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# Pre-Service Physics Teachers' Experiences of Being Member of Photo Voice Project

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**Abstract.** In effort to map the readiness of high school physics laboratories in East Java to support the achievement of Basic Competency (BC) Skills, research has been conducted involving prospective teacher students through the technique of "photo voice", to optimizes pre-service physics teacher who take part in learning field practice in 2019 as participant research (teaching exercises as well as research exercises) through Participatory Action Research (PAR) 93 prospective teacher receive photography training, plan shooting actions, reporting the results of taking a physics laboratory shot at a partner school in the form of an article. Providing experience to prospective teacher has a positive impact on the achievement of pedagogical and professional competence. The impact of the experience is that students have been able to take laboratory photo images in accordance with the purpose of displaying images. By doing so, the project of making articles from capturing and interpreting laboratory images is used as achievement of BC of knowledge and BC of skills as mandated by the Indonesian education curriculum 2013.

## 1. Introduction

Curriculum of 2013 in Basic Competence (BC) requires a balance between basic competence of knowledge (BC. 3) and basic competence of skills (BC. 4) [1]. But the reality on the ground shows that the realm of knowledge is more concerned than the realm of skills. So it is not surprising if the learning process and assessment are less than optimal. The teacher only focuses on teaching and accessing knowledge competencies and often ignores students' competency skills. The development of self-potential is the subject of education to achieve an interesting, effective and efficient learning process. In accordance with the application of the 2013 curriculum which includes the development of an integrated attitude, knowledge and skills competencies. On the other hand, a high school physics laboratory should be available to bridge achievements of the basic competence of knowledge.

In an effort to map the readiness of high school physics laboratories in East Java in an effort to achieve basic competence (BC) Skills, research has been conducted involving prospective teacher students through the technique of "photo voice" = photo sound [2], which teaches and optimizes students physics teacher candidates who take part in the field practice program in 2019 as participant research (teaching exercises as well as research exercises) through participatory action research (PAR) [3-4].

Photo voice is one of the many participatory studies applied in education [2, 6-7]. This technique was first introduced as Photo novella by Wang and Burris twenty years ago, is a methodology that allows individuals to reflect the strength of their community [3,8]. Photo voice technique is also very



supportive in efforts to develop aspects of pedagogy in the classroom because this technique is a set of pedagogical tools in the education and psychology class community [7]. In this case, the researcher adopts photo voice as a set of pedagogies that gives the atmosphere of students as prospective physics teachers as observers or observers in their own physics learning community and creates space for them to participate (participatory) and activities that give meaning to the community (community-focused meaning making activities). This means photo voice is a method that allows educators and researchers to gain experience from the perspective of students [6,9]. One of the goals of the photo voice technique is to develop critical reasoning from participants [2]. Associated with high school physics laboratories through this technique is expected to provide a vehicle for prospective physics teachers to provide critical scientific reasoning through photographs related to the physics lab that they capture themselves then they give their own interpretations.

According to Behrendt and Machtmes [6], there are three main objectives of photo voice, namely: (1) Providing opportunities for participants to record personal experiences and assets of the community, which in this case is the physics teacher community, (2) Opening dialogue through discussion about photography (3) Communicating educational ideas and ideas to the public and government.

Meanwhile there are at least three advantages of photo voice [2]: "self-authorship, a new methodological conceptualization, and pedagogical applications". In terms of self-authorship, photo voice provides an opportunity for participants to demonstrate their ability to communicate ideas through photography. In addition, through the photo voice process, prospective physics have opportunities in gaining hands-on experience in participatory research as they learn the basics of qualitative research to improve pedagogical and professional competence.

## 2. Methodology

The photo voice planning process begins with brainstorming and is followed by planning actions. The core activities of the photo voice technique are photography training, facilitated discussion, and shooting practice. After that the participants take real data, provide interpretations and make a report.

The research targets are high schools in East Java who are partners in the implementation of the learning field practice. The "Participatory Action Research" strategy was used students from the Physics Education University of Surabaya who took part in the program with around 93 students. So the student is actively involved as well as a participant in data collection. In accordance with the rationale that photo voice is one of the participatory action research (PAR) methods.

The first step is for students to take photo laboratory with the stipulated drawing conditions, namely (1) A minimum image resolution of 300 dpi and a maximum file size of 3 MB, (2) Taking pictures related to laboratory conditions and the school environment, (3) Each picture taken consists of two forms, the first included in word and the second set aside in save it in a jpg or png file. Next is arranging articles with provisions (1) The title of the article is written in capital letters of each word, with a type of Bookman Old Style size of 14 pt with a distance of 1 space, bold and centre, (2) Writing of the article typed in type Bookman Old Style, size 12 pt with a distance of 1 pt and flattened right-left, (3) Minimum article consists of 300 words (4) The article content describes the conditions contained or occurred in the laboratory or each school. It can be in the form of descriptive narratives, sequential images that are then told, one picture with a descriptive description of conditions or with many images that describe specific conditions, (please be creative with your own pictures and language), (5) Between students and one another in the same school, it is not permissible to use the same photos and/or descriptions. Each article will be tested for plagiarism, (6) Typed in A4 paper with a top margin of 2.5 cm, bottom 2.5 cm, right 2.5 cm and left 3 cm.

The second step is participatory given a questionnaire instrument to find out how much students' understanding of physics concepts and questionnaires for students and teachers in schools to find out the responses to find out how much the school laboratory preparedness is the results and input for this research.

### 3. Result and Discussions

#### 3.1. Photography Training

Provision of photography techniques was carried out before students underwent the school field program, which was in June 2019. The briefing was given by photography experts, namely experts from the State University of Yogyakarta and multimedia experts from the State University of Surabaya, inside Focus Group Discussion (FGD). Material supplies include, shutter settings, lighting settings, ISO settings (picture sharpness), diaphragm settings, frame settings, camera angel settings, series of photo stories (how to sort photos) so that they become a unified whole story.



**Figure 1.** Preparation before Focus Group Discussion (FGD).



**Figure 2.** Focus Group Discussion (FGD); the photography expert share the best practice of taking a picture (*left*), implementation of photography training (*right*).

#### 3.2. Take a Picture

The picture was taken, begins by making a drawing design. The design contains the planned objectives and views made in the form of a table. (1) general description of the existence of school laboratories, (2) storage of tools, (3) tools that are not used (4) Inventory of tools or list of tools owned by physics laboratories, (5) Arrangement of laboratory equipment, (6) Arrangement of laboratory equipment laboratory schedule, (7) Laboratory organizational structure and (8) work safety in the laboratory between the availability of the first aid kit.



**Figure 3.** Taking a picture; capturing object inside class (*left*), capturing object outside class (*right*).

### 3.3. Reports: Images and Articles

The results of taking photographs of physics laboratories in schools include: (1) students report the results of taking pictures that contain meaningful images, which tells the physics laboratory equipment in high school, (2) make identification of laboratory physics tools, (3) identification includes the type of practicum that can be done with these tools, any physical concepts related to laboratory equipment in the school, the frequency of use of laboratory equipment, (4) students make interpretation of the suitability of existing tools with the achievement of basic competence of knowledge (BC. 3) and basic competence of skills (BC. 4) in school.



**Figure 4.** Laboratory in high school; practicum room (*left*), preparation room (*right*).



**Figure 5.** Props that can't be used; optic (upper-left), fluid (upper-right), heat (bottom-left), and sound (bottom-right).

The Participatory of pre-service physics teacher make a description from Figure 5 as follows:

*“Some physical aids that are not feasible to use and are dusty as in Figure 5. Supposedly, these tools have been removed and can be updated with new tools that are better maintained. To make it easier to care for and organize these tools, the laboratory assistant can request assistance from students to be required and be included in terms of cleanliness, arrangement of practicum tools or teaching aids so that school residents can continue to be responsible with the facilities at the school. Then for props that are still good can be placed in a cupboard, to be more secure”*

Based on the study, students are able to use their knowledge to make good judgments, suggestions and decisions on how to manage a good lab.



**Figure 6.** Part of laboratory (Tools); Multimeter (left), optical tools (right).

Based on the picture the students make a description:

*“The picture shows a multi meter that is less organized. The multi meter cable that has been used has not been neatly arranged, other than that the arrangement of optical practicum tools is still not good, it can be proven in Figure 6, the cardboard box of practicum wrappers has begun to be damaged so that the practical tools are randomly placed in one container without being neatly arranged. The tool is used for the acquisition of concepts, electric current, resistance, voltage, ohm's law, Kirchhoff law. While the optical equipment available is a tool for the acquisition of concepts, reflection and refraction law, the reflection by a flat mirror, concave, curing, lenses, prisms.”*

The study trains students to give their opinions on the correct arrangement of tools in the laboratory. Identify the concepts that can be obtained from the tool. Connection of basic competence of knowledge (BC.3) and basic competence of skills (BC.4) with equipment in the physics laboratory.

### 3.4. Implications for Prospective Teacher Students

The involvement of pre-service physics teacher who took part in the learning field practice in 2019 as participant research (teaching practice as well as research exercise) through participatory action research (PAR) through the technique of "photo voice", provided an excellent experience for increasing their competence as pre-service physics teacher. Pre-service teacher students use their knowledge to provide photo descriptions so that it becomes a sequential story line, giving a description of the state of the laboratory in the school. Furthermore, students give interpretations from each image associated with a standard laboratory mandated by the Indonesian education curriculum 2013 [1], which is in accordance with laboratory criteria according to *Permendiknas* number 24 of 2007. Pre-service physics teacher also make evaluations according to their versions and provide alternative solutions. This gives students direct experience of how the link between laboratory equipment and the

achievement of basic competence of knowledge (BC.3) and basic competence of skills (BC.4) in the Indonesian education curriculum 2013.

#### 4. Conclusion

Giving direct experience to prospective teacher students as participant research (teaching exercises as well as research exercises) through participatory action research (PAR) through the photo voice technique has a positive impact on the achievement of pedagogic and professional competence. The impact of the experience is that students have been able to take laboratory photo images in accordance with the purpose of displaying images. The project of making articles from capturing and interpreting laboratory images is used as achievement of BC of knowledge and BC of skills as mandated by the Indonesian education curriculum 2013.

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