



App Inventor2 Learning Basketball at Grade X Senior High School

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Abstract

The purpose of this study is to involve the growing sophistication of technology on education and determine the feasibility and the improvement of learning outcomes using a smartphone. This study uses a development which is the basis for developing models produced. The results of the small scale trials, improving every aspect obtained is the cognitive aspects of 59%, 49% psychomotor, and affective 0%. Gain test results criterion level of cognitive, psychomotor and the average yield was high (value ≥ 0.7). On the affective aspect, low level criteria (value ≤ 0.3). From large-scale trial found an average increase in each school obtained on the cognitive aspects of between 49% -54%, psychomotor aspects 48% -55%, affective 0%. Data validation field tests of media experts 83.33%, experts PE 85%, experts basketball 97.5% and an average of four teachers at 93.1%, as well as the responses of students amounted to 91.68%. Gain test results criterion level of cognitive, psychomotor and the average yield was high (value ≥ 0.7). On the affective aspect, low level criteria (value ≤ 0.3). Based on the above results, it can be concluded that the instructional media PE (basketball) Android-based high school students eligible for use in learning.

How to Cite

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INTRODUCTION

In teaching, the teacher should be good at using the approach in discerning and wise, not recklessly which could be detrimental to the protégé (Syaiful Bahri Djamarah and Aswan Zain,2010:53). Sometimes in the process of learning the communication failure occurred. With the given material sense not entirely absorbed by students. Only a portion of the material can be accepted and understood by the student learners. The more severe again if students wrong captures the contents of the message given by the teacher. To avoid this, then teachers can craft a strategy of learning by utilizing various media and learning resources.

The media is what tools can serve as instruments of the message in order to achieve the purpose of teaching (Syaiful Bahri Djamarah and Aswan Zain, 2010:121). Media education is one of the sources for teachers enriches insight protege. A wide range of forms and types of educational media used by teachers, be the source of knowledge for students. So terakui considering the media as tools auditif, visual, and audiovisual. Use of the media is certainly not indiscriminate, but must comply with the formulation of the goal intruksional, and of course with the competence of teachers themselves, and so on.

Not denying it anymore, the appearance of the media as tools and learning resources provide significant impact within a goal in the study paves. According to the Vienna Sanjaya (2011:171) jotted down considering “media use can increase student learning motivation so that the attention of the students towards the learning material can be further improved.” From the quote, just as teachers are required to be able to play an active role in cutting-edge packing and the learning process. Teachers should have the mindset of the present to be able to mengkemas the growth of technology that so quickly, and can be useful in its use.

Panji Wisnu Wirawan (2011:22), stating “almost 90% of the students would have had his own cell phone or even have more than one mobile phone”. So it becomes a great opportunity of use of technology devices in the world because of the many education students who have and use mobile devices “. Mobile learning (M-Learning) is media of learning technology that utilizes mobile phone (2011:23, Panji Wisnu Wirawan). M-Learning can be one alternative learning media development at the school. The presence of mobile learning is intended as a supplement to pembelajaran as well as provide opportunities

for learners to be able to understand the learning material that is considered less obvious when penyampaian by the teacher. Students can learn wherever and whenever in accordance with their wishes.

Based on the results of the last statistics from Stat Counter Global Stats, Android dominates the smartphone in Indonesia with the range of 77.52%, as indicated in Figure 1 below:

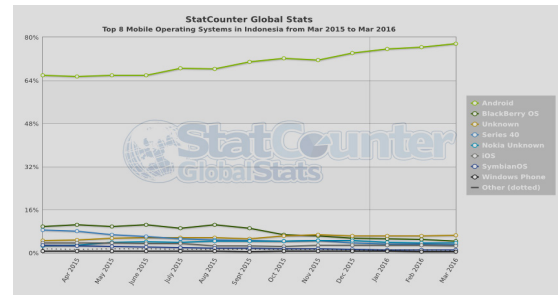


Figure 1. Graphics Mobile Operating Systems in Indonesia from March 2015-2016

Source: StatCounter Global Stats Top 8 Mobile Operating Systems accessed through http://gs.statcounter.com/#mobile_os-ID-monthly-201503-201603 on March 31, 2016 at 14.50 BST.

Based on the results of observation while committed researchers, by taking a sample of using charging the now thoroughly done on high school students/class X in particular Equal in SMA N 1 Jekulo KUDUS District in January 2016, the obtained results in Figure 2 as follows:

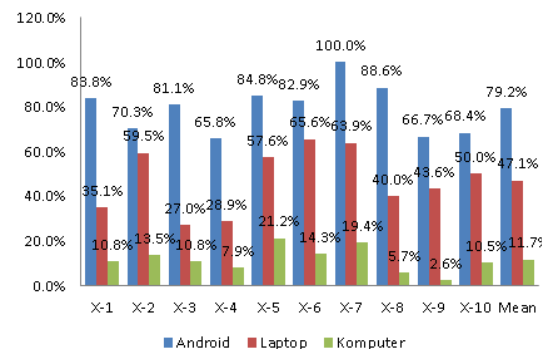


Figure 2. Graph The Percentage Of Student Ownership Of The Android, Laptops And Computers. Source: Data of observation class X 1 Jekulo High School.

From the data above, it is concluded, more effective use of the Android phones are used for learning media any time by teachers compared to a laptop or computer. Although on the other hand the use of laptops and computers still used

in learning and certain conditions, such as the learning of information technology and Communication while & presentation.

Seeing the potential, learning media development by utilizing cell phones prove very effective. Empowers teachers and students to be more up-to-date and innovative media available. And can direct students to optimize the use of the gadgets in the world of education. Learning media development by utilizing cell phones is making designs from existing Android application, intended for all cell phones berplatform Android. With reason, because the operating system Android is transformed into a system that is most widely used on Smartphones. In addition to the more practical and simple, it was a lot of Android smartphone affordable with a price range below 1 million rupiah. Proven among students already have the item dikisaran 79.2%.

Observation of field researchers done, there are some obstacles faced by PE teachers in the field. One of them is not all schools have indoor spaces for learning, PE, as well as the associated learning using the projector LCD (Liquid Crystal Display) that dirincikan on the basis of table 2 as follows:

Table 1. Pros and cons of the projector LCD (Liquid Crystal Display) with a cell phone

Descrip-tion	Android phone	LCD Projectors
Excess	Feature full use of the advantages of a practical, populist Price, using an open Software, batrai, can be developed by anyone, some phones put up with all kinds of weather	Can serve images as in desire, can be used by anyone, has a for sharp image quality
Weakness	Requires an internet connection, a small Sail for private use requires a power source Used	In the room is not practical use of specific price not stand with specific weather

Source: Observations on SMA N 1 January 2016, the KUDUS Jekulo

As for the limitations that must be enacted by teachers, especially teachers of PE when cell phone use in the field. So that learning does not deviate from the objectives that will be achieved.

One of them is the use of mobile phones in education should be under the control of the master. Expected students don't tend to be cool with his own, more so if open the site outside of the context of learning. So the teacher remains the controlling the students his protégé.

Therefore, through this final project researchers are motivated to develop an Android-based learning media through the application "APP Inventor2" designed specifically for learning PE by 2016. Expected, learning through the medium of the smartphone will be more practically be done anywhere and anytime, so can make students more easily in learning and fishing students to read.

APP Inventor is a visual programming used for developing Android-based applications with features that support in the form of drag-drop tool. Can we designed the user interface of an application using the web GUI (Graphical User Interface) builder, then we can specify behavior of the application by installing a block that fits like a puzzle while playing (the spacecraft computer, 2013:4).

APP Inventor applications completed on July 12, 2010 and was released to the public on December 15, 2010. Google APP Inventor project stop on December 13, 2011. APP Inventor is now held by MIT Centre for Mobile Learning with the name MIT APP Inventor (the spacecraft computer, 2013:4).

APP Inventor for Android is an application which basically provided by Google and now on maintenance by Massachusetts Institute of Technology (MIT). APP Inventor allows everyone to make software applications for the Android operating system. The user can use a graphical interface GUI and features drag and drop visual objects to create an application can run on the Android operating system (the spacecraft computer, 2013:6). The capacity of the data entered on the APP Inventor2 to create applications is only 10 MB including coding used. And only 5 MB capacity to smooth consumption.

APP Inventor using Kawa Language Framework and Kawa's Dialect developed by Per Bothner. Both of these applications are distributed as part of the GNU Operating System by the Free Software Foundation. Both of these applications are made as a compiler and translate the Visual Block. Programming to be implemented on the Android platform. Certainly users live enjoy the ease with which there is (a vehicle computer, 2013:6). The use of applications that were created using the APP Inventor2, used at least on Android Operating System 2.3

Users can create a variety of different applications using APP Inventor. Just by using your imagination as well as putting together a puzzle as it does command, users can make all the applications into a fun and powerful. These are the kinds of applications that can be created using APP Inventor, namely: applications games, application, education, location tracking-based applications, application, applications, complex web-based applications (Vehicle computer, 2013:12). Restrictions on research on design subjects PE also take the example of a learning material that is basketball. This study is focused to gauge the feasibility of the Android-based learning media on subjects PE. Researchers take the subjects of research on the students of class X SMA/Equal. The measurement is performed with the feasibility assessment instruments by some experts. Including media expert, expert content, experts, expert learning basketball, PE, as well as expert appraisers from the associated students. The instruments are made with a variety of indicators were tested kevaliditasannya.

In accordance with the translation of existing problems, as well as the results of the observations of the researchers who have done. Hence the need for cutting edge learning and innovative learning especially in the PE field. So researchers are motivated to do research with the title "APP Inventor2 Learning basketball at Grade X SENIOR HIGH SCHOOL in the KUDUS Year 2016". The Android-based learning media development in the form of a design application "APP Inventor2", using the methods of research and development (research and development).

METHOD

In Sugiyono (2016:407) research development referred to as research and development (research and development). Research Development is a cycle that begins from the existence of a need and require the solution of using a particular product. Step of the development process including pegumpulan information, develop product design, test validation, product trials, revision, test and off broad, mass products.

The subject of the test was a target that will be involved in research that is high school student/County-equivalents. By involving 2 class in high school N 1 Jekulo at the trials I, and II trials involving 1 class at each school that is HIGH SCHOOL N 1 BAE, SMK N 1 KUDUS, and KUDUS MAN 1.

Product Design

Fond of sport is an application created using the MIT software APP Inventor2 to dioprasionalkan on the system OS (Android). The application was designed with the goal of learning in PE as a media-driven technological development present, i.e. smartphoneAndroid. Diambilkan sample application design-making learning basketball at HIGH SCHOOL/class X Equivalent. As for the features or the look of the initial design after the creation of the product can be seen in table 2.

Types Of Data

The data to be collected in this study consists of two data, i.e. qualitative and quantitative data. a. Qualitative data is data about the development process of learning in the form of media criticism and suggestions from media experts, expert PE material, material experts basketball, practitioners of learning (teacher), and students; b. quantitative Data is data that is research principal appraisal data about the medium of instruction in the form of a paperback book from a digital media expert, expert, expert PE material material basketball, practitioners of learning (teacher), and students.




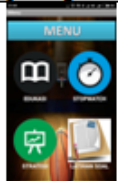





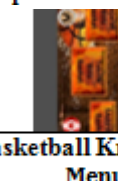
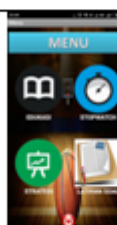
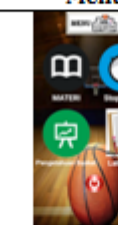
Data Collection Instruments

Data collection instruments used is the question form or questionnaire. The now used in this research is the question form, adapted from the digital pocket book development research for Android by Gian Dwi Oktiana (2015) with further development by researchers. Now it is a combination of open and closed as well as created in order to find out the opinions or student response regarding products that have been made. Question form to these students using Ghuttman which is a scale of measurement by using two answers that is Yes-No, benar-salah, never-never, negative, etc. (Sugiyono, 2011:139). Feasibility study on media instruments generally use the Likert scale with 4 alternative answers (Sugiyono, 2011:93): excellent, good, sufficient, and less. Question form an opinion or response will be distributed to students as a respondent.

Analysis of The Data

Test of normality for the withdrawal decision on data treatment group and the control group test-circling, using SPSS test two samples free to know the numeric probability in the control group and the Group circling with Kolmogorov-Smirnov test calculations. And the paired samples tests to find out the probability of inc-

Table 2. The features or the look of the initial design of end product applications..

Expert	Critisem	Early Design	Revision Design
	a. Video display is too small b. Make simple but shows the identity of the person is easy to know.		
		The opening Welcome	The opening Welcome
	a. Is too simple and less attractive b. Design a neat menu Setup and bersymbol.		
		Main menu	Main menu
Supervisor	a. Writings on education, provide a Setup menu color that is easy to read		
		Educational Menu	Educational Menu
	a. Design simple but memorable or classy look according to the theme of learning.		
		Stopwatch Menu	Stopwatch Menu
	a. Menu strategy is not used on a class X b. Adjust design with learning material grade X.		
		Strategy Menu	Basketball Knowledge Menu
Media	a. remove the status bar and title visible. b. design pictures a bit dark, but not a fatal effect. c. too much usage data.		
		There is a status bar and title visible	Without the status bar and title visible

reased numbers pretest-posttttest group-circling. (2014:114-128 santoso, Singgih). As well as test the Gain to know the level of criteria results circling.

$$g = \frac{S_{post} - S_{pre}}{S_{max} - S_{min}}$$

Description:

S_{post} = Score postes

S_{pre} = Score pretes

S_{max} = maximum Score that may accrue to the students

Table 3. Index Gain Criteria.

Interval Criteria	Gride
$g > 0,7$	high
$0.3 < g < 0.7$	normal
$g < 0,3$	low

From Archambault (Maulana,2014)

RESULTS AND DISCUSSION

Large Scale Trials

Discharging test (test wide scale) implemented in the CMS BAE, SMA 1 1 1 MA and KUDUS KUDUS, starting on 3-17 September 2016. The number of subyekyang used in the trial of a wide scale is 1 dimasing-masing school class of 110 students. (Image or photo activity test wide scale attached in the appendix).

At this stage of the analysis of this data, the data of wide scale trial results (data in the form of observations, the question form, documentation) are analyzed in a descriptive analytic, by doing pencermatan and deep examination of the information and or feedback that can be dija-ring from the subject of the trial.

Indicator to determine whether the results of the model product development application APP Inventor2 is in compliance with the purpose of the research is to assess how appropriate indicators that have been created from the approval of expert appraisers. The table details the results of the assessments that have been conducted trial researchers in wide scale can be seen in table 4.

Obtained results tenormalisasi criterion on the level test Gains against large scale trials data i.e. the level of cognitive, psychomotor and criteria of the average yield is high (a value of ≥ 0.7).

Table 4. The Vast Scale ofThe Trial Results.

X-IPS 2		Students		Value		
No	SMA 1 BAE	K	p	A	R	
1.	Pretest	36	26	37	80	48
2.	Posttest 1	36	55	54	80	63
3.	Posttest 2	36	80	92	80	84
4.	Proggres		54%	55%	0%	36%
X-MIPA 5		Students		Value		
No	MAN 1 KUDUS	K	P	A	R	
1.	Pretest	37	30	42	80	51
2.	Posttest 1	37	57	67	80	68
3.	Posttest 2	37	79	90	80	83
4.	Peningkatan		49%	48%	0%	32%
X-AK 3		Students		Value		
No	SMK 1 KUDUS	K	P	A	R	
1.	Penilaian Pretest	37	21	41	80	47
2.	Penilaian Posttest 1	37	63	67	80	70
3.	Penilaian Posttest 2	37	80	91	80	84
4.	Peningkatan		59%	50%	0%	37%
School		Students		Average		
No		K	P	A	R	
1.	Large scale	110	80	91	80	83,7
2.	proggres		54%	49%	0%	35%

No	Grade	Students K	Gain Value	Gain Value			
				High P Category	High A Category	High R Category	High Category
1.	Large scale	110	0,7	0,9	0,0	0,7	Category

Sumber : Data primer yang diolah
Description: a) K: Cognitive; b) P: Psychomotor; c) a: Affective; d) R: average

On the affective aspect, low level criteria (values ≤ 0.7). While at class level control criteria of cognitive, affective and the average low gets results (value ≤ 0.3), on psychomotor aspects get high criteria (the value of ≥ 0.7).

The data obtained were tested using normality Descriptive Statistics-explore on SPSS. Since the data obtained

Table 5. Wilcoxon Signed Ranks Test

		Ranks		
		N	Mean Rank	Sum of Ranks
After- Before	Negative Ranks	0 ^a	.00	.00
	Positive Ranks	37 ^b	19.00	703.00
	Ties	0 ^c		
	Total	37		

- a. After < Before
- b After > Before
- c. After = Before

Test Statistics ^b		Sesudah - Sebelum
Z		-5.313 ^a
Asymp. Sig. (2-tailed)		.000
a. Based on negative ranks.		
b. Wilcoxon Signed Ranks Test		
Sumber SPSS		

Decision:

Because angka in column ASYMP. SIG is 0000 far below 0.05 then Ho denied. This means the learning media use with Android, effective for the enhancement of student learning outcomes.

Table 6. Two-Sample Kolmogorov - Smirnov Test

		Frequencies	
		Ujicoba	N
Nilai	1	1	40
	2	2	37
	Total		77

Test Statistics ^a		Nilai
Most Extreme Differences	Absolute	1.000
	Positive	1.000
	Negative	1.000
Kolmogorov-Smirnov Z		4.384
Asymp. Sig. (2-tailed)		.000
a. Grouping Variable: Ujicoba		
Sumber SPSS		

Decision:

Because angka in column ASYMP. SIG

is 0000 which is much below the 0.05 so Ho is rejected. This means the learning media use with Android, effective for the enhancement of student learning outcomes.

Table 7. Recap Of The Opinion Of The Students About Media

No	Name School	Total	Percentase
1	X-IPS 2 SMA 1 BAE	36	93,06%
2	X-MIPA 5 MAN 1 KUDUS	37	84,23%
3	X-AK 3 SMK 1 KUDUS	37	97,75%
Jumlah		110	275,04%
Rara-rata Persentasi "Ya"		36	91.68%

source: primary Data are processed

Upon tabular data test results, wide scale looks tests that nearly all aspects of the look has been very good with the difference between a satisfying achievement upswing.

Cognitive

Comparison of large scale test results data class circling (BAE, SMA 1 MAN 1, CMS 1 KUDUS) and control classes (X-IPS5) that has been processed, the obtained results an increase in the learning achievements of students in the cognitive domain. Improvement of the cognitive domain SMA 1 BAE-circling on the class of the pretest and posttest data, obtained as a result values in the pretest and posttest results 26 of 80, so an increase of 54% was obtained. Improvement of the cognitive domain MAN 1 in class-circling from pretest and posttest data, obtained as a result values in the pretest and posttest results of 30 of 79, so improvement is acquired for 49%. Improvement of the cognitive realm CMS 1 class-circling the KUDUS of pretest and posttest data, obtained as a result values in the pretest and posttest results 21 of 80, so an increase of 59% was obtained. Obtained average results on a massive scale, an increase of 54%. The increase occurred in the control class by 4%, which only get value 22 on pretest and 26 on posttest. So the difference between the results obtained by the increase of posttest with control-circling between

classes by 50%. It can be concluded that the use of Android on PE learning can improve student learning outcomes in the cognitive domain.

Psychomotor

Comparison of the results of a large scale test data class circling (BAE, SMA 1 MAN 1, CMS 1 KUDUS) and control classes (X-IPSS) that has been processed, the obtained results an increase in the learning achievements of students in the psychomotor domain. The increase in psychomotor domain SMA 1 BAE-circling on the class of the pretest and posttest data, obtained as a result values in the pretest and posttest results of 37 of 92, so improvement is acquired for 55%. The increase in psychomotor domain MAN 1 in class-circling from pretest and posttest data, obtained as a result values in the pretest and posttest results of 42 of 90, so improvement is acquired for 48%. The increase in psychomotor domain SMK 1 class-circling the KUDUS from the pretest and posttest data, obtained as a result values in the pretest and posttest results of 42 of 91, so improvement is acquired for 49%. Improvement on the class control of 38%, obtained from the difference between the results of the value in the pretest and posttest results amounted to 54 of 92. So the difference between the results obtained by the increase of posttest with control-circling between classes of 11%. But the difference in the increase of the value of the class description, circling and posttest grade control is obtained that is-3%, the value of the control's class of 92 and 89-circling of class. It can be concluded that by using or without using Android on PE learning can improve student learning outcomes in the psychomotor domain. Because in the psychomotor domain relies heavily on the ability of the child as well as exercises given by the teacher.

Affective

On the affective domain is not an increase in on-circling class or class control. The results obtained from the teacher is good value with accumulated keangka i.e. 80. So it can be concluded that using or without using Android on PE learning can not improve student learning outcomes in the affective domain. Because the affective domain depends heavily on the personality of the child, which is essentially the student is indeed well behaved all in all schools.

The average

The results obtained from the average of these three aspects, for the class and for circling amounted to 83.7 control class of 66. The diffe-

rence in improvement between class and grade control of circling 17.7%. So that it can be summed up with an Android-based learning can improve student learning outcomes better at circling class compared to the control class.

The opinion of the students and teacher assessment

Recapitulation of the opinion of the students as much as 110 students with 6 indicator problem, obtained the approval rate of the use of media that have been made by researchers of 91.68%. It can be concluded that learning media created by researchers and accepted students with excellent judgment.

Based on data obtained at the top, then the product is evaluated by experts and teachers to determine feasibility of the use of the product. Data results obtained by researchers from experts/experts and supporting teachers in wide scale test.

Based on the table above, it can be seen the total results of the assessment of all aspects of the media, experts PE, expert learning basketball and learning practitioner PE. Charging results questionnaire given by the media expert of 83.33% concluded with **Good** criteria. The results of questionnaires given by experts of PE 85% concluded with **Good** criteria. The results of questionnaires given by experts of basketball learning 97.50% concluded with **Verry Good** criteria. And the results of questionnaires provided by practitioners learning PE of 96.71% concluded with **Verry Good** criteria. The average percentage of all aspects on the basis of the assessment of appropriate experts in the field, Android-based learning media development, obtained the percentage of 91.56% and the average teachers ' assessment of learning acquired 93.10%. Based on predetermined criteria, then it meets the criteria exceptionally well.

CONCLUSION

The end result of this development is a development application APP Inventor2 named "Love sports" which is used to smartphoneAndroid with a basketball on the material grade X senior high school Equivalents. This application is a media learning material and exercises a matter that could be used both offline and online. Big 10, 3 MB hard data with a slight error at the time of pengoprasionalan, but no impact damage smartphone users.

The results obtained from the average of these three domains (cognitive, psychomotor,

affective) to class-circling of 83.7 and to control class of 66. The difference in improvement between class and grade control of circling 17.7%. It can be concluded with an Android-based learning can improve student learning outcomes better at circling class compared to the control class. So the existence of the terbukrti effect of the Android-based learning strategies to change the learning achievements.

Protable designs are available in the application include a basketball matter offline as well as online to the learning process inside there are CATEGORIZED (Worksheet students), knowledge of the basketball match the material performed a offline dioprasonalkan, stopwatch as a menu extra, menu as well as a quiz to evaluate the level of cognitive development of students.

Recapitulation of the opinion of the students as much as 110 students with 6 indicator problem on a large scale, it brings a level of approval of the use of media that have been made by researchers of 91.68%. It can be concluded that learning media created by researchers and accepted students with excellent judgment.

The average percentage of all aspects on the basis of the assessment of appropriate experts in the field, Android-based learning media development, obtained the percentage of 91.56% and the average teachers ' assessment of learning acquired 93.10%. Based on predetermined criteria, then meets the criteria very well, sehinggalayak used to study PE. kalayak rame and give effect to the improvement of learning are very good especially in the cognitive domain. It can even be developed in other PE learning materials, as well as on the subjects taught in schools.

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