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Design Prototype of Simple Jarimatic Visualization Application Model, Attracting, Motivating Early Children to Learn and Grow

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Abstract:

The main purpose of this work is to develop a model or product design into a final product that can meet user demands. The methodology of this study is the product development by making designs, samples, or models with the aim of testing the concept or work process of the product. In the product development process, users can take part in the product development process by evaluating and providing feedback. Therefore, we create a prototype design for a simple, attractive, and attractive Jarimatika visualization application model that motivates early childhood to learn and grow, which results in a product development of the Jarimatika Visualization Software.

Keywords: Visualization Application Model, Simple and Interesting Jarimatika, Motivating.

1. Introduction

Software-based product development is currently experiencing developments in terms of appearance and focus on user experience (Höst and Oručević-Alagić, 2011; Flórez-Aristizábal et al., 2019). The manufacturing process leads to an application prototype to be able to find out early on the shape of the product to be developed (Ozer, 2000; Sarama and Clements, 2002). The prototype is a system design scheme that forms a model and standard size or scalability that will be worked on later (Viswanathan and Sridharan, 2012). Every developer and user can interact directly with the model without having to create a real product. The prototype system that is built adapts to the initial needs of software development to find out some of the features and functions that have been defined previously (Wathoni et al., 2021; Avriani et al., 2022). So as to be able to detect errors early before implementing and releasing the product as a whole (Hinostroza, 2000; Pal, 2022).

In the development of this prototype, there are several types of UX Design prototypes that support application development (Yu and Peng, 2021), namely: sketches, wireframes, and mockups. While the stages of developing this application are as follows: (1). Conduct information gathering and initial observations; (2). Make a prototype based on the results of the analysis obtained; (3). Carry out the evaluation process of the prototypes that have been successfully made; (4). Conduct testing (testing) on prototype products that have been made; (5). Carry out retesting of the system before entering the prototype release; (6). Testing the prototyping system to related users and stakeholders.

The Jarimatika method is popular methods in higher education and can be investigation in some literature. Purwanti and Khoiriyah (2020) presented of the effectiveness of the use of tapertis media towards the 4 graders of elementary school's multiplication concept understanding. They found that the Jarimatika with Tapertis media has effectiveness in improving the 4 graders elementary schoolsâ€™ multiplication concept understanding. Koswatiningsih (2020) studied of the improve learning outcomes and subtraction in Class I SD Negeri 2 Sandingtaman research focusing emphasis on the ability and the activities of teachers in planning and implementing learning and activities and student learning outcomes in implementing the lessons to students of class I, which totaled 35 people, assisted by a teacher partner who act as observers. They found that the showed an increase during the implementation of the action research as indicated by the increasing student achievement test at the end of each learning cycle, ranging from the achievement of the average value of 61.1 in early tests (pre action research), increasing to 72 in the first cycle, increased to 76.6 in the second cycle and increased to 88.6 in the third cycle.

The application of the kindergarten curriculum is not as strict as the curriculum at the primary and secondary education level medium (Rini and Margorini, 2020). There is still a lot of room that can be used to realize quality early childhood education (Yuliana, 2019; Rueangprathum and Witosurapot, 2019). However, it is necessary to apply a balanced curriculum and learning methods for children so that children do not burden, the most important thing is to

prevent the occurrence of learning barriers in higher level. In this regard, to improve performance student learning, education and training (Adewiyah and Setyawan, 2022). However, the format and There is no standard/standard grammar education structure yet. In fact, College Even though it is high, it does not yet have a standard in the development of education Jarimatika (Fausia et al., 2021; Wang et al., 2008). For non-formal and informal education, although there is education Jarimatika is still a skill education, even though Jarimatika is not the same as skill (Ihsanudin and Alamsyah, 2019).

The main purpose of the prototype of the Jarimatika visualization application is for the product to be released according to user requests, namely PlayGroup and Kindergarten students and elementary school children in Grades 1,2 and 3, so that the role of the prototype is as a liaison between application builders and application users, to be able to realize the product. in the form of appropriate and appropriate software.

2. Methodology

2.1. Research Flowchart

Figure 1 show the real data from the wishes of parents, teachers, the community, and the Surakarta Diaspora Service regarding development of a prototype model for a simple, attractive finger-pointing visualization application that can motivate students to learn.

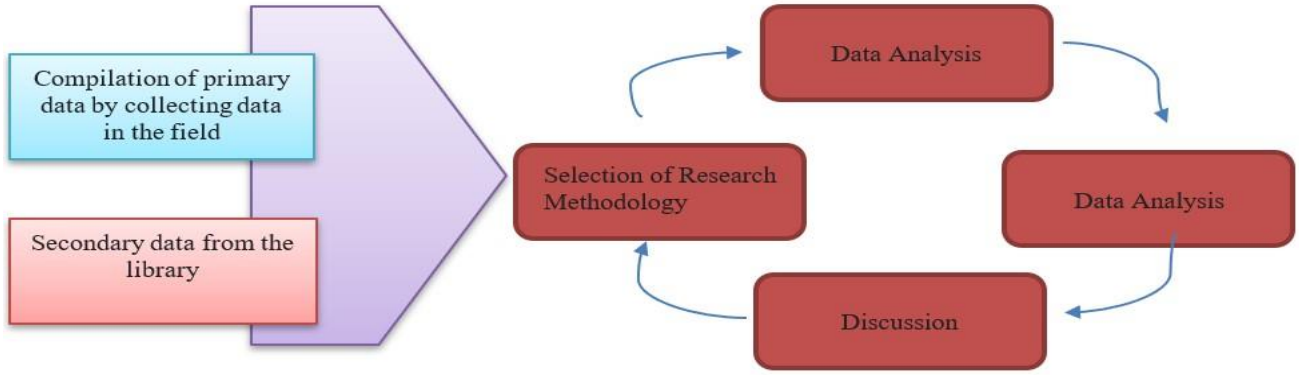

Figure 1. Research Flowchart

2.2. Research Stages

In the first year of research, the researcher builds an application program that can be used to assist the teaching and learning process of early childhood education, kingdergartens and elementary school, in the form of an application design model as shown in Table 1.

Table 1. Research Stages

Stages	Activity	Analysis	Output
Research Year 1	Preliminary research (exploration, model assessment, draft design and validation prototype model, limited test prototype model draft)	Process and work analysis System Analysis	1) Model Design 2) Prototype Model 3) CD DVD Jarimatika 4) Nas/Inter Journal Articles 5) Proceding Seminar results 6) IPR : Copyright

2.3. Research Conceptual Framework

The conceptual framework for research is the link or relationship between one concept and another from the problem to be studied. The conceptual framework is obtained from the concept of science/ theory that is used as the basis for research. In this research, the conceptual framework can be shown in Figure 2.

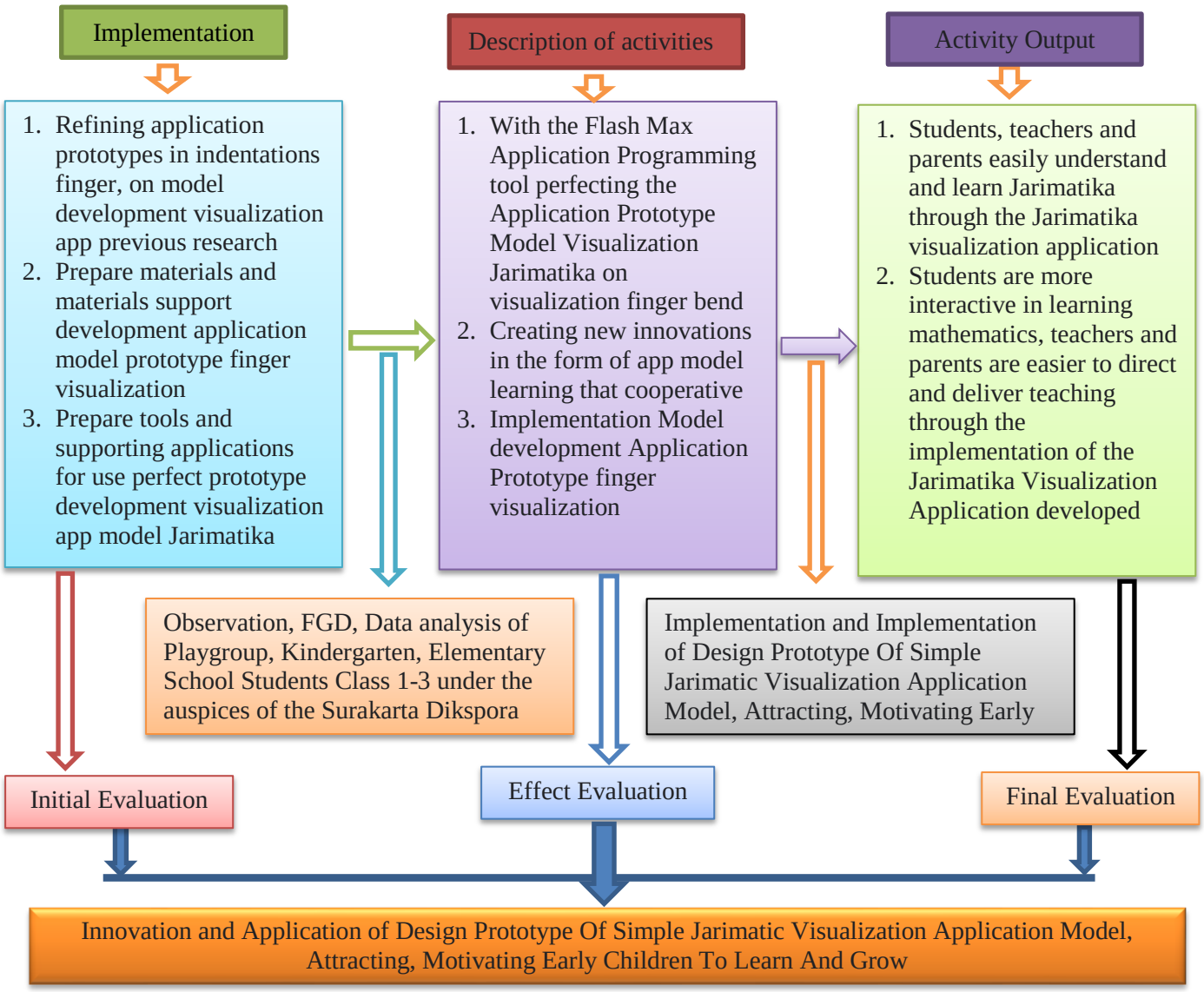

Figure 2. Research Conceptual Framework

2.4. Fishbone Research

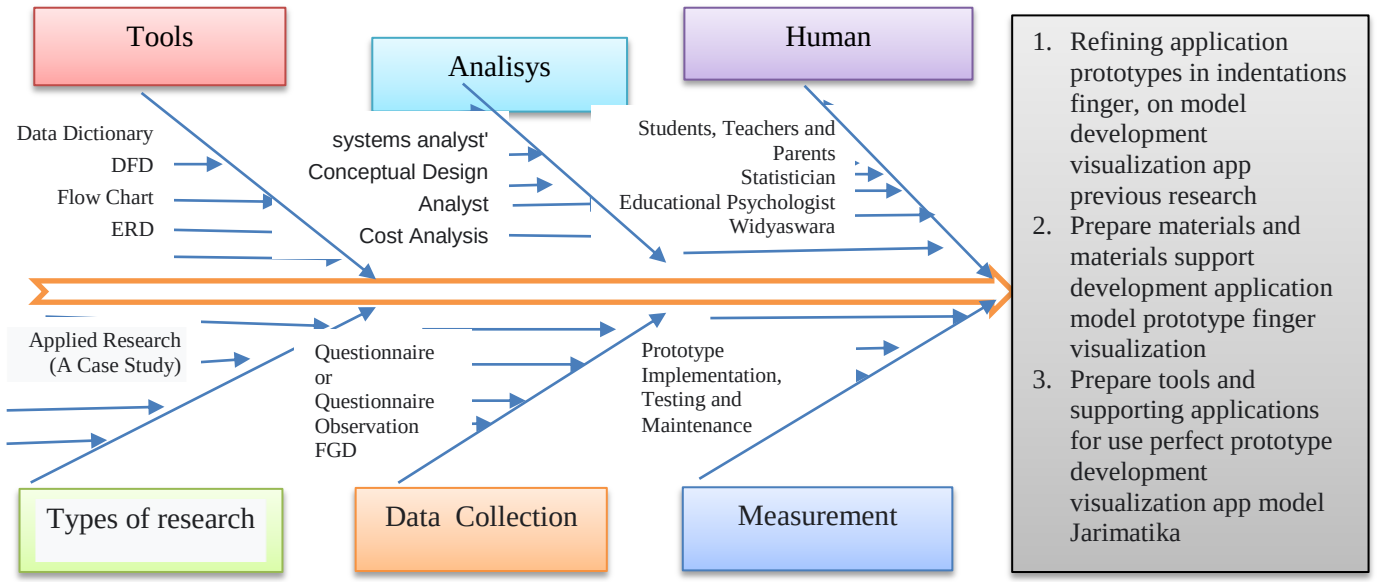

Figure 3. Fish Bone Researcher

Fishbone (or Ishikawa) analysis is a structured approach that allows a more detailed analysis to be carried out in finding the causes of problems, discrepancies, and existing gaps, can be shown in Figure 3.

3. Results and Discussion

From the results of the study, it can be analyzed that the Jarimatika visualization application model developed is based on Web. Model design/design contains model structure. Jarimatika visualization learning includes:

1) math and arithmetic
2) Competency standards for Playgroup, Kindergarten and Elementary School Learning Class 1-3
3) Learning Outcome Indicators
4) Student learning objectives
5) Conceptual net of learning activities,
6) Description of essential science materials,
7) Learning materials (materials and tools),
8) Learning activity scenarios.
9) Learning Evaluation (individual and classical).

The results of the analysis in the first year of research obtained the percentage of ability learn mathematics and arithmetic in Playgroup, Kindergarten, and Elementary School children in Grades 1-3, in 35 samples of schools that are in the service. Dikspora Surakarta shows the figure of 73.9%. As for the improvement to be expected achievable is 15% of the assessment score at the initial assessment. The following is the achievement target the average obtained by students in 35 research samples which can be described in Figure 4.

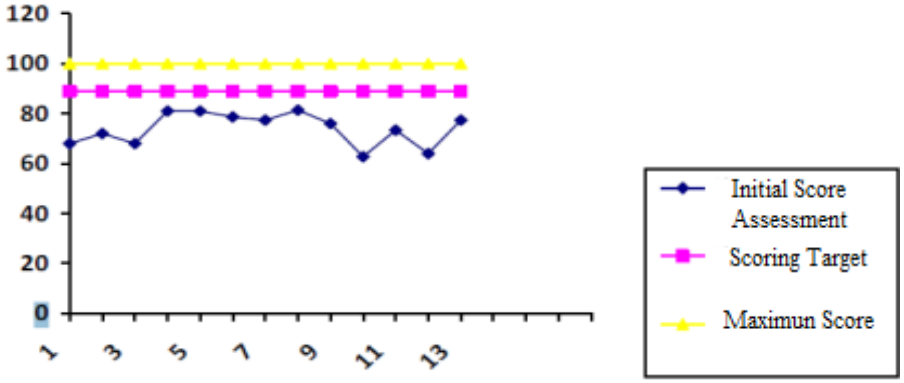

Figure 4. Assessment Score Average learning outcomes 35.

The data from the initial assessment when it was implemented to users, namely students of playgroup, kindergarten, and elementary school grades 1-3, then conveyed to teachers, parents and student affairs of the Surakarta Dikspora office, as well as school principals. Then the researchers gave the innovation of learning models to students with various alternative learning activities that more interesting, motivating and able to improve mathematics learning for students, through Design Prototype Of Simple Jarimatic Visualization Application Model, Attracting, Motivating Early Children To Learn And Grow.

Research Observation Results Researchers conducted direct observations on students in 35 sample schools under the auspices of the Surakarta Dikspora Office. Some PAUD and Kindergarten school teachers where observations were made, Introduction to Jarimatika, conveyed the difficulty of getting applications that match learning needs in schools. Therefore, researchers try to provide solutions to problems faced by PAUD teachers, Kindergarten teachers, and teachers in grades 1-4 of Elementary Schools, in the form of the Jarimatika Application Model. This model is then developed continuously and continuously so that it can provide answers to the needs of PAUD Schools, Kindergartens and Elementary School students grades 1-4 in the Surakarta Dikpora Office.

The results of research observations, interviews, data collection and introduction to learning of finger mathematics were carried out in early childhood / Playgroup / Kindergarten as well as grade 1-4 elementary school students in the Surakarta Dispora Service, up to 35 samples of schools used as a place of research, it turned out that there were many similarities, namely: 1) Basically very important child early age/PAUD/playGroup/TK and grades 1-4 of Elementary School, given the basic introduction of Jarimatika in learning at school and outside of school; (2) Students are very happy when they receive new learning patterns, which are easy for them to understand and understand, with the application model of Jarimatika, which they use as a learning tool, namely by watching interactive videos, through their eyes when it is implemented in 35 sample schools in the environment. Surakarta City Department of Youth and Sports; (3) Students are enthusiastic about learning to listen, see, then practice everything that is taught in interactive videos, some even play videos for hours and practice counting as taught through interactive video learning DVD; (4).

The nature of children tends to be bored, talking alone or with friends beside them, shouting, fighting, running around, busy themselves and doing their own thing. However, through interactive videos, almost 90% of students can sit quietly, watch and practice.

3.1 Prototype Design of Jarimatika Visualization Application Model

The prototype design of the Jarimatika Visualization Application Model on the interactive learning DVD that was built contains the basics of interactive learning that was developed when conducting internal research with the research site at Kanisius Elementary School Semanggi Surakarta which is still done manually. The prototype model is still a manual drawing of the right hand and left fingers with colors that attract students. And in this competitive grant research, improvements were made to Finger Illustrations on the results of interactive video visualizations by perfecting the process of finger curvature for the illustration of the thumb, index, middle, ring and little fingers can be seen in Figure 5.

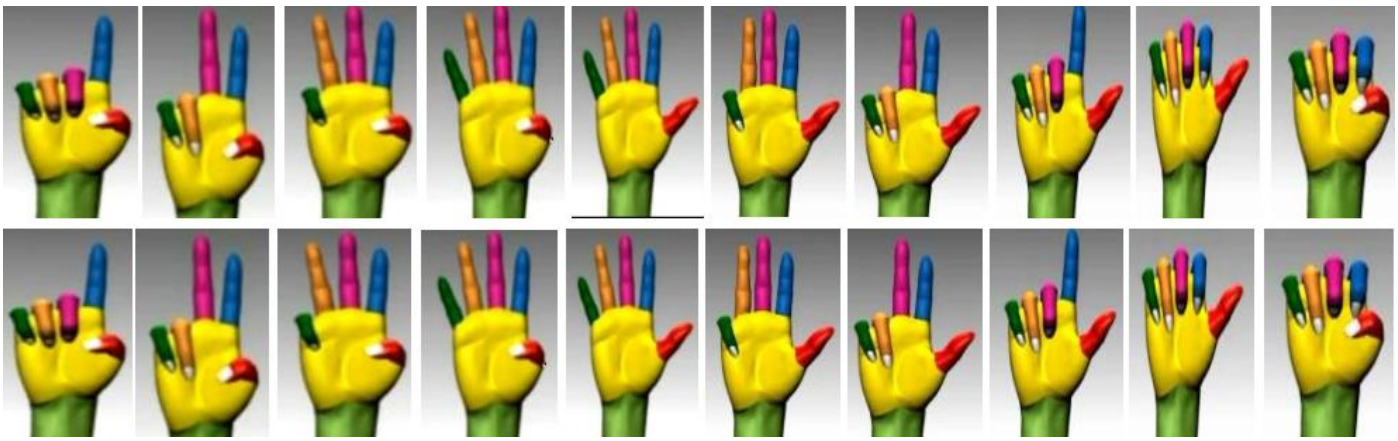

Figure 5. Jarimatika Prototype Model

3.2 Interactive Learning Design

Interactive learning design jarimatika visualization DVD which is built in the form of a finger drawing pattern, contains a basic model of Jarimatika recognition, pattern design add, less pattern, add less. The basic pattern for the introduction of the concept of Jarimatika in interactive video is basically the same as the shape of a child's finger, which is built on a DVD as an application program in the form of an interactive video. The concept of the model given through the interactive learning DVD video of Jarimatika is: Right Hand Finger Recognition and Left Hand Finger Recognition. The learning concept is very simple so that it is easy for students to understand, because the picture formed in the results of this interactive learning video application program guides students to learn to count quickly and simply.

The finger illustration presented on the results of this interactive learning DVD program starts from 1-100, because basically early childhood learns to count from numbers 1 to 100. Assistance is carried out for the growth and development of students. Parenting Growp needs to be developed, so that children understand properly basic concepts of Jarimatika through this application. The prototype model of the Jarimatika Visualization Application, built with the Adobe Flash Professional CS5 application, is a development of Adobe Professional CS4 or Flash 10.5. This software has been implemented and tested in 35 sample schools, namely PlayGroup, PAUD, Kindergarten and grade 1-4 elementary school students in the Surakarta City Education and Sports Office.

Macromedia Flash Professional 8 Portable Version 2.1.3 is widely used by people because of its reliability which is able to do all things related to multimedia. Can also be combined with other programming software for making animations, cartoons, interactive learning, animation effects, advertising banners, websites, games, presentations, etc. Adobe Flash CS5 is a very well-known software released by a well-known company from the United States, namely Adobe System Incorporated. Owned facilities such as 3D Effects or very interesting transformations, can be used to create interesting and fun 3D animation effects. Its latest features can create a variety of animations, including ease of use of Adobe Bridge and version cue, Bounding box, Adobe Device Central, active content detection, quick video, and action scripts. Adobe Flash CS5 is a program aimed at designers or programmers that aims to design animations for making web pages, making interactive games, presentations for business purposes, learning processes, making cartoon films and can be used to build an application high value. Flash technology can be divided into two aspects, namely:

1. Flash as software. Adobe Flash as software maker or application builder, Information System, and Animation Maker.

2. Flash as a Technology. Currently, almost all browsers and some electronic equipment have Flash Player installed to be able to run animations.

Flash is a vector-based animation program that can produce small files that are easy to access. Flash is equipped with tools to create images which will then be animated or run with the script. The results of the Application Program are an interactive learning DVD animation video. Can be played easily on a DVD player, so students can easily learn on their own via DVD.

3.3 System Design

Interactive learning system design through DVD programming results of this Jarimatika visualization model can be seen in Figure 6.

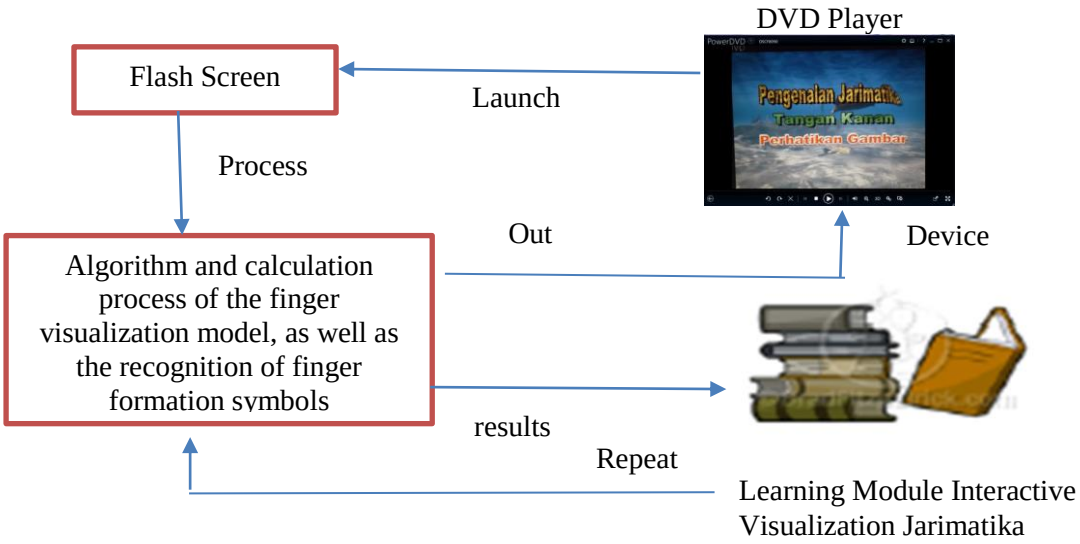

Figure 6. Global System Flowchart.

Based on the Figure 6, the Interactive Learning DVD application is in the form of steps for using the fingers, starting with the counting process, exercises and completion. This application is only limited to the learning process. By In general, the learning process on each display menu is a tutorial followed by practice questions.

3.4 Processing Sound

Digital audio is a file format used to store sound on a computer system. The need and development of computing technology has made it possible to manipulate audio files easily. Digital Audio Editor (digital sound processing) is a tool / tools used to manipulate digital audio. Starting from the functions of recording, mixing, editing and mastering. Digital audio editor is an easy-to-use, practical and efficient application. Digital Audio is a file format used to store sound on a computer system. The need and development of computing technology has made it possible to manipulate audio files easily. Digital Audio Editor (digital sound processing) is a tool / tools used to manipulate digital audio. Starting from recording, mixing, editing and mastering functions, everything can be done with digital audio editor in an easier, practical and efficient way. So that the sound used in this Jarimatika interactive learning visualization application is more interesting and not boring. The files used can be in *.wav, *.midi or *.mp3 formats. This sound file is used for animated background sound and application program output. The stages of sound processing software can be seen in Figure 7.

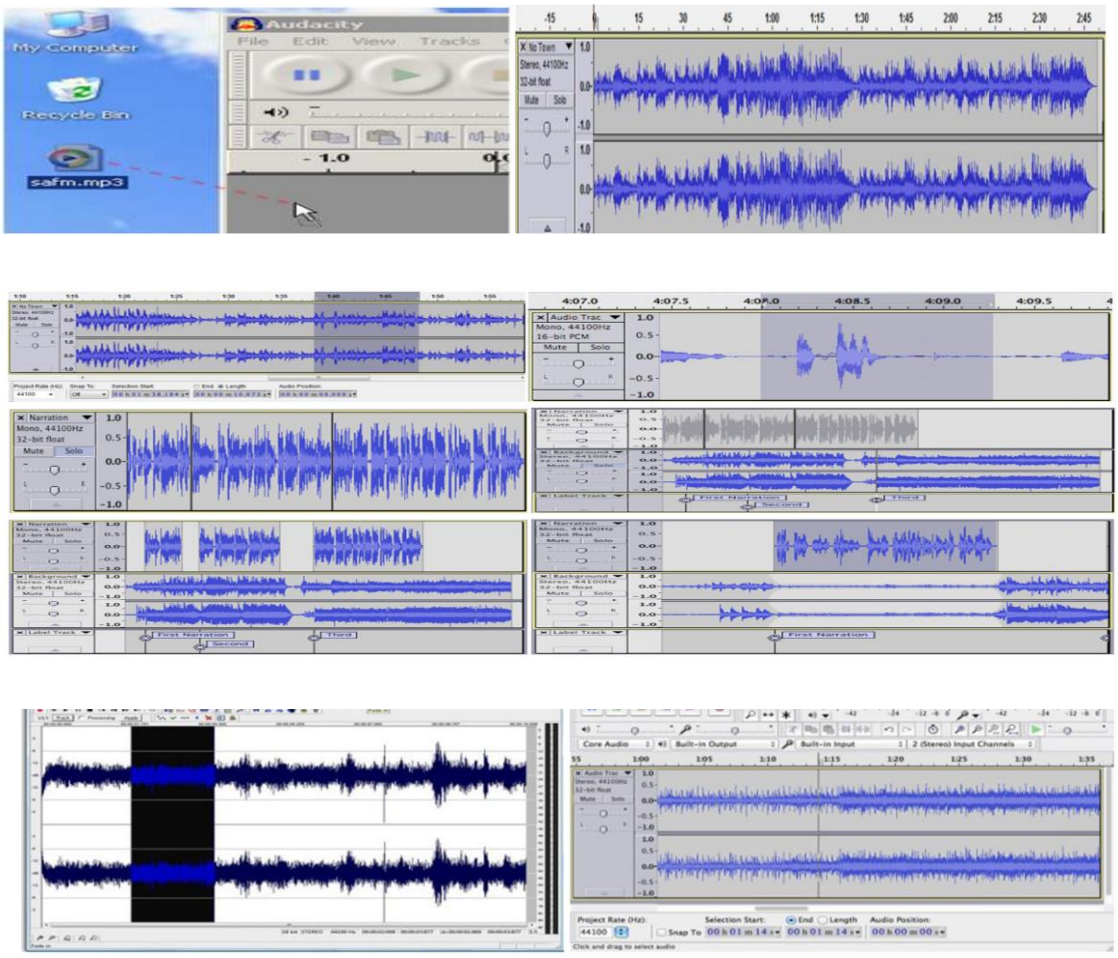

Figure 7. Stages of sound rendering and mixing process DVD Jarimatika visualization using sound processing software

3.5 Program Prototype Model

The results of the prototype of the Jarimatika Visualization Application Model in the form of an Interactive Learning DVD can be seen in Figure 8.

Figure 8. The prototype of the Jarimatika visualization application model in the form of an interactive learning DVD

4. Conclusion

The main objective of this study to develop/build a prototype model of the Jarimatika visualization application to help the learning process of early childhood. The method used is to build a prototype. The results of the study are (a) Design of Jarimatika Application Prototype Model, (b) Programed Prototype Model and (c) Programed Jarimatika CD DVD.

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