SOCIAL AND BEHAVIORAL SCIENCES. Education

ORIGINAL RESEARCH

Development of Educational Media in Assessing the Growth and Development of Toddlers

Authors' Contribution:
A – Study design;
B – Data collection;
C – Statistical analysis;
D – Data interpretation;
E – Manuscript preparation;
F – Literature search;
G – Funds collection

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Abstract

Background and Aim of Study: *Developmental delays in children are still a serious problem in both developed and developing countries in the world. About 5-10% of children experience developmental delays. The potential to develop the current media in accordance with technological developments and advances in the use of technology-based platforms.*
The aim of the study: to develop a growth and development assessment model to increase knowledge and skills in assessing the growth and development of toddlers and to analyze the implementation of the growth assessment guide model based on android applications.

Material and Methods: *This type of research is design and development research with a mixed methods approach. The steps of development research are carried out using the ADDIE framework (Analysis, Design, Development, Implementation and Evaluation). In using this framework, designers and developers use analysis, design, development, implementation and evaluation as the main stages.*

Results: *The research product is the "GUVI_Tools" application which is an interactive multimedia-based learning media. The implementation of the application showed a significant increase in knowledge before and after using the application and the average application usage assessment was 4.8 (good category).*

Conclusions: *It is hoped that this development program can be used as a learning program and can develop learning media on other basic competencies and can be continued at the stage of testing the effectiveness of the learning process.*

Keywords: *assessment, growth and development, analysis, design, toddler*

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Introduction

The development of each child is unique and the speed of achievement of each child is different (McDevitt & Ormrod, 2010). The time range for achieving each developmental stage is generally quite large, for example a child is said to be normal if he can walk from the age of 10-18 months, so that developmental differences often occur between children of the same age (Roux et al., 2012; Stein et al., 2014).

A child may experience developmental delays in only one developmental domain or more than one developmental domain. General developmental delay or global development delay is a state of significant developmental delay in two or more developmental domains (Bégin et al., 2020). Broadly speaking, the realm of child development consists of gross motor, fine motor, language/speech, and personal social/independence (De Araújo et al., 2021; Urlacher, 2021). About 5-10% of children experience developmental delays. Data on the incidence of general developmental delays are not known with certainty, but it is estimated that around 1-3% of children under the age of 5 years experience general developmental delays (Arnett et al., 2020; Boyatzis & Junn, 2020; De Onis, 2017).

General developmental delays require data/reports or complaints from parents and early detection or screening of child development. Developmental delays in children are still a serious problem in both developed and developing countries in the world (Wang et al., 2019). Previous research has stated that children in 54 developed countries show some symptoms of anti-social behavior disorder which can develop into behavior disorders later in life (Haleemunnissa et al., 2021). The incidence of delays in child development in the United States ranges from 12-16%, Argentina 22% (Lejarraga et al., 2008), and Hong Kong 23% (Wang et al., 2016). This phenomenon also occurs in Canada and New Zealand, where there are 5-7% of children who experience social development disorders (Stein et al., 2014). Meanwhile, developmental disorders in children in Thailand reached 37.1% (Jeharsae et al., 2013) and in India it is around 19.8% (Toldo et al., 2020). This child development delay occurs mostly in Asia and Africa (Grantham-McGregor et al., 2007).

Data on the growth and development of toddlers is needed as an effort to find disorders earlyfor immediate action (Hyman et al., 2020). Early detection of developmental deviations needs to be done to be able to detect early developmental deviations of toddlers, including following up on any complaints from parents about their child's growth and development problems. If deviations are found, early intervention is carried out in the development of toddlers as a corrective action by utilizing the plasticity of the child's brain so that growth and development return to normal or the deviation does not get worse (Boyatzis & Junn, 2020). If toddlers need to be referred, then referrals must also be made as early as possible according to indications. Intervention or the right stimulation will stimulate the toddler's brain so that the development of movement, speech and language skills, socialization and independence in toddlers takes place optimally according to the child's age (Lipkin et al., 2020).

Stimulation, detection and early intervention for toddler growth and development is one of the competencies that must be achieved by nursing students contained in the curriculum (White, 2006). The role of educators is not only as a teacher but also as a mentor, developer and manager of learning activities so that students can achieve learning goals. Educators design learning by considering the objectives, learning theory, characteristics of the material being taught, methods and media or teaching resources (Webster-Stratton & Herman, 2010).

Technology and multimedia that are currently developing have a good impact on educators in developing learning methods and media. The features of the multimedia learning platform form the foundation so that technology-based learning facilities are essential for effective learning. Consistent with cognitive theory of multimedia learning (Johnson & Mayer, 2009). The potential to develop the current media in accordance with technological developments and advances is the use of technology-based platforms. Currently, the use of smartphones has been used by most people, as a means to communicate, media to seek knowledge or something they want to know (Park, 2020; Radgohar et al., 2020).

Several studies on the use of technology applications in the assessment of toddler growth and development have been carried out. Sanitasari et al. (2017) the research design used is applied research, which in this study will apply a computer-aided expert system regarding monitoring the growth and development of infants/early children. Hernanda and Yustanti (2016) in a study on the design of an Android-based toddler growth monitoring application. The advantages of this system, from the data that used to be in the form of a card, now all data on growth and development of toddlers and immunizations/vaccinations are stored both in the database. This prevents data loss and is also more efficient because it can be accessed via a smartphone. This android application provides information and facilitates the user to monitor the growth and development of toddlers.

The aim of the study. To develop a growth and development assessment model to increase knowledge and skills in assessing the growth and development of toddlers and to analyze the implementation of the growth assessment guide model based on android applications.

Materials and Methods

This type of study is research and development with a mixed methods approach (Doyle et al., 2009; O'Cathain et al., 2007). In the conceptual model development phase, qualitative aspects will be more dominant, while mixed aspects (qualitative and quantitative) will be used in the product development and trial phases. In the pilot phase, quantitative aspects are more dominantly used.

This development research aims to design and build an application as a guide for users (students and lecturers) to increase knowledge and skills regarding the assessment of growth, development and stimulation of child development. The steps of development research carried out using the ADDIE framework (Analysis, Design, Development, Implementation and Evaluation). In using this framework, designers and developers use analysis, design, development, implementation and evaluation as the main stages (Rusdi, 2018).

Research Stage

Phase I Research: Analysis. Data sources: In the early stages of developing a guide model for assessing growth and development of toddlers, data was collected based on the results of the initial survey and secondary data derived from literature studies, theoretical studies and survey reports, documents, interviews, while the types of data were quantitative and qualitative. Participants in this stage are lecturers and instructors of pediatric nursing courses and prospective users, namely students majoring in nursing who have received material on growth and development of toddlers.

Phase II Research: Design. The next step is to design the application using the components of an intervention design with elements of the basic theory of learning, the theory of supporting the intervention and the growth and development of toddlers. Describe the addition of explanations for each component that is tailored to the purpose, namely to increase student knowledge about growth and development of toddlers as well as skills in assessing growth and development. Each stage/component will describe a number of instructions that lead to the formation/development of devices or attributes that support the establishment of an effective and efficient intervention system. Each instruction is designed based on the basic assumptions and basic and supporting theories from the results of the literature (theoretical) and empirical analysis in stage one.

Phase III Research: Development. The method of developing a guide model by conducting a theoretical study that is suitable for development research and pediatric nursing topics for assessment of growth and development as well as stimulation and collaborating with IT experts for product development.

Phase IV Research: Implementation. The implementation process is to validate by experts, namely doctors/nurses, research development experts and IT experts. Validation includes the content of the product, suitability for purpose, and ease of use.

Furthermore, a trial is carried out with the following stages:

a) One-on-one trials were carried out by involving a student who was attending a pediatric nursing course as well as a tutor. Researchers and users pair up one by one and interact to conduct practice evaluations of applications that have been validated by experts, researchers will interact with users and observe what users are doing, recording all perceptions and ratings given by users. The participants in this one-on-one trial are 3 people. The instruments used were interview protocols, data collection techniques by interviewing verbal and body language data types and observing gesture/sign language data types, social interactions, actions, atmosphere and physical environment, sensations. The data analysis technique is a qualitative analysis technique with the spiral method to obtain narrative information that focuses on aspects of the weaknesses and deficiencies contained in the product.

b) Small group test. Researchers conduct pretest and posttest to see indicators of the impact of product use, assess differences in students' knowledge and skills in using the application. During the process, researchers will pay attention to the efficiency of time and resources involved in using the product. Researchers conducted pretest and posttest to see indicators of the impact of product use, assess differences in knowledge and skills of students and lecturers in measuring children's growth and development as well as selecting the right stimulation. During the process researchers will pay attention to the efficiency of time and resources involved in using the product.

The participants involved in the small group evaluation are 10-15 students who are selected randomly. The data generated are qualitative and quantitative data. Qualitative data are analyzed for follow-up to improve product quality, while quantitative data obtained from questionnaires and observations will be analyzed statistically.

c) Field trial/large group. Participants in the large group/field trial were prospective users with a purposive sampling technique totaling 30 people with inclusion criteria: students who have or are currently taking pediatric nursing courses, have smartphones and understand their use.

The use of the instrument is almost the same as the small group trial. The instrument used is a questionnaire to see the impact which is carried out through pretest and posttest. The pretest is to see the participants' initial ability and the posttest is to show the ability after using the developed product. The observer at this stage is carried out by the researcher.

Quantitative data in the large group trial phase follows the following steps: Describing the data using descriptive statistics and answering the hypothesis using inferential statistics (differential test/t-test).

Results

Analysis Stage

Needs/Problem Analysis. The needs analysis process is based on application requirements to improve students' knowledge and skills in assessing the growth and development of toddlers in a simple way and can be done anywhere and anytime. Problems that can be identified: growth and development assessments require a large number of forms and will be used when conducting an age-appropriate assessment of the child. Analysis of user characteristics is a student majoring in nursing who is currently or has received material on the assessment of growth and development of toddlers who have smartphone facilities.

Contextual Analysis. Contextual analysis is carried out with field visits to ensure that these problems really exist

and identify things in more detail so that predicting product interactions with the target will be easier to design. The grid of questions made based, there are 6 (six) factors that affect contextual problems, namely:

1) stakeholders – those involved in the implementation are lecturers of pediatric nursing courses;

2) target group – students majoring in nursing who are currently or have received growth and development assessment materials;

3) physical context – the must-have facilities are servers for the use of android-based applications and smartphones for prospective application users (students);

4) organizational policy context – the nursing department of the Health Polytechnic of the Jambi Ministry of Health has the independence in making changes, especially for the development of teaching media that aims to improve the quality of learning;

5) educational context – changes made by considering the needs and technological developments;

6) eligibility – the developed application has advantages, namely insert material and procedures in the application that are used as material for student learning and there is an assessment following the growth and development assessment steps (Rusdi, 2018). Weaknesses that can be identified are the internet network which must always be available. Opportunity: Poltekkes, Jambi Ministry of Health has a server that can be used and all students and lecturers have smartphones.

Design Stage

The results of the analysis of problems that have been studied practically and theoretically and have been deemed worthy of being used as research objectives, the researchers and the team together design and build products to solve problems. This stage will produce a design or initial prototype of the development product in the form of a storyboard, namely a storyboard in the form of a rough sketch where there are sequential images in the form of a series of stories consisting of several pages.

Development Stage

The development of product prototypes in collaboration with IT experts resulted in an android-based application called GUVI_Tools, which also explained the application title: Assessment of toddler growth and development. The application contains a menu of materials, growth and development assessment, history and assessment recap, about the application.

The material menu is an advantage in this application which contains material about growth, development and development, this material is useful as a learning medium for users, the material is equipped with videos on how to measure growth to facilitate user understanding.

The growth assessment menu requires data input by the user containing user biodata, toddler biodata for which growth and development measurements will be carried out, toddler weight and height data, as well as a developmental assessment format according to the toddler's date of birth input. After inputting the data, the user will get results in the form of: the current age of the toddler, the classification of growth status (nutritional status category): which consists of very underweight, underweight, normal weight, and overweight. The recommended growth assessment results will also be displayed so that users can find out the actions taken on toddlers based on the results of the growth assessment. The results of the assessment of toddler development will be displayed according to the inputted data, namely development according to the age of the toddler, deviant development and dubious development. The recommended results will also be displayed. A return visit schedule for growth and development assessment will appear at the end of this assessment menu with the aim that users can find out and provide information to the toddler's family when to return.

Implementation Stage

The prototype development stages consist of expert validation, one-on-one test, small group test and field test stage. The evaluation is carried out by IT and child health experts/experts as well as material experts. The evaluation results in the form of qualitative data or a description of the suggestions given by the experts will be used to revise the design of the overlay intervention. Evaluation/revision can be done by reviewing the design, development and analysis processes.

The teaching media application developed will be validated by practitioners to get input from the perspective of experts in this development: material experts, namely pediatric nurse specialists and 1 nutritionist each. There are aspects of material assessment, educational aspects and communication aspects.

The results of the expert validation of child nursing materials can be seen in Table 1, nutritionist material validation can be seen in Table 2, media expert validation results can be seen in Table 3.

Trials:

a) One-on-one trial. Preparation, preparing all the equipment needed: Instruments, learning media, application manuals and note-taking tools. Submission of materials related to the content and use of the product: The concept of toddler growth and development, the need for stimulation of toddler development and simulation of the use of applications/products. Implementation of product trials: providing opportunities for users/participants to use the product, Assessment through observation, Documentation of assessment results, Revising the results of observations and assessments by users.

The one-on-one trial was carried out by involving 3 (three) students who had been determined by the researcher based on the criteria for having received the material and following the pediatric nursing course. Researchers and users pair up one on one and interact to conduct a practice evaluation of the growth and development assessment application based on Android, researchers interact with users and observe what users are doing, recording all perceptions and assessments given by users. Researchers provide an explanation of the application and its use. Users (students) can use the application properly starting from installing, registering

and then inputting assessment data. When the trial was carried out there were discrepancies in the application, namely when assessing toddlers aged 3 months 24 days, the display of the developmental assessment form leading to the form for the assessment of 6 months of age, this error has been revised and the application can be continued for small group trials.

b) Small group trial. This small group assessment is a transitional assessment between individual assessment and field/large group testing. The purpose of the assessment in this group is to ensure that the product can really be used properly and to see the temporary impact of using the product. Researchers do not interact with users and only as observers. Researchers will respond if there are serious problems.

Table 1
Results of Expert Validation of Child Nursing Materials

Statement	Value scale				
	1	2	3	4	5
Material Aspect					
The suitability of the material with the concept of growth and development				+	
Concept truth					+
Order of presentation of material					+
The images used are in accordance with the material					+
Educational Aspect					
Material suitable for educational purposes				+	
Content clarity					+
Indicator clarity					+
The suitability of the image given to clarify the material					+
Use of each material				+	
Communication Aspect					
Accuracy of terms					+
Grammatical accuracy					+
Ability to increase user motivation					+
Total score	57				
Average	4.8 (Good Category)				

Table 2
Validation of Nutritionist Materials

Statement	Value scale				
	1	2	3	4	5
Material Aspect					
The suitability of the material with the concept of growth and development as well as stimulation					+
Concept truth				+	
Order of presentation of material				+	
The images used are in accordance with the material				+	
Educational Aspect					
Material suitable for educational purposes				+	
Content clarity				+	
Indicator clarity				+	
The suitability of the image given to clarify the material				+	
Use of each material				+	
Communication Aspect					
Accuracy of terms				+	
Grammatical accuracy				+	
Ability to increase user motivation				+	
Total score	49				
Average	4.1 (Good Category)				

Table 3
Media Expert Validation Results

Statement	Value scale 1	2	3	4	5
Programming Aspect					
Serving menu					+
Instructions for use				+	
Convenience					+
Completeness				+	
Display Aspect					
Letter					+
Use distance					+
Text legibility					+
Picture				+	
Layout				+	
Navigation Keys					+
Color					+
Serving between pages					+
Total score			56		
Average			4.7 (Good Category)		

Researchers conducted pretest and posttest to see indicators of the impact of product use, assess differences in student knowledge and skills in assessing growth and development of toddlers. During the process researchers will pay attention to the efficiency of time and resources involved in using the product.

The results of small group trials were carried out on 15 students, the average time used to manually assess the growth and development of toddlers before using the application was 45 minutes and after using the application only took an average of 15 minutes. All students stated that they enjoyed using the application. The distribution of knowledge data before and after the application was normally distributed, a test of normality was carried out with Shapiro-wilk with p value = 0.432 and after using the application p value = 0.42, then analyzed using paired t-test.

Results of knowledge analysis before and after using applications for assessment of toddler growth and development in small groups can be seen in Table 4.
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Table 4
Results of Knowledge Analysis Before and After Using Applications for Assessment of Toddler Growth and Development in Small Groups

Knowledge	M	T	DF	*Sig.* (2-tailed)
Pre Test	53.3	-14.24	14	0.000
Post Test	78.0			

Note. M – the mean (average); *T* – the t-test statistic; *DF* – the degrees of freedom; *Sig.* – the significance level.

c) Field trials/large groups. Field or large group testing is carried out for product improvement in terms of structure, function and user behavior. Currently there is no interaction between users and researchers to test whether the product can really be operated properly without the presence of researchers. Users are provided with a product user procedure manual. The test used a one-group pretest-posttest experimental research design.

The distribution of knowledge data before using the application using the Shapiro-wilk test of normality with a value of p=0.118 and after using the application the value of p=0.084, thus it can be concluded that the distribution of data is normally distributed. Next, paired t-test analysis was performed.

Results of knowledge analysis before and after using the toddler growth and development assessment application can be seen in Table 5, assessment of application use by large groups can be seen in Table 6.

Table 5
Results of Knowledge Analysis Before and After Using the Toddler Growth and Development Assessment Application

Knowledge	M	T	DF	*Sig.* (2-tailed)
Pre Test	56.7	-21.184	29	0.000
Post Test	78.5			

Note. M – the mean (average); *T* – the t-test statistic; *DF* – the degrees of freedom; *Sig.* – the significance level.

Table 6
Assessment of Application Use by Large Groups

Rating Indicator	Average	Category
Media Aspect		
Use of language in media	4.8	Well
Use of images in media	4.6	Well
Ease of use of media	5.0	Very good
Instructions for use	4.6	Well
Material Aspect		
Material presentation	4.8	Well
Accuracy of terms and use of sentences	4.8	Well
Ease of understanding	4.8	Well
Ease of implementing	5.0	Very good
Interesting	5.0	Very good
Benefits/usage	5.0	Very good
Aspects of Product Use		
Constraints in using the product	4.8	Well
Impact of using the product	5.0	Very good
Average	4.8	Very good

Evaluation Stage
This summative evaluation focuses on the extent to which product use interventions can be used to achieve the desired goals. In this study, the summative evaluation was not carried out because the development research carried out had not yet reached the assessment of potential impacts.

The rating scale uses a Likert scale with a score of 1–5. Based on the results of Table 2, there are 12 indicators of assessment by material experts with a total score of 49 and an average of 4.1 with the conclusion that the application is in the good category. Validation of nutrition experts is needed related to the assessment of toddler growth. Table 3 shows that the average expert validation results are 4.7 in the good category.

Comments given by pediatric nursing experts are: Growth material can be added with material for infants 0-12 months, so that there is a way of measuring body length for babies. Comments from nutritionists: good app and increase user motivation. In the application there is still the use of foreign languages, one of which is a table. The material needs to be added about the impact of children's growth if they are not in line or parallel. Applications accessed via Android may be slightly enlarged or can be replaced with material made in the form of videos. In the growth classification, the source library is listed.

The follow-up to the expert assessment is to revise and add videos and a bibliography or source material to the application. Next, a stage 2 expert assessment is carried out and the results of the assessment show that it is suitable for use without revision.

The assessment of media experts is carried out by computer and programming experts to get input on the feasibility of the applications that have been developed, the results of the assessment obtained an average of 4.7 (good category) and the advice given is to add videos according to the material to facilitate user understanding. Revision of the application is done by adding a video of the material on the menu of the material being applied

and at stage 2 assessment by media experts it is concluded that it is suitable for use without revision.

The results of the paired sample t-test analysis showed that there was a significant difference between knowledge before using the application (M=53.3) and knowledge after using the application (M=78.0 and p<0.05).

The conclusion is that there is a significant difference in knowledge before and after using the application, while the application assessment is carried out using a research subject assessment sheet with an average result of 4.8 (good category).

Discussion
The development of teaching media applications is carried out by following systematic steps: the process of designing and developing using the ADDIE framework (Rusdi, 2018) namely Analysis, Design, Develop, Implementation and Evaluation as the main stages while the process of designing intervention products uses the Dick and Carey (Mohammadi et al., 2015) intervention design model where the guidelines for assessing the growth and development of toddlers are based on Android is used to make the educational process and skill improvement easier and more interesting.

The results of developing a growth and development assessment application with recommendations from media experts and material experts are suitable for use without revision as well as trial results from users with good category scores and interesting application comments making this application applicable in learning in pediatric nursing courses.

Several application developments have been carried out with good results and can be applied, in general the previous developments are with different methods and are more directed at development in assessment and stimulation (Lee et al., 2004). Designing instrument for early stimulation, detection and intervention for growth and development of children based on android system. In this study, the design includes hardware, software and

manuals with evaluation using the focus discussion group (FGD) method. The results show that the content, accuracy, time and speed of application operation are good and it is recommended for the government to use this application.

Other app development Design and build a child growth monitoring system application as a growth detection tool (Julizal et al., 2019). Desktop-based application research using the Java programming language in processing child growth or child growth cards as an application for monitoring problems or deviations in child growth with a community education approach. The results of filling out the development sheets for infants and toddlers can be seen quickly, however, further monitoring and guidance is still needed so that Posyandu cadres and clinical midwives can carry out monitoring activities on child development using application programs independently and continuously.

Prototype of application for growth and development of toddlers for posyandu cadres in rural areas (Wijayanto, 2012). The purpose of this study was to develop a prototype of an Android-based toddler growth and development application that could be easily used by posyandu cadres in rural areas. With the existence of a prototype (prototype) application for growth and development of toddlers based on Android, it is expected that the accuracy of the counseling provided by posyandu cadres can be further increased along with the accuracy of the data recorded by the system.

Applications for early detection of growth and development of children age zero to six years based on Android (Saurina, 2016). The purpose of this research is to make an application for early detection of growth and development of children aged zero to six years based on Android. This application is intended for parents and the health medical team on duty at the Puskesmas to provide information about children's growth and development, find growth irregularities and can provide advice on what early stimulation should be given to children.

The use of multimedia in the teaching and learning process is aimed at improving the quality of teaching and learning, with the development of multimedia technology, the elements of video, sound, text and graphics can be packaged into one application. Basically, the purpose of implementing learning using multimedia is to be able to replace and complement the objectives, materials, methods and assessment tools that exist in the teaching and learning process in conventional learning systems. With the application of this multimedia, it is hoped that it will be able to provide changes in the learning atmosphere, so that it can lead to motivation, especially in participating in learning so that it can improve student learning outcomes. The use of multimedia technology helps in efforts to increase student motivation, explore and improve subject matter in schools. Multimedia technology applications in the form of tutorials, simulations, virtualization and make it easier to get information, transmit and perform routine tasks automatically.

This type of learning has several advantages. The development of multimedia technology has promised great potential in changing the way a person learns, to obtain information, to adapt information and so on. Multimedia also provides opportunities for educators to develop learning techniques so as to produce maximum results. Like wise for students, it is hoped that with multimedia they will find it easier to determine what and how students can absorb information quickly and efficiently. Sources of information are no longer focused on the text of the book alone but are broader than that. The ability of multimedia technology that has been connected to the internet will further increase the ease of obtaining the expected information.

A lot of research on the use of multimedia has been done (Johnson & Mayer, 2009). In this study, the transfer performance and retention performance of students who received information using multimedia were assessed. The results showed that the multimedia representation group had better performance. In retention performance, it was found that students who received multimedia in delivering information remembered more than the group of students who only received one medium.

Multimedia has been widely used by companies to deliver training materials to their employees, as well as by teachers and lecturers to deliver teaching materials to students (Mohammadi et al., 2015). It is believed that the use of multimedia in a learning activity (at school or in training activities) can improve learning outcomes (Sanitasari et al., 2017). Presentation software such as Microsoft Power Point combines various types of media into an attractive presentation package, which will attract attention and increase the motivation of learners (Levasseur & Sawyer, 2006).

The results of research on multiple channels, namely the delivery of information through various types of media indicate that when a channel is complementary to existing information, learning activities will increase, but when information provided through a different channel is excessively repetitive (redundant), then generally learning activities will not increase. When information provided through different channels is inconsistent with previously available information, learning activities will actually decrease (Lindsay, 2011).

Research on multimedia and learning technologies related to multimedia over the years has shown inconsistent findings regarding the effects of multimedia on learning activities (Al-Qeisi et al., 2014). Some studies show a positive effect of multimedia, while others show no effect, and some even show a negative effect. The inconsistency of the results of this research is caused by the many unified factors that influence the role of multimedia in learning activities (Huang et al., 2013).

The debate about the role of multimedia in learning activities is fierce between Kozma and Clark.

Clark (1994) argues that the media has no effect on learning activities. According to him, the media is only a "vehicle" for learning activities, while what affects learning activities is the method used. Clark agrees with the opinion that the new media used in learning activities will affect a learner's learning activities, but once the learner is used to the new media, the influence of the media no longer exists.

Kozma (1994) argues that media can enhance learning activities. Media can help create a better "mental model" so as to help a learner understand. For example, a text-only book requires us to have prior knowledge of what is discussed in the book so that we can create a "mental model". Without prior knowledge about the material discussed, the "mental model" that is made may be inaccurate. When pictures are included in the book, it will be easier for students to create a completer and more precise "mental model". Thus, through media, a learner has the ability to explore places, within his virtual world, that he may never see in person.

Conclusions

The development of an Android-based growth and development assessment guideline provides output in the form of the "GUVI_Tools" application which is an interactive multimedia-based learning media developed with development research steps carried out using the ADDIE framework (Analysis, Design, Development, Implementation and Evaluation) and Implementation the application shows a significant increase in knowledge before and after using the application and the results of the assessment of application use are in good category.

Ethical Approval

This study complies with the ethics committee of the Health Research Ethics Commission of the Ministry of Health, Jambi (LB.03.02./3.5/144/2021 from 01/16/2021).

Acknowledgments

Funding Source

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