

UDC 378

OLA APPLICATION TO IMPROVE SELF-REGULATED LEARNING ABILITY AND LEARNING OUTCOME OF VOCATIONAL HIGH SCHOOL STUDENTS

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ABSTRACT

The purpose of this research was to develop an Android-based learning media called OLA (Office Layout Application) to improve students' self-regulated learning ability and their learning outcomes. The OLA application serves as a mobile learning device for Vocational High School (SMK) students in Indonesia. The application has an attractive design and it covers essential elements of learning activities including apperception, core learning activities, evaluation and report from students to teachers. This application allows teachers to monitor the learning activities even without face-to-face meetings. This research was conducted based on the Research and Development model proposed by Borg & Gall with some modifications. The eligibility of this product was tested by media experts, content expert and was tried out to students. Self-regulated learning ability was measured using a questionnaire, while learning outcomes were evaluated in a posttest. The results of this research showed that the OLA application has been considered very well by media experts, material experts, and test subjects. Therefore, this product is feasible to be applied in learning activities in the 21st Century Learning era. This research also found a difference gap in students' self-regulated learning ability and learning outcomes between students who were taught using OLA application and those who were not.

KEY WORDS

Mobile learning, vocational high school, self-regulated learning, learning outcome.

The Industrial Revolution 4.0 does not only affect the economic sector, but also education sector (Chaim et al. 2018), particularly vocational education in Indonesia. Vocational schools in Indonesia (SMK) are defined as educational institutions that promote the mastery of certain skills in order to prepare graduates to be ready for work based on the needs of industries (Triyono 2015). Learning activities based on relevant knowledge needed in the current technological era must be realized in a learning framework for SMK. Education in the Industrial Revolution 4.0 era is also influenced by the extremely rapid development of digital media and technology as it makes information distribution more efficient. The rapid development of technology currently causes a transition from conventional learning towards technology-based learning, one of which is reflected in the use of innovative digital-based learning media (Fajriah and Churiyah 2016, Hrynko, 2019). Responding to this demand, Indonesia has adopted the concept of 21st Century Learning which requires a digital-based learning process (Afandi et al. 2019). Digital-based learning or commonly called mobile learning can be facilitated by the use of android applications as learning media (Wijaya et al. 2019).

At present, many researchers and educators have developed Android-based learning media. Some android-based learning applications have been developed for language learning (Muzayyanna Zatulifa et al. 2018), economics (Zheng, Li, and Chen 2018), chemistry (Jatmiko, Sugiyarto, and Ikhsan 2018; fajriah and Churiyah, 2016), natural-science (Taufiq et al. 2016), technology and information (Yassine et al. 2018), statistics (Hendikawati, Zahid, and Arifudin 2019) and mathematics (Kularbphettong et al. 2015; Rudyanto, Ghufro, and Hartono, 2019). These studies focused on discussing whether the Android applications that had been developed were effective for use and they measured the impact of using the Android applications for mobile learning in improving self-regulated learning ability, learning outcomes, and learning motivation.

Most vocational school teachers in East Java still applied the 'lecturing' method in delivering material in learning activities (Setiyani, Churiyah, and Arief 2019). In this present research, the researcher interviewed the teachers of General Administration in SMKN 1 Pasuruan and found that the school had not yet adopted digital-based learning. The learning activities carried out at this school were still based on the lecturing method using power point presentation as the media. During such learning activities, most students preferred using their smartphones rather than listening to the lessons delivered by the teacher. Consequently, students had inadequate self-regulated learning ability and unsatisfactory learning outcomes.

Mobile learning provides an alternative method in applying independent learning activities. Mobile learning devices allow students to learn regardless of time and place. Students are able to perform the steps in learning process including planning, implementation, up to the evaluation. Therefore, mobile learning devices are important in improving students' self-regulated learning ability. Self-regulated learning ability is one important abilities that should be developed by students in the 21st Century Learning era (Zheng et al. 2018). In addition, learning outcomes as the most important part of education strongly correlate with the achievement of learning goals that should be facilitated in mobile learning devices.

Based on the description, this study was carried out to develop an Android-based learning media on General Administrative subject, especially for the teaching of Office Layout material for SMK students. Most textbooks only provide abstract materials which still require further explanation through photos and videos, to help students understand the concrete concept of the learning materials (Yassine et al. 2018). Android-based learning media should be developed based on the characteristic of vocational students who are active smartphone users (Hsieh and Tsai 2017). Android-based learning media product developed in this study was implemented to improve students' self-regulated learning ability and learning outcomes.

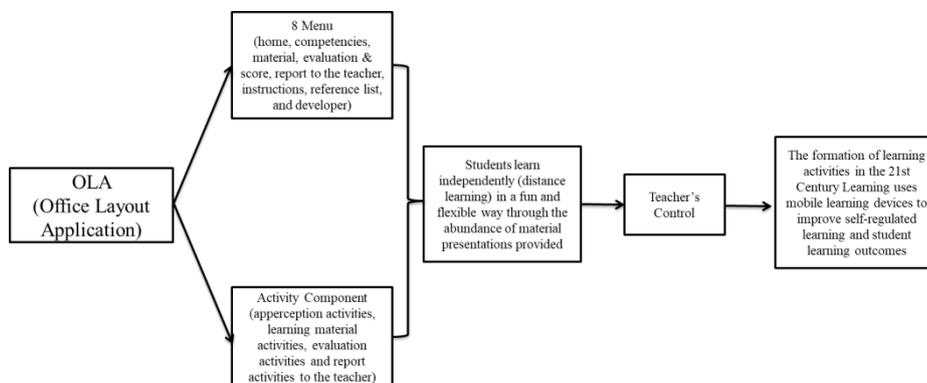


Figure 1 – The Design of OLA Application to Improve Students' Self-Regulated Learning ability and Learning Outcomes

Louhan, et al. reported in his research, one of the shortcomings in mobile learning is the weakness regarding evaluation or assessment (Louhab, Bahnasse, and Talea 2018). Teachers are less able to make evaluation in mobile learning practices, students can also make maximum independent assessment according to learning objectives or just the opposite. In addition, supervision cannot be performed optimally. The android-based application developed in this study namely OLA, (Office Layout Application) there is a special menu for assessment and reporting via email. This facilitates the teacher in conducting supervision, to see whether or not students have studied the material and conducted an evaluation. Evaluation questions were developed based on the six levels of difficulty in Bloom's taxonomy.

Definition of mobile learning

Mobile learning can be interpreted as distance education using cellular devices, such as cell phones, tablets and laptops for learning purposes (Pereira and Rodrigues, 2013) . Through mobile learning practices, students can learn in their own way (Zakaria et al. 2019) . This allows students to access learning material anywhere and anytime without being limited by space and time (Jatmiko et al. 2018; Fajriah and Churiyah 2016).

Android is one of operating systems on a smartphone which can be installed with many applications (Kocakoyun and Bicen, 2017). In Indonesia, almost all students have Android-based smartphones. They spent their time mostly on using smartphones such as playing games and accessing social media, which are not related to learning activities(Yassine et al. 2018). It is a proper strategy to offer students to use smartphones as a form of digital technology that integrates learning processes to achieve educational goals (Yot-Domínguez and Marcelo, 2017).

Definition of self-regulated learning

Self-regulated learning is an active and constructive process in which students set goals for their learning and seek to monitor, regulate, and control their cognition, motivation, and behavior, guided and limited by purpose and contextual features in the environment (Zimmerman 1990). Independent learners can play their role actively in the learning process such as planning, monitoring, or evaluating the learning activities they do (Yun, Fortenbacher, and Pinkwart, 2017). Students believe that learning is a proactive process where they maintain existing motivation and realize how to use a broad repertoire of strategies to achieve the desired academic results (Pintrich, 2000).

Through mobile learning devices, students are given the broadest opportunity to organize their own learning activities, starting from preparation, core activities, evaluation, and reporting to teachers. Mobile learning is more flexible as it can be done regardless of time and place, while at the same time it has many features.

Definition of learning outcome

Learning outcomes are a reflection of the level of success or achievement of the learning objectives that has been carried out which is measured through evaluation (Lestari, Siswandari, and Indrawati, 2019). Integrating learning material into digital technology means combining text, graphics, audio, video and animation that can attract students' attention to improve their learning outcomes (Y.-H. Lee, Hsiao, and Ho, 2014).This includes the use of mobile learning devices with an attractive interface which prevents students from boredom during the learning activities. In addition, mobile learning covers large scope of materials, making it possible for students to enrich their knowledge about certain topic.

Bloom divided learning outcomes into three domains and one of them is the cognitive domain (K. Lee et al. 2014). The cognitive domain includes mental skills that refer to the results of prior and learned knowledge. The cognitive domain consists of six specific levels (knowledge, understanding, application, analysis, synthesis, and evaluation).

METHODS OF RESEARCH

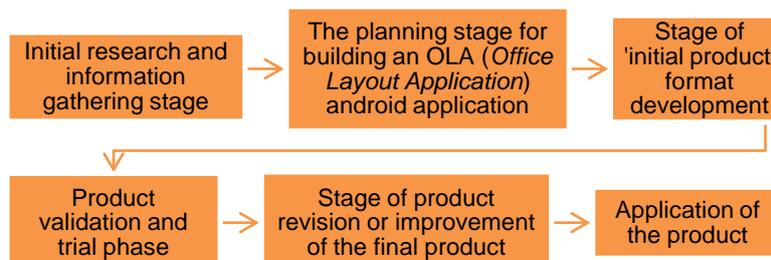


Figure 2 – Research Steps

This study modified the Research and Development method proposed by Borg & Gall into six steps: 1) The initial research and information gathering stage, including the implementation of field studies and literature studies relating to General Administration learning materials as well as students' characteristics; 2) The planning stage, starting with preparing menus or tools and materials that will be available on the product; 3) Initial product development was started with material collection, material management, and the product production process. Furthermore, the materials collected were processed and edited using Corel Draw software, Microsoft Office Power Point, iSpring Package, Java Script, Air SDK and Andaired; 4) The validation stage was carried out by media experts and material experts. Product try out was also conducted in a small group of six students; 5) Product revision or improvement of the final product was done based on information obtained from the previous stage, in the form of criticism and input from the validator and the test subjects. After that the product was published on the app store; and 6) The ability of the product in improving students' self-regulated learning ability and learning outcomes was examined.

Research design

This study involved two classes in SMK 1 Pasuruan which were assigned as 1) the experimental class: the class that used the OLA application in learning activities and 2) the control class: the class that did not use the OLA application in learning activities. The control class was taught using conventional learning activities with instructional media in the form of power point slides. The success of this study was measured by comparing the experimental class and the control class.

After the OLA application was validated by media experts, material experts, and had been tried out, it was then applied to determine the level of self-regulated learning ability and learning outcomes of students from both classes. After the treatment, each class was given self-regulated learning questionnaire and posttest questions. The experimental class worked on the posttest questions in the OLA application, while the control class completed the posttest using paper-based method.

Population and sample research

The population of this study population included all students of SMKN 1 Pasuruan, East Java, Indonesia in OTKP (Office Automation and Office Management) Competency. Class X OTKP 1 with a total of 36 students was assigned as the experimental group, while the control class was class X OTKP 2 with a total of 35 students. Whereas, for the product try out, a small group consisting of six students with heterogeneous abilities (low, medium and high) from the experimental class X OTKP 1 was formed

Research instrument

The data collection instruments were a media expert validation questionnaire, material expert validation questionnaire, try out questionnaire, student self-regulated learning questionnaire and posttest. The data obtained were in the form of quantitative and qualitative data. Data were collected through questionnaires, interviews, and posttest.

Data analysis

The data of this study were in the form of average numbers which were categorized using validity levels to measure the feasibility of this product to be applied as learning media to identify the levels of students' self-regulated learning ability. Learning outcomes were measured and categorized based on the minimum passing grade of 75.

RESULTS AND DISCUSSION

The Development of Office Layout Application (OLA)

The OLA application has been successfully developed and can be downloaded at the Amazon AppStore application store for free or through the bit.ly/OLAbys1PAPDUM link. In general, there are eight menus in the application as presented in Figure 3.

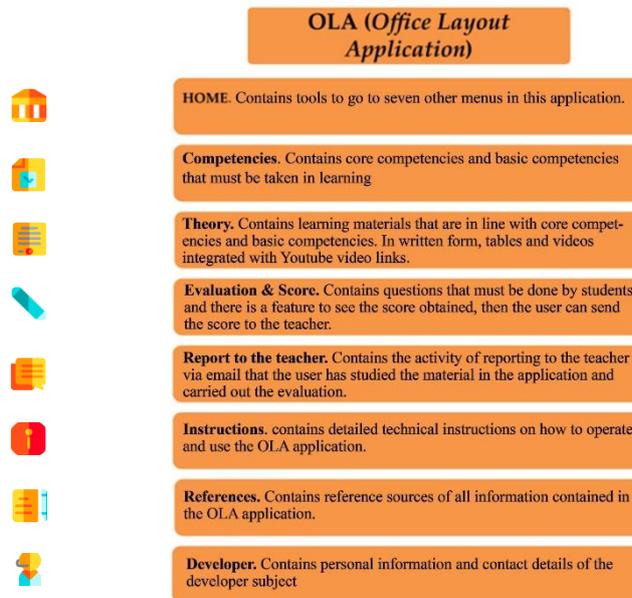


Figure 3 – Explanation of Menus in OLA Applications

The results of validation from media experts, material experts and product try out indicated that the OLA application is quite feasible to be applied as a learning medium. After the validation and try out, the product was revised based on the inputs obtained from media experts, material experts, and test subjects. Data on validation results of media experts, material experts and product try out are presented in Table 1..

Table 1 – Results of Validation and Tryout

No.	Aspect	Score			i (%)
		X (1)	X (2)	ΣX (3)	
1	Language	4	3.5	3.6	93%
2	Effects for Learning Strategies	4	4	3.7	98%
3	Software engineering	4	-	3.4	93%
4	Visual Display	3.9	-	3.5	93%
5	Relevance of Material	-	4	3.7	96%
6	Organizing the Material	-	3.7	3.6	91%
7	Evaluation / Practice Questions	-	3.6	3.5	89%
	Σ	3.9	3.8	3.6	-
	Percentage (%)	99%	94%	89%	94%
	Interpretation	SL	SL	SL	SL

Note:

X (1) = Media Expert Validator
 X (2) = Material Expert Validator

X (3) = tryout
 VF= Very Feasible

Based on Table 1, the media expert validator assessed four aspects, the material expert assessed six aspects, and seven aspects were assessed in the try out. The aspects of assessment were determined based on the needs of each assessor of this learning media product. The OLA application developed in this study has a variety of interesting features that can support learning activities and make learning more fun (Fajriah and Churiyah 2016). The materials are arranged in the form of templates that fit the characteristics of Vocational High School students (Hsieh and Tsai 2017). Videos in this application are integrated with YouTube video links, allowing this OLA application to offer large options of materials, especially to make abstract materials more concrete. Most android-based learning media at only present text display that is quite boring. Whereas, OLA application presents learning materials in attractive ways as shown in Figure 4 below.

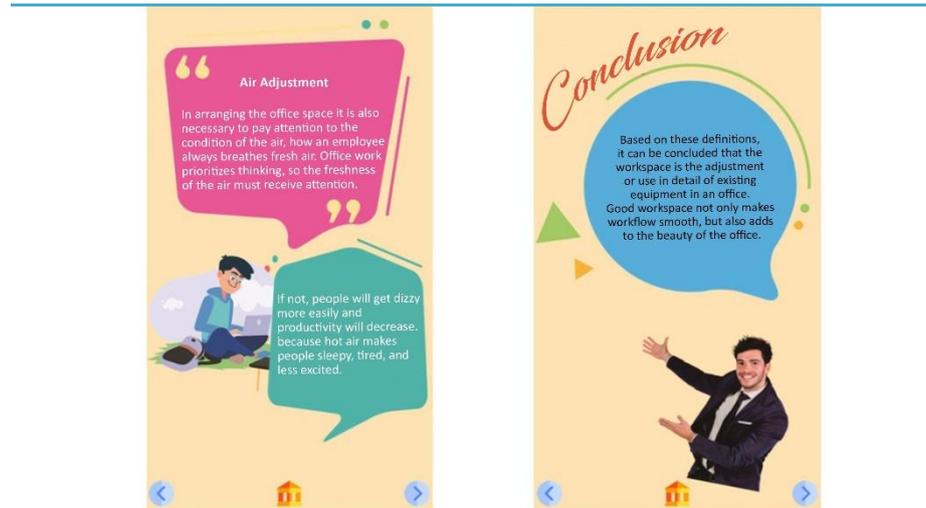


Figure 4 – Material Display in the OLA Application

The welcome page of OLA application presents a quote as shown in Figure 5. Then students will be shown an apperception video as shown in Figure 6 to get themselves prepared for learning Office Layout material. This is an aspect that distinct OLA application from other similar android-based learning media applications.



Figure 5 - Display of the Start Page of the OLA Application



Figure 6 - Display of Apperception Pages in OLA Application

In this OLA application, there are ten material themes and also an evaluation section. The evaluation section enhances students' comprehension as they are asked to answer some questions related to the material (Zakaria et al. 2019) in order to measure their cognitive skills.

After answering the evaluation questions, students can immediately see their scores. Then, students can report to their teacher that they have learned the material in the OLA application and worked on the evaluation questions. Android application as a learning media allows students to learn the material and independently evaluate the material that has been learned in this application (Zakaria et al. 2019). The OLA application provides proper monitoring from teacher during distance learning through 'Report to Teacher' menu as shown in Figure 7.

OLA application as a mobile learning application can be used anywhere and anytime (Jatmiko et al. 2018)(Kularbphettong et al. 2015)(Karimi 2016)(Yun et al. 2017). This application is very helpful when teachers are unable to conduct face to face learning

activities. Learning activities up to the assessment stage can still be done systematically under teachers' supervision. The OLA application also supports students to develop their media literacy and digital literacy in this 21st Century Learning era (Uther 2019).



Figure 7 – Display of the Report To Teacher Menu in the OLA Application

Besides providing several advantages, OLA application also has several disadvantages. The size of this application is quite large at 52MB. Thus, this application requires large memory space to be installed on students' smartphones. The OLA application also has no feature to enlarge the screen display.

The effect of OLA on self-regulated learning

The use of OLA application in the classroom indicated some differences in the level of self-regulated learning abilities between students who used the product and who did not. The students' self-regulated learning scores in the experimental class were higher than the ones in the control class. There are four aspects related to self-regulated learning questionnaire. In all four aspects as presented in Table 2, students who used the OLA application obtained higher scores than students who did not.

Table 2 presents the analysis of the self-regulated learning scores obtained by students in both groups..

Table 2 – Levels of Student Self-Regulated Learning

Aspect	Percentage	
	Experiment Class	Control Class
Self-confidence & efficacy	91%	81%
Intrinsic motivation	89%	83%
Extrinsic motivation	91%	86%
Learning Settings	88%	78%
Average	90%	82%
Category / Level Self-Regulated Learning	High	High

The use of this product in the classroom indicated a gap in the learning outcomes between experimental class and control class. The experimental class obtained higher higher scores than the control class as presented in Table 3.

Table 3 – Student Learning Outcomes

	Experiment Class	Control Class
∑ Average Score	95	88
Achievement of Minimum Completeness Criteria (KKM) (≥ 75)	100%	97%

DISCUSSION OF RESULTS

The purpose of this research was to develop an Android-based learning media called OLA (Office Layout Application) to be applied in the learning activities of SMK students to improve their self-regulated learning ability and learning outcomes.

The positive effect of OLA on self-regulated learning

The use of the OLA application has made students feel that such learning media can improve their self-regulated learning ability (Sha et al. 2012). This is due to access to complete learning stages ranging from apperception activities, studying material, evaluating to the reporting process to the teacher which can be done anywhere and anytime.

Office Layout materials in the OLA application are presented using interesting language that is easy to understand and there are videos that make the materials easier to understand. As the result, students grew high confidence and self-efficacy. In addition, their intrinsic motivation in using this application is also very good.

OLA application as a mobile learning device is an alternative option to the implementation of independent learning. OLA application allows students to determine how they should learn. Students can determine the time, place, and way of learning that fit them best. Students' extrinsic motivation is at a very good level where they are more motivated to learn Office Layout material than their friends who do not use the OLA application. OLA application facilitates students to play their role in the learning process that will be carried out, ranging from planning, implementation, up to evaluation.

The OLA application has been specifically designed for vocational students in Indonesia. Learners can easily download and install this application on their Android smartphones. Students are independently responsible for the learning process that is done on the OLA application and the teacher is authorized to control the learning activities carried out by students in the OLA application.

The positive effect of OLA on learning outcome

Satisfactory learning outcomes as one of the important elements in learning activities can be achieved through the use of the OLA application as students can have a high interest in learning (Fajriah and Churiyah 2016) Office Layout material concepts. Therefore, they can understand the learning material better than those who do not use OLA application. The use of mobile learning devices can also stimulate students' emotions (through passion, pleasure, and flowing experiences) that will positively affect their learning outcomes (K. Lee et al. 2014).

The OLA application also presents a lot of material in the form of text arranged in an attractive display, graphics and video that are integrated with YouTube. Hence, students have broad opportunity to gain wider knowledge related to the concept of Office Layout material. This wider knowledge will eventually enhance students' comprehension (Zheng et al. 2018). On the other hand, students in the control class only learned from teachers' explanation and limited videos as the learning sources. Consequently, their comprehension is less extensive and they easily get bored during the lecture (Anjawati et al 2016)

In addition, students who use the OLA application can learn the concept of Office Layout material in a fun way through their personal smartphone device and develop more positive attitude and enthusiasm in exploring the material (Wijaya et al. 2019). This kind of learning can certainly make it easier for students to understand the learning materials..

CONCLUSION

This research developed an android-based learning media on General Administration subjects Office Layout material in 10th grade Vocational High School Students in Indonesia. The product developed in this research is named OLA (Office Layout Application) and the product can be downloaded from the Amazon App Store application store or via the bit.ly/OLAbYs1PADPUM link. The results of validation from media experts, material experts,

and small-scale product try out obtained very decent ratings. This indicates that the application of the OLA application as a mobile learning device in the 21st Century Learning is feasible and important.

Students in experiment class and the control class obtained different levels of self-regulated learning and learning outcomes. Students who used OLA application developed higher level of self-regulated learning ability and better learning outcomes than students who did not use it. Therefore, OLA application is not only important in the 21st Century Learning era as a learning media, yet it is also important to improve self-regulated learning ability as one of the important aspects to be mastered by students and to enhance their learning outcome as an important element in learning activities.

Similar research need to be conducted to broader subject and it is suggested to develop this application to be ready on Google Play Store app store as the largest android app store at the moment. Android-based learning media products should also be developed for different subjects to support learning activities in the 21st Century Learning era. Finally, the use of an android application as a learning media should be assessed in terms of its relationship to other variables.

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