# The use of reflective photography in a large service-learning module

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*Abstract: The Faculty of Engineering, Built Environment and Information Technology (EBIT) at a university in South Africa presents a compulsory undergraduate course, Community-based Project (code: JCP). It entails students working at least 40 hours in the community and then reflecting on their experiences. The module's aim is for students to make a beneficial impact on a chosen section of society. It is a large-class service-learning module in which more than 1 600 students are enrolled annually. Therefore, with the JCP lecturer's approval, each group identifies a project that it will execute in the community. Students have an opportunity to solve a problem collaboratively in a community setting. They then develop self-directed learning habits through practice and reflection to address a specific community need. The research aims to investigate the value of an assignment using the Fotofeedback Method™ in a service-learning module. As a research methodology, the Fotofeedback Method™ is predominantly used in social sciences. By integrating it into a hard science context, it allows students to engage visually in a critical reflection of their learning process.*

*Using the Fotofeedback Method™'s reflective photography approach, students collected data by taking a photograph of a specific challenge they had encountered during the execution of their projects. Afterwards, they reflected on the visually captured problem and how they had resolved it. By means of a questionnaire, students critically reflected on the meaning of their problem-solving experience while viewing the visual material. The questionnaire was firstly validated by 10 groups before requesting ethical clearance. Thereafter, the students in the module were requested to complete the questionnaire and forward a photograph related to the questionnaire to the lecturer. Completion of the survey was voluntary, and 116 (29.07%) of the groups completed the survey and submitted a photograph through their group leaders. The researchers analyzed the students' feedback on their photographs of the challenges they had encountered to identify themes according to systematic problem-solving and decision-making steps to determine what the students had learnt.*

*The Fotofeedback Method™ is an acknowledged research method and is a highly flexible data-gathering tool. Photography is combined with narrative discourse related to a topic or experience. This process empowers students to experience their preservation of that moment through the photograph as a moment in time and structure their reflective thoughts. In a service-learning module, reflection plays an essential role in the educational process of student learning. The paper will discuss how the Fotofeedback Method™ can be used for critical reflection in the Community-based Project module for undergraduate students in engineering, the built environment and information technology. The study concludes that the Fotofeedback Method™ can be successfully implemented in a large-class service-learning module as an additional reflective assignment. It will give students the opportunity to critically reflect on their learning process visually.*

*Keywords: FotoFeedback method, Reflective photography, Service-learning, Reflection, Higher education*

## Introduction

Images are an essential aspect of our digital lives. With ubiquitous access to smartphones to capture moments in time, it has become easier to revisit a specific event and either share it or reflect on it. Social media access from smartphones allows users to share images with the world. Facebook indicates that 4 000 photographs are uploaded onto its links every second (Omnucore 2020). Instagram reports that 95 million photographs and videos are shared daily (Smith 2019).

Various research methods have included the incorporation of visual images as a data-collection technique. These visual methods include Photovoice (Wang and Burris 1997), photo-elicitation interviews (PEIs) (Epstein et al. 2006), participant-authored audiovisual stories (PAAS) (Ramella and Olmos 2005) and hermeneutic photography (Hagedorn 1994). Photovoice is the most replicated and established framework for participatory photography in research (Lal et al. 2012). Different names have been used to describe the participatory method and each of them emphasizes a different trait of the practice. However, the basic process of participatory photography is usually the same (Gerodimos 2018). It is a participatory research approach and involves participants taking photographs and then explaining to the researcher why they took them. This becomes part of the data collection and analysis process (Murray and Nash 2017).

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However, in 2012, Tornabene et al. (2012) developed an alternative photo-related research method, the Fotofeedback Method™ (FFM), as a qualitative image-based research methodology, which intended to increase the reflective learning of Millennials (born between 1977 and 1993) and members of Generation Z (born between 1993 and 2005). The FFM merges narrative communication and photography related to a topic or experience by combining participant-initiated photography with a written account in response to a research or evaluation inquiry (Tornabene et al. 2019; Vogelsang et al. 2008).

The FFM is especially relevant for members of Generation Z, who have grown up with instant global connectivity. This has been made possible by, among other things, wearable devices, smartphones, tablets, social media platforms and access to Wi-Fi, according to the Global Market Research and Public Opinion Specialist (Madden 2017; IPSOS MORI 2018). Members of Generation Z are content creators (Madden 2017), supported by their brain's visual development (Rothman 2016). The FFM is, therefore, an excellent participatory research method to enable participatory research in which Generation Z students participate.

The method's flexibility allows lecturers to receive feedback on various topics and ensures students' deeper learning with guided questions. The method complements Generation Z's high degree of permanent connectivity and its members' search for outstanding experiences (Turner 2015). The research process gives students the opportunity to experience a moment in time. This moment in time is preserved through a photograph. After that, students can reflect on the meaning of the topic or their experience while viewing the photograph (Tornabene et al. 2019; Vogelsang et al. 2008).

There are several criteria for the FFM. These include basic training in photography and addressing ethical issues when taking photographs, as the photographs are taken by the participants in the research and not by the researcher. The narratives about the photographs can use various formats, including feedback questionnaires, which, together with the photographs, can either be in a printed or an electronic format. A participant may or may not share their narratives, and these narratives may include personal and authentic information related to the research question (Tornabene et al. 2012). The FFM builds on the knowledge gained for qualitative inquiry forms such as journaling, focus groups and interviews (Amerson and Livingston 2014), and allows more flexibility.

An additional advantage of the FFM is its ability to be used for a wide range of topics or project questions. It can either be student- or lecturer-driven, as the students or participants take the photographs. The narratives can include a variety of content related to the focus or research question. The photographs, as well as the narratives, can be in an electronic or a printed format. The students or participants may or may not share their photographs and narratives with each other (Tornabene et al. 2012).

*The theory underpinning this research*

This FFM study underscores the theory of symbolic interaction as the theory's foundation is similar to the connotations attached to a specific photograph. The symbolic interaction theory accredits individuals for their social interactions, objects and symbols (Aksan et al. 2009). Symbolic interaction theory, subsequently, emphasizes the meaning an individual ascribes to symbols and things through and as part of their social interactions with them. Therefore, every human being has an authentic meaning-making potential in their daily social engagement (Gusfield 2003). Consequently, symbolic interactionism was created to understand society from an operational or "bottom-up" perspective. Symbolic interactionism was a movement away from perspectives that (perhaps) provided over-socialized views of the individual to the development of the individual as an independent, self-sufficient and integral part in creating their social world (Schulze 2007). In summary, it enables an authentic and dynamic research method as it includes a continuous interaction process between objects and humans and their ability to add meaning to it.

The theory of symbolic interaction as a theoretical foundation for the FFM can be utilized in exploring reflective learning in students. It provides a theoretical lens to interpret the data collected through their reflection about a topic or experience as captured through a camera lens. Through symbolic interaction theory, the principle of meaning becomes the centre of human behavior. This can be linked to the FFM, where the photographs are the principle of meaning. It reinforces the reflective process as the researchers now have a visual photograph with which to evaluate the visual data individually and explain the meaning of the data through a written account of the visual data. Above all, it can lead to a changed perspective due to revisiting the moment and deeper learning for Millennials and members of Generation Z since they relate to the world visually (Tornabene et al. 2019; Vogelsang et al. 2008).

## The Community-based Project module as a service-learning module

The Faculty of Engineering, Built Environment and Information Technology at a university in South Africa presents a compulsory undergraduate module, Community-based Project, for all undergraduate students in the faculty. The module's objectives include that a community project must impact a chosen section of society and that this society must be significantly different from the students' own background. The module aims to develop the students' personal, social and cultural values. After completing the project, students must show a willingness to serve the community and understand the social issues in South Africa. Through the module, students also have to develop various life skills that include teamwork, communication and leadership skills (Jordaan 2014).

Annually, a high number of students enroll for the module. During 2019, 1 598 students were enrolled, of which the highest percentage was second-year students. In 2019, the students preferred to do basic building and renovation projects (62.31%) and focused on pre-schools, primary and secondary schools, and non-profit organizations, including animal shelters and zoological gardens. Students also did other projects, including repairing old computers for schools (2.02%) and non-profit organizations, and teaching community members basic computer skills (5.53), mathematics and science (5.3%) or developing websites (2.01%). Other projects included developing reading corners at pre-schools, upgrading school libraries (4.52%) and assisting with various tasks at local museums (4.39%) (Jordaan and Mennega 2019).

Students attended a compulsory orientation lecture where they were briefed on the module's outcomes and the ethical issues involved when taking photographs. Students then created a group of not more than five members and identified a project with the assistance of the lecturer. During 2019, there were 442 different groups. As part of their final assessment, students had to submit a permission letter from the community partner, indicating that the photographs taken during the project's execution may be used for the student's final presentation. The letter also included permission that the videos taken may be uploaded on YouTube and whether they may be made public (Jordaan 2013).

Students do various reflective assignments on the module's outcomes on the Learning Management System (LMS). The university uses Blackboard$^{TM}$ as its LMS. As part of their final assignments, students developed a reflective report on the outcomes of their projects, uploaded a reflective video, published it on YouTube and delivered a PowerPoint presentation to the lecturer on the outcomes (Jordaan 2013).

The module's design philosophy is based on the concepts of service-learning. The service-learning educational approach entails combining the learning objectives with community service to provide a learning experience for the students, while addressing the community's societal needs (Jacoby 1996). Service-learning occurs through action and reflection. Reflection is an essential feature of service-learning programmes. Critical thinking by the student symbolizes the learning that occurred (Bringle and Hatcher 1999). The large-class, service-learning module does not provide enough interaction between the lecturer and the students to

develop critical thinking. Even though the individual reflective assignments, the group reflective report and the reflective video provide the students the opportunity to reflect on their learning experience, there are no on-site reflection opportunities. To add an assignment through the FFM will give students the opportunity to reflect on a specific point in time in the execution of their projects. This paper will discuss how the FFM can create an additional reflective opportunity for a large-class, service-learning module.

## Methodology

The methodology used is a reflective photography qualitative research technique with a voluntary research sample within the Community-based Project module. Researchers such as Harrington and Schibik (2003) indicated that reflective photography is a technique to critically reflect on a proposed topic, while Amerson and Livingston (2014) demonstrated that reflective photography is a more robust metod of self-reflection.

As part of the module's outcome, students must provide visual evidence through photographs of their project's execution. Integrating an FFM assignment is therefore a natural extension of the existing visual tasks students must complete. They must then also develop a presentation and a YouTube video for their final evaluation. All the groups enrolled in the module in 2019 were requested to take a photograph of a specific problem or challenge they encountered during their project's execution. The photo challenge assignment was not compulsory, and students submitted their photographs voluntarily. The group leader had to complete an online survey in QualtricsXM and share the group reflection on the identified problem or challenge using the guided questions. The challenges that had to be considered included problems showing stumbling blocks or challenges the students experienced in completing the project and ensuring that they delivered a quality project.

As indicated, all students were briefed on the ethical implications of taking photographs in the community. For this study, the photograph, the response to the online survey and each group's final reflective report were treated as a specific unit. The visual evidence of the photograph strengthened the narrative in the online feedback and the reports.

The research approach comprised the following steps: Ten groups were requested to complete the questionnaire. Thereafter, the two researchers addressed the issues identified and submitted the questionnaire to the faculty's Ethics Committee.

Ethical approval was received from the Ethics Committee of the Faculty of Engineering, Built Environment and Information Technology. The South African Protection of Personal Information Act, Act No. 4 of 2013 (the POPI Act), endorses the protection of personal information by public and private bodies. In specific instances, such as in research, it is necessary to give or ask for consent (RSA 2013). To ensure that the process abides by the POPI Act, students received instructions during the orientation session and the project proposal session on how to take photographs, as well as what and who to include in or exclude from their photographs. Students were made aware of the legal aspect of using a photograph without the person's consent, especially vulnerable populations such as children, providers or clients in clinical situations (Jordaan 2013). The community partners sign an informed consent form acknowledging that the photographs taken during the project may be used for the students' final reflective report and for their Vlog or YouTube video. Students also sign an informed consent form before their final presentation to give their consent that the photographs may be used on social media (if no faces of underaged children are reflected and if the community provided consent), as well as for research purposes. Understanding the ethical implication and process are vital in applying the FFM. The photographs used in this article serve as examples only and do not identify community partners or students by name.

Through the LMS used for the module, the group leaders were requested to submit the questionnaire (Table 1), as well as a photograph of a challenge they experienced during the execution of their projects. The group leaders indicated that they were aware that the

questionnaire and the photograph will be part of a research project. The questionnaire included the following questions:

Table 1: Questionnaire to the groups of the Community-based Project module of the Faculty of Engineering, Built Environment and Information Technology

| 1. | Reflect on your photograph and indicate why it was a challenge for you. |
|----|------------------------------------------------------------------------|
| 2. | Describe the photograph that you indicate as a "challenge". |
| 3. | For whom was it a "challenge" – for the community, the team or an individual? |
| 4. | Why did you identify this as a challenge? |
| 5. | When did you take this photograph (the beginning, middle or end of the project)? |
| 6. | How did you feel about the challenge? |
| 7. | Was this challenge solved? |
| 8. | How will you avoid this challenge if you could? |
| 9. | Kindly email the photograph to the lecturer. |

*Source: M. Jordaan*

The survey was voluntary and not part of the final assessment. From the 1 598 students enrolled for the JCP module, 1 503 students (94.06%) completed the module. Of the 442 groups registered for the projects, 399 groups (90.27%) completed the module. A total of 116 groups (29.07%) completed the survey on QualtricsXM and submitted a photograph. The students enrolled in the module were mainly second-year students. ATLAS.ti (Version 6.2.27, Berlin, Germany) was used to analyze the thematic content based on open coding. The software was also used to facilitate the storage and coding of the data.

Thereafter the photographs were linked to the feedback on the questionnaire The visual data (the photograph) was evaluated based on the feedback in the questionnaire, using the symbolic interaction theory, to explain the photograph's meaning. The information provided by the group leader in the questionnaire was linked to the photograph to understand the meaning the group assigned to the photograph. This stage comprised of appraisal, identification and interpretation. The researchers first studied the photographs and analyzed the content and meaning of the specific images independently. Thereafter, the researchers compared the notes and consolidated the information. Specific themes were identified within the written data. Students had to submit the photograph and state why they had identified this challenge as a problem. Their reflection on why they had decided to submit the specific photograph as part of the visual reflection of their problem assisted with this. Finally, the photographs were studied to analyze the content and meaning of the specific images submitted.

At the end of the academic year, all the students in the course could vote for the most exciting photograph submitted as a challenge. The students voted Group 168's photograph as the most interesting challenge that students had to face during their project's execution (Figure 1). The students indicated that they had to paint a roof and find a solution not to spill any paint on their clothes. Many students could identify with this painting project as similar projects were very popular during 2019.

Figure 1: Group 168 received the most votes from the JCP students
*Source: The photograph was submitted on the LMS by Group 168 of 2019*

## Findings

Each group identified a specific project that was linked to their field of study in engineering, the built environment and information technology. The group had to photograph logistical or practical issues they had to overcome to complete their project. The photographs became the principle of meaning and an additional reflective process in the execution of their projects. The identified challenges that the students submitted were mainly a group challenge that was applicable to all the group members (95.7%) and a few experienced by individual members in the team (4.3%). Most of the photographs were taken in the middle of the project (67.25%), 17.25% were taken at the beginning of the project, and 15.5% were taken at the end of the project. The students mainly reflected positively (77.58%) about the problem, as 96.5% indicated they could solve it. Group 74 reflected that "at first, the challenge was disheartening, but we realized that overcoming challenges is part of life and thus did our very best to overcome this problem".

The photographs could be divided into themes using systematic problem-solving and decision-making steps (Pokras et al. 1994). Various themes thus emerged from the research. The assignment was to identify a logistical or practical issue the students encountered during the execution of their projects. Therefore, the photographs submitted were all part of Step 1 of the problem-solving steps, where the students had to recognize a problem. The themes for the rest of the photographs could be divided into the following problem-solving steps (Priemer et al. 2020):

Step 2: Defining the problem
Step 3: Determining the cause of the problem
Step 4: Identifying, prioritizing and selecting alternatives for a solution
Step 5: Implementing a solution.

Each theme is discussed, and examples of the students' feedback and photographs are showcased. Students permitted these photographs to be shared. Figure 2 shows the distribution of the photographs according to the different themes. Most of the photographs reflected the phase in which students were defining the problem (26.8%), determining the cause of the problem (39%), identifying, prioritizing and selecting alternatives for a solution (4.9%) and implementing a solution (29.3%). Most of the students found the identified challenge at the beginning of their project and managed to solve it before continuing with the project.
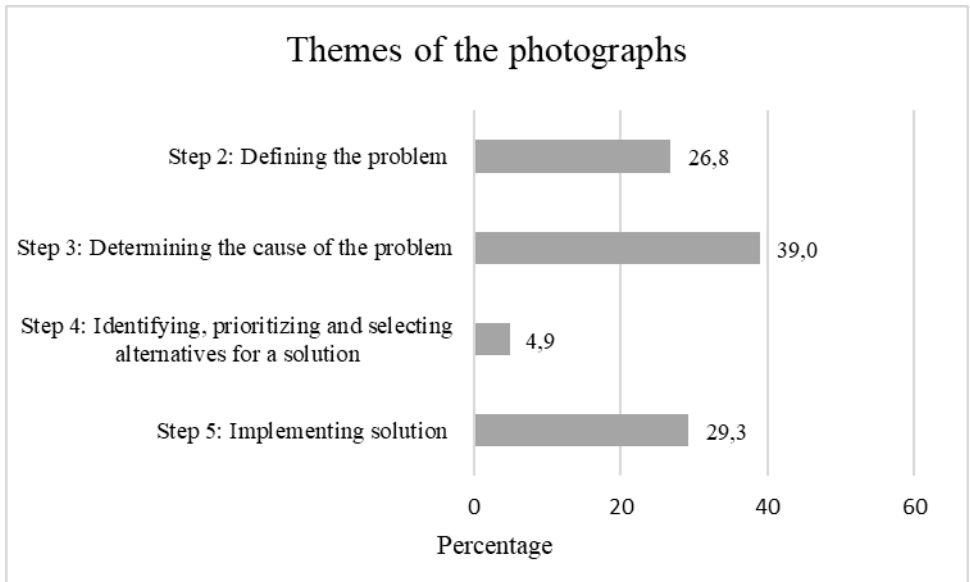
Figure 2: Themes of the photographs
*Source: M. Jordaan*

In almost every problem-solving methodology, the second step is defining or identifying the problem. It is the most important and most challenging step. The real problem must be identified and not the symptoms of the problem (Priemer et al. 2020). Group 34 lacked the tools to dig out a root (Figure 3), and Group 195 lacked the equipment to move a heavy slab (Figure 4).



Figure 3: Group 34 did not have the tools to dig out a huge root
*Source: The photograph was submitted on the LMS by Group 34 of 2019*

Figure 4: Group 195 lacked the equipment to move a heavy slab
*Source: The photograph was submitted on the LMS by Group 195 of 2019*

The following step is to determine the cause of the problem. Identifying and selecting appropriate options to address a problem should be guided by understanding its cause (Priemer et al. 2020). Group 397 spilled paint in their car as they did not put the lid back on the bucket (Figure 5), and Group 29 indicated that the members struggled to paint a sloped ceiling (Figure 6).



Figure 5: Group 397 spilled paint in the car
*Source: The photograph was submitted on the LMS by Group 397 of 2019*



Figure 6: Group 29 struggled to paint the sloped ceiling
*Source: The photograph was submitted on the LMS by Group 29 of 2019*

Students took a photograph of logistical or practical issues that they had to overcome to complete the project. Students did not need to develop new knowledge to solve the problem, but used alternative solutions to solve the problem. Students' reflection on the problem-solving step of identifying, prioritizing and selecting alternatives for a solution included a group that struggled to lift a 6.8-ton

armored vehicle. They needed to raise the armored vehicle so that they could place stands beneath it. They only had a two-ton trolley jack, which they tried to use. The jack could barely lift the front of the vehicle, and did nothing to the back, where the engine was located (Figure 7).



Figure 7: Group 120 struggled to lift a 6.8-ton armored vehicle.
*Source: The photograph was submitted on the LMS by Group 120 of 2019*

The last step of the problem-solving process is to implement a sustainable solution. Students took photographs where they implemented a solution to their problem. These photographs include Group 98, which had to improvise to find alternatives for a lack of trowels. These students used a spoon to complete the task (Figure 8). Group 228 spilled paint and had to improvise to ensure that their final project would be of a good quality (Figure 9).



Figure 8: Group 98 used a spoon for a trowel
*Source: The photograph was submitted on the LMS by Group 98 of 2019*

Figure 9: Group 228 spilled paint
*Source: The photograph was submitted on the LMS by Group 228 of 2019*

For most of the problems identified, students did not need to develop new knowledge to solve the problem, but could use existing knowledge or problem-solving skills. Students also reflected on what they had learnt from the process. Group 79 indicated that "the challenge pushed all of us to find creative ways to overcome it and get the job done, so we felt challenged by our challenge, and at the end, we had a sense of satisfaction when we were done".

Some 41.5% of the students thought that they could not avoid the challenge: Group 194 wrote that "there was no way to avoid this challenge if we wanted to renovate the wall properly so that it will last as long as possible" and Group 132 reflected that "this was an unavoidable challenge due to the fact that it was a natural occurrence in a very dry area".

The students who indicated that they could avoid the problem indicated that they had learnt from the execution of the project. Group 123 responded: "Yes, we learnt from this, and for the next nests and flysheets, we used double the amount of wax in the mold and a different construction method".

## Discussion

The study shows that the FFM can be used as an effective way for students to reflect critically on their project in a service-learning module. To add the assignment to photograph a challenge they experienced, students focused on the learning process they had to go through to complete the project. The students found the assignment exciting as it was part of an internal competition. As the theoretical foundation of the FFM, the symbolic interaction theory enables students to capture authentic perspectives that enable the group or individual to speak for themself (Lal 1995). The community engagement module provides members of Generation Z with practical learning opportunities to immediately apply what they have learnt.

In this service-learning module, an important outcome is for students to critically reflect, think about and analyze their responses to service activities. The high number of students enrolled in the module does not always provide sufficient opportunities to reflect critically. The photographs taken increased their reflection opportunities as it challenged the students to reflect and interpret the challenge they experienced during the community engagement project's

execution. The photographs and reflection symbolized the interpretation of their interactions with the environment in which they completed their community-based project. The method allowed the researcher to enable the students to become data collectors. Consequently, they demonstrated the reflection of their symbolic interactionism in a unique context as the "bottom-up" views of their engagement with objects and humans.

As the researchers did not interact with or influence the research process, they had the freedom to focus on any problem or challenge they encountered. The students had to identify the challenge while they were on-site with their community project and capture it at the specific moment they encountered the problem or challenge. The group leader had to submit a questionnaire through QualtricsXM and forward the photograph to the lecturer. QualtricsXM became the qualitative instrument to replace interviews with the students as they reflected on the whole process linked to the photograph. The photographs reflected how they solved the problems they encountered on-site. Most of the students took a photograph at the beginning of the problem-solving process. Even though the students identified the problem or challenge, they managed to solve the problem. The groups managed to work through all the steps of problem-solving on-site. The themes of the photographs could be divided into the last four steps of problem-solving, which included defining the problem, determining the cause of the problem, identifying, prioritizing and selecting alternatives for a solution, and implementing the solution. The highest percentage of photographs could be added to the theme of determining the cause of the problem.

## Limitations

Three main limitations underlay this study. Firstly, the data was collected from one service-learning module at one university, even though the module is significantly larger than other national or international modules. Secondly, the participants were voluntarily involved in the study and it was a competition, yet the latter improved the participation of the students and allowed them to be more transparent in sharing often embarrassing mistakes. The group leader submitted the questionnaire, as well as the survey, and therefore represented the views of the group. Thirdly, only one photograph was submitted per group. Although a large number of students are registered in the module annually, the study could be improved by conducting research at more than one university and by allowing students to critically reflect on either their own or other photographs submitted using an online peer evaluation system, supported by a rubric for critical reflection.

## Conclusion

One of the objectives of the Community-based Project module is that the students must provide a learning experience while addressing the community's societal needs. During the execution of the project, they experienced various challenges to complete the project. As part of a service-learning module, students are also required to reflect on their experience and what they have learnt. This article discussed the benefits of using the FFM and strategy to let students reflect on a problem or challenge identified in the execution of their community engagement project. Each group could submit a photograph through the group leader and complete the questionnaire linked to the photograph. The aim was to give the students an additional reflection opportunity in addition to their existing reflection assignments, which included a YouTube video or Vlog and a reflective report. The objective of this study was to determine if the additional reflective opportunity gave students insights into how they solved a specific challenge that they experienced during the execution of their project.

The authors also draw attention to the potential of the photographs to get students who are members of Generation Z to be more eager to do such an assignment. The students had to reflect on

the project's execution in a more in-depth manner and overcome this specific challenge to complete their projects successfully. Students mainly took the photographs at the beginning of their projects and indicated that they could solve the challenge. Four themes were identified from the photographs that were linked to problem-solving. These themes were defining the problem, determining the cause of the problem, identifying, prioritizing and selecting alternatives for a solution, and implementing a solution. The study supports the symbolic interaction theory, where the principle of meaning becomes the center of human behavior. The students added meaning to the photographs and reflected on why they took the photographs and the outcomes after taking the photograph.

The value of this article is to bring attention to the inevitable link between the visual and narrative data. The FFM makes the students the collectors of data, and, in this case, they took a photograph of their challenge or problem during the execution of their community project. This forced the students to capture a point in time and reflect on the incident through an online questionnaire. Photo feedback, as an assignment in other service-learning modules, is an ideal method for members of Generation Z. It can allow the students to reflect deeper on the project they executed and on their involvement in the community as the key component of service learning that distinguishes service-learning from volunteerism.

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