

Android-based CERMAT (Cerdas Mengenal Pubertas) Media Development in Enhancing Students Understanding of Puberty as a Part of Sex Education for Elementary School Students

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Abstract

This research was established because of the widespread sexual abuse of children. Additionally, students' learning outcomes on puberty subject matter at SDN Purwoyoso 02 are yet to be considered proper. The aims of this research are developing android based CERMAT (Guide to Puberty) learning media to enhance students' understanding about puberty on elementary school level; testing the media feasibility; and examining students' understanding improvement on puberty through the implementation of android based CERMAT learning media. This research was using the RnD method with ADDIE development model (analyze, design, development, implementation, and evaluation). The subjects of this research are 6th grade students of SDN Purwoyoso 02 Semarang City. The data were obtained through a test with multiple choices. Through the media, material, and language expert judgements, android based CERMAT learning media was proven to be "very feasible" to be implemented. The results obtained through t-test on students' pretest and posttest gained sig. (2-tailed) score of 0,000, which means that sig. (2-tailed) 0000 < 0,05 Ho is rejected, and Ha is accepted so, android-based CERMAT learning media can enhance students' understanding about puberty. Meanwhile, the n-gain test of the pretest and posttest obtained a score of 0,57 (57%) and categorized "Quite Effective" with a score difference of 25,09. Based on the result of the study, it can be inferred that android based CERMAT learning media development is considered feasible and effective in enhancing 6th grade students' mastery of the subject matter puberty.

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INTRODUCTION

In an attempt to face future challenges, education becomes one of the ways to build and improve personal qualities. The rapid development of knowledge and technology brings some changes in education in Indonesia. Syahputra (2018) argued that 21st Century challenges in education is the ICT (Information and Technology) literacy skill mastery for every associated stakeholder; teachers, students, and parents. Additionally, Septikasari & Frasandy (2018) stated that in 21st century education, students must possess some skills such as critical thinking, collaboration, communicative, creative, and problem solving. Upcoming challenges are possible as the impact of the new economic system which was supported by entrepreneurship, technology, and innovation. By possessing 21st century skill students are expected to be able to adapt to the global market in the future (Malik, 2018).

Carrying 21st century learning activity in elementary school is different from any other levels of education. Teachers must determine and be aware of students' development aspects. Hayati et al. (2021) explained that learning design for elementary school students must be adjusted to students' needs: they love to play; they love to move; they love group activities; and they love being engaged in direct learning. Learning media become alternatives in meeting students' needs. Learning media is a tool to convey any kind of information in order to build a conducive learning environment to create an effective and efficient learning process. Kereluik et al. (2013) argued that the implementation of technology in this 21st century education plays an important part as the medium between the teacher and the students. Astiti et al. (2021) stated that science learning activity in elementary school were oriented towards teacher and students' activities which support the concept, principal, and procedures to attain learning objectives in achieving optimal results so that the students would actively search and explore knowledges, and finally aimed for proving theories with some real analysis themselves.

Shocking news about child sexual abuse (CSA) keep happening lately, one of them is a case in Lebak Banten Indonesia which revealed that there are approximately 30 cases of CSA in 2022 (detikNews, 2022). The age range for child sexual abuse cases occur in children is from 7 to 14 years old. Each case has different factors, and in fact there are many cases in society, only there are those who dare to report it, there are also those who still consider it a disgrace so they are reluctant to report it. In fact, formal environment does not guarantee that sexual violence will not occur. National Commission for Child Protection Indonesia (KPAI) revealed that there were 18 cases of sexual violence recorded happened in schools in 2021. Reported from Women's Empowerment and Child Protection Indonesia, CSA became the most common case of sexual assault happened in Central Java for the last 3 years (2020, 2021, and 2022). There are a total of 789 children became the victim of CSA in 2020, 807 children in 2021, and 748 children in 2022.

Hermaini (2018) stated that being weak, easy to manipulate, less risks, and secretive are the main reasons why minors are being targeted as the victim of sexual assault. Domino effect experienced by the children that become the victim of sexual violence leads them to trauma which can cause them to be more closeted and quieter instantly, so the truth will be buried inside of them forever without them being able to speak about it and the perpetrator would take advantage of this state to repeat their action many times (Tuliah, 2018). Nurfazryana and Mirawati (2022) explained that child sexual abuse is a violence targeted to children by adults/someone' older in the form of sexual activities. Forms of child sexual abuse include pressuring children to engage in sexual activities, exposing them with inappropriate actions such as showing genitals, doing sexual intercourse, physical contacts with genitals, looking at child's genitals, or even worse taking advantage of them to produce pornography (Amalia, 2019).

Puberty usually occurs between the transition from childhood to early adolescence. According to Sumiati et al. (2023), puberty is the name for the transition time marked with some

sexual reproduction development and changes to prepare the body so that it will be capable of reproduction. Puberty for girls usually begins at the age of 10-14, meanwhile boys are at the age of 12-16. The most common problems happen during the early period of puberty caused by physical and emotional changes that bring some problems such as: sensitivity, restlessness, anxiety, and confusion (Adina, 2021). In this period of time, children will fully understand about their very being as males/females and naturally spend most of their times with their friends so it is so important to make sure that they have had enough understanding about social boundaries with the gender based and strangers they should not cross to minimize sexual assault. It is essential to teach them about sexual education.

According to Dewi and Bakhtiar (2020), sexual education is the attempt to teach, raise awareness, and enlightenment regarding sexual issues to the children with the aim of protecting them from nonconformity to a set of norms based on the physical, mental, and spiritual health. This is in line with Tursilarini (2017) which argued that the purpose of sexual education is to build a healthy emotional behavior regarding sexual issues and guide them to a healthy lifestyle with full of responsibility regarding their sexual life.

A proper and suitable learning media can be implemented in an attempt to ingrain sexual education to the students. Fatmawati et al. (2021) stated that choosing the good learning media to support learning activity is one thing, but based on the behaviorist paradigm, developing learning media become one of the most important things to stimulate the learners. Based on the observation results obtained, some common problems regarding sexual education on elementary school students are: (1) the average score of students' learning outcomes are 66,67% which indicated that they are yet to reach the standard of minimum completeness (75); (2) conventional learning model (teacher centered); (3) lack of variation of the learning media which only use one figure despite of the availability of facility that support digital-based learning; (4) students' lack of awareness regarding verbal

harassment; (5) textual-based learning resources and materials; (6) 6th grade students already get their first smartphone. Based on the problems encountered, it is essential to initiate the development of android based CERMAT learning media to solve the problems as an act of prevention regarding sexual education.

In line with the study conducted by Herman & Andika (2022) about android-based sex education learning media development, android-based learning media development offers some innovation to increase knowledge and minimize sexual assault on children. Children as well as parents have easy access to every information in this learning media. A study conducted by Satriawan et al. (2022) showed that android-based media development as the provisions of self-protection from sexual abuse were obtained "very good" category during feasibility test and the results of the experiment showed that the developed media was indeed influenced children's understanding about sexual education to protect themselves from sexual abuse. Another study conducted by Ichwan et al. (2020) about the effectivity of android apps in improving teen's knowledge about reproductive health obtained a score of $p = 0,000$, so android application was suitable to be implemented as the learning media about reproductive health in school.

Students' conceptual understanding is the ability to understand a particular concept so that the students will be able to explain it based on their understanding (Wahyuni, Hariandi, & Alirmansyah, 2023). Android-based media development was chosen as android is an open-source software that allows us to distribute its application with a massive number of users. Emergency Medical Service (EMS) in Widiastika et al. (2021) stated that android has some advantages such as: 1) multitasking; 2) flashing indicator lamp with a ringtone when notification pops up on the screen; 3) support thousands of applications verified by Google Play; 4) widget features that allow the users to open different apps faster. On the other hand, some of the disadvantages of android are: 1) battery utilization waste; 2) Google-focused for it is an

open source from Google; 3) malware protection is still low.

The purposes of CERMAT media development are: 1) enhancing students' understanding about puberty on elementary school level; 2) testing the media feasibility; 3) examining students' understanding improvement on puberty through the implementation of android based CERMAT learning media. The benefit of the android based CERMAT media is allowing the students to get a new learning experience to improve their understanding about puberty.

METHOD

The type of this research is Research and Development (RnD) with ADDIE development model. Defina (2018) stated that the ADDIE development model aims to meet the students' needs so the development of each product is based on necessity; innovative, authentic, inspiring. The development steps include: 1) Analyzing and solving problems; 2) Designing CERMAT media development; 3) Developing CERMAT media through articulate storyline; 4) Applying CERMAT media through learning after going under experts judgements which later be implemented to the learning process; 5) Evaluating after developing and implementing CERMAT media in the classroom. Below are the steps of ADDIE development model as seen in figure 1.

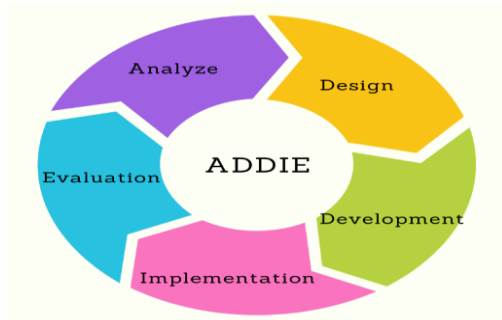


Figure 1. The Steps of ADDIE Development Model

This research was using pre-experimental design with one group before-after design. Experiment consisted of preliminary testing

(pretest) and post-action test (posttest). The subjects of this research were 6th grade students of SDN Purwoyoso 02 with a total of 33 students. Media feasibility test was using validation assessment by media, language, and material experts. The next step was implementing the media to the subject of the research. The data collection process to examine students' level of material understanding was obtained through an objective test in the form of multiple choices which already went through a reliability and validity test. The test questions consist of 20 multiple choice questions which include identifying puberty, determining the differences in puberty between men and women, how to maintain the health of reproductive organs, identifying harassment and its forms, and determining appropriate action for sexual harassment. After participating in the lesson, students will also be given a response questionnaire to see student responses regarding the development of CERMAT media, which consists of 10 statements. Those data would be analyzed with normality test, homogeneity test, t-test and N-gain for learning outcomes data. Then questionnaire data will be analyzed using Aiken V.

RESULTS AND DISCUSSION

The results of the research include design and media development, expert judgements, N-gain test results, t-test results.

The Results Of The Design And Media Development

The first step in developing android based CERMAT media was Analyze. Analyze is the process of analyzing the solutions to problems found in the field. Content/material needs being analyzed along with the app needs.

Material mapping was carried out to make sure the content of the application is more directed and focused only on puberty. The targeted competencies are Science Theme 6 for 6th "Towards a Prosperous Society" sub-theme 1 "Environmental-Awareness Society" Puberty subject matter Basic Competence 3.2

understanding puberty, differences between male and female puberty, how to keep reproductive organ clean, sexual abuse, act of prevention towards sexual abuse.

The next step is arranging the learning media by integrating text, video, pictures/illustrations, and audio using software called Articulate Storyline 3 to ease the students during the learning process. This learning media has 4 main menus namely Material, Super-Quiz,

Collaboration Room, and Edu-Fact. Each of the menu has a sub-menu which is designed as attractive as possible to attract the students and increase their enthusiasm and learning motivation so it will enhance their learning outcomes as well.

The next step was Design. In this step, CERMAT media was arranged which contained interface arrangement as seen in prototype Figure2.

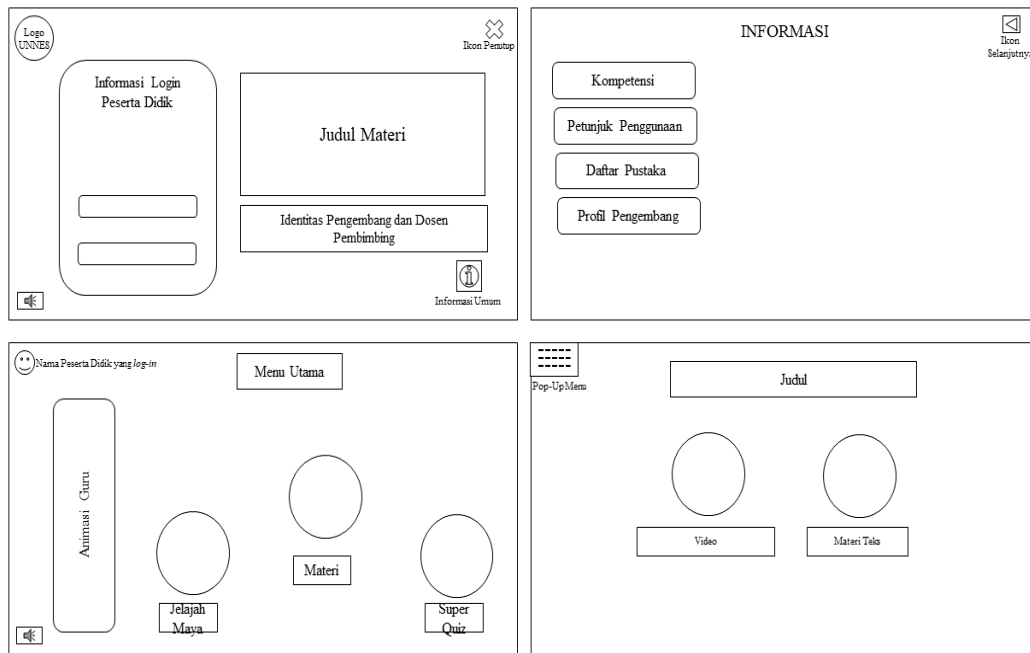


Figure 2. CERMAT Media Development Prototype

The third step was Development. This includes some steps: developing the materials, arranging learning tools, CERMAT media development based on the prototype which was developed using Articulate Storyline 3. The process of building this app included saving the file in html which later was converted into .apk

using web2apk. The use of android-based learning media helps the students during the learning process both in the classroom or self-study at home. Students only need to open the app as the learning sources. Below is the flowchart of CERMAT media development in Figure 3.

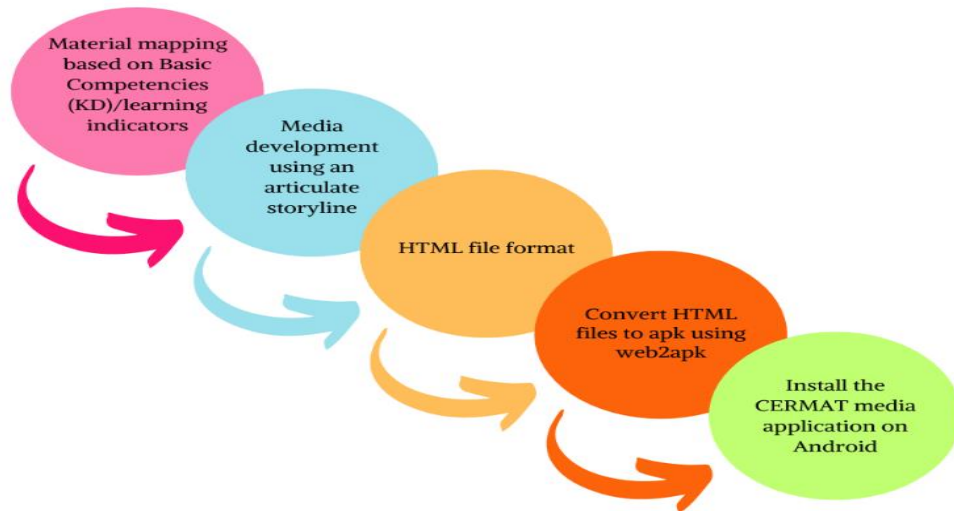


Figure 3. Media Development Flowchart

Based on Figure 3, the application is now available to be used in their smartphone. The first thing to notice when the students open the app is the “welcome” dialog box. To use the app,

students need to enter their name and students’ number on the provided box as seen in Figure 4 below.



Figure 4. Opening Page

On the opening page, there is some information provided such as developer logo, title, developer identity, log-in information, and General Information menu which contains basic information about CERMAT app. This app provides various menus to be explored by the students to avoid boredom while opening the

app. The content of CERMAT media focused on puberty and sexual harassment. General Information menu on the opening page was designed to give additional information about the media being used. Below is the display for the General Information menu as seen in Figure 5.



Figure 5. General Information Page

This menu contains: (a) Competence; (b) Instructions; (c) References; and (d) Developer Profile; also, user icon to go back to the main page. Sub-menu “Competence” contains basic competence as well as learning indicators on CERMAT media. Students are now able to open the main menu to explore its features. Below is the display of the main page as seen in Figure 6.



Figure 6. Main Page

CERMAT media main page consists of some menus: Materials, contains some materials with images and animation video. Super-Quiz contains 5 Right/Wrong quizzes where the students can complete the quiz by giving analysis to their answer. Edu-Fact contains some Facts & Myths about puberty. Get to Know Yourself, a menu where the students can recognize the signs of puberty that they experience. The first main menu is “Material”. This menu covers the topic of puberty with a catchy user interface that can help the students to easily access the information. Below is the display of the “Material” menu as seen in Figure 7.



Figure 7. Material Page

Material page contains some materials in the form of texts, pictures/illustrations, as well as educational learning videos about puberty. There are three navigation buttons: Back, Home, and Next to continue the learning activity. After receiving the materials, students are to be finally able to do the quizzes provided by CERMAT

media. There are some questions provided as an ice breaking, so the students do not get bored in using CERMAT media. These questions are also meant to track how far the students understand the materials about puberty they have learned. Below is the display of Super-Quiz menu as seen in Figure 8.



Figure 8. Super-Quiz Menu

Students will see a dialog box on the first page of Super-Quiz asking whether they are sure to do the quiz. Super-Quiz provides short questions where the students can analyze the statements and categorize them into Right/Wrong with some explanations required. At the end of the quiz, students will be able to see

their final score as well as reviewing their answers.

CERMAT media is also equipped with some prime features called Edu-Fact with the purpose of reducing false or hoax information regarding puberty in the society. Below is the display of Edu-Fact menu as seen in Figure 9.



Figure 9. Edu-Fact Menu

Edu-Fact covers some information wrapped in facts & myths that widely spread in the society regarding puberty. Through this menu, users especially students will be able to understand and learn the right information and not only relying on some myths so it will hinder them on believing in hoax for a long period of time.

The last menu is “Get to Know Yourself”. This menu serves the purpose to help the students understand about the changes happening to them and intensely learn about their own puberty. Figure 10 below displays the menu of “Get to Know Yourself”.



Figure 10. “Get to Know Yourself” Menu

This menu offers the students to get to know the signs of puberty they may experience. This app divides the menu into males and females which they can choose based on their gender where the results will be sent to their parents.

Expert Judgements

Finishing developing the app did not necessarily mean it was ready to be implemented

to the students. Expert judgements are the next step to do to make sure that the media being developed was really feasible to be used. Expert validation is useful to determine whether the learning media is feasible/not feasible to be used in the classroom. Media assessment feasibility was carried out by three different experts: materials, media, and language. The assessment was done by giving scores based on their

judgements which later were interpreted in percentage. After going through expert judgements, CERMAT media finally went to the fourth step which was Implementation. Below is the score obtained from exert judgements as seen in Table 1.

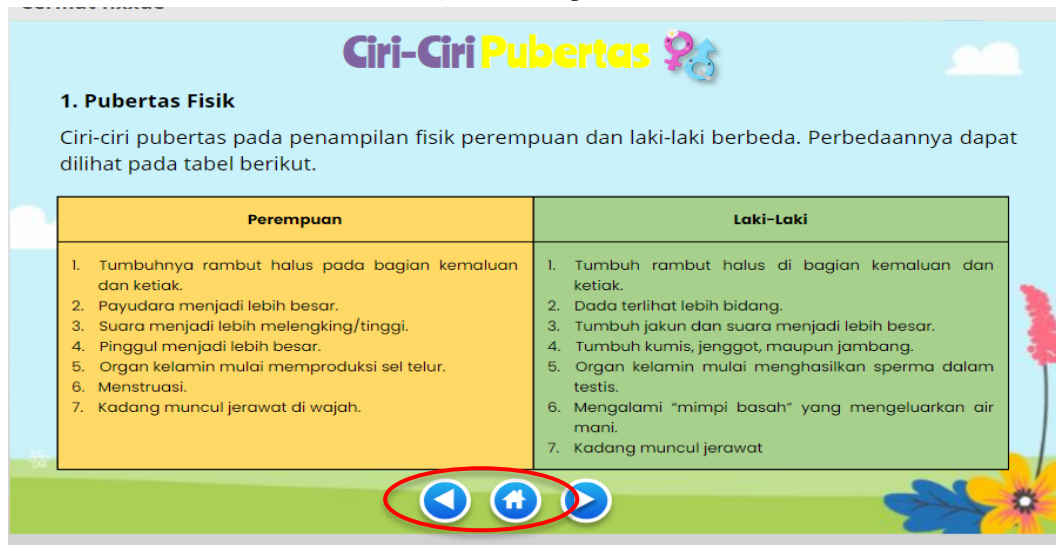
Table 1. Material, Media, and Language Experts Validation Results

Expert	Score	Percentage	Criteria
Materials	81	90%	Very Feasible
Media	86	95%	Very Feasible
Language	49	89%	Very Feasible

Based on Table 1, the results of the validation test showed that CERMAT media

categorized “very feasible” with a percentage of 90% from the material expert, 95% from the media expert, and 89% from the language expert. Those score obtained with some suggestions from the experts, some of them are: navigate buttons on some menus were too small so it was hard to click on it, it would be better if the learning video on Material menu displayed bigger than it originally was, some icons were lack of precision, Basic Competence and or Indicator should be adjusted to the learning objective, suggestion for additional column on Super-Quiz menu so the students can add the reason behind their choices to track their understanding, and suggestion to add quiz review. Those suggestions became the refinement guide for CERMAT media which later would be implemented in big group as well as small group. Below is Figure 11 which contains some refinements based on the experts’ suggestions.

a) **Navigate Button**



b) Basic Competencies and Indicator

Kompetensi
Petunjuk Penggunaan
Daftar Pustaka
Profil Pengembang

INFORMASI

A. Kompetensi Dasar

- 3.2 Menghubungkan ciri pubertas pada laki-laki dan perempuan dengan kesehatan reproduksi.
- 4.2 Menyajikan karya tentang cara menyikapi ciri-ciri pubertas yang dialami.

B. Indikator

- 3.2.1 Mengidentifikasi ciri pubertas pada laki-laki dan perempuan
- 3.2.2 Menentukan perbedaan pubertas laki-laki dan perempuan
- 3.2.3 Menganalisis perbedaan pubertas antara laki-laki dan perempuan serta cara menjaga kesehatan pubertas
- 3.2.4 Menyimpulkan ciri-ciri pubertas, dan cara menjaga kesehatan reproduksi remaja
- 3.2.1 Mengidentifikasi arti pelecehan
- 3.2.2 Menganalisis bentuk-bentuk pelecehan dan cara melindungi diri
- 3.2.3 Menyimpulkan tindakan yang tepat dalam bergaul dengan keluarga/teman/orang lain
- 4.2.1 Mengumpulkan data tentang pubertas dan pelecehan
- 4.2.2 Membuat infografis tentang pubertas dan pelecehan

c) Video Display

video_6VxBdKcRQk_22_48_1280x720.mp4 - Google Chrome

File | D:\AISYA%20MASTER%20FOLDER\Anggit\Tugas\KULIAH\KULIAH%20S2\SEMESTER%202\Inapem%20IPA\Media\Cermat%20fixue%20-%20Storyline%20output\story_content\video_6VxBdKcRQk_22_48_12...

Seperti tumbuhan yang tumbuh dari biji ke anak pohon lalu tumbuh menjadi pohon yang berbunga,

d) Super-Quiz Feature

Super-Quiz

Pubertas merupakan masa peralihan dari usia anak-anak menuju remaja. Masa pubertas terjadi di usia 2–7 tahun. Pubertas ditandai dengan adanya pematangan organ reproduksi manusia. Adanya pubertas tidak dipengaruhi oleh hormon.

Benar
 Salah

xx

Correct

Figure 11. Refinement After Feasibility Test

Experiment Results

The fourth step of ADDIE model is Implementation. After went through expert judgements, the next step was to implement the media to the students to obtain the data needed. Before using CERMAT as the learning media, students were required to do a pretest to examine their preparedness. The results showed that the percentage of the passing grade was 30% or only 10 out of 33 students got a score more than 70, with 80 as the highest score and the lowest score was 32. Meanwhile, after implementing android based CERMAT media, students' understanding about puberty significantly improving. Based on the posttest, students' passing grade was 100% where all the students got a score >70 with 100 as the highest score and 72 as the lowest score.

t-test

T-test is a test used to compare the means or average between two related samples (pretest and posttest). Normality test using SPSS should be performed before conducting a t-test to examine whether the data have normal distribution. Normality test being carried out using one sample Kolmogorov Smirnov. The following table is the result of the normality test.

Table 2. Pretest-Posttest Normality Test

Tests of Normality		Kolmogorov-Smirnov ^a		
		Statistic	df	Sig.
Students' Learning Outcomes	Pretest	0,177	33	0,010
	Posttest	0,170	33	0,016

a. Lilliefors Significance Correction

Based on table 2, pretest and posttest are having significance value of 0,010 and 0,016 with the probability score of 0,05 which can be concluded that students' pretest and posttest score have normal distribution. After conducting a normality test the next step is to perform a t-test using SPSS. The interpretation of the t-test was

based on the significance value sig. (2-tailed) < 0,05, Ho is rejected, and Ha is accepted. Meanwhile, if sig. (2-tailed) > 0,05, then Ho is accepted, and Ha is rejected, android-based CERMAT media can enhance students' understanding about puberty.

Students' enhancement was possible by the utilization of CERMAT media as a learning media directly accessed by the students through smartphone. According to Jang et al. (2021), developing technology as a learning media has a positive impact to increase students' learning motivation. Purwati et al. (2022) explained that the utilization of technology-based learning media aimed to help the students discover some new material concepts so that it will improve students' information and technology literacy.

Through CERMAT media, students get more thorough and directed understanding on the materials, puberty, as the basic step in processing the information about sex education. Sulistyoningsih (2022) described that the lack of information and understanding would cause the children to feel embarrassed, confused, self-doubt or even inferior for there are various physical changes that happen during puberty. Failure to understand one's state during puberty would lead them to psychological disorders and affect their future. Malakaet al. (2021) stated that gaining information about sex education should be supported by suitable and proper media to prevent them from getting false information from inappropriate resources such as internet/writings/watching porn videos which its validity could not be accounted for and not appropriate for their age.

N-gain

N-gain test is a test to examine the average score improvement to perceive the effectivity of the utilization of android-based CERMAT media in enhancing students' understanding about puberty. N-gain test examined students' pretest and posttest results on SPSS. The following table is the result of the N-gain test.

Table 4. N-gain Test Result

Data	Pretest	Posttest
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Mean	56.24	81.33
Number of Students	33	
Score Difference	25,09	
N-gain	0.57	
N-gain percentage	57%	
Criteria	Quite Effective	

According to Table 4, it can be seen the N-gain score obtained 0,57 or 57% with score difference of 25,09 and considered “quite effective”. The increasing score indicates that CERMAT media proved to be effective to be used as a learning media. According to Erfan et al. (2020) a good learning media is not only increasing students’ learning motivation to keep learning, but also plays an important part in relieving students from learning boredom and sharpening their cognitive skills. According to Batubara et al. (2022), android application is a phone-based application so it’s very efficient for users to use. In this case, an android application is one of digital learnings that can be used in facilitating the students in accessing information and knowledge.

Leung et al. (2019) argued that sex education for teens is defined as an education in accepting and promoting human rights, gender equality, knowledge, values, and essential skills for sexual health and prevention of early pregnancy/HIV. The focus of sex education for teens is regarding sexuality and education in preventing sexual abuse, in order to cultivate positive values and wisdom in managing the

emotion “love” (Lewis & Allen, 2013). According to Ratryana (2020) sex education materials for children at the age of puberty (12-16 years old) including: (1) sexual ethics based on the religious and social perspective; (2) basic knowledge about anatomy and genitals physiology and human’s reproduction process; (3) cultivating social role awareness on both boys and girls; (4) development of reproductive systems; (5) difference between healthy and unhealthy sexual behaviors; (6) sexual abuse.

There were some challenges that can affect students’ process of understanding, such as: 1) students are still unfamiliar with smartphone-based learning media; 2) reproduction organs seemed to be a newly studied subject so there are yet repetition from previous materials; 3) different learning style; and other internal factors.

Students’ Response

Students’ response towards the implementation of CERMAT media is used to see how their responses were after using CERMAT. Response data were collected using questionnaires. The questionnaire consists of 10 “yes”/”no” statements given to all the participants, in total of 33 students who have carried out learning through the implementation of android based CERMAT media. The analysis for students’ response was using Aiken V which aimed to analyze every single statement thoroughly. Below is the result of Aikan V analysis on students’ response which is presented in the form of a diagram as seen in Figure 12.

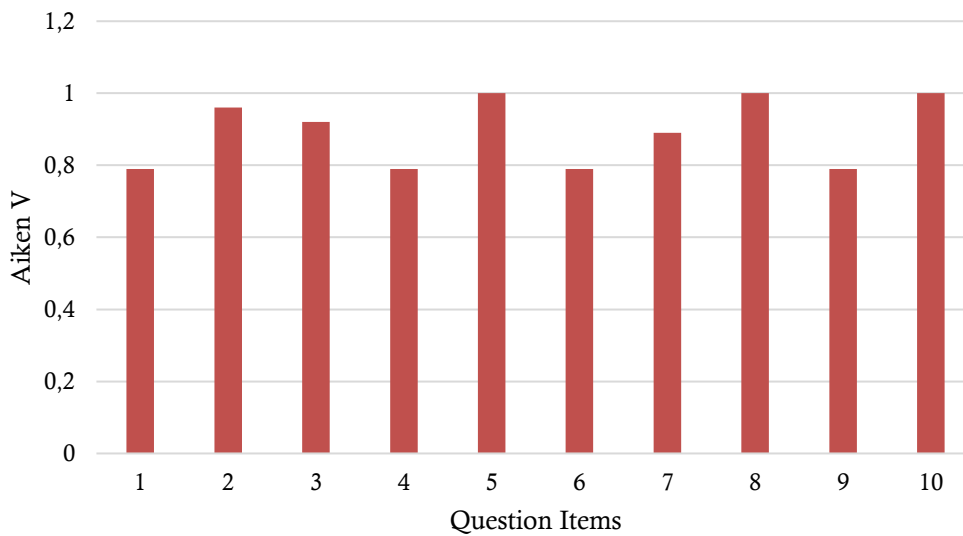


Figure 12. The Result of Aiken V Analysis Diagram

According to Figure 12, it can be seen that 6 out of 10 statements of the questionnaire gained “Very High” interpretation while the other 4 gained “High” interpretation. Based on those interpretations, it can be concluded that the students feel satisfied with the implementation of android based CERMAT media for learning activity about puberty.

Through the interview with the students regarding the implementation of android based CERMAT media, it was found that the students claimed they enjoyed the learning activity for it was fun and did not make them feel uncomfortable. At first, they claimed that learning about puberty and reproduction organs originally made them feel embarrassed and uncomfortable. However, after engaging in learning activity using interactive learning media, they confessed that they felt more relaxed in learning about such things and that it was not something embarrassing like how they originally thought. After learning about puberty with the use of CERMAT media, they concluded that: (1) puberty will hit each and every one but in different period of time; (2) physical and psychological changes that happen during puberty is normal and not something to be embarrassed about because it means our body is capable of reproduction, so we must pay extra care in protecting ourselves when it comes to

social interaction with the opposite sex; and (3) it is essential to understand every kinds of sexual assault and how to oppose it.

The last step of ADDIE development model is Evaluation. Evaluation is the process of assessing whether the learning activity arranged using CERMAT media met the expectations of development. In this case, the result obtained was the learning activity went as it was planned and met the expectations of development with the validity test and students’ learning outcomes which showed significant improvement as the proof of this statement. On the other hand, the evaluation for future development regarding the utilization of CERMAT media in the classroom is to integrate games during the learning session so that the students will not be too focused on their smartphone and smartphone allocation, 1 smartphone for each table.

CONCLUSION

Based on the result of the study, it can be inferred that android based CERMAT learning media development is considered feasible and effective in enhancing 6th grade students’ mastery of the subject matter puberty. This can be proven through the results of validity test by 3 experts (media, materials, language) and t-test result on the average score of students’ pretest and posttest

which obtained sig. (2-tailed) score of 0,000, which means the significance value is 0,000 < 0,05, Ho is rejected, and Ha is accepted so android based CERMAT media can enhance students' understanding about puberty. Meanwhile, the n-gain test of the pretest and posttest obtained a score of 0,57 (57%) and categorized "Quite Effective" with a score difference of 25,09

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