

## THE IMPROVEMENT OF LEARNING EFFECTIVENESS IN THE LESSON STUDY BY USING E-RUBRIC

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### Abstract

Lesson Study is a learning strategy or development model deemed effective in improving learning quality. However, the evaluation on the lesson study observation sheets is still done manually. For that reason, the research is intended to develop e-rubric observation sheet of lesson study using android device. This research used 4D research and development method (Define, Design, Develop, and Disseminate). Qualitative and quantitative descriptive data analysis was used as the data analysis technique. The results of this paper clearly showed that android based e-rubric observation sheet is applicable as an observation assessment instrument in lesson study. The advantage of e-rubric lesson study observation sheet is the administrator or lesson study team can vary or develop the components of observation indicators and can use various android devices. This e-rubric has also advantage in the efficiency of assessment and includes both quantitative and qualitative aspects. The findings in this paper are very educators can use e-rubric in the learning process.

Keywords: E-rubric, Lesson study, Observer.

### 1. Introduction

Lesson Study is a learning strategy or development model that involves lesson collaborative planning and evaluation. Lesson Study encompasses planning, teaching, observation, and criticism of the lessons [1]. It consists of three main steps [2]; 1) plan, involving teachers preparing and learning the lessons; 2) do, involving teachers (model teachers) and observers; and 3) see, which involves all the

components for class discussions and reflections among other teachers [3, 4]. Teachers collaboratively [5] plan, teach, observe, revise and share learning outcomes [1]. Lesson study evaluation focuses mainly on student learning [3].

Lesson Study has proven successful in improving the quality of learning and can be applied in various subjects in different contexts [3]. The research on lesson study has been carried out in different subjects as in Mathematics [6, 7]; Physics [2]; English [8]; Geography [9]; and science [10]. In Indonesia, research on lesson study works quite well [11]. However, findings from those studies reveal that either quantitative or qualitative analysis [11] is not discussed well.

Regardless of the success of Lesson Study in various fields, the evaluation at the time of observation is still not effective in observing all the elements of students in class. Manual observation sheet assessment is relatively challenging. In addition to having to write on the sheet, the data still have to be transferred into the software to archive the database. Another difficulty is that the observer must memorize all of the observed indicators [12]. Additionally, after the evaluation, the lecturer does not have quantitative and qualitative data of all assessment results, making it less efficient. Therefore, an easy, practical, efficient, accurate, responsive and accountable tool is needed to conduct the qualitative and quantitative assessment.

The focus of this observation sheet is designed to address the observer needs. To this end, the researchers focus on identifying the existing observation sheets. Portable, efficient and accurate electronic device is needed to meet the challenge. The device can be an embedded application on a smartphone. This observation sheet tool was developed to facilitate the observer when undertaking lesson study. This type of assessment combines both quantitative and qualitative aspects.

The use of mobile learning has proven to be effective. It is also evidenced that the use of mobile learning in college or school has become more popular [13, 14]. Mobile learning can be one of the educational technologies that promise educational development. The context of mobile learning applications has a significant positive effect on user convenience.

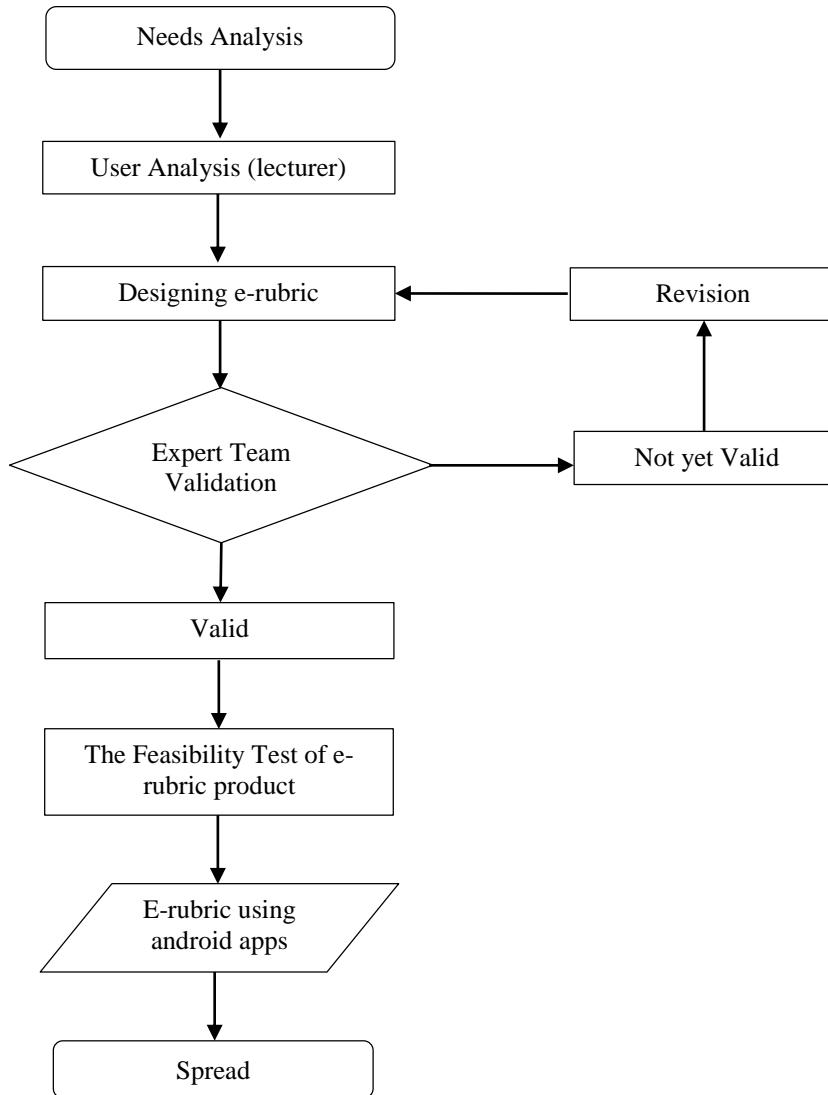
## 2. Experimental Method

Development of the android based lesson study observation sheet adopts 4-D model [15]. The procedure is described in Fig. 1.

Server side scripting development of e-rubric lesson study observation sheet used PHP programming language (PHP: Hypertext Preprocessor). Server Side Scripting is a technique in a web designing process involving embedding scripts in HTML documents (Hypertext Markup Language) requested by the client of a server. The script is run on web browsers used by the users.

The media database in its storage must be large so that it will be more structured and secured. The database used is MySQL, which is an SQL or DBMS (Database Management System) database management software system. This is a web-based application run on smartphone. After this E-Rubric application can run on the server-side, it will be then rendered into an android-based application. The programming language for the android-based application is JAVA. Android Studio was used as the tool to create this E-rubric coding process.

The location of this research is at Universitas Kanjuruhan Malang (Indonesia). The validity test for the application is done by 3 android expert from MIS (Management Information System) at Universitas Kanjuruhan Malang, Indonesia, 3 assessment experts (lecturer), and 3 instructional experts (lecturer).



**Fig. 1. Flowchart e-rubric lesson study observation sheet development procedures.**

Qualitative and quantitative descriptive data analysis were used as the data analysis technique. The expert and small group test questionnaires were analysed based on its percentage and described qualitatively. The analysis includes reducing data, presenting data, and drawing conclusions or verification. The data presentation was delivered in description, table, diagram and figure. The data was then verified, interpreted and summed up.

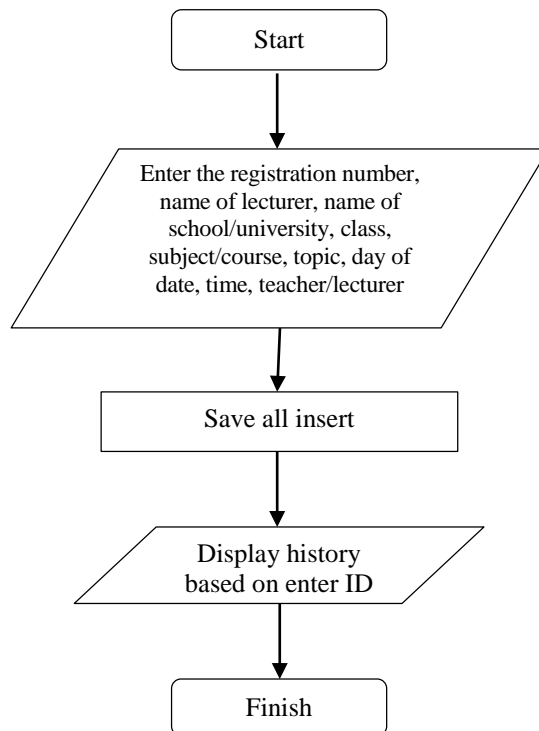
### 3. Results and discussion

#### 3.1. Android-based observation sheet product

Lesson study includes a comprehensive observation of learning in one class. Observation sheets used by observers need to be developed in line with the world of technology and digital. The observation sheets developed in this study are android-based program called e-rubric.

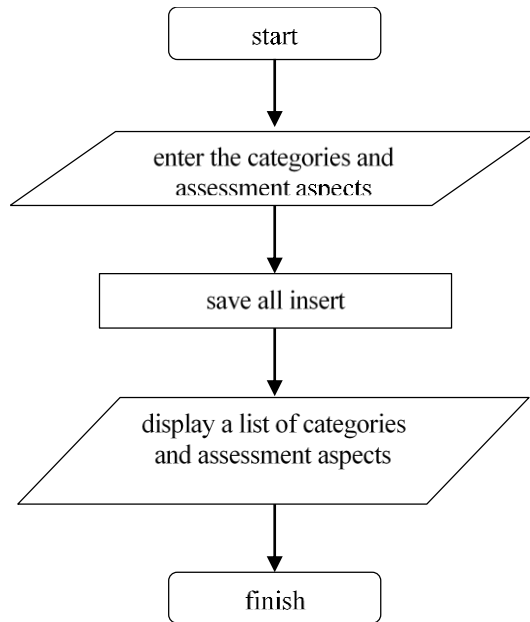
This e-rubric is different from the conventional observation sheets. It provides qualitative and quantitative data. These types of data are needed in the lesson study implementation [11]. The application of e-rubric is presented in Fig. 2.

Figure 2 shows the flowchart of e-rubric lesson study observation sheets by users. Flowchart user is the step by step of assessment aspects, which also shows the assessment and its history.



**Fig. 2. Flowchart user.**

One of the advantages of this application is the presence of qualitative and quantitative data, which enable admin/ team of lesson study that can add/ remove/ develop indicators analysed by the observers so that this application is proven to be efficient, particularly for lesson study observers. Admin flowchart that can add indicators can be seen in Fig. 3.



**Fig. 3. Flowchart admin add indicator.**

Flowchart admin add indicator is a system flow to add categories and indicators in which users can assess. The indicators of e-rubric lesson study observation sheets are shown in Table 1.

**Table 1. Lesson study observation sheet e-rubric.**

No	Aspects	Score	Comments and Reviews
<b>Students and The lesson</b>			
1	The lesson supports the learning outcomes.		
2	The lesson attracts the students to keep learning		
3	The lesson encourages students to think more.		
<b>Students and The Learning Media</b>			
1	The learning media attracts students interest in learning		
2	The learning media facilitates the students to understand the lesson		
3	The students are able to apply the topic into the real world situation as a result of the application of the learning media.		
<b>Students and Teachers/Lecturers</b>			
1	Teachers' / lecturers' effort in motivating the students in teaching learning process		
2	Rapport (Teachers-students relationship)		
3	Student-Teacher activity is relevant to the lesson plan and learning objectives		
<b>Students and Students</b>			
1	Students' involvement in learning activities		

2	Students actively collaborate in completing assignments relevant to the contents (Group work activities)
3	Students are able to self-evaluate that enable them to process and interpret the lesson.
<b>Learning Objective Accomplishment</b>	
1	Learning objective accomplishment
2	Students understand the learning topics
3	Students acquire learning from the lesson
<b>Total Score</b>	
<b>General Comment</b>	
<b>Solution</b>	

Based on Table 1., the indicator we use is the modification of the teacher's teacher base [16, 17]. This indicator is essential for assessing because active learning is an interactive process in which students' knowledge and content unite through effective teacher facilitation [18]. This course is very important for the observation [8, 19].

The observer of the lesson study can do evaluation by giving qualitative and quantitative assessment along with their respective reasoning. The score was then classified as very good (86-100), good (71-85), moderate (60-70) and bad (<60). This application also provides a space for the observer to offer some solutions for the identified problems, particularly ones that occur in the class.

The results of observation can be immediately printed using e-rubric. All the printed data are in PDF. Thus, the data can be used to assess the implementation of lesson study. The printed version of lesson study observation sheets is presented in Fig. 4.

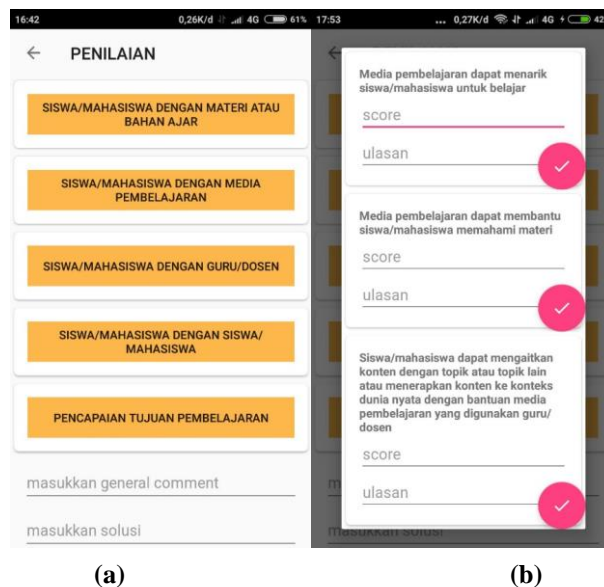


Fig. 4. Interface of e-rubric.

Figure 4(a) is the whole interface of e-rubric. In this interface, users can click the indicators, which can later show the factors to assess shown in Fig. 4(b). In this part, users can fill in general comments and proposed solution in the last part of the e-rubric. Finally, data can be printed in accordance with the assessment results.

### 3.2. Feasibility test of lesson study observation sheet e-rubric

The feasibility data of e-rubric was obtained from 3 assessment experts (lecturer), 3 android expert and 3 instructional experts (lecturer). The data were in the forms of qualitative and quantitative data. The quantitative data was e-rubric assessment sheet used to identify the feasibility of the e-rubric. In addition, the qualitative data was presented in terms of comment to improve e-rubric. The result of feasibility test of e-rubric is presented in Table 2.

**Table 2. Feasibility test of lesson study observation sheet e-rubric result.**

No.	Components	Percentage	Criteria
1.	Content Appropriateness	92 %	Very Valid
2.	Feasibility of Presentation	85%	Valid
3.	Language Appropriateness	90 %	Very Valid

The analysis instrument in Table 2 is a modified model of the evaluation of an e-learning system [20]. Content appropriateness is stated 92%, feasibility of presentation is 85%, and language appropriateness is 90%. Feasibility of presentation gets the lowest score compared to others. This is because the appearance of e-rubric is still standard and need to be developed again.

The rubric must have an observer feasibility test so that every observer can use the rubric accurately and avoid any misinterpretation or misapplication. This rubric has passed the feasibility test based on the content, presentation and language feasibility aspect. The feasibility test has obtained data confirming that this rubric is considered valid so that this rubric can be used to represent class observations in lesson study.

The rubric should also include criteria of quantitative and qualitative aspects. This is because the rubric describes the desired criteria in assessment or giving a level of student performance outcomes [21, 22]. Thus, the quantitative and qualitative data can be used to describe the observed condition. Some of the strengths of android-based devices are paperless, on-going process, real time, and the results can be immediately accessed by the observers [23].

Assessment of lesson study was initially conducted through the record of the observer [23]. Today people seem to be more dependent on smartphones than other electronic devices [24] and the android media have also been well used in Indonesia [25]. It is expected that e-rubric lesson study can help and facilitate the assessment process of lesson study. The advantages of this android-based is paperless, ongoing process, is real time, and the results can be directly known to the observer [23].

## 4. Conclusion

Lesson study is increasingly used because it proves to be good and effective in learning. In the future, of course, it should be more practical and time efficient. That is required applications that support and based android. The advantage of e-

rubric lesson study observation sheet is the administrator or lesson study team can vary or develop the components of observation indicators and can use various android devices. This e-rubric has also advantage in the efficiency of assessment and includes both quantitative and qualitative aspects. This e-rubric has already passed the feasibility test by expert judgments, instructional experts, and android experts. Hence, the E-rubric can be used by all observers in the observation of lesson study on all subjects.

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