How to record learning activity with a smartphone on lesson study program

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Abstract. This study was motivated by the desire to digitally record and document students’ learning activities in a program namely lesson study since so far, the observation on lesson study has been conducted manually. Thus, the purpose of the study was to identify on how to record students’ behaviors during lesson study using a smartphone. There are two techniques of learning activity recording. First, to record learning activities classically, the technique used is placing a smartphone camera horizontally from the back of the classroom. Second, to have more detailed recording for each individual, there needs to be a tripod to help zoom in and zoom out during the lesson. The results of the study show that the digital observation using a smartphone enabled the teachers have more detailed and focused documentation. In addition, there are to other benefits that the recording could be replayed to see the lesson reflection in accordance with the lesson plan and it could also be discussed further in the context of collaborative lesson study.

1. Introduction
Lesson Study (LS) learning is an approach to reach professional learning [1-3]. One of the indicators of professional learning in the context of lesson study can be analyzed from the learning cycle based on collaborative learning [4] which consist of plan, do, and see steps. In lesson study, the special feature is observation process by a team of observers. Therefore, observers play an important role in analyzing and recording students’ learning behaviors.

Students’ behaviors in every learning setting, including in LS, are crucial to analyze. The learning focus on student learning will help teachers predict, observe, and evaluate learning more effectively [5]. The observation in LS will also identify the students’ “noticing” skill and accurately describe what they teachers and students do within the learning process [6]. The observation process is also able to measure the impact of students’ learning outcome in a short-term [1].

Currently, the observers perform their observation in LS manually. Each of them usually write down what is happening on a piece of paper. This process appears to have some weakness; one of which is that the observation is not comprehensive. Meanwhile, there needs to be detailed observation particularly when it comes to reflection session at the end of the learning process. Manual observation through handwriting also has a risk of loss so that it cannot be documented in a long-term [7].

To cope with the aforementioned disadvantages, the offered solution is using digital documentation as a part of e-learning [8]. In the context of LS, one of the possible tools for observation is e-rubric, which makes it easy for observers to record every indicator analyzed in the learning process [7]. Digital observation is easily conducted using a smartphone [9-12].
Considering the aforementioned reasons, this study aims to explain how to use a smartphone to record students’ behaviors in the context of LS since observation, carried out by more than one observer, is a special feature in LS. This digital observation is also expected to be the main resource for reflective evaluation. The fact that it is digital makes the evaluation possible to be discussed in detailed and replayed repeatedly.

2. Method

Smartphones, including Android-based ones, are equipped with a good quality camera. This gives an advantage to observers of LS that the learning activities are representative to analyze.

To record learning activities in LS using a smartphone, we can follow the steps shown in Fig 1. However, prior to the recording, there are several things to prepare. First, we need to clean the camera lenses. This is important to make sure that there is no dirt on the lenses so that the snaps are clear. Second, we need to do video manual setting of the smartphone. In this step, we have to choose 1080p for the best quality of the video. The next setting is to deactivate Electrical Image Stabilization (EIS) and to activate the setting of Optimal Image Stabilization (OIS); this is due to the fact that EIS tends to decrease the video quality. However, to have good videos with real color, there needs to be white balance setting of the camera. This setting is usually on camera setting, by comparing the viewfinder with eye-view.

![Fig 1. Steps on how to use a smartphone to record LS activities.](image)

Fig. 1 shows that there are two main methods in the process of observation using a smartphone. To record with a wider range, so that the classical learning activities are recorded comprehensively, the recording is done in a horizontal position. Meanwhile, to observe students’ behaviors in a closer point of view, a zoom-in zoom-out technique can be used.

3. Results and discussion

Using a smartphone in LS learning activities has a lot of advantages, especially in the process of observation. The use of smartphones can be implemented in three main steps of LS covering plan, do, and see.
3.1. Recording process on “Plan”
This step is an initial activity in the whole practice of lesson study. Thus, it is such an important step since it determines the rest of the steps. In this step, the model teachers present the lesson plan or scenario and they will be watched by the observers.

The recording in this step focuses more discussion between model teacher’s other teachers. This process is in relation to the relevance of learning outcome based on the scenario planned by the model teachers.

3.2. Recording process on “Do”
In this step, observers start to focus on analyzing students’ behaviors. The data collected from this step are essential for the learning reflection. When recording, the smartphones should be put in a horizontal position. This aims to create more aesthetical videos and give easy access to edit and replay the videos since there is no black border which makes the videos less interesting (See Figure 2 and Figure 3).

![Figure 2. Recording of students’ behaviours during learning activities using a smartphone.](image1)

![Figure 3. Recording of teacher-student discussion using a smartphone.](image2)

Figures 2 and 3 show the results of horizontal recording by observers during the entire process of teaching and learning processes. Observers will find it easy to analyze the whole activities even when the teacher is giving lecture. The device is positioned at the back of the class to avoid distracting students’ focus. When the recording is replayed, sharing tacit knowledge to accurately diagnose learning obstacles takes place [13].

In the meantime, Figures 4a and 4b show a closer look of the whole learning processes during lesson study. When recording, observers can actually move when necessary. To be able to have more detailed recording without distracting students’ focus, observers can use a tripod and zoom in or zoom out the recording based on the needs.

![Figure 4. Recording of students’ practicum using a smartphone.](image3)

Figures 4a and 4b are the closer look recording. This recording technique enables observers to have a closer and more detailed look particularly in the practicum. Therefore, observers can see whether or not the students reach the competencies required. The recording also enables observers to analyze human activity and recognize students’ behaviors [14].
3.3. Recording process on “See”
The recording collected from the “do” step is then compiled for evaluation (see). This process is an essential step to identify the relevance between plan and do. The reflection and evaluation process is conducted by the observers while replaying the recording to have more concrete and analytical discussion. This step puts more focus on students’ behaviors rather than teachers’ behaviors as the “do” process does.

4. Conclusion
Learning in lesson has special characteristics since there is observation process in it. Another special characteristic in lesson study is that it has three steps covering Plan, Do, and See. This study focuses on how to record learning digitally using a smartphone. There are several advantages of using a smartphone to record learning. Observers can have more detailed and focus analysis on students’ behaviors which are important for evaluation. The fact that the observation is in the form of recording makes it advantageous since it can be replayed to find out concrete and more critical evaluation.

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