

Leveraging Motion Graphic-Based Educational Videos to Disseminate Less Waste Principles Among Wanadri Mountaineering School (SPGW) Students

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Abstract

The implementation of Less Waste principles in mountaineering activities requires educational media that can communicate environmental messages in a concise, relevant, and engaging manner. At the Wanadri Mountaineering School (SPGW), Less Waste principles have been incorporated into educational activities; however, the delivery of the material remains predominantly theoretical and text-based, creating a communication gap between existing content and participants' practical experiences. This community service program aimed to support the dissemination of Less Waste principles among SPGW students through contextualized visual communication media. The program was implemented through four stages: identification of partner problems and needs, formulation of an intervention strategy and development of educational media, implementation of educational outreach, and evaluation of participants' responses. A motion graphic-based educational video entitled "Implementing Less Waste Principles in Mountaineering" was developed to present practical waste-reduction behaviors, including the use of refillable bottles, reusable bags and food containers, reduction of wet wipe consumption, waste management, and carrying personal waste back from the mountain. The intervention was delivered through material presentation, video screening, question-and-answer sessions, and group discussions. Evaluation results showed a positive response, with an overall mean score of 4.46 (89.2%), categorized as Very Good. Visual attractiveness received the highest score of 4.60 (92.0%), followed by perceived usefulness at 4.50 (90.0%). These findings indicate that contextualized visual communication can serve as a useful complementary medium for supporting Less Waste education in the SPGW learning context. However, further evaluation is required to determine its long-term influence on participants' actual waste-reduction behavior during mountaineering activities.

Keywords: Motion Graphics, Environmental Education, Less Waste.

1 INTRODUCTION

Mountain climbing activities in Indonesia have continued to develop as a form of recreation and outdoor activity, particularly among younger generations [1]. The increasing number of mountain climbing activities has also raised environmental concerns, particularly regarding waste generated during hiking and camping. Plastic and other consumption-related waste may accumulate along hiking trails and in camping areas, potentially affecting the sustainability and cleanliness of mountain ecosystems [2]. This condition demonstrates that the development of mountain climbing activities needs to be accompanied by efforts to strengthen climbers' environmental awareness and responsible practices. One relevant approach is the application of the Less Waste principle, which emphasizes reducing waste

generation through responsible choices before, during, and after mountain climbing activities.

Wanadri, an organization engaged in outdoor activities, places emphasis on exploration, conservation, and safety education in natural environments. This commitment is implemented, among other initiatives, through the Wanadri Mountaineering School (Sekolah Pendaki Gunung Wanadri/SPGW), which provides mountaineering education for participants aged 18–28 years [3]. In addition to developing technical mountaineering competencies, SPGW incorporates environmental awareness and responsible outdoor ethics into its educational activities [4]. One of the programs introduced to participants is the Less Waste principle, which provides knowledge and guidance on reducing waste generated during mountaineering activities [5]. The principle is applied through practical actions, including planning and preparing equipment before



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climbing, reducing the use of single-use plastic packaging, using reusable containers, and managing personal waste responsibly [6].

Although the Less Waste principle has been incorporated into SPGW educational activities, its implementation still faces challenges at the participant and communication levels. The identification of partner conditions indicates that single-use products, including plastic bottles and plastic bags, are still observed during mountaineering activities, while participants' awareness of managing and carrying back their personal waste needs to be strengthened [7]. These conditions indicate a gap between the environmental messages delivered through the program and their practical application during mountaineering activities. In addition, Less Waste materials have predominantly been delivered through theoretical explanations, text-based materials, and static presentation slides. Such media provide information but offer limited opportunities to visualize concrete waste-reduction practices in situations directly related to mountaineering [8], [9]. The partner also does not yet have a dedicated visual educational medium specifically developed to support the delivery of Less Waste principles within the SPGW learning context.

The identified conditions indicate that SPGW requires an educational communication approach that can bridge the gap between Less Waste concepts and their practical application in mountaineering activities. Environmental education is more meaningful when information is communicated in ways that are relevant to the characteristics, experiences, and learning needs of the target audience [10], [11]. In the SPGW context, participants aged 18–28 years are closely associated with outdoor and adventure activities and are accustomed to consuming digital visual content, including short videos and infographics [12], [13]. Therefore, the partner requires an educational medium that can translate Less Waste principles into concrete, concise, and contextually relevant examples of behaviour that participants can recognize and apply before, during, and after mountain climbing activities.

To address this need, the community engagement program developed an educational video as a supporting medium for the SPGW Less Waste learning activities. The video was developed using motion graphics and visual storytelling to translate abstract environmental messages into concrete situations encountered during mountaineering. The content presents practical alternatives to common single-use practices, such as replacing disposable plastic bottles with refillable bottles, reducing the use of plastic bags through reusable bags, using reusable food containers, minimizing unnecessary wet-wipe consumption, managing waste appropriately, and carrying personal waste back from the mountain. The video was subsequently implemented through an interactive educational session involving

material delivery, video screening, question-and-answer activities, and group discussion. Thus, the media was not intended to replace the existing SPGW program, but to complement it by providing a more contextual and visually accessible way of communicating Less Waste practices.

The contribution of this community engagement program lies not in the use of motion graphics as a new technology, but in the contextualization of Less Waste educational content to the specific needs of mountaineering education at SPGW. The developed medium integrates environmental messages with situations, equipment, habits, and decision-making encountered by participants during mountain climbing activities. This contextualization enables Less Waste principles to be communicated through examples that are directly connected to participants' experiences rather than through general environmental messages alone. From a visual communication design perspective, the program therefore contributes a partner-oriented communication solution that translates an existing environmental education program into a context-specific visual learning medium. The resulting media is expected to strengthen the delivery of Less Waste messages, support participant understanding, and provide SPGW with a reusable educational resource for future learning activities.

Based on these partner conditions and identified needs, this community engagement program aimed to strengthen the dissemination of Less Waste principles among SPGW students aged 18–28 years through a context-specific educational video. The program focused on addressing the communication gap between existing Less Waste materials and their practical application in mountaineering activities by developing and implementing a visual learning medium tailored to the characteristics of SPGW participants. The activity involved partner needs identification, development of the educational medium, implementation through interactive outreach, and evaluation of participants' responses to the developed media. Through this approach, the program sought to support SPGW's existing environmental education efforts and provide a practical and reusable communication resource for promoting more responsible waste-management practices in mountain climbing activities.

2 METHODS

This community engagement program employed a participatory approach that integrated partner needs identification, intervention development, implementation, and evaluation. The approach was designed to ensure that the intervention responded to the actual communication needs of the Wanadri Mountaineering School (SPGW) and was relevant to the

characteristics of its participants. The program consisted of four main stages:

- 1) Identification of partner problems and needs;
- 2) Formulation of an intervention strategy and development of contextualized educational media;
- 3) Implementation of the educational intervention with SPGW participants; and
- 4) Evaluation of participants' responses to the developed media. These stages were connected sequentially, with the findings from each stage informing the subsequent stage.

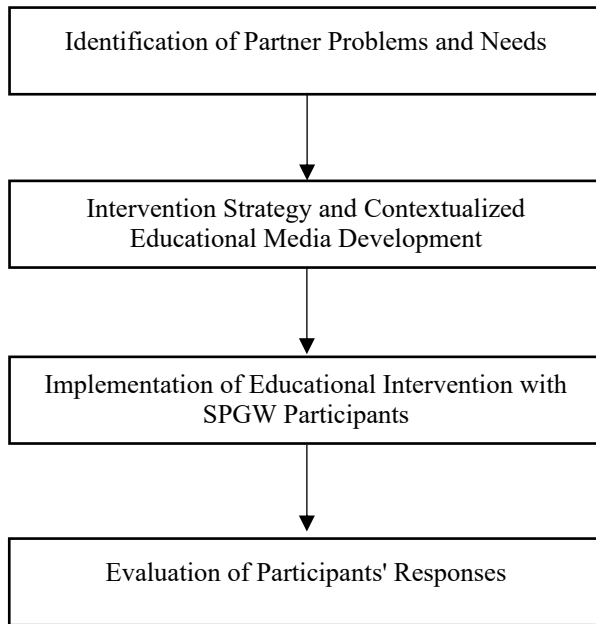


Figure 1. Implementation phases of the community engagement project.

2.1 Partner Needs Identification

The first stage focused on identifying the partner's problems, needs, and existing conditions related to the delivery of Less Waste education at SPGW. Data were collected through observation, interviews, questionnaires, and a literature review. Interviews were conducted with the Secretary of Wanadri, the Head of the Wanadri Mountaineering School (SPGW), and Wanadri members to obtain information regarding the implementation of the Less Waste program, existing educational content, participant characteristics, and the need for more effective educational communication media. Observations were conducted at the Wanadri secretariat to understand the learning context and implementation of SPGW programs. Questionnaires were distributed to SPGW alumni to obtain information regarding participants' comprehension of Less Waste materials, learning experiences, and preferences for educational media.

Secondary information was obtained from books, scientific journals, organizational documentation, and references related to visual communication design, environmental education, Less Waste principles, and communication strategies.

The partner was involved primarily in the identification of program conditions, clarification of existing Less Waste educational practices, provision of organizational and participant information, and support for the implementation of the educational activity. Information obtained from Wanadri representatives and members was used to determine the communication gap that needed to be addressed and to establish the content priorities of the intervention. During implementation, the partner supported the delivery of the educational session, while SPGW participants took part in the video screening, question-and-answer session, and group discussion. This involvement positioned the partner not only as the recipient of the resulting media but also as a source of contextual information and a supporting actor in the implementation of the community engagement program.

2.2 Intervention Strategy

The findings from the partner needs identification were used to formulate an intervention strategy. STP analysis was employed as a supporting tool to clarify the characteristics of the intended participants and to ensure that the educational communication was appropriate for the SPGW context. Segmentation considered demographic, psychographic, and behavioral characteristics. The primary target consisted of SPGW students aged 18–28 years who are interested in outdoor and adventure activities and are accustomed to consuming digital visual content. Based on these characteristics, the educational media was positioned as a communicative, informative, and practical resource that complements the existing Less Waste learning activities at SPGW.

SWOT analysis was subsequently used as a supporting analytical tool to identify internal and external considerations relevant to the implementation of the educational intervention. The analysis considered the strengths and weaknesses of the existing Less Waste educational process as well as opportunities and challenges associated with delivering the material to SPGW participants. The resulting considerations were used to determine the priority messages, communication approach, and media characteristics. Thus, STP and SWOT functioned as supporting tools for translating the partner's identified needs into an appropriate educational intervention rather than as independent objectives of the community engagement program.

2.3 Development and Implementation of the Intervention

The intervention was developed in the form of a short educational motion graphic video that served as a supporting medium for SPGW's Less Waste learning activities. The development process included identification of key messages, scriptwriting, storyboarding, visual illustration, motion animation, video editing, and final refinement. The content was structured around practical Less Waste behaviours that are directly relevant to mountaineering activities. A visual storytelling approach was used to present these behaviours through concise language, contextual illustrations, and a systematic narrative flow. Supporting communication media, including posters, tote bags, tumblers, and lunch boxes, were also developed to reinforce the Less Waste messages beyond the video presentation.

The central design consideration was contextualization. Existing Less Waste messages were translated into situations and behaviours associated with mountaineering activities, including reducing single-use products, using reusable containers, managing personal waste, and carrying waste back from the mountain. The media was therefore developed not to introduce a new environmental concept, but to provide a context-specific visual communication resource that could bridge existing Less Waste knowledge with practical situations encountered by SPGW participants.

The developed media were implemented in an educational outreach activity involving SPGW students. The intervention combined the delivery of Less Waste principles with the screening of the educational video. After the screening, participants were involved in a facilitator-led question-and-answer session and group discussion focusing on the application of Less Waste practices in mountaineering activities. This implementation stage was intended to connect the visual messages presented in the media with participants' practical experiences and to provide an opportunity for participants to clarify information and discuss its application in their own activities.

2.4 Evaluation

The final stage involved an evaluation of participants' responses to the educational media after the outreach activity. Evaluation data were collected through a questionnaire and participant feedback. The questionnaire assessed five dimensions: material clarity, visual appeal, information delivery quality, message comprehension, and perceived usefulness of the video as a medium for communicating Less Waste principles. Each aspect was assessed using a five-point rating scale, with higher scores indicating more positive participant

responses. The evaluation was conducted after the educational intervention and was used to assess the acceptance and perceived usefulness of the developed media.

The evaluation data were analyzed descriptively by calculating the mean score for each assessment dimension and converting the scores into percentages to facilitate interpretation. The percentage score was calculated by comparing the obtained mean score with the maximum possible score and multiplying the result by 100%. The resulting values were interpreted to describe the level of participant acceptance of the educational media. The evaluation was intended to assess immediate participant responses and perceived usefulness of the intervention and was not designed to measure long-term behavioural change.

3 RESULTS AND DISCUSSION

3.1 Results of Partner Problem and Needs Identification

The identification of partner problems and needs was conducted as the initial stage of the community engagement program to determine the main challenges faced by the Wanadri Mountaineering School (SPGW) in delivering Less Waste education. Data were obtained through observation, interviews, questionnaires, and literature review. The identification focused on four aspects: the implementation of Less Waste education, participants' waste-related practices, existing learning media, and the characteristics and communication preferences of SPGW participants. The findings were subsequently used to determine the intervention strategy and the characteristics of the educational media developed for the partner.



Figure 2. Online interview with the Head of the Wanadri Mountaineering School (SPGW).

The identification findings showed that Less Waste principles had already been incorporated into SPGW environmental education. The content addressed waste reduction from the preparation stage through mountain climbing activities, particularly by reducing single-use products and encouraging the use of reusable containers and equipment. However, the implementation

of these principles still faced practical challenges. The use of single-use items, including plastic bottles and plastic bags, was still observed during climbing activities, indicating that the existing educational intervention had not yet fully translated environmental messages into consistent waste-management practices.

A second problem concerned the delivery of Less Waste information. The existing instructional materials were predominantly theoretical and presented through text-based materials or static presentation slides. Consequently, the information was not sufficiently contextualized through concrete examples of waste-related practices during mountain climbing. The needs identification also indicated that SPGW did not yet have a dedicated visual educational medium specifically developed to support the delivery of Less Waste principles. This finding established the need for a medium capable of translating existing educational content into concrete and context-specific messages.

The participant mapping further showed that SPGW students were aged 18–28 years and had strong interests in outdoor activities and adventure. The participants were also accustomed to digital visual content, including short videos and infographics. These characteristics indicated that an audiovisual medium could provide a more relevant format for presenting Less Waste information. Therefore, the intervention was directed toward the development of a concise visual educational medium that connected environmental messages directly with participants' mountaineering activities.

Based on the results of Partner Problem and Needs Identification are summarized in Table 1.

Table 1. Identified Partner Problems and Program Needs

Identified Problem/Condition	Finding	Program Need
Less Waste materials	Less Waste content is already integrated into SPGW education	Existing content needs to be communicated through more contextualized examples
Learning media	Instruction relies predominantly on text and static slides	A dynamic audiovisual medium is needed
Material delivery	Information tends to be theoretical	Practical behaviors need to be visualized
Participant characteristics	Participants are aged 18–28 and interested in outdoor activities	Language and visuals need to be relevant to young mountaineers
Waste-use practices	Single-use products are still observed	Messages should encourage practical waste-reduction actions

Identified Problem/Condition	Finding	Program Need
Dedicated media	No specialized Less Waste visual medium is available	A dedicated educational video is needed
Information distribution	Participants are accustomed to digital media	The medium should be suitable for digital dissemination

Based on these findings, the core problem was not the absence of Less Waste content within SPGW, but the gap between the existing educational content and the communication format used to deliver it. The partner therefore required a contextualized educational medium that could translate theoretical Less Waste information into concrete and relevant actions for mountain climbing activities. This finding became the basis for formulating the intervention strategy and developing the educational media.

3.2 Intervention Strategy and Contextualized Educational Media Development

3.2.1 Intervention Strategy

Based on the identified partner problems and needs, an intervention strategy was formulated to ensure that the educational media addressed the specific characteristics and learning requirements of SPGW participants. The strategy combined audience segmentation and positioning through the Segmentation, Targeting, and Positioning (STP) approach with a SWOT analysis of the existing educational context. Rather than functioning as separate program stages, STP and SWOT were used as supporting analytical tools for determining the target audience, communication direction, message priorities, and media characteristics.

The STP analysis identified SPGW students aged 18–28 years as the primary target audience because they represent the direct participants of the partner's educational program and are involved in mountain climbing activities. The audience was characterized by interests in outdoor activities and environmental issues, as well as familiarity with digital visual content. Based on these characteristics, the educational media was positioned as a concise, informative, practical, and visually oriented learning medium that complements the existing Less Waste content at SPGW. The secondary relevance of the media extends to young mountaineers and nature-oriented communities with similar characteristics.

The SWOT analysis identified organizational experience and credibility, participant interest in mountaineering, and access to digital communication platforms as important strengths and opportunities. At the same time, limited dedicated visual media, limited instructional time, and the persistence of single-use

product habits were identified as important weaknesses and challenges. These findings indicated that the intervention needed to provide concise, visually engaging, and context-specific educational content that could complement existing instructional activities.

Table 2. SWOT Analysis Supporting the Intervention Strategy

Factor	Analysis Results
Strengths	1. Wanadri possesses extensive experience in outdoor activities. 2. Wanadri enjoys high credibility and trust among nature enthusiasts and mountaineers. 3. SPGW participants demonstrate a strong interest in mountaineering and environmental conservation. 4. Wanadri has effectively utilized social media platforms, such as Instagram and YouTube, for information dissemination.
Weaknesses	1. Previous instructional delivery lacked detailed coverage of "Less Waste" principles. 2. Limited time allocated for material delivery necessitates highly efficient and effective media. 3. There is a lack of dedicated visual media specifically designed to support the "Less Waste" campaign at SPGW.
Opportunities	1. Rising environmental awareness among the younger generation. 2. The increasing trend and demand for visual educational content on digital platforms like YouTube, Instagram, and TikTok. 3. Strong support from nature enthusiast communities that align with "Less Waste" principles.
Threats	Persistent habits of using single-use packaging may hinder the consistent implementation and adoption of "Less Waste" principles.

The strengths identified indicate that the media development project possesses a strong foundation, bolstered by organizational credibility and a clear alignment between participant characteristics and the environmental issues addressed. Conversely, the primary weakness lies in the current lack of dedicated communication media specifically tailored to convey 'Less Waste' principles. This gap underscores the necessity for developing specialized educational videos.

Regarding opportunities, the rising environmental awareness among the younger generation, coupled with the proliferation of visual educational content, provides significant avenues for expanding message dissemination via digital platforms. On the other hand, the persistent use of single-use products remains a major challenge in fostering behavioral change. These factors are consistent with the SWOT analysis findings, which specifically delineate

the strengths, weaknesses, opportunities, and threats relevant to the program.

Based on the SWOT findings, a Weaknesses–Opportunities (WO) strategy was selected to address the limitations of existing instructional media by utilizing the growing relevance of visual educational content. The identified weaknesses included insufficiently detailed instructional content, limited time for material delivery, and the lack of dedicated visual media. These limitations were considered in relation to several opportunities, namely rising environmental awareness among the younger generation, the increasing trend of visual educational content on social media, and the availability of digital platforms for media distribution. Therefore, the WO strategy focused on developing concise, structured, and practical educational videos using accessible visual language, practical examples, and content that could be used both during SPGW instructional sessions and through digital platforms. The relationship between the identified weaknesses, available opportunities, and resulting strategies is presented in Table 3.

Table 3. Strategic outcomes of the SWOT analysis

Weaknesses	Opportunities	Strategies
Insufficiently detailed instructional content	Rising environmental awareness among the younger generation	Developing more structured and comprehensive educational videos using simplified visual language.
Limited time for material delivery	Increasing trend of visual educational content on social media	Creating concise, high-impact, and interactive videos.
Lack of dedicated visual media	Availability of digital platforms for media distribution	Developing educational video media suitable for both instructional use and digital dissemination.

As presented in Table 3, the WO strategy translates the identified weaknesses and opportunities into three complementary strategic directions. First, the limited detail of the existing instructional content is addressed by developing more structured and comprehensive educational videos using simplified visual language. Second, the limited time available for material delivery is addressed through concise, high-impact, and interactive video content. Third, the lack of dedicated visual media is addressed by developing educational videos that can function both as instructional media during SPGW sessions and as digital content for broader dissemination. These strategies provide a direct link between the partner's identified needs and the proposed educational intervention. Consequently, the SWOT findings serve as a strategic foundation for the subsequent media design phase, particularly in determining the content structure, visual approach,

duration, interactivity, and distribution format of the educational video.

3.2.2 Contextualized Educational Media Development

Based on the intervention strategy, the primary educational medium developed was a short video entitled "Implementing Less Waste Principles in Mountaineering." The media was specifically contextualized to SPGW participants and mountain climbing activities rather than developed as a generic environmental education video. The content translated Less Waste principles into practical situations that participants may encounter before, during, and after mountain climbing activities.

3.2.3 Message Concept

The core message was formulated around the principle that mountain conservation begins with individual actions. The Less Waste principles were translated into practical messages concerning refillable water bottles, reusable bags, tote bags or dry bags, personal food containers, reduced use of wet wipes, appropriate waste management, and carrying personal waste back after climbing. Each message was connected to an expected practical action, enabling the educational content to move beyond general environmental information toward behaviors relevant to mountain climbing activities.

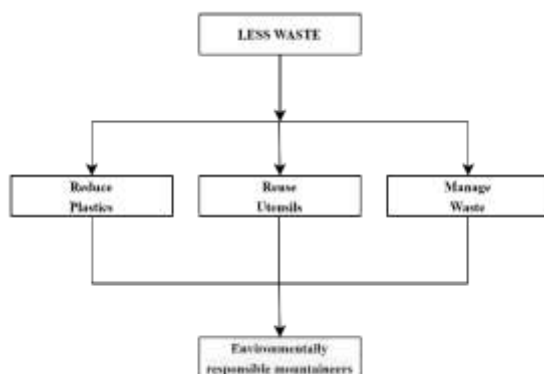


Figure 3. Core message concept of 'Less Waste' education for Wanadri Mountaineering School (SPGW) students.

Building upon the formulated message concept, each 'Less Waste' principle is translated into specific educational messages designed to foster more environmentally responsible behavior among mountaineers. The mapping of the relationship between the 'Less Waste' principles, the messages conveyed, and the intended behavioral outcomes is detailed in Table 4.

Table 4. Contextualized Less Waste Messages and Intended Actions.

No.	Less Waste Principle	Educational Message	Intended Behavioral Outcome
1	Using refillable water bottles	Minimize the consumption of single-use plastic bottles	Reduction of plastic waste
2	Minimizing plastic bag usage	Transition to reusable bags for packing	Reduction of packaging waste
3	Utilizing tote bags or dry bags	Carry equipment in reusable containers	Promoting sustainable mountaineering practices
4	Using personal food containers	Avoid single-use food packaging	Minimizing food-related waste
5	Minimizing wet wipe usage	Opt for reusable alternatives	Reduction of non-organic waste
6	Managing organic waste	Segregate waste by category at the source	Facilitating effective waste management
7	Carrying back personal waste	"Leave No Trace" begins with individual responsibility	Preserving mountain cleanliness



Figure 4. Visual representation of the 'Replacing Plastics with Tote Bags or Dry Bags' message concept in the 'Less Waste' educational video.

3.2.4 Visual and Narrative Development

Based on the partner needs assessment and the formulated intervention strategy, the Less Waste messages were translated into a visual and narrative format that was relevant to mountain climbing activities. The development focused on presenting environmental information through concrete situations and practical actions that could be readily associated with the experiences of SPGW participants. Thus, the visual approach was not intended merely to enhance the aesthetic appearance of the media, but to facilitate the communication of Less Waste principles in a context that was familiar to the target participants.

The narrative was structured sequentially to connect the environmental problem with practical solutions. The video begins by presenting waste-related problems associated with mountain climbing activities,

particularly the use and disposal of single-use products. The narrative then introduces the Less Waste principles as an approach to reducing such waste, followed by examples of responsible practices and reusable alternatives. The video concludes with a call-to-action encouraging participants to apply the recommended practices in their own mountain climbing activities.

The visual presentation reinforced this narrative through comparisons between single-use and reusable products commonly associated with mountain climbing. Examples included plastic bottles and reusable tumblers, plastic bags and tote bags or dry bags, and single-use food packaging and reusable food containers. These comparisons were intended to make the recommended actions immediately recognizable and relevant to participants' experiences. By presenting the alternatives in direct visual contexts, the media connected general environmental messages with practical choices that participants could implement before and during mountain climbing activities.

The combination of visual storytelling and motion graphics also enabled the Less Waste messages to be presented in a concise and sequential manner. Rather than presenting the principles as abstract environmental information, the media emphasized recognizable situations, product alternatives, and individual actions. This contextualization formed the main contribution of the intervention, as the educational content was adapted specifically to the learning needs of SPGW participants and the practical context of mountain climbing.



Figure 5. Narrative flow of the Less Waste educational video.

The narrative flow consisted of five interconnected elements: (1) the waste problem, (2) introduction to Less Waste principles, (3) examples of responsible behavior, (4) alternatives to single-use products, and (5) a call to action. The sequence was designed to establish a clear relationship between the problem of waste generation, the principles introduced, and the practical actions that participants could adopt during mountain climbing activities.



Figure 6. Selected visual scenes illustrating Less Waste practices in mountain climbing activities.

The resulting visual and narrative structure positioned the video as a contextualized educational intervention rather than simply a promotional or visual design product. The media was designed to complement the existing Less Waste learning activities at SPGW by providing concrete visual examples that could be discussed and further explained during the educational session.

3.2.5 Primary Media

The primary medium developed in this project is a short educational video with a duration of approximately 1–3 minutes, adopting a popular explanatory style similar to the Kok Bisa? format. The video is designed to present environmental education in an engaging, concise, and easy-to-understand manner. The content consists of:

- A simple narrative explaining the issue of waste generated during mountain climbing activities.
- A comparison between hikers who apply the Less Waste principles and those who do not.
- Practical tips for reducing waste before, during, and after mountain climbing activities.
- Supporting visuals in the form of mountain-climbing footage combined with simple illustrations, or alternatively, full live-action footage without animation.

The video opens with an introductory sequence featuring the Wanadri logo accompanied by the headline "Wanadri Present 2025", presented using motion graphics. This introduction is followed by a transition to the main title, "Applying the Less Waste Principles in Mountain Climbing," displayed over a landscape view of Mount Manglayang. A subtle dark overlay is applied to the background to enhance the readability and visual prominence of the title text.



Figure 7. Logo Motion



Figure 8. Video Title



Figure 9. Typographic emphasis on the term 'Waste'



Figure 10. Waste footage and typographic emphasis



Figure 11. Typographic emphasis on 'Less Waste'



Figure 12. Comparison of items before and after 'Less Waste' implementation



Figure 13. Call to Action (CTA) Typography

3.2.6 Supporting Media

To reinforce the campaign message, several supporting media were designed, including:

1. Pocket Book: Contains information on the types of waste that are biodegradable and non-biodegradable, providing practical guidance for waste management during mountain climbing activities.



Figure 14. Pocket Book Mockup



Figure 15. Pocket Book Contents

2. T-shirt: Features concise visual messages promoting environmentally responsible behavior, such as "Avoid Using Single-Use Items."



Figure 16. Mockup T-Shirt

3. Tote Bag: Designed with illustrative graphics that emphasize the Less Waste campaign, accompanied by the message "Replace Plastic Bags with a Tote Bag."



Figure 17. Mockup Totebag

3.3 Implementation of Educational Intervention with SPGW Participants

The educational intervention was implemented with students of the Sekolah Pendaki Gunung Wanadri (SPGW) as the primary target participants. The activity was designed as an integrated educational session that combined the delivery of Less Waste materials, screening of the contextualized educational video, question-and-answer activities, and group discussion. This approach was intended to complement the existing delivery of Less Waste materials at SPGW by providing participants with concrete visual examples of waste-reduction practices relevant to mountain climbing activities.

The implementation began with an opening session in which the facilitators introduced the environmental issues associated with waste generated during mountain climbing activities. This initial activity established the context for the intervention and encouraged participants to recognize the relationship between their daily consumption practices and waste generation in outdoor environments. The facilitators then delivered the basic principles of Less Waste as the foundation for understanding responsible consumption and waste management practices during mountain climbing.

The educational video was subsequently screened as the main visual component of the intervention. The video presented Less Waste principles through situations and examples related to mountain climbing activities, including the reduction of single-use plastic bottles, the use of reusable tumblers, the replacement of plastic bags with tote bags or dry bags, the use of reusable food containers, the reduction of unnecessary wet wipes, and the practice of carrying personal waste back after the activity. These visual examples were intended to translate the previously delivered principles into practical choices that participants could recognize in the context of their own mountain climbing activities.

Following the video screening, the activity continued with a question-and-answer session. Participants were given an opportunity to clarify information presented in the educational materials and video and to discuss the application of Less Waste practices in outdoor activities. This session was followed by a group discussion that encouraged participants to relate the presented principles to their experiences before, during, and after mountain climbing. The discussion also provided an opportunity for the facilitators to identify aspects of waste management that required further explanation and to reinforce the practical relevance of the recommended behaviors.

The implementation consisted of six sequential activities, as presented in Table 5.

Table 5. Implementation of the Educational Intervention with SPGW Participants

Stage	Activity	Intervention Focus
1	Opening Session	Introducing environmental issues associated with mountain climbing and establishing the context of the Less Waste program.
2	Less Waste Material Delivery	Providing fundamental knowledge about waste reduction and responsible waste management practices.
3	Educational Video Screening	Presenting contextualized visual examples of Less Waste practices and alternatives to single-use products.
4	Question-and-Answer Session	Providing opportunities for participants to clarify information presented in the educational materials and video.
5	Group Discussion	Connecting Less Waste principles with participants' experiences and practices in mountain climbing activities.
6	Closing Session	Reinforcing the key messages and encouraging participants to apply Less Waste practices in future mountain climbing activities.

The sequence of activities positioned the educational video as an integrated component of the learning intervention rather than as a standalone visual product. The combination of explanatory materials, visual presentation, questions, and discussion provided participants with opportunities to receive information, interpret practical examples, and discuss their relevance to mountain climbing activities. Thus, the intervention emphasized interaction between the educational content and the participants' existing experiences within the SPGW learning environment.

The implementation also strengthened the role of the partner as an active participant in the educational process. SPGW provided the learning context and participants, while the intervention introduced contextualized educational media that complemented the existing Less Waste learning materials. Through the question-and-answer and discussion sessions, participants were not positioned merely as recipients of information but were encouraged to engage with the content and consider its practical application in their activities.

Overall, the intervention addressed the communication gap identified during the partner needs analysis. Less Waste principles that had previously been delivered predominantly through theoretical or static materials were complemented by a concise audiovisual medium containing concrete examples relevant to mountain climbing. Therefore, the contribution of the intervention was not the introduction of motion graphics as a new technology, but the contextualization and integration of visual communication into Less Waste education at SPGW, enabling environmental messages to be presented in a form that was directly connected to participants' mountain climbing experiences.

3.4 Evaluation of Participants' Responses

The evaluation was conducted to assess participants' responses to the Less Waste educational intervention, particularly their perceptions of the clarity, visual presentation, delivery, message understanding, and usefulness of the educational media. The evaluation was conducted after the educational intervention and focused on participants' experiences with the contextualized educational video as an integral component of the Less Waste learning session. A five-point response scale was used, with higher scores indicating more positive participant responses toward the educational media.

Five aspects were assessed: material clarity, visual attractiveness, quality of information delivery, message understanding, and perceived usefulness. These aspects were selected to assess whether the educational media was able to communicate Less Waste information clearly, present the messages in an engaging visual form, support participants' understanding, and provide useful information relevant to mountain climbing activities. The assessment indicators are presented in Table 6.

Table 6. Evaluation Aspects and Assessment Indicators of Participants' Responses

Evaluation Aspect	Assessment Indicator
Material Clarity	Participants' ease of understanding the Less Waste information presented in the educational video.
Visual Attractiveness	Participants' level of interest in the video's visual presentation, animation, and overall appearance.
Quality of Information Delivery	The educational video's ability to communicate information in a clear, systematic, and coherent manner.
Message Understanding	Participants' ability to understand the key messages conveyed in the educational video.
Perceived Usefulness	Participants' perceptions of the educational video's usefulness as a medium for supporting the delivery of Less Waste principles.

The results of the participant response evaluation are presented in Table 7.

Table 7. Evaluation Results of Participants' Responses to the Educational Media

Evaluation Aspect	Mean Score	Percentage	Interpretation
Material Clarity	4.45	89.0%	Very Good
Visual Attractiveness	4.60	92.0%	Very Good
Quality of Information Delivery	4.40	88.0%	Very Good
Message Understanding	4.35	87.0%	Very Good
Perceived Usefulness	4.50	90.0%	Very Good
Overall Average	4.46	89.2%	Very Good

The evaluation results show that the educational media received a very good overall response, with an average score of 4.46 or 89.2%. All five evaluated aspects were classified as Very Good, indicating that participants generally responded positively to the contextualized educational media used during the Less Waste intervention. The results suggest that the media was perceived as clear, visually engaging, understandable, and useful within the SPGW learning context.

The highest score was obtained for Visual Attractiveness, with a mean score of 4.60 (92.0%). This result indicates that participants responded particularly positively to the visual presentation of the educational video. The finding supports the intervention strategy of using contextualized visual communication to present Less Waste principles through concrete situations and comparisons associated with mountain climbing activities. The visual representation of alternatives to single-use products, such as reusable tumblers, tote bags or dry bags, and reusable food containers, provided recognizable examples that were directly connected to participants' activities.

The Perceived Usefulness aspect obtained the second-highest score, with a mean of 4.50 (90.0%). This result indicates that participants perceived the educational video as useful for supporting the delivery of Less Waste principles. The usefulness of the media can be understood in relation to its role as a complementary learning resource within the existing SPGW educational activities. Rather than replacing the delivery of Less Waste materials, the video provided a concise audiovisual representation of the principles and their practical application in mountain climbing contexts.

The Material Clarity aspect received a mean score of 4.45 (89.0%), indicating that participants generally found the information presented in the video easy to understand. Meanwhile, Quality of Information Delivery obtained a mean score of 4.40 (88.0%), suggesting that the information was perceived as being communicated in a clear and coherent manner. These findings indicate that the contextualization of Less Waste information into a short audiovisual format was appropriate for supporting the communication of environmental messages during the educational session.

The lowest score was obtained for Message Understanding, with a mean of 4.35 (87.0%). Although this was the lowest among the five aspects, it remained within the Very Good category. This result indicates that the participants generally understood the key messages presented in the educational media. At the same time, the relatively lower score compared with the other aspects suggests that visual attractiveness alone does not necessarily guarantee complete understanding of all educational messages. This finding reinforces the

importance of combining visual media with explanatory activities, question-and-answer sessions, and group discussions, as implemented in the intervention.

The overall evaluation therefore indicates that the educational intervention was well received by the SPGW participants. The results provide evidence that the contextualized educational video was able to complement the existing Less Waste learning activities by presenting environmental information through visual examples that were relevant to mountain climbing experiences. The combination of audiovisual presentation and direct interaction through questions and discussion also created opportunities for participants to clarify information and relate the presented principles to their own activities.

From a community service perspective, the findings demonstrate that the intervention addressed the communication problem identified during the partner needs analysis. The identified gap was not the absence of Less Waste content at SPGW, but the need for a more contextualized and visually communicative way of presenting the existing principles. The participant response results indicate that this intervention was positively received and perceived as useful within the existing learning environment. Thus, the contribution of the activity lies in adapting Less Waste education to the specific context of mountain climbing and SPGW participants through contextualized visual communication, rather than in presenting motion graphics itself as a technological novelty.

However, the results should be interpreted within the scope of the evaluation instrument. The 89.2% overall score represents participants' positive perceptions and responses to the educational media and does not directly demonstrate sustained behavioral change. The evaluation did not include a pre- and post-intervention comparison, longitudinal observation, or direct measurement of participants' waste-reduction behavior. Therefore, it would not be appropriate to conclude that the intervention had definitively changed participants' behavior based solely on the questionnaire results. Instead, the findings provide an initial indication of the media's acceptance, perceived usefulness, and ability to support the delivery of Less Waste messages.

The positive participant responses nevertheless provide a basis for the continued use of the educational media within SPGW activities. Because the video was developed as a supporting educational resource, it can be reused in subsequent Less Waste learning sessions and combined with other educational materials and participatory activities. For future implementation, evaluation can be strengthened through pre- and post-intervention measurements, follow-up assessments, and observation of participants' waste-management practices during mountain climbing activities. Such follow-up evaluation would provide stronger evidence regarding

whether positive perceptions of the educational media are subsequently translated into consistent Less Waste practices.

Overall, the evaluation demonstrates that the contextualized educational media was well accepted by SPGW participants and effectively supported the communication of Less Waste principles within the educational intervention. The findings strengthen the role of visual communication as a complementary approach to environmental education in the context of mountain climbing, while also indicating the need for longer-term evaluation to determine the extent to which the intervention contributes to sustained behavioral practice.

3.5 Discussion

The findings of this community engagement program indicate that the main challenge faced by the Wanadri Mountaineering School (SPGW) was not the absence of Less Waste content, but the gap between the environmental principles already introduced in the educational program and the way these principles were communicated to participants. The needs identification showed that Less Waste materials had been incorporated into SPGW education, while the use of single-use products and the need to strengthen personal waste-management practices remained evident. At the same time, the existing delivery relied predominantly on theoretical explanations, text-based materials, and static presentation slides. This finding suggests that strengthening environmental education in the SPGW context requires attention not only to the substance of the message but also to the communication format through which the message is delivered. This interpretation is consistent with previous research emphasizing that environmental education and pro-environmental communication can benefit from communication approaches that are relevant to audience characteristics and supported by digital media.

The contextualized educational video developed in this program addressed this communication gap by translating existing Less Waste principles into situations that are directly associated with mountaineering activities. Rather than introducing Less Waste as a new environmental concept, the intervention connected existing principles with practical decisions such as using refillable bottles, reducing plastic bags, using reusable food containers, minimizing wet wipes, managing waste, and carrying personal waste back from the mountain. This contextualization is important because environmental messages may become more meaningful when participants can relate them to their own activities and decision-making situations. In this case, the video did not simply communicate the importance of reducing waste, but demonstrated what waste reduction could

look like in the specific context of preparing for and conducting mountain climbing activities. Previous studies have similarly indicated the potential of digital media and short-form visual content to support pro-environmental intentions and environmental communication.

The participant response results provide further support for the appropriateness of this intervention. The educational media achieved an overall mean score of 4.46 (89.2%), categorized as Very Good. The highest score was obtained for Visual Attractiveness, at 4.60 (92.0%), followed by Perceived Usefulness, at 4.50 (90.0%). Material Clarity, Quality of Information Delivery, and Message Understanding also obtained high scores of 89.0%, 88.0%, and 87.0%, respectively. These results suggest that the visual and contextual characteristics of the media were well aligned with the participants' perceptions of an appropriate educational format. The particularly high score for visual attractiveness is relevant to the intervention strategy because the video used visual comparisons and concrete representations of reusable alternatives rather than presenting Less Waste principles solely as abstract information. The finding is also consistent with research highlighting the potential of environmental information delivered through digital and visual media to support environmental knowledge, attitudes, and behavioral intentions.

The high perceived usefulness score also indicates that the video was viewed positively as a complementary educational resource rather than merely as a visual campaign product. This distinction is important for community engagement because the intervention was designed to strengthen an existing SPGW educational program rather than replace it. The implementation combined Less Waste material delivery, video screening, question-and-answer activities, and group discussion, allowing participants to connect the visual information with their own mountaineering experiences. This integrated approach is particularly relevant because the educational media was followed by opportunities for clarification and discussion. Previous research on environmental communication suggests that digital media can contribute to pro-environmental responses, but communication effects are influenced by how information is presented and experienced by the audience. Therefore, the value of the present intervention lies not simply in the production of a motion graphic video, but in its integration into an interactive educational process.

The findings also clarify the novelty and contribution of the program. Motion graphics itself cannot reasonably be considered a new technology. The contribution of this community engagement activity instead lies in the contextualization of existing Less Waste education for the specific learning needs of

SPGW participants and the practical realities of mountaineering activities. The video translated general environmental messages into context-specific choices involving equipment, packaging, consumption, and personal waste management. This approach provides a partner-oriented communication solution because it transforms existing educational content into a reusable visual learning resource that can be incorporated into future SPGW activities. In this sense, the program demonstrates how visual communication design can function as a practical component of environmental education rather than merely as an aesthetic enhancement of educational materials.

Nevertheless, the findings should be interpreted within the limitations of the evaluation design. The 89.2% score represents participants' immediate perceptions and acceptance of the educational media and should not be interpreted as direct evidence of sustained behavioral change. The evaluation was conducted after the intervention and did not include a pre- and post-intervention comparison, longitudinal follow-up, or direct observation of participants' waste-management practices. This limitation is important because positive responses to educational media do not necessarily result in consistent pro-environmental behavior. Previous research on plastic-waste reduction also demonstrates that behavioral change is influenced by multiple factors beyond information provision alone [5]. Consequently, future implementation should incorporate follow-up evaluation, behavioral observation, or pre- and post-intervention measures to determine whether the positive response to the media is translated into sustained Less Waste practices.

From a community engagement perspective, the program nevertheless provides a practical and sustainable contribution to SPGW. The developed video can be reused in subsequent educational sessions and distributed through digital platforms, while the supporting materials can reinforce the messages beyond the initial intervention. The program therefore has potential for continued implementation without requiring the educational content to be redeveloped for every session. More importantly, the intervention establishes a model in which existing environmental education content can be continuously adapted into context-specific visual communication media according to the characteristics and needs of the partner. The results therefore support the use of contextualized visual communication as a complementary strategy for strengthening environmental education among young mountaineers, while further longitudinal evaluation is needed to establish its contribution to sustained behavioral change.

4 CONCLUSION

This community service program demonstrates that the main challenge in implementing the Less Waste program at the Wanadri Mountaineering School (SPGW) was not the absence of educational content, but the need for a more contextualized and visually communicative way of delivering the existing material. The needs analysis showed that Less Waste principles had already been integrated into SPGW activities, while the delivery of information remained predominantly theoretical and text-based. In response, a motion graphic-based educational video entitled “Implementing Less Waste Principles in Mountaineering” was developed to contextualize Less Waste principles within practical mountaineering activities. The intervention combined educational material delivery, video screening, question-and-answer sessions, and group discussions, thereby involving participants in an interactive learning process.

The evaluation showed a very positive response from SPGW participants, with an overall mean score of 4.46 (89.2%), categorized as Very Good. Visual attractiveness received the highest score of 4.60 (92.0%), followed by perceived usefulness at 4.50 (90.0%), material clarity at 4.45 (89.0%), quality of information delivery at 4.40 (88.0%), and message understanding at 4.35 (87.0%). These findings indicate that the contextualized educational media was well received and perceived as clear, engaging, understandable, and useful for supporting the dissemination of Less Waste principles within the SPGW learning context.

The contribution of this program lies primarily in the contextualization of Less Waste education to the specific needs and experiences of mountaineering communities through visual communication, rather than in motion graphics itself as a technological novelty. However, the findings should be interpreted within the scope of the evaluation, as the 89.2% score reflects participants' perceptions and acceptance of the media and does not directly demonstrate sustained behavioral change. Future programs should therefore incorporate pre- and post-intervention measurements, follow-up evaluations, and direct observation of waste-reduction practices during mountaineering activities. The developed video can also be reused in subsequent SPGW learning activities and disseminated through relevant digital platforms to support the continuity and wider application of Less Waste education.

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