Campaign video for utilizing black soldier fly as organic decomposer in organic waste management

D T Ardianto and R H Rifai
Visual Communication Design Departement, Universitas Sebelas Maret, Indonesia

Corresponding author: denytri@staff.uns.ac.id

Abstract. Waste management in Boyolali Regency, Central Java, is still experiencing problems. Around 71% of the total 167 tons of daily waste has not been managed properly, and 51.88% of which is organic waste. Since early 2020, Black Soldier Fly start-up has started organic waste management, sold larvae products, and conducted training and consultation on organic waste in various regions. However, due to the current Covid-19 pandemic, its product marketing has not been optimal. For this reason, a profile video was designed as a medium of campaign for environmental issues to make people aware of waste management, especially organic waste. The campaign video was developed using five stages of ADDIE research and development model. The produced video is expected to be a campaign medium for better environmental management.

1. Introduction
According to data from Sustainable Waste Indonesia (SWI) 2017, around 64 million tons of waste are generated in Indonesia annually. Of this figure, only 7 percent was recycled, 69 percent accumulated in landfills, and the remaining 24 percent was littered carelessly, thus polluting the environment (illegal dumping) [1]. The data has not changed to date. The Directorate General of Waste and B3 Waste Management, Ministry of Environment and Forestry of the Republic of Indonesia noted that the amount of waste generated nationally in Indonesia reached 175,000 tons per day or the equivalent of 64 million tons per year. The data also note that organic waste is the most generated type (up to 50%), followed by plastic waste (15%), paper waste (10%), and a combination of metal, glass, wood and other materials [2].

Through Government Regulation number 27 of 2020 concerning Specific Waste Management, the government implements Article 23 paragraph (2) of Law number 18 of 2008 concerning Specific Waste Management. Specific Waste Management is a systematic, comprehensive and continuous program that includes the reduction and handling of specific waste [3]. This implies that to solve the waste problem, a strong commitment from the government, the business world, and the community is needed. Household waste is one of the main sources of waste (36%). Therefore, the government has been promoting the National Movement Program of Separating Waste from Home since 2018. Markets and commerce contribute to waste accumulation by 38%, and the remaining 26% comes from office areas and public facilities [2]. This data shows the importance of waste management from the source to reduce the burden of downstream management.

The government has made some efforts to manage waste in every area. However, the waste problem in Indonesia is still a threat along with other social, economic and cultural problems. Similar to almost all regions in Indonesia, Boyolali Regency is having waste management problems. An amount
of 71\% or 167 tons of daily waste has not been managed well in Boyolali [4]. Based on data from Boyolali Environmental Service, 234 tons of waste is produced every day in Boyolali, a city well known as the City of Milk. This figure was estimated from a survey results, in which each person produces 0.24 kg of waste/day. With a population of 979,799 people, most of the waste comes from community settlements, trade, agriculture, tourism sites, and other sources. The largest composition of waste is organic waste (51.88\%), followed by plastic waste (20.13\%), paper waste (12.82\%), and the rest is metal, rubber, cloth, wood, glass, and other types of waste. The waste management problem is exacerbated by the lack of public awareness regarding waste issue. This can be seen from the many acts of littering done by Boyolali citizens.

BSFLY (Black Soldier Fly) is a start-up engaged in organic waste management. They treat organic waste from kitchen, restaurant, market and the industry. BSFLY applies bioconversion technology using Black Soldier Fly (BSF) or Maggot (Hermetia Illucens larvae). The organic waste is decomposed and converted into natural protein source for fish, poultry, and organic farming needs. BSFLY seeks to reduce organic waste accumulation, support the national food security, and help the organic farming sector. In addition, BSFLY is also active in campaigning for and assisting the community in processing organic waste that has been the community’s problem. In Kemuning Village, BSFLY collaborated with Karanganyar Care Community to provide assistance in managing restaurant and tourism waste. In Pandeyan Village, Ngemplak District, Boyolali Regency, BSFLY assisted UNS students to farm BSF Maggot for their community service program. Further, BSFLY also provides consultation and sharing sessions about organic waste management at individual, group, and company levels.

As a developing startup, BSFLY had not promoted their products and services optimally. Based on the interview results on February 7, 2021, the promotions of BSFLY products and services were still limited to websites, posters, brochures, pamphlets and simple product photos. Meanwhile, the general community also has a difficulty in understanding bioconversion technology using BSF larvae. For this reason, audio-visual information media in the form of a profile video is needed. Aside from being a promotional means, a profile video can also serve as a learning media that can provide clear, complete, and interesting information.

2. Methods
This study is a development research using ADDIE model carried out in five stages including Analysis, Design, Development, Implementation, and Evaluation. The ADDIE model implements systemic approach. The essence of systemic approach is dividing the learning process plan into several steps, and then organize the steps into logical sequences. The outputs of each step are then used as inputs for the next steps [5,6].

The research and development activities were conducted to help promote BSFLY products and services using audio-visual media in the form of a profile video [7]. This profile video is expected to help introduce BSFLY products and bioconversion technology using BSF Larvae to the wider community, especially internet users [8,9].

At the Analysis stage, the field data shows that BSFLY was still weak in product publication and promotion at the market. Promotional media was needed to provide comprehensive information related to activities, products, programs, and benefits offered by BSFLY in overcoming waste problems in the surrounding environment [10–12]. Audio-visual-based media is considered capable of providing solutions in overcoming such problem [13].

The second step was the design stage. In this stage, the design of the video profile was created. The purpose of this video not only to help market BSFLY products and services, but also to provide education to the community about using BSF larvae bioconversion to overcome organic waste problem. In addition to designing the video media, distribution channels to disseminate the video were also determined. Publications through BSFLY YouTube channel and its other social media were chosen as the dissemination channels of the profile video.

In the development stage, the video making process was carried out. The process included scenario development, pre-production, production, post-production, and distribution.
After the media was created, the next stage was implementation. At this stage, the media was widely published through BSFLY social media platforms and YouTube channel. The last stage was evaluation. This stage was carried out by observing the public's response to the profile video. Positive responses are expected to further introduce BSFLY in the broader community and increase public awareness of the importance of waste management in their environment.

3. Results and discussion
According to the development research approach, there are several phases that must be carried out by the researchers. These phases are described by the researchers in accordance with the Analysis, Design, Development, Implementation, and Evaluation (ADDIE) \([14,15]\) stages as follow:

3.1. Analysis
Prior to the research, BSFLY had marketed its products through several media and platforms but the results were not optimal. After analysis process in several FGDs and online forums, it was found that the media that BSFLY used had not been able to provide a clear description regarding BSFLY for the public. From this finding, the use of audio-visual-based profile video media was selected to comprehensively explain the BSFLY profile and educate the public about the way to use BSF larva bioconversion to overcome organic waste problem.

3.2. Design
At the design stage, the media was designed according to a specific target market. In this case, the target of BSFLY market is villages in Central Java, especially the rural areas. This is in accordance with BSFLY's mission to make all villages able to independently manage their waste. The success of such mission is expected to bear positive impacts on the local economy and the environment.

3.3. Development
At this stage, the media began to be created according to the video production method, namely:
- Script Development
  The narrative contains the history and background of BSFLY establishment, vision & mission, types of products and services, as well as information about Bioconversion Technology.
- Pre-production was the stage where all materials related to the production of the video profile were prepared, such as funding, crew, production equipment, licensing, talents, and scheduling.
- Production was the stage of taking pictures and sound according to the predetermined script.
- Post-production was the stage of compiling and editing images, sound, animation, and text effects.
- Distribution was the stage where the final post-production video is distributed to the selected media. The steps of bioconversion technology that would be included in the video are shown in figure 1. Figure 2 shows some scenes of the created profile video.

![Figure 1. Bioconversion technology flow (Source: https://bsfly.id/)](https://bsfly.id/)
Figure 2. Profile video of BSFLY (Source: https://www.youtube.com/watch?v=Kyp6rduAfx0)

3.4. Implementation
The implementation stage was the stage in which the media video profile was widely published through social media platforms and YouTube channel owned by BSFLY. Figure 3 show the BSFLY YouTube page where the profile video and its description are displayed.

Figure 3. Profile video of BSFLY on YouTube (Source:https://www.youtube.com/watch?v=Kyp6rduAfx0).

3.5. Evaluation
The Profile Video on BSFLY YouTube display page gained fairly positive responses from the viewers. This shows that the video is well received. In addition, the public's interest in the use of BSF Larva for Bioconversion to overcome organic waste problem is also increasing. One of the indicators is that, until mid-2021, many farmer groups and villages had asked BSFLY to provide training on how to utilize BSF
Larvae for Bioconversion. In addition, with a promotional video that can reach a wider target, BSFLY is increasingly recognized and even won the second-best start-up event at the Hetero for Central Java Start-ups event in Semarang, Central Java in April 2021.

4. Conclusion

Based on the discussion above, it can be concluded that BSFLY profile video is an effective medium to promote BSFLY products and services. In addition, the profile video can also be used to educate the public about using BSF Larva Bioconversion to overcome organic waste problem. This is expected to bear a positive impact on BSFLY development in the future. The more advanced the pilot business is, the more benefits will be given to the community. The organic waste problem can be overcome independently by the people, either through individual or group management. Thus, in accordance with Regent Regulation Number 68 of 2018, the aspiration of Boyolali Regent to achieve a Waste-Free Boyolali in 2025 can be achieved with a community-based waste management model.

References
[1] Tim Publikasi Kata Data 2019 Menuju Indonesia Peduli Sampah https://katadata.co.id/timpublikasikatadata/infografik/5e9a4c4a336e0/menuju-indonesia-peduli-sampah
[2] Kementerian Lingkungan Hidup dan Kehutanan 2019 Gerakan Nasional Pilih Sampah Dari Rumah Resmi Diluncurkan https://www.menlhk.go.id/site/single_post/2379
[3] Peraturan Pemerintah Republik Indonesia Nomor 27 Tahun 2020 Tentang Pengelolaan Sampah Spesifik http://jdh.menlhk.co.id/uploads/files/PP_Nomor_27_Tahun_2020_menlhk_06222020120956.pdf
[4] Suharsih 2021 71 Persen Sampah Boyolali Belum Tertangani https://www.solopos.com/71-persen-sampah-boyolali-belum-tertangani-940155
[5] Baharuddin B 2018 IOP Conference Series: Materials Science and Engineering. 306 12020
[6] Januszewski A and Molenda M 2008 Educational Technology: A Definition With Commentary (New York: Lawrence Erlbaum Associates)
[7] Artman N 2020 Exploration in Media Ecology 19 371–80
[8] Costa-Sánchez C 2017 Commun. Soc. 30 17–38
[9] Sedej T 2019 J. Int. Bus. Entrep. Dev. 12 37–48
[10] Moe W W and Schweidel D A 2017 J. Prod Innov Manag. 34 697–702
[11] Irfan A, Rasli A, Sami A and Liaquat H 2017 Adv. Sci. Lett. 23 8728–31
[12] Wan F and Ren F 2017 J. Electron Commer. Res. 18 288–302
[13] Reyna J, Hanham J and Meier P 2018 E-learning Digit Media 15 36–52
[14] Muruganantham G 2015 Int. J. Appl. Res. 1 52–4
[15] Dick W, Carey L and Carey J O 2015 The systematic design of instruction 8th ed. (Boston: Pearson) p 420