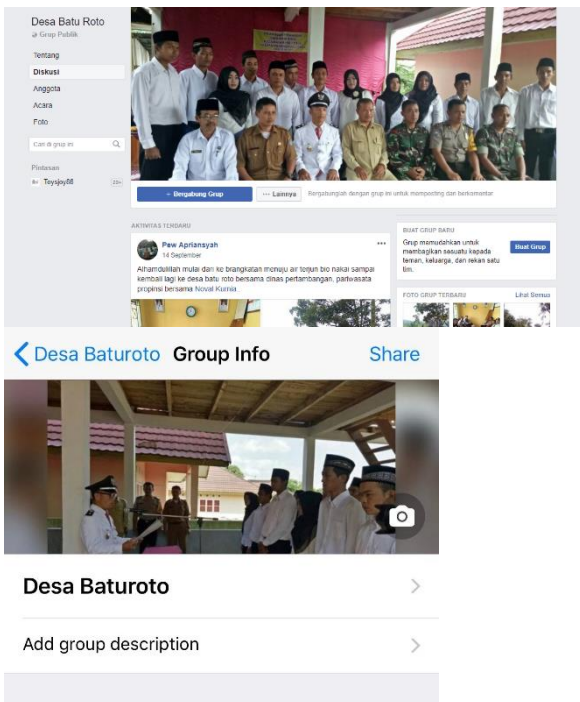
Fig. 7: Facebook and Whatsapp Group Desa Baturoto
Source: Facebook & Whatsapp

The most internet usage in Indonesia is for chat services (89.35%) and social media (87.13%). Data from WeAreSocial.net and Hootsuite (2017) also supports the selection of Facebook and Whatsapp mediums as new media in the spread of infographics because they are second and third in their research. Broadly speaking, the selection of the two media is based on field conditions where there is a Facebook group Baturoto Village and Baturoto Village Library that are active in sharing content with the community. Besides that, the Whatsapp group was also chosen because of its characteristics which can spread information faster among members in it. This is in line with research from WeAreSocial.net and Hootsuite (2017) where the use of internet services in new media is to read social or environmental news by 50.26%. Not choosing Youtube as a medium for delivering infographics is because Youtube has a relatively large amount of internet quota, which is considered burdensome for rural communities in general.

Infographics related to maintenance and troubleshooting of pico hydro turbines are needed for the Baturoto village community. In accordance with the new media principles that adhere to egalitarianism, so is the purpose of making infographics so that information about the maintenance and troubleshooting of piko hydro turbines can be understood and understood by all villagers. We hope that all parties will be able to digest this information through selected new media channels, namely Facebook and Whatsapp. Another thing that is emphasized is that this piko hydro turbine is public property or together with all Baturoto villagers so that all communities have an obligation to maintain the turbine to run normally and when problems are found that interfere with the turbine maintenance system, the community can repair it independently by reading the guidelines contained in infographics.

REFERENCES

Adhikari, P. et al. (2013). A Study on Developing Pico Propeller Turbine for Low Head Micro Hydropower Plants in Nepal. Journal of the Institute of Engineering, Vol. 9, No. 1, pp. 36–53.

B. Ho-Yan, "Design of a Low Head Pico Hydro Turbine for Rural Electrification in Cameroon," University of Guelph, 2012.

DiMaggio, P., Hargittai, E., Neuman, W.R. and Robinson, J.P. (2001), "Social implications of the internet", Annual Review of Sociology, Vol. 27, pp. 307-36.

Direktorat Jendral Ketenagalistrikan, "Statistik Ketenagalistrikan," Jakarta, 2016.

E.M. Roger. (2003). Diffusion of Innovations (Fifth edition). Free Press: New York.

Goggin, G. and Newell, C. (2003), Digital Disability: The Social Construction of Disability in New Media, Rowman & Littlefield, Bristol.

H. Zainuddin, M. S. Yahaya, J. M. Lazi, M. F. M. Basar, and Z. Ibrahim, "Design and development of pico-hydro generation system for energy storage using consuming water distributed to houses," *World Acad. Sci. Eng. Technol.*, vol. 59, pp. 154–159, 2009.

Joanna Siah Ann Mei, Namrata Bansal, Augustine Pang, (2010) "New media: a new medium in escalating crises?", Corporate Communications: An International Journal, Vol. 15 Issue: 2, pp.143-155,

Murphy, J. W. (2014). Community-based interventions: Philosophy and action. New York, NY: Springer.

Pigaht, Maurice and van der Plas, Robert J., (2009), Innovative private micro-hydro power development in Rwanda, Energy Policy, 37, issue 11, p. 4753-4760, https://EconPapers.repec.org/RePEc:eee:enepol:v :37:y:2009:i:11:p:4753-4760.

Richard Bannor, Anthony Kwame Asare, Justice Nyigmah Bawole, (2017) "Effectiveness of social media for communicating health messages in Ghana", Health Education, Vol. 117 Issue: 4, pp.342-371

S. J. Williamson, B. H. Stark, and J. D. Booker, "Low head pico hydro turbine selection using a multi-criteria analysis," *Renew. Energy*, vol. 61, pp. 43–50, 2014.

Vicente, Silvia and Bludszuweit, Hans, (2012), Flexible design of a pico-hydropower system for Laos communities, Renewable Energy, 44, issue C, p. 406-413, https://EconPapers.repec.org/RePEc:eee:renene:v :44:y:2012:i:c:p:406-413.

Warjito, Dendy Adanta, Budiarso, Aji P Prakoso. (2018). The Effect of Bucket Number on Breastshot Waterwheel Performance. IOP Conf. Series: Earth and Environmental Science 105 (2017) 012031. DOI: 10.1088/1755-1315/105/1/012031.

http://rri.co.id/post/berita/360205/daerah/daya_dan_jari ngan_belum_interkoneksi_sebabkan_listrik_di_ bengkulu_sering_padam.html

http://bengkuluutarakab.go.id/

https://apjii.or.id/downfile/file/SurveiPenggunaanIntern etSektorBisnis2013versienglish.pdf

https://www.facebook.com/groups/619789918181403/ ?ref=br_rs

https://www.facebook.com/profile.php?id=100008516 103834&__tn__=%2CdCH-R-R&eid=ARCkPXiKACw4OPzXlOSOuH562Te0 Ub32VpS6ayjMftR6bpj25Snkc2AKEoMs881bdP YvcY6eUMwYjM3f&hc_ref=ARSg7a9OZ8FgOs 91VaHE40rz2aM5D5kHu8uWLJ7rrAlR95t9QUy Y2iYOUAkFSWQ2qgo&fref=nf&hc_location=gr ouphttps://databoks.katadata.co.id/datapublish/201 8/02/01/media-sosial-apa-yang-paling-sering-digunakan-masyarakat-indonesia

https://databoks.katadata.co.id/datapublish/2018/02/01/ media-sosial-apa-yang-paling-sering-digunakan-masyarakat-indonesia