Development of Android-Based Learning Media With Smartapp Creator Media On The Subject Of Ipa Reproductive Material In Humans Class 9 SMP Negeri 2 Tawangsari

Yakub Eriyanto Sulistyono [a,1], Anita Trisiana [b,2], Alfonsa Maria Sofia Hapsari [b,3]

[a] Universitas Slamet Riyadi, Sukoharjo, Sukoharjo 57552, Indonesia

[b] Universitas Slamet Riyadi, Surakarta, Surakarta 57136, Indonesia

[1] yakuberiyanto02@gmail.com; [2] anita.trisiana@unisri.ac.id; [3] alfonsamaria79@gmail.com

Abstrak

The research aimed to evaluate the feasibility of Android-based learning tools crafted with Smartapp Creator for Grade 9 Science students at Tawangsari State Junior High School 2, focusing on human reproduction. Utilizing the Research and Development (R&D) method with the ADDIE model, the study encompassed phases such as Analysis, Design, and Evaluation. Data was collected via interviews, questionnaires, and documentation. Media validity was gauged by specialists in media, subject matter, and local Science teachers. Analysis relied on the Likert scale for media feasibility scores and blackbox testing. The study's findings included (1) The Android-based media on human reproduction proved functional and purposeful, affirmed by blackbox testing. (2) Feasibility scores, as determined by media experts, were high. Subject matter specialists rated it at 96% ("very feasible"), while local Science teachers rated it at 86%.

Keywords: *Development, Media Learning, Android, Smart Apps Creator, Science, Reproduction in Humans*

A. Introduction

Information and communication technology in this era greatly affects many aspects of social life, including the education department**.** The development of the fields of knowledge, education, and technology has a role to play in advacing and developing learning media that help in the learning process and improve the quality of instruction for the student. At this time, data and communication technology in the field of education has been developed continuously and has begun to implement each subject, so it is necessary to develop and adjust to various subjects in schools with various kinds of innovations in order to make it easier for teachers and students to understand learning.

Learning is declared good learning if the teacher can create a learning environment where all understudies are dynamic within the learning process and are involved in a process of changing behavior from not knowing to knowing and from not being able to become able to (Kaharuddin, 2020). The learning process requires technological advances in order to channel information and expand the range of learning as a supporting medium for students to learn without any time and place restrictions in order to get optimal results (Kulaphettong, 2015). There are many basics of knowledge about their application and use in teaching and learning activities in schools. In schools, as the improvement of data and communication innovation begins to be implemented in each subject, this can be expected to improve the quality of learning for students by helping them explore and understand the material provided by the teacher, while the teacher himself is required to be able to also develop and continue to learn related to the demands on moving forward the quality of educational materials (Darmawan, 2014).

One way to move forward the quality of learning is to extend students' interest in learning based on pressure-free and fun learning, without forgetting the core aspects of learning, by creating interactive learning media with innovative designs in accordance with the times and existing innovation. Learning media becomes a link between teachers and students. The use of learning

media as an auxiliary medium in teaching and learning activities can have an influence on the atmosphere and environmental conditions when teaching that has been arranged by the teacher.

The development of technology itself has created an Android-based operating system that is today very easy to use by all age groups. The impact of the rapid development of technology has caused students to now be able to operate the Android system, especially on smartphones. With the existence of smartphones, they can have an effect on daily activities and provide various conveniences in their use. However, the use of smartphones itself cannot be utilized as a medium to support teaching and learning activities and is only used as an entertainment medium for students and teachers. Although in some aspects it has begun to use smartphones as a support for teaching and learning activities during the COVID-19 pandemic, its utilization is limited as a place to interact in giving assignments to students, and the lack of interaction between teachers and students causes distance learning during the COVID-19 pandemic. Students only understand how to do their assignments but do not understand the content of the material provided. (Yallah & Huda, 2022)

The utilization of smartphone media is considered inadequate in teaching and learning activities and student interests applications that can be accessed without being limited to space and time or can be interpreted as accessible anywhere and anytime, so researchers develop interactive modules based on Smart Apps Creator, which are developed and adjusted so that they can be utilized more for educating and learning exercises that are more varied and look more attractive, and the media used can better support teaching and learning activities for students and teachers in explaining material to students.

Gerlach and Ely define media broadly as human materials or occasions that construct conditions that make learners (understudies) able to obtain information, abilities, or demeanors. In this sense, instructors, course readings, and the school environment are media. More particularly, the definition of media within the learning handle tends to be deciphered as realistic, photographic, or electronic devices to capture, prepare, and recompile visual or verbal information (Nurfadhillah, 2021), while the definition of media according to (Trisiana, 2020) Media is anything that can be used to send all messages from the sender to the recipient, so that it can stimulate thoughts, feelings, learner attention, interest, and attention, so that the learning process can take place.

Smart Apps Creator has several advantages when used in learning, including: (1) Smart Apps Creator is an application that does not require programming knowledge, so it can be a solution to become a learning medium. (2) This application only requires a small amount of storage space so that it can be sent via social media, such as Grub Chat. (3) The output of this application product is in the form of files in HTML5,.exe, and apk formats, with the ease of being accessed on various platforms compatible with previous file formats. (4) The display is easy to understand, so that information between teachers and students is easily provided through visual communication. In addition, an interesting way of presenting material can be combined and turned into an interesting quiz or an educational game. (5) Become a learning process guidance application with easy access via smartphone, *personal computer* (PC), and laptop. (6) It can be a media solution for independent and group learning (Azizah, 2020).

Based on the perceptions made by analysts amid the teaching campus activities at SMP Negeri 2 Tawangsari Sukoharjo, within the handle of educating and learning **exercises**, the majority of teachers still use conventional learning media and simple PowerPoint media. Moreover, current learning has begun to implement independent learning, better known as Merdeka Belajar, in order to increase the viability of learning and increase the proficiency of direction and learning exercises within the school environment. Confinements within the utilization of reproducible learning materials mean that teaching and learning activities are not maximized. The teaching materials used

2

Andi Risyanto dkk.   Perlindungan Sosial Terhadap Hak Atas Akses…

are also too monotonous by relying only on textbooks, and when using PowerPoints, they are limited to simple PowerPoints that only display text and images that seem boring, so that the objectives of quality learning are difficult to achieve.

B.   Research Methods

This inquiry about and advancement points to get android-based learning media products with smart apps creator media in science subjects for grade 9 junior high school students The research model used is the ADDIE model developed by Dick and Carry, which consists of 5 stages that include analysis (*analysis*), design (*design*), development (*development*), implementation (implementation), and evaluation (evaluation) (Sugiyono, 2019). In this study, the implementation stage was carried out by conducting *Blackbox testing* on the learning media application.

The analysis stage was carried out by conducting interviews with science teachers at SMP Negeri 2 Tawangsari Sukoharjo. The interview was conducted to find out the existing learning situation at school and the problems faced by teachers in using technology-based learning media in classroom learning.

The design stage is the stage where researchers compile and design the learning media to be made in accordance with the data obtained during the analysis stage. This stage is carried out sequentially, specifically, and systematically by reviewing core competencies and basic competencies to determine learning materials in accordance with the applicable curriculum with a basis in the competence of human reproductive material.

The development stage is the stage of making learning media products as teaching materials that will be tested for feasibility and combining the content of the material that has been designed in such a way at the design stage into a product that is prepared to be actualized in accordance with the inquired-about goals.

The execution plan is the arrangement for executing the learning media items that have been created and designed. The learning materials that were created were then applied to actual situations and conditions by conducting *blackbox testing*. *Blackbox testing* is a stage of testing how the actions performed on the designed learning media work. After *blackbox testing*, researchers carry out the next stage, namely implementation, with material experts, media experts, and science subject teachers on the learning media that have been made.

The evaluation organization is responsible for assessing the learning media that have been tested. The results of the evaluation are obtained from suggestions from fabric specialists, media specialists, and science instructors about the usage of learning media. The subjects of this development research are material experts, totaling 1, who are lecturers who are competent in testing science learning materials; media experts, totaling 1, who are lecturers or experts who are competent in testing product media in terms of design and appearance; and a science subject teacher from SMP Negeri 2 Tawangsari Sukoharjo, totaling 1, who will test the feasibility of scientific learning materials**.** The object of this study is an Android-based learning tool medium with *Smart Apps Creator* on science subjects related to human reproduction.

The data collection techniques used in this research are: (1) interviews, in order to explore and find the data information needed for the improvement of learning media. (2) Questionnaires consisting of a set of questions for materials specialists**,** communications specialists**,** and science teachers to assess the feasibility of learning media. (3) Documentation by collecting data and utilizing data in the form of photos of research activities.

Questionnaires (questionnaires) to experts and science teachers on a Likert scale with intervals of 1 to 5 with the most elevated score of 5 and 1 as the least score then calculated using a percentage of all aspects. This validation calculation uses the formula (Abdullah & Yunianta, 2018).

$$P = \frac{S}{N} \times 100\%$$

Description:

P = Percentage of sub variables

S = Total score of each sub

N = Maximum number of scores

Furthermore, the results of the calculation are classified according to the categories in the following table:

Table 1. Validity Table

No	Interval	Category
1.	0% - 20%	Very Unfit
2.	21% - 40%	Not Feasible
3.	41% - 60%	Decent Enough
4.	61% - 80%	Worth
5.	81% - 100%	Very Feasible

C. Results and Discussion

The model used in this research is the ADDIE model which consists of 5 stages*,* namely *Analysis, Design, Development, Implementation,* and *Evaluation.* The description of the results of the five stages is as follows:

a) Analysis Stage

Based on the results of the interviews conducted, it can be concluded that in teaching and learning activities, students are less interested in the learning media utilized in the form of LKS, bundle books, and simple power points, which causes the delivery of material by the teacher to be less than optimal. In this case, the curriculum used at SMP Negeri 2 Tawangsari, Sukoharjo, is the 2013 curriculum (K13), where K13 itself requires students to be more dynamic in educating and learning activities and teachers can be more creative in using learning media as an apparatus for educating and learning exercises. The lack of utilization of creative and practical learning media in instructing and learning exercises, particularly within the field of technology itself, made researchers decide to develop Android-based learning materials using a smart app maker so teachers can more easily convey learning material. The selection of the *Smart Apps Creator* application is because this application is easy to use by new users who do not have the basics of complicated programming.

b) Design Stages

At the design stage, researchers begin to create Android-based learning materials with Smart App Builder by determining and systematically compiling the materials needed as a reference that will be used in learning media. The materials needed include images, subject matter, and practice questions. Making Android-based learning media uses the Canva application *software* to create a display design that will be displayed on the media, create buttons, create the basic appearance of the application (the background), and add a logo. The following is a display of the design stages with the Canva application (Figure 1).

Image 1. Display of the creation of learning media design stages

c) Development Stages

At the development stage, researchers realize the conceptual framework into a form of Android-based learning media application that is ready to be implemented in accordance with the destinations of the study. The media development process is to combine all the materials that have been compiled and prepared into a program that can be used on an Android smartphone. Researchers use Smart Apps Creator 3 *software* as a means of developing media into interesting applications. The results of combining with Smart Apps Creator 3 *software* can be exported into an output in the form of an Android file (*.apk), which can make it easier for users to operate it on an Android smartphone. The following is the intro design display (Figure 2) and the *start* menu display (Figure 3).

Image 2. Intro view of learning media

Image 3. Start menu display of learning media

After the intro and *start* menu display, the main menu of the learning media is displayed which consists of menus, KI/KD, material, quiz, help and profile. The following is an image of the main menu page of the application (Image 4).

Image 4. Main menu display of the application

An example of the KI/KD menu display in the application (Image 5).

Image 5. Display of KI/KD menu contents

In the material menu there is a separate menu selection sub menu that contains several sub menu learning materials (Figure 6) and for example the display of material from the sub menu (Image 7).

Image 6. Material menu display

Image 7. Material sub menu display

Based on data collected from educator interviews, questions from the application are linked to a google form from the teacher (Image 8).

PROSIDING
The 5ᵗʰ International Conference on Technology, Education, and Social Science Vol. 1, No. 1 *September,*
2023 **"Human Security in Multidisciplinary Perspective (Mainstreaming Sustainable Development Goals Toward a Post-Pandemic Society)"**
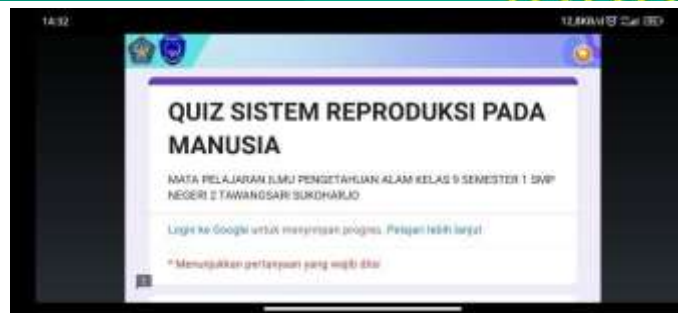
Image 8. Quiz menu interface

Next is the help menu, which contains various information related to the navigation buttons in the application and also information about some command buttons (Image 9). And finally there is a profile menu that contains information related to the application developer.

Image 9. Help menu interface

d) Implementation Stage

After developing the application, the next step is to implement the application to *expert judgment* consisting of material experts, media experts and teacher educators, but before the implementation stage is carried out to expert judgment*,* testing is carried out by means of *blackbox testing.*

Table 2. Blackbox testing results

No	Test Scenario	Testing Results	Display on the device	Conclusion
1.	App Icon	Appears after installation on android smartphone	In accordance with the expected results	Valid
2.	Pressing the MEDIPA app icon	The application opens and displays the intro then goes to the start menu page	In accordance with the expected results	Valid
3.	Pressing the start button on the start menu	The display moves to the main menu page which consists of 5 options	In accordance with the expected results	Valid
4.	Pressing the KI/KD menu button	The display switches to one that contains information about core competencies and basic competencies.	In accordance with the expected results	Valid
5.	Pressing the Material menu button	Display bepimdah to a page containing a menu of sub-chapters of reproductive material in humans	In accordance with the expected results	Valid

Andi Risyanto dkk. *Perlindungan Sosial Terhadap Hak Atas Akses…*

PROSIDING
The 5th International Conference on Technology, Education, and Social Science   Vol. 1, No. 1 *September,*
2023 **"Human Security in Multidisciplinary Perspective (Mainstreaming Sustainable Development Goals Toward a Post-Pandemic Society)"**

6.	Pressing the Quiz button	The display of the application moves to a page containing a quiz connected to the google form application.	In accordance with the expected results	Valid
7.	Pressing the Help menu button	The view of the app switches to the help page, which contains descriptions of the various functions of the buttons in the app.	In accordance with the expected results	Valid
8.	Pressing the Profile menu button	The display moves to a page with the profile of the app developer	In accordance with the expected results	Valid
9.	Pressing the navigation button corresponding to the icon	The display of the application will move according to the choice of icon pressed	In accordance with the expected results	Valid

Based on the comes about of the blackbox test, the conclusion is this android-based learning media application can run well in accordance with the functions and needs of the android operating system and is only designed to run on smartphones that use the android system by first installing it on a smartphone, so that henceforth it can be used by teachers and students as learning media in teaching and learning activities.

The results of research conducted by (Mahuda, Meilisa, and Nasrullah, 2021) in the application there are instructions, competency standards and basic competencies, material summaries and quizzes consisting of practice questions and overall material evaluation. While the learning aids that researchers are creating include Core Skills and Core Competencies (KI/KD), documents, questions, help, and records are organized sequentially and follow the skills contained in the curriculum that belong to the teachers of the school SMP Negeri 2 Tawangsari Sukoharjo. The syllabus of learning activities can be seen. KI/KD contains information about center competencies and fundamental learning competencies. The fabric comprises of 3 sub-chapters of material from human reproduction. Quiz is part of the evaluation which consists of 5 questions and is directly connected to google form and can be seen directly on google form from the teaching teacher. Help contains information about the function of the buttons in the application. Profile contains information from the developer of the learning media application. Testing carried out by researchers with *blackbox testing* tests whether the application runs in understanding with the anticipated comes about within the test situation, after which the next test is testing to *expert judgment* to material experts, media experts and science subject teachers.

e) Evaluation Stage

The evaluation stage of the ADDIE research was modified because the research was only limited to *expert judgment,* so the evaluation came from the responses and input from the expert judgment.

    a. Data on feasibility test results from material experts

        Learning media testing was carried out by one expert who mastered science learning materials who was a FKIP Lecturer from Slamet Riyadi University Surakarta.

Table 3 Material expert validation results

Aspects	No.	S	N	Per	Percentage	Description

PROSIDING
The 5ᵗʰ International Conference on Technology, Education, and Social Science   Vol. 1, No. 1 *September,*
2023 **"Human Security in Multidisciplinary Perspective (Mainstreaming Sustainable Development Goals Toward a Post-Pandemic Society)"**

	No	S	N	Aspects	Feasibility	Description
Curriculum	1	5	5	15	100%	Very Feasible
	2	5	5			
	3	5	5			
Content	4	4	5	23	92%	Very Feasible
	5	5	5			
	6	4	5			
	7	5	5			
	8	5	5			
Media	9	5	5	10	100%	Very Feasible
	10	5	5			
Total score			**50**	**48**	**96%**	**Very Feasible**

The comes about of the appraisal of learning materials of document experts include aspects of the program reaching a 100% feasibility rate with a very feasible category, aspects of the content of the material reaching a feasibility rate of 92 % with very viable category, And media aspects achieve a 100% viable percentage with a highly viable item. All result of the materials expertise achieves a viable percentage of 96% with **very feasible** category.

b. Data from the feasibility test results by media experts

Learning media testers were conducted by one media expert who mastered the field of media design, namely FKIP lecturers from Slamet Riyadi University Surakarta.

Table 4. Media expert validation results

Aspects	No	S	N	Per Aspects	Percentage Feasibility	Description	Aspects
Visual	1	4	5		22	88%	Very Feasible
	2	4	5				
	3	5	5				
	4	5	5				
	5	4	5				
Programming	6	5	5		23	92%	Very Feasible
	7	5	5				
	8	5	5				
	9	4	5				
	10	4	5				
Total score			**50**		**45**	**90%**	**Very Feasible**

The results of the assessment of learning media from media experts consist of visual aspects getting feasibility rate is 88% with very viable portfolio and for programming aspects getting a feasibility percentage score is 92% for the very viable category. The final result of media expertise is a probability of 90% percentage score with a **very feasible** category.

c. Data on the results of the feasibility test by science subject teachers

The learning media test was conducted by one science subject teacher who is a science subject teacher at SMP Negeri 2 Tawangsari Sukoharjo.

Table 5. Science subject teacher validation results

Aspects	No.	S	N	Per	Percentage	Description

PROSIDING
The 5ᵗʰ International Conference on Technology, Education, and Social Science   Vol. 1, No. 1 *September,*
2023 **"Human Security in Multidisciplinary Perspective (Mainstreaming Sustainable Development Goals Toward a Post-Pandemic Society)"**

				Aspects	Feasibility	
Design	1	5	5	17	85%	Very Feasible
	2	5	5			
	3	3	5			
	4	4	5			
Operational	5	5	5	9	90%	Very Feasible
	6	4	5			
Visual Communication	7	4	5	17	85%	Very Feasible
	8	5	5			
	9	4	5			
	10	4	5			
Total score			**50**	**43**	**86%**	**Very Feasible**

Results of assessment of learning materials from science subject teachers consist of the design aspect getting a score of 85% with the very feasible item**,** the operational aspect reaching 90% with the very feasible item and the last aspect of visual communication getting a score of 85% with a very viable portfolio**.** Overall rating of science subject teachers get a score of 86% with a **very feasible** category.

Based on the results of research done by tests android learning media applications to *expert judgment* to decide the achievability of learning media, the results are in understanding with investigate conducted by (Mahuda, Meilisa, and Nasrullah, 2021) which in the research conducted obtained results within the frame of an android learning media application that was created suitable for use as a learning medium.

D. Conclusion

Based on the over inquire about comes about, it can be concluded that the item is fabricated within the frame of an android-based learning medium with a means of creating intelligent applications in the sciences of human reproductive devices. The results of the tests using the black box test are valid, which can work well according to the needs and desired functionality. For the application to work properly. The research process uses the learning media development procedure according to Dick and Carry, which has produced Android-based learning media with Smart Apps Creator media human reproductive science subjects by going through several stages, namely the analysis stage, design stage, development stage, implementation stage, and evaluation stage. But in this study it is only limited to the feasibility test of learning media by fabric specialists, media specialists, and science subject teachers at SMP Negeri 2 Tawangsari Sukoharjo.

Android-based learning media is tried for possibility utilizing a media feasibility testing system with an assessment, obtained from a feasibility percentage score by material experts of 96% with a **very feasible** category, from media experts getting a feasibility percentage score of 90% with a **very feasible** category and from science language subject teachers at SMP Negeri 2 Tawangsari Sukoharjo getting a feasibility percentage score of 86% with a **very feasible** category.

References

Abdullah, F. S., & Yunianta, T. N. H. (2018). Pengembangan Media Pembelajaran Matematika Trigo Fun Berbasis Game Edukasi Menggunakan Adobe Animate Pada Materi Trigonometri. *AKSIOMA: Jurnal Program Studi Pendidikan Matematika*, *7*(3), 434. https://doi.org/10.24127/ajpm.v7i3.1586

Azizah, A. R. (2020). Penggunaan Smart Apps Creator (SAC) Untuk Mengajarkan Global Warming. *Prosiding Seminar Nasional Fisika (SNF) UNESA*, 72–80.

Darmawan, D. (2014). *Inovasi Pendidikan : Pendekatan Praktik Teknologi Multimedia dan Pembelajaran Online*. PT. Remaja Rosdakarya.

Kaharuddin, A. (2020). *Pembelajaran Inovatif dan Variatif*. Pusaka Almaida.

Kulaphettong, K. D. (2015). Developing of M-Learning for Discreate Mathematics Based on Android Platfrom. *Journal of Procedia Social and Behavioral Science*, 197.

Mahuda, I., Meilisa, R., & Nasrullah, A. (2021). Pengembangan Media Pembelajaran Matematika Berbasis Android Berbantuan Smart Apps Creator Dalam Meningkatkan Kemampuan Pemecahan Masalah. *AKSIOMA: Jurnal Program Studi Pendidikan Matematika*, *10*(3), 1745. https://doi.org/10.24127/ajpm.v10i3.3912

Nurfadhillah, S. (2021). *Pengertian Multimedia, Fungsi, Manfaat, Jenis-Jenis Media Pembelajaran, dan Cara Penggunaan Kedudukan Media Pembelajaran*. CV Jejak. https://books.google.co.id/books?id=zPQ4EAAAQBAJ

Sugiyono. (2019). *Metode Penelitian Pendidikan*. Alfabeta.

Trisiana, A. (2020). Penguatan Pembelajaran Pendidikan Kewarganegaraan Melalui Digitalisasi Media Pembelajaran. *Jurnal Pendidikan Kewarganegaraan*, *10*(2), 31. https://doi.org/10.20527/kewarganegaraan.v10i2.9304

Yallah, S. O. R., & Huda, Y. (2022). Pengembangan Media Pembelajaran Smart App Creator3 Berbasis Android pada Mata Pelajaran Kerja Bengkel dan Gambar Teknik di SMKN 1 Sumatera Barat. *Jurnal Pendidikan Tambusai*, *6*(1), 1244–1255.