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Design and Development of Mathematics and Basic Indonesian Learning Tools for Early Children Based on Android

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ABSTRACT

It is media learning. Using advanced Android smartphones also evolved from manual to digital learning media. However, the rapid development of the era does not shed light on advancing learning methods in the educational institution, as PAUD Kamboja, Tanjung Gadang Sub- District, which still uses manual learning methods today. PAUD Kamboja needs different media to help the learning process, such as using digital media as android applications. Actionscript 3.0 is designed and built using Adobe Flash Professional CS6 software and language. Support is also an android-based AdobeAIR application, used as a drive or runtime.

1. Introduction

Today's advances in information technology have spawned daily gadget culture. One of the widely used smartphone gadgets. Using smartphones is already felt in education. An example is mobile apps on android smartphones as a medium for conveying material to students or as props. Education should be provided early. The advantages of early childhood education such as Early Childhood Education and Play Group or Kindergarten (PAUD and PG or Kindergarten) help lay the groundwork for the development of attitudes, knowledge, skills, and copyrights required by students adjusting to their environment and further development.[1]

In this study, the authors used android smartphone media or gadgets to place android apps that can help early childhood in the learning process depending on the child's level, which is undoubtedly in the form of educational or educational apps. The author took the initiative to create a more compelling interactive learning medium for early childhood, using a play-by-learning system. The creation of this android app aims to prevent any child who uses it from feeling bored in learning. Learning or educating early childhood by using the playing system while learning will help introduce and convey materials to make it more attractive to be accepted and more comfortable to understand, especially for children still at an early age. The designed application can only show materials or simple Indonesian mathematics and language problems for early childhood. Data collection is performed in the sijunjung regency, Tanjung Gadang sub-district in Jorong Timbulun Patah. The creator would need specific tools to create the program. Of course, the critical software used is Adobe Flash Professional CS6, and other supporting software such as Adobe AIR to publish the project in android applications or APKs. ActionScript 3.0 for coding or scripting programs, Adobe Photoshop CS6 for application architecture.[2]

2. Method

2.1 Software Engineering

The discipline that addresses all software development areas, starting from the initial stage of user needs research, interface requirements, architecture, coding, and device maintenance testing after use. SDLC or device life cycle is the process of designing or changing a software system using the templates and approaches used to build previous software systems (based on best practices or well-tested methods). Models for designing SDLC-based structures are waterfall model, prototype, rapid application creation (RAD), iterative, and spiral.[3]

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2.2 UML (Unified ModelingLanguage)

Unified Modeling Language (UML) is a modeling language to develop, imagine, specify, create, and record image-based applications from an OO (Object-Oriented) software framework. UML is a tool or blueprint for object-oriented software creation. Generally splitting UML diagrams into 13 (thirteen) sorts. In this analysis, authors will use 7 (seven) UML diagrams, among others.[4]

a) Use Case Diagram is modeling to build information system actions. The usage case diagram decrypts an association between one or more participants and the information system.
b) Class Diagram explains the framework layout and identifies the classes to be generated to construct the system. What groups are called attributes and processes?
c) Sequence Diagram Explains entity actions in use case by explaining the lifetime of artifacts and messages sent and retrieved between objects. Therefore to explain sequential diagrams, the artifacts involved in a use case must be understood to allow sequential diagrams necessary to see scenarios on the use case.
d) Collaboration Diagram (Communication Diagram) Collaboration diagrams define relationships between artifacts as sequences of message distribution but stress an entity's position. Communication diagrams reflect knowledge derived from Class Diagrams, Sequence Maps, which Utilize Case Diagrams to decrypt a system's static layout and interactive behavior.
e) State Map Diagram Also named Indonesian position engine diagrams or condition maps are used to describe shifts. A state machine is the development of a finite-state automated diagram, incorporating many additional functions and principles.
f) Activity Diagram Defines the workflow or activity of a device, business procedure, or program menu. The main point to remember here is that the action diagram is not what the actor does, so the machine does the activity.
g) Deployment map Demonstrates part setup in program execution

2.3 Educational Games

The animation is a series of photographs that are processed so that animation activity embodies the movement's illusion by exposing or presenting a set of images that steadily alter at a comparatively fickle rate. Multimedia animation creates motion from different media or objects varying by effects and filters, transitional motions, and sounds associated with animation movement. Multimedia is characterized as a mixture of text, pictures, graphic art, sound, and video. The mix of media is integrated into the device to be stored, interpreted, and displayed simultaneously. An educational game is a device or software where players make choices by manipulating items in the game to achieve valuable science for the player or user himself. Educational games aim at teaching idea creation, comprehension, and preparation. Educational games are designed to promote children's learning through digital games leveraging immersive multimedia technologies.[5]

3. Results and Discussion

Data review The data analysis stage is the most critical development stage of a system or program as the performance measurement and identification of what is expected for the intended specification is carried out in this stage before the study is appropriate. Process analysis is essential to design the applied learning media or simple mathematical and Indonesian learning resources. Application Analysis This analysis stage is planned to figure out what is required for developing a learning media application or Indonesian Math and Learning Tools for Android-based early childhood, to make the system effective and productive later. Describe the system using UML, among others:

a) Using Case Diagram This map illustrates what performers or consumers should do with the learning media framework and how the learning media application operates.
b) Class Diagram Class Diagram implementation demonstrates how systems in learning media applications are constructed.
c) Sequence diagrams explain the actions to be followed in the chart case in response to an application that produces a particular outcome.
d) A Partnership Map Collaboration defines the relationship between performers and activities that can be achieved in the context of message distribution sequences in this Learning Media application.
e) The task diagram outlines workflows or actor tasks for the Developed Learning Media program.
f) State map State Chart demonstrates how to model different state (state) artifacts used to form the application's more complex actions.
g) Deployment Diagram, The Deployment Diagram, displays component specifications varying from equipment to equipment.[6]

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Implementing the framework is part of developing the system, and programming software is needed to execute it while creating the gui and writing the program code according to the developed system. The system's deployment is often an application development operation that uses software and hardware to evaluate and design an application that will have good advantages for its users.[7] Implementation is often undertaken to clarify the machine limitations needed to operate this program. The Android simulator DROID4X is used to evaluate apps designed to see how the software is designed. This evaluation brings the efficiency of the built environment into consideration. App monitoring is carried out as one step to decide if the app will run properly. The actions that have been taken are:

a) Load Adobe AIR android app in Droid4X software, which targets built-in Android applications as a drive (Runtime).
b) Load android Media Pendidikan program in Droid4X apps.
c) Running the framework for Media Edukasi

A. Main Menu Interface View

The software's main view is the user's first view or view when the Instructional Media app is accessed. The following image displays the main view of the software for educational media.

Fig 1 Application Main View

B. About Interface View

The About display is an interface view that occurs after the user presses the About button on the application's main view. In this view, details on the application for education media and the author is given. The following picture gives an outline of the chosen lesson view.

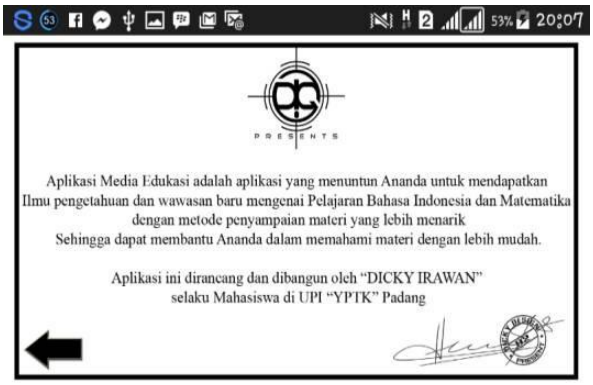

Fig 2 About View

Figure 2 above would surface after the user presses the About button in the program's main view successfully.

C. Interface View Select Lessons

The Lesson selection view is the interface look that occurs after the consumer clicks the START button at the app's first screen. There are many lessons learned from Indonesian and mathematical lessons in this regard. The accompanying picture provides an outline of the chosen lesson view.

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Fig 3 Lesson Select View

D. Indonesian Interface Display

The Indonesian display is the program view shown after the user clicks on Bahasa Indonesia in the Pick Lessons view. In this opinion, there are many content choices for Indonesian lessons, including the report on letters or alphabets, the inclusion of animals, and the identification of fruits. The following picture gives a summary of the Indonesian view:

Fig4 Display Select Language Materials Indonesian

E. Mathematical Interface View

Math view is an interface view that displays the Math icon in the Pick Lesson view after the user clicks. Several resources relevant to mathematics courses are eligible for this study, including number recognition content, finger count, item count, and money count. The following picture describes the Mathematics view.

Fig 5 Select Material View Math

F. Exercise Interface View

Exercise View is an interface view that is shown when the user selects the button located in the Pick Lesson view. There are multiple level choices in this view that the user may choose based on the user's skill. The stage choices are simple regular, and challenging levels in the exercise view. The following picture describes the training view

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Fig 6 Exercise Name Input Display

Figure 6 above will appear after the Practice button is pressed in the Learning View chosen

Fig 7 Select Confirmation View Level

Figure 7 above appears after the user completes the name form and clicks the Start button to start the exercise.

Fig 8 Level Selection Display

Figure 8 above represents a set of exercise levels. Users should select the standard of training depending on their skill

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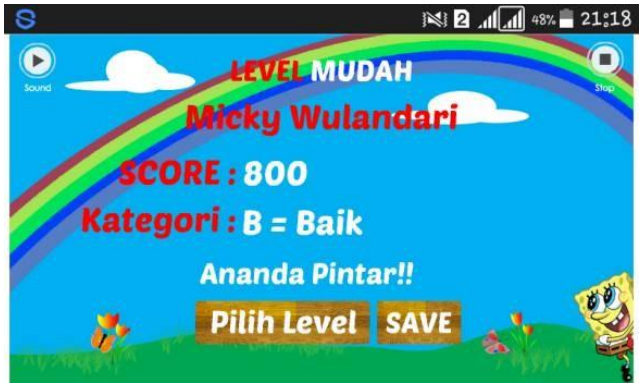

Fig 9 Display Score or Value

Figure 9. The above view occurs after the user has completed the exercise and the program terminates the measurement of the user's ranking. The overhead view will appear in training at all stages.

4. Conclusion

A Learning Media Platform for early childhood focused on Android was built from the research, design, and implementation process carried out in the previous Chapters. Built-in software can be viewed without internet access, which can save you money. This application offers Indonesian and basic early childhood math lessons. Early children can understand technology well, and science can be learned quickly by this program. With this app, early childhood can no longer rely on Android-based games with no schooling. Furthermore, the motivation and contribution to the use of early childhood learning media are increasing as expected.

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