Journal of ICSAR
ISSN (print): 2548-8619; ISSN (online): 2548-8600
Volume 7 Number 1; DOI: http://dx.doi.org/10.17977/um005v7i12023p80

Orientation to Mobility, Socialization, and Communication Android Apps to Help Visually Impaired Students Understand the State University of Surabaya (UNESA) Campus Environment

Sri Joeda Andajani [*], Endang Pudjiastuti Sartinah, Meini Sondang Sumbawati

Department of Special Education, Faculty of Education, Universitas Negeri Surabaya, Surabaya, Indonesia

*Corresponding Author E-mail: sriandajani@unesa.ac.id

Abstract: UNESA is a national leader in education development. This is consistent with UNESA's vision of achieving educational excellence. This realization is consistent with UNESA's primary competency and capacity as a disabled-friendly campus, with one visually-impaired student. The goal of this research is to describe the outcomes of creating an Android application with a social mobility and communication focus to help students with visual impairments understand the UNESA campus environment. The product of this development research takes the form of an android application with a focus on social mobility and communication. Realization of product design, namely: 1) android application program packaged in mobile phones, 2) practical guide to access the outdoor environment on the way to various places in the UNESA Lidah Wetan and Ketintang campus environment with braille writing and writing alert, 2) cooperative form of think pair share type, 3) authentic assessment tool as a successful use of android applications in social orientation and communication mobility. The products created will be used by all visually impaired students who wish to visit the UNESA campuses in Lidah Wetan and Ketintang. UNESA's inclusive campus is a place for all disabled people who want to continue their education, including the visually impaired who require environmental mobility facilities.

Keywords: orientation of social mobility and communication, android application, problem-based learning

INTRODUCTION

State University of Surabaya (UNESA) is a national leader in education development. Excellent educational outcomes, according to UNESA's vision. This realization is consistent with UNESA's primary competency and capacity as a disabled-friendly campus, one of which is the blind. Visual impairment can result in three types of limitations, according to (Cole, 1990; Widjaya, 2013; Depdiknas, 2014), such as 1) limited concepts and diversity of experience, 2) limitations in interacting with the environment, and 3) limitations in orientation and mobility.

UNESA has a different landscape in each building from 8 faculties. Various kinds of campus facilities require an understanding of the introduction of different building concepts to make visually-impaired people independent when visiting campus. Understanding the introduction of the outdoor environment by finding landmarks/field characteristics and clues

to the campus environment is an illustration of the development of this research model. Support Heinich, (1999); Hasrulbakri, (2010); Nandi (2012), said that multimedia refers to various combinations of two or more media formats that are integrated into the form of information or instruction programs. The android application is a type of mobile learning device that was developed as one of the social communication tools for the people with visual impairment, (Kingsley, 1999; Ismaili, 2017; Lahav, 2022).

In everyday life, humans are in a mutually beneficial relationship with their surroundings, both the socio-cultural and physical environments. Humans require the support of their senses in order to interact with their surroundings, including the senses of sight, hearing, touch, smell, and taste. Despite their distinct functions and characteristics, the five senses work in concert to provide a comprehensive understanding or meaning of the surrounding environment.

The eye is the most important of the five senses in capturing information from the outside world, which is then processed by the brain into knowledge and experience. Then, with this knowledge and experience, a person can finally carry out various activities in his daily life, which is especially important for the visual impairment. It is necessary for visually-impaired people to have social mobility and communication orientation in everyday life in order to develop their abilities. Every visually-impaired person requires social mobility and communication orientation in order to access and interact with their environment, (Kemendikbud, 2014).

Warsita, (2018), An Android application is a distribution tool in the form of an operating system on a Linux-based mobile device that includes an operating system, middleware, and applications. Pretto & Curro, (2017), that android is an operation that can be used on Linux-based mobile devices and consists of an operating system, middleware, and applications. An android application that serves as a guide in carrying out social communication activities required to access and interact with the environment, aided by a distributor in the form of a mobile operating system for the visually impaired. Kemendikbud. (2014); Jackson, (2012); Prescott, et al., (2018), that the learning environment is created by presenting various situations that students can do in pairs and small groups, adjusting different completion limits, monitoring and managing work, and arranging necessary learning resources.

In connection with the audio program on the android application, it is designed on a cellphone as a guide for the visually impaired to go to various places in the UNESA campus environment. This design is equipped with a route to each campus building, making it easier to identify each destination building on the UNESA campus environment for the visual impairment. The android application is equipped with a Braille writing guide and beware, and a map that appears on the UNESA campus environment for readability of the visual impairment to various places.

Smaldino, et al., (2005) defined packaged interactive media as "various combinations of two or more media formats integrated into the form of information or instructional programs." Interactive media is defined as media that involves a controller that the user can use to select what he wants for the next process. The most important feature of interactive media is that students are required to interact during learning rather than just pay attention to the media or objects. This means that interactive media, based on this android application,

has been developed as an orientation model for social mobility and communication by combining audio programs and equipping them with braille and alert manuals. The interactive audio program was chosen so that visually impaired students could benefit from hearing as a substitute for vision. The efforts of the visual impairment to collect information through audio programs is a representative medium for changing their learning behavior, (Andajani & Wijiastuti, 2020).

One piece of information provided by an android application makes it easier to grasp the concept of the environment. Then, interactive media as an android application for social mobility and communication orientation is equipped with a braille writing manual, and be cautious if the visually impaired use direct touch, [28]. The goal of this research is to describe the outcomes of creating an Android application for social mobility and communication orientation in order to better understand the UNESA campus environment for the visual impairment.

METHOD

Investigate the development of Android applications with a focus on social mobility and communication in order to comprehend the outdoor environment. The participants in this study were all visually impaired people who came to visit the UNESA campus. This is a development study using a research and development (R&D) model, (Gall, 2003). This android application-based development research design was carried out as a problem-based learning to understand the concept of the outdoor environment for the visually impaired. The flow chart below schematically depicts the stages of the research procedure.

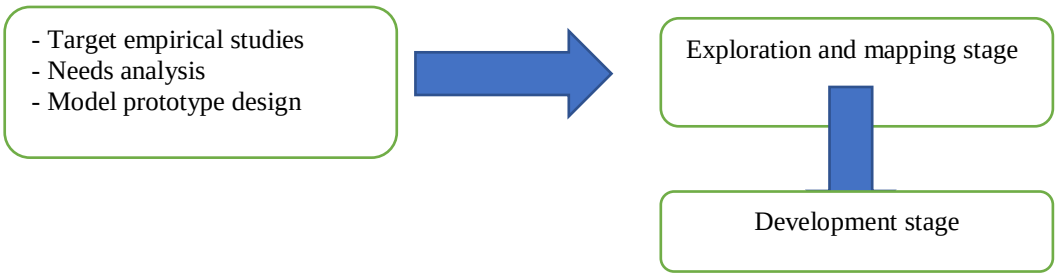


Figure 1. Schematic of Development of an Android Application-Based Communication and Social Mobility Orientation Model for Problem Based Learning in Understanding the Concept of the Outdoor Environment for the Visual Impairment.

Research and Information Collecting

At this point, the authors examine needs and problems, as well as literature, observations, and considerations, in order to obtain theoretical references. In the application of the orientation model of social mobility and communication based on Android applications to solve problems in learning to understand environmental concepts, it was chosen to help overcome the problems of visually-impaired students. Reference theory and field observations are used as a discourse to facilitate learning activities orientation model of social mobility and application-based communication. Furthermore, it is used as a solution to solve learning problems in dealing with people who have visual impairments in understanding the concept of the campus environment. People with visual impairments can use this learning model to

describe the layout and location of buildings, as well as road access, at the Ketintang and Lidah Wetan campuses.

Planning

This activity will describe the initial product in the form of developing an orientation model for social mobility and communication based on Android applications for problem-based learning in understanding the concept of the campus environment. This is accomplished by working with information technology experts, special education experts, and visually impaired users to develop product designs. In the planning stage, the product is created using an android application in the form of a google map that is designed on a mobile phone with an interactive audio program.

Develop preliminary form of product.

The development stage of the product are the prototype design plan for the android application display conditioned according to the characteristics of the visually impaired who require support for the UNESA campus layout raised map.

In this study, a questionnaire was used to collect data. It is used to determine the needs and characteristics of users of the android application prototype product. While the descriptive qualitative data analysis technique was used to process the data from expert reviews. The data is in the form of input, feedback, criticism, and suggestions for product improvement of the android application prototype.

FINDINGS AND DISCUSSIONS

FINDINGS

This research's product can be created through several stages of the development process. Furthermore, the development process necessitates adherence to the rules governing the existence of theory and field reviews. If the stages of the development process are followed correctly, it will be able to produce a representative product that is suitable for the needs of the visually impaired.

The stages of the development process are the preliminary steps taken in order to manufacture a product. This is accomplished through field studies and references from reputable national and international indexed journals, books on ICT, and visual impairment. The model [29] in the preparation of making a prototype product is referred to in the development of this study.

Mainstreaming this product development can be done in the following process stages:

Preliminary Study and Information collecting

Searching and collecting information is an early stage of product design that can be developed through several important points below

Literature Review

This literature review was carried out in order to gather theoretical references for the development of this study. The literature review was conducted by tracing reference studies from various books and journals on information and communication technology, as well as android application software programs.

Field Study

Several phases are completed at this stage, such as determining the form of a mobile learning application as an initial concept prototype product. To obtain campus layout data, the search is conducted through the Head of Academic, Student Affairs, and Cooperation Planning, the Head of General Affairs, and the Head of Finance. then directed to the head of the Public Relations and Household Sector. As a disability-friendly university, the State University of Surabaya strives to provide public facilities, particularly for the visually impaired. One of the efforts made was the development of an Android application facility for the creation of prototype products of social mobility and communication orientation models. This necessitates the creation of a campus building layout. The location of this field study is conditioning as a route that is used as an illustration for developing the concept of an orientation model for social mobility and communication based on android applications.

The next step is to conduct observations, interviews and collect documentation data in the form of layouts, pictures of the Lidah Wetan and Ketintang campus buildings as places of orientation for social mobility and communication for the visually impaired. In obtaining information on the objective conditions of the UNESA campus field, through various sectors, such as the Head of Academic, Student Affairs and Cooperation Planning as well as the Head of General and Finance Bureau for the acquisition of campus layout data directed at the Head of the Public Relations and Household Division. Field studies were conducted in the PSLD Rectorate and Postgraduate buildings in collaboration with users, chairpersons, secretaries of PSLD UNESA , and application development teams from informatics engineering. In addition to mobile learning application facilities, supporting products in the form of a map layout originating from the Lidah Wetan and Ketintang campuses should be provided as a true nonverbal understanding for the visually impaired. This means that the need for assistance outside of the application must be supported by nonverbal products that are required to comprehend the extremely broad concept of the campus environment.

The findings of the blind's characteristics show that they require courage to travel independently. On the other hand, their lack of environmental awareness, the need for assistance from others, and the complexities of social problems are realities they face on a daily basis. As a result, facilities for social mobility and communication in a new environment are required. Another confirmation of the findings of the literature and field studies was the discovery that the blind have three limitations: 1) limitations in the environment and diversity of experience, 2) limitations in interacting with the environment, and 3) limitations in orientation and mobility. As a result, people with visual impairments frequently have limited mobility in their surroundings. Weaknesses in the direction concept and distance are the most common problems faced by people with visual impairments. Based

on the observations, it was discovered that the visually impaired frequently become disoriented when moving in a new environment. They occasionally make mistakes on their way to their destination. When interviewed, they stated that they did not understand the concept of a new environment and needed to learn to recognize it. Then, according to the findings of an interview with one of the Special Education lecturers involved in this study, the blind are often hesitant and lack the courage to walk because they are afraid of being bumped, stumbled, and lost when moving in a new environment. Furthermore, people with visual impairments are less able to translate directions, and asking people around them necessitates listening comprehension so that the intendedis coreect.

Based on the analysis of these field findings, the visually impaired require an easy and interactive facility that can provide an overview of the new learning environment. The findings of this field have inspired the development of a product prototype for an orientation and social mobility model and communication based on an Android application supported by an environmental relief map. This Android application is expected to inspire, challenge, and motivate visually impaired students to solve learning problems and understand the concept of the campus environment. The unique feature of this application is its ability to function independently without the intervention of a supervisor. This means that the android application prototype was created with the rules for traveling independently with visually impaired people in mind, such as being easy to orient, providing a clear picture of the concept of direction and distance, and providing clear and easy-to-understand clues and landmarks.

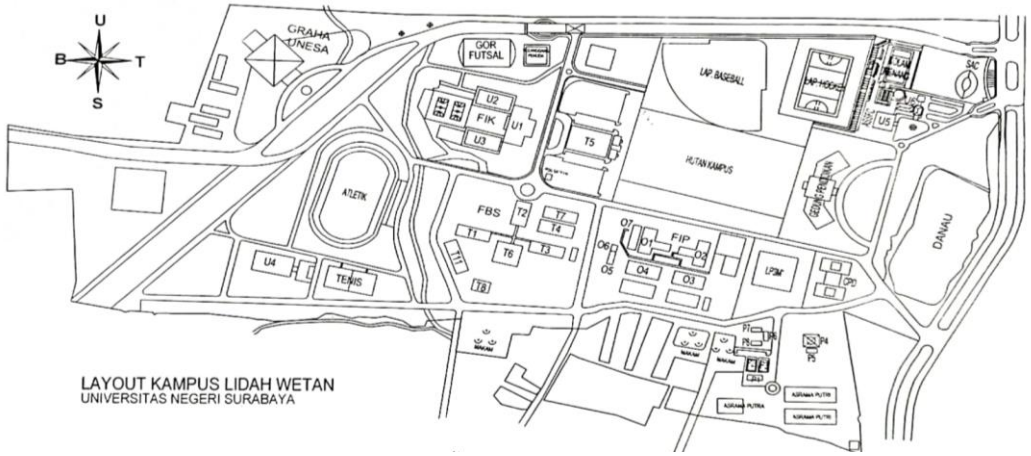
Interrelatedness with the concepts of direction and distance to move well in the learning environment, this is based on the mastery of the blind, notably orientation of social mobility and communication. Orientation and mobility foundations must master some fundamental concepts, such as shape, direction, distance, size, time, and numbering, among others. The visually impaired must master the concepts of direction and distance in order to be mobile.

In this social mobility and communication orientation skill, optimization of other senses that are still owned by the visually impaired, such as the sense of hearing, the sense of smell, the sense of touch, and the sense of taste. These four remaining senses can be used to gather information needed for mobility. The senses of hearing and smell can be used to collect information in the form of sounds and smells that can be oriented by the sense of touch. The results of the information collected are then used as a consideration when moving. In addition, the environment must minimize verbalistic instructions. Verbalistic instructions are difficult for people with disabilities to translate because they are abstract. It may even be wrongly perceived by the blind, which can actually be misleading. Therefore, direct practice in the form of demonstrations or demonstrations can be more easily understood by the visually impaired.

After the orientation skills of social mobility and communication are mastered well, then the next step is to introduce understanding of the campus environment to the visually impaired through the support of media map facilities, the UNESA campus layout appears. Talkback model audio program facilities are packaged in the android application as a model for the orientation of social mobility and communication that is presented to represent the existence of objects, so that they can provide a concrete picture of the learning environment for the visually impaired. Therefore, the development of an android application-based social mobility and communication orientation model for problem based learning was developed by

taking into account the real needs of the blind with disabilities. This means that the preparation for making an android application product prototype with a social mobility and communication orientation model pays attention to the characteristics of the blind. This model is in the form of an audio talk back program that is packaged in an android cellphone.

In the field study, a description of the campus environment's condition was obtained as an urgency, which was then introduced to the visually impaired community.



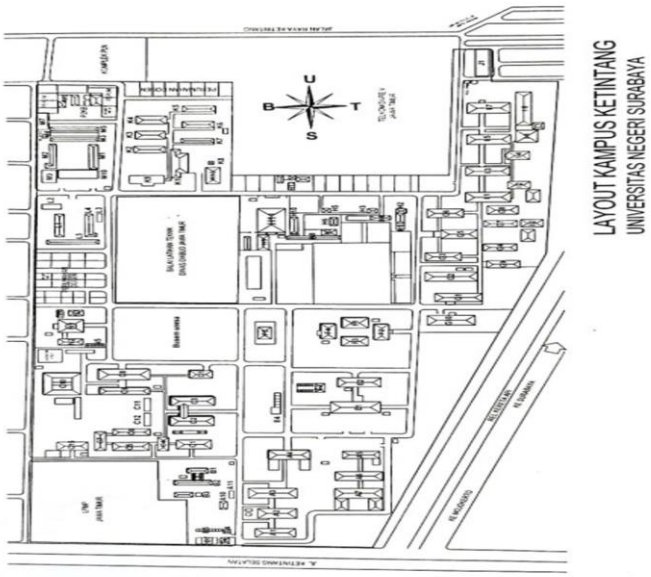


Figure 2. Campus *Layout in* Lidah Wetan dan Ketintang

Planning

It is necessary in this planning to describe the initial product prototype by determining a systematic development sequence. This plan requires several matters, including 1) goals, 2) development budget, 3) energy, 4) time, and 5) product qualifications, which are developed by requiring the participation of people who are competent in their fields.

1) The steps taken in planning by establishing goals.The goals outlined in this plan are the first step in creating a product prototype, which begins with an understanding of the environmental conditions at the Lidah Wetan and Ketintang campus layouts. The difference in land area is referred to here. An overview of environmental conditions through the layout of the State University of Surabaya campus, which is used as a reference for developing an android application product prototype with a social mobility and communication orientation model to solve the problem of visually impaired students learning to understand environmental concepts.
2) The next step is planning by compiling a development budget for making UI/UX designs for product prototypes in the form of android software. The funding needed for the development of an android application prototype for the social mobility and communication orientation model is the need for slicing design, integration of google maps api, integration of voice narration, and finalize and run tests. The design was carried out through discussions with informatics engineering experts, Special Education experts for the visual-impaired and product users. The basic results of the discussion determined the budget requirements spent on product manufacturing, namely a) social mobility practices in the Lidah Wetan and Ketintang campuses, b) voice recording for audio programs, c) making applications that can be downloaded on the PSLD UNESA web, and d) transferring applications to android.
3) The experts' decision is the next step. It is necessary in this development research to have competent experts in their fields to create the initial product, revise it, and manufacture the final product. In connection with this, we require informatics engineering experts as well as Special Education experts for the visually impaired. Informatics engineers are needed for system analysis, asset creation, transitions, audio programs in the form of walking guides, and tracing Android applications. Meanwhile, Special Education experts are needed to voice audio programs that provide road route guidance.
4) Following that, time management is adjusted to account for the path required in implementing this development product. The time required for its implementation varies according to the location of the visually impaired on campus.
5) The last step is the product prototype qualification step (android application) which requires the participation of people who are competent in the field of informatics engineering, and special education for the visual-impaired.

Design Development

Below are the stages of developing an android application product prototype with a social mobility and communication orientation model for problem based learning to understand the concept of the campus environment: 1) Determine the product prototype design; 2) Determine the distance (route) from one place to another from the Lidah Wetan and Ketintang campus environment; 3) Making a relief map layout media in the Lidah Wetan and Ketintang campuses, in the form of relief map images supporting the understanding of the UNESA campus environment in the form of layouts and validation instruments.

Mainstreaming the design of the initial product prototype development of the social mobility and communication orientation model based on this android application is classified as follows.

a) Determine the product prototype design for the social mobility and communication orientation model based on android applications.The first step in creating this Android application is gathering campus images from the field of Public Relations. The layout of the Lidah Wetan and Ketintang campuses was used to determine the product prototype design. The results of electrical engineering experts and visually impaired Special Education experts as the foundation for developing software programs for Android applications.
b) It is an effort to make long-lasting products for future pioneers when determining the Android application software. The image below depicts the Lidah Wetan and Ketintang campuses, which are used for the development of Android applications. Following the selection of a software program, the next step is to create a flowchart that depicts the software used to create a mobility orientation model. Determining and assembling a software program necessitates the use of the internet to create the application and an audio program, which will then be placed on the android application as instructions that users with Visual Impairment can use.

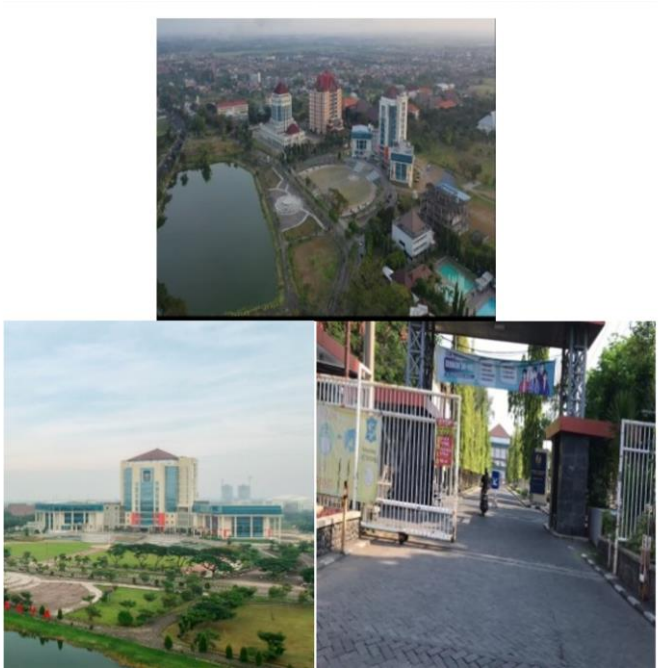


Figure 3. Campus of Lidah Wetan dan Ketintang, Universitas Negeri Surabaya

The following is a flowchart and diagram as an overview of the process system that will be made in software for mobile learning in the android application.

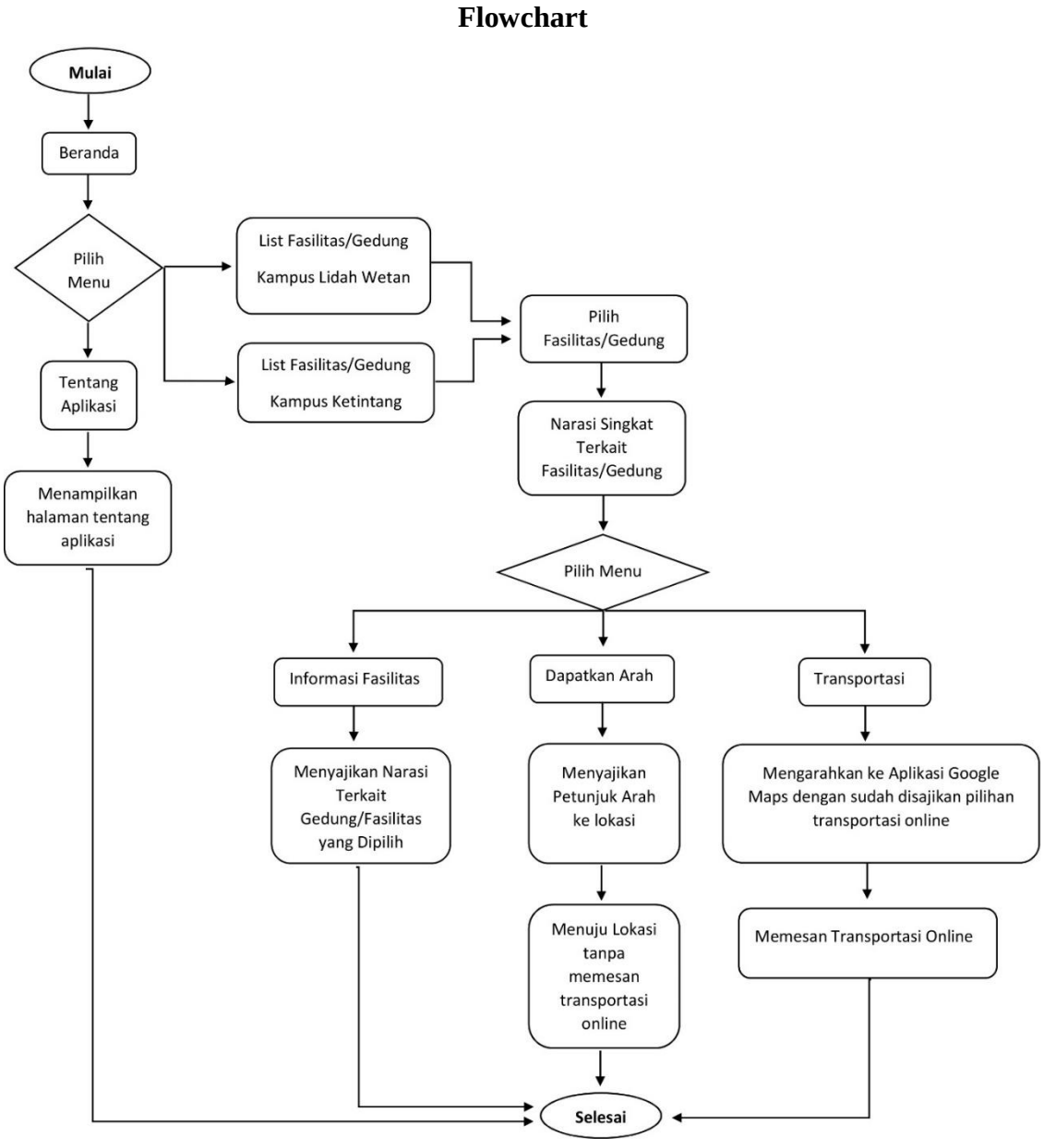


Figure 4. *Flowchart* as a Process System in Android Applications Mobility and Social Communication Orientation Models

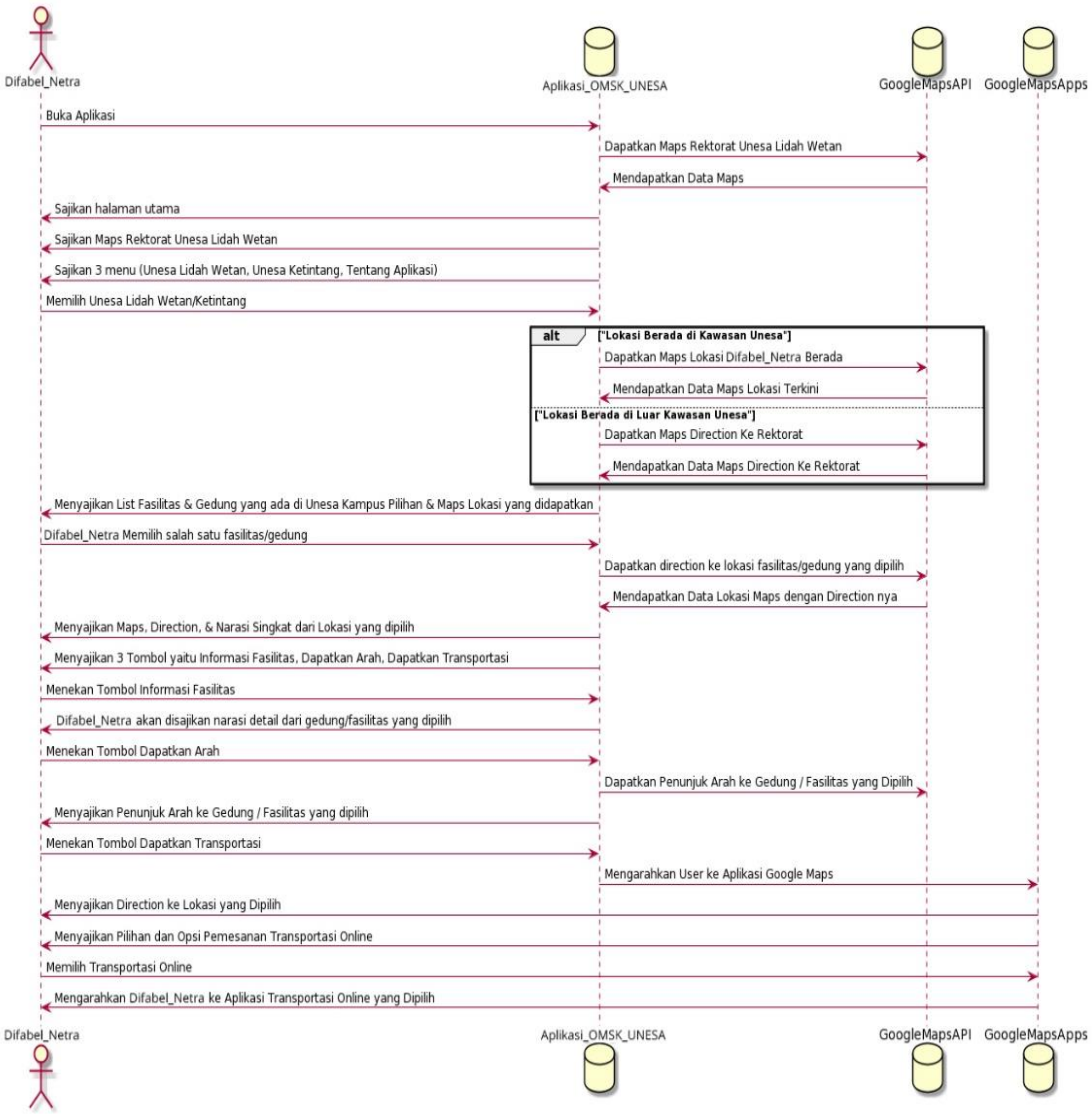


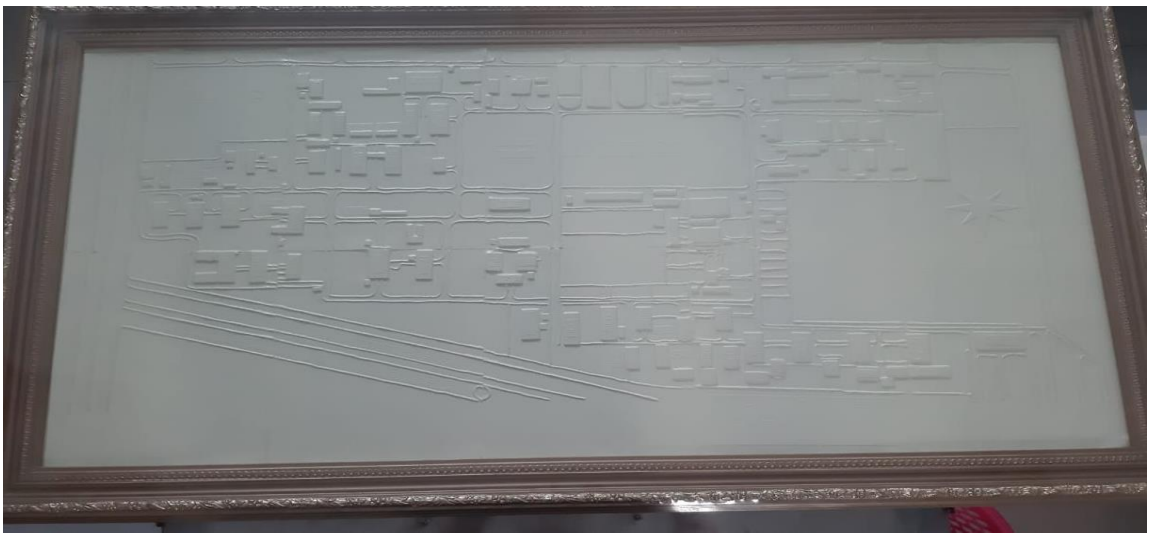
Figure 5. Diagram Activities in *Android Apps*

The layout of the Lidah Wetan and Ketintang campuses is the most significant aspect of the product prototype results. The layout of the Lidah Wetan and Ketintang campuses, created in the android application, is purposefully designed to make it easier for the blind to navigate around the campus environment. There is a guide in one of the application programs that allows them to access the orientation model of social mobility and communication of places on campus that they desire. The following two aspects can be used to evaluate the outcomes or products of this application-based social mobility and communication orientation model.

a. Physical aspects of the model prototype

The physical aspects of this prototype model consist of the design, the application's audio program components, and the digital manual which is accessed via a link.

1. This social mobility and communication orientation model's product prototype design is intended for all people with visual impairment. Because of this, the design is tailored to their specific requirements and characteristics.
2. The audio program in this application is purposefully designed to make orientation and mobility easier. As a result, the narrator who conveys the instructions must speak clearly through his intonation and pronunciation. One of the priority scales used to position software programs in each brand of smart phone is meticulous planning. This means that the application in this software can be placed on all types of smart phones, making it easy for users to install. Furthermore, smart phones can be programmed to play audio.
3. Digital guide instructions are available via the application's user guide link. A guide on how to install the application can be downloaded at https://UNESA.me/PanduanOMSKUNESA. The download results can be studied using a smart phone that has been registered with the JAWS (Job Access with Speech) program. The link also includes a step-by-step installation guide. This application assists in resolving the issue of learning to comprehend the concept of knowing the campus environment. Furthermore, support for map relief readability on campus can contribute to their discussion. The image below shows the mobile application user guide, which can be used to assist with installation.



Picture.6. Map of the Ketintang Campus, State University of Surabaya

Figure 7. Map of the Lidah Wetan Campus, State University of Surabaya

Based on the activity diagram design in the Android mobile application, a mobile user guide for the UNESA OMSK application is formed. The description of the android mobile application has the potential to help solve the problem of understanding the concept of the UNESA campus environment for the blind community with disabilities. The realization of problem solving learning to understand the concept of the UNESA campus environment for the OMSK android mobile application display in Figure 8.

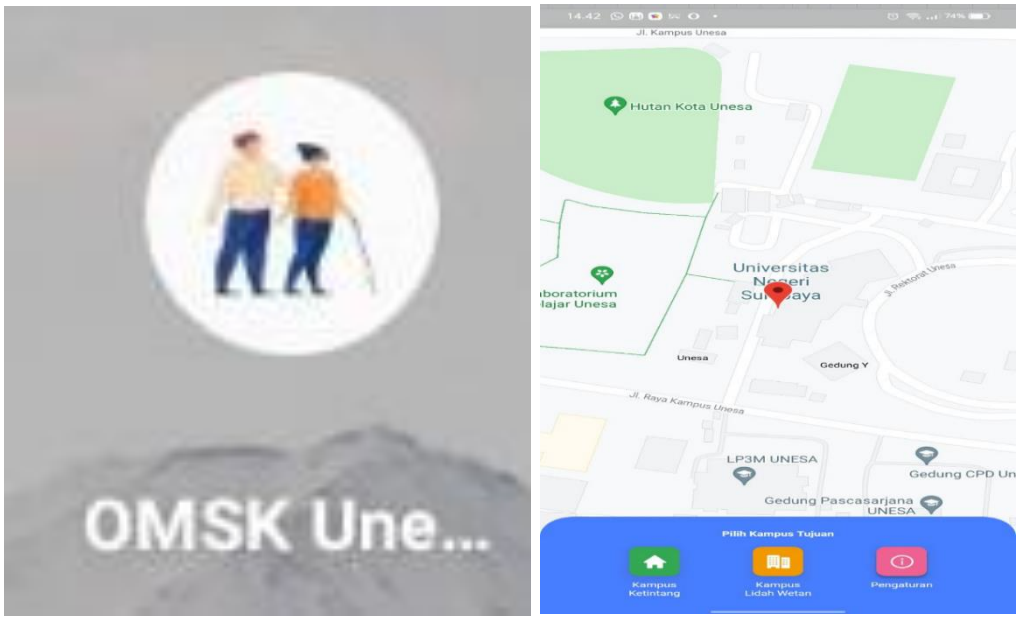


Figure 8. UNESA campus environment for the OMSK android mobile application display

b. Aspects of clues to the direction of the prototype model

The prototype product of the social mobility orientation model and application-based communication for problem based learning understands the concept of the campus environment for the visual impairment which is related to the clear voice of the road route guide, clear instructions and clear directions.

a) Clear voice of the road route narrator

The narrator's voice in this route guide audio program is recorded using a computer equipped with special software, resulting in high-quality sound that the visual impairment can understand. The route guide audio program's voice actors are carefully chosen in order to produce high-quality audio products. The narrator's voice was chosen to be female because the visual impairment people are more familiar with this voice.

b) Clear Instruction

The route guide uses simple language in the audio program instructions to make it easy to understand. Left and right are used for directions, while meter is used for distance instructions.

c) Clear *clue* or sign

The audio program for road route guidance includes signs or clues that can be used as a reference point for the visually impaired community while on the road. On the Lidah Wetan and Ketintang campuses, signs or clues in the campus environment are used to facilitate mobility.

DISCUSSIONS

In a product development of this study, this year I produced a prototype product based on Gall, (2003), theoretical studies and field findings about the condition of limitations of the visual impairment in understanding environmental concepts. The impact of limited understanding of the environment, especially on the ability to have social mobility and communication orientation, has a negative effect on the recognition of the surrounding environment, (Andajani, 2018). If the visually impaired experience obstacles in mastering the concept of the State University of Surabaya campus environment, this shows that psychologically it has an impact on disrupting the orientation of social mobility and communication. The tendency that occurs in visually impaired people to be passive in moving because of fears of getting lost or getting hurt, when moving in an unfamiliar environment. This is confirmed by Arikunto, (2010), stating that a person's blindness can result in three forms of limitations, such as (1) limited concepts and diversity of experience, (2) limitations in interacting with the environment, (3) limitations in orientation and mobility.

Based on this reality, the development of a prototype product orientation model for social mobility and communication based on an Android application is used as a solution in teaching an understanding of correct and easy road routes in each destination. This prototype product development effort refers to the development of a model Gall, (2003) with three steps, namely (1) research and information collecting, (2) planning, and (3) developing a preliminary form of product. The suitability model [29], was selected in this study and used to develop a prototype product of an android application-based social mobility and communication orientation model. The process in developing the prototype product is

supported by the opinion Smaldino, (2005), that the product development is not only in the form of learning media, but also in the form of procedures, instruments and learning processes.

In connection with the prototype product, the social mobility and communication orientation model based on the Android application for problem based learning is produced on target. Based on the opinion Gall, (2003) said that product development uses the correct procedure with reference to the following cycle steps.

Research and Information Collecting

This is due to the discovery that the blind community (students with visual impairments) frequently use an alert companion when traveling around campus. State University of Surabaya, as a disability-friendly campus, requires facilities to help students with orientation, social mobility, and communication. In order to introduce a very large campus, both in Ketintang and in Lidah Wetan, a scaffold that can assist the blind in moving from one location to another is required. Furthermore, one of the difficulties they face is a lack of understanding of direction and distance. Scaffolding is extremely important in the digital era 4.0 for the orientation of social mobility and communication as skills in accessing and interacting with the environment, (Kemendikbud, 2014).

Planning

Planning is the first step after getting the facts as a preliminary study and collecting field data for product development. The development of an orientation model for social mobility and communication based on an android application is a scaffold prototype made in mobile phones. Preparation of prototype products requires careful planning in order to produce the perfect product. This mainstreaming begins with a search on the Head of the Sub-Division of Public Relations and the household sector where the layout of the campus environment is stored. The results of this search were obtained through searching the Head of Academic, Student Affairs and Cooperation Planning as well as the Head of General Affairs and Finance for data acquisition. The layout reference for the condition of the building and land area as well as the design of the campus environmental conditions owned by the State University of Surabaya as the basis for developing prototype products.

Develop preliminary form of product

This stage develops a prototype product of an Android application-based social mobility and communication orientation model, as determine the design of the product prototype model, determine the distance (route) between destinations from one place to another in the Lidah Wetan and Ketintang campuses, State University of Surabaya, and creating media map relief layouts for the Lidah Wetan and Ketintang campuses, this is a relief map image for a better understanding of the campus environment.

Based on the opinion Gall, (2003), the development procedure in year I showed the results of a prototype product of an Android application-based social mobility and communication orientation model through the three stages above. The opinion Hosni, (1996); Andajani, (2018) stated that the need for educational services for the visually impaired has special principles, including 1) mental development scale, 2) dexterity of social mobility and

communication orientation, 3) demonstration or performance, and 4) repetition in providing learning, is referred to as mainstreaming the development of this prototype product. According to Widjaya, (2013), when the visually impaired learn, he requires tools, special methods, and specific techniques to enable them to learn even with limited vision.

The practical realization of facilities must be carried out by competent Andajani, (2018), in two ways. The first step is to provide students with visual impairments with social mobility and communication orientation skills. With these abilities, it can be used as a guide for them to carry out various activities on campus. The next step is to create learning media that will provide an overview of the campus environment. As a result, special education services for the visually impaired are required in everyday activities.

Based on the development procedure, the prototype product of the social mobility and communication orientation model based on the Android application is one of the scaffolds that is suitable for the needs of the community with visual impairment to be able to recognize the environment more independently. In the process of learning activities in the campus environment, visually impaired students need to use strategies according to their needs and characteristics Andajani, (2018). This is in accordance with the opinion of Hosni, (1996), which stated that there are two things of learning strategies in the education of visually impaired poeple: (1) efforts to modify the environment to suit the conditions of the visually impaired, and (2) efforts to optimally utilize the senses that are still functioning. This is conducted to compensate for the weakness caused by the loss of visual function. Optimizing the use of the senses that are still active is a suitable and simple learning strategy. Because a learning success is determined by optimal and integrated utilization

The design of this prototype product really pays attention to the characteristics of the blind community, which is very sensitive in touch and hearing. Thus, this prototype product was developed by combining tactual aspects and audio programs. The form of support for this tactual product is in the form of a relief map for the Lidah Wetan and Ketintang campuses for readability and understanding. Furthermore, the form of audio programs through android applications in the design of instructional technology, development, utilization, management and evaluation of processes and resources for learning, (Seels, 1994). Learning technology seeks to design, develop, and utilize various learning resources so as to make it easier and facilitate someone to learn anywhere, anytime, by anyone, and in any way that suits their conditions and needs.

According to Lahav & Mioduser, (2002), orientation is the ability to understand the relationship between one object and another; the formation of a mental pattern from the environment. Meanwhile, mobility is intended to include the acquisition of skills and techniques that allow visually impaired people to travel more easily in their environment. Mobility training entails learning skills and techniques that allow visually impaired people to travel more easily in their surroundings. A visually impaired person must understand the concepts of direction and distance when it comes to mobility orientation. Because they will be able to move more appropriately and effectively if they understand the concepts of direction and distance. Correct in the sense that students can arrive at their desired destination. While effective means that a visually impaired person can reach their destination safely and quickly.

Understanding the concept of the cardinal directions designed in the Android application is very useful for developing independence in orienting social mobility and communication on campus. This concept teaches the visually impaired about the eight cardinal directions and how to calculate the angle formed by each cardinal direction. The direction of the wind for the visually impaired community is considered very important to know and understand through direct practice. The concept of distance must also be well understood by the visually impaired community. The concept of distance is important to understand so that the visually impaired community can estimate the distance they will travel to get to the place they want. In social mobility and communication orientation, distance measures are generally used meters, fathoms, and foot steps. However, to make it easier for them to understand the concept of distance, it is enough to use a meter benchmark.

In addition to the concepts of direction and distance, there is one more important thing that must be understood if you want to know the environment well. It is the mastery school environment concept that is imagined in the minds of visually impaired students. To instill mastery of these concepts is not easy. For students who have been blind since birth, they are poor in concepts so it is difficult to describe an object. Especially if the object described is only informed through verbal language. Likewise for visually impaired students who experience post-viewing visual impairment, the concepts they have have not been able to support the creation of a cognitive mapping of environmental objects that is too broad. Therefore, it is necessary to have a concrete media for depicting the campus environment that can be observed directly by the visually impaired community through their hearing and touch.

This is consistent with Smaldino, et al., (2005), who stated that multimedia refers to various combinations of two or more media formats integrated into the form of information or learning programs. The prototype product design for the social mobility and communication orientation model based on this android application is a multimedia model with a user-operated controller. The android application's form can be accessed via a link created by the Center for the Study of Disability Services at the State University of Surabaya. Therefore, the prototype product of the social mobility and communication orientation model based on Android applications uses the model Smaldino, et al., (2005), as problem based learning for understanding the concept of the campus environment. Below is a form of realization of the resulting product specifications: practical guide how to install the application via a link, Android Apps, and Authentic assessment tool for comprehending the concept of the campus environment as a determinant of social mobility and communication orientation.

CONCLUSION AND SUGGESTION

CONCLUSION

The development of the prototype product for the orientation model of social mobility and communication based on android applications as problem based learning in understanding the concept of the UNESA campus environment for the blind has been designed with the collaboration of informatics engineering experts and visually impaired education experts.. The product prototype includes the realization of the resulting product specification design, such as: 1) an android mobile learning application program, 2) embossed map for outdoor access, roads leading to various locations on the UNESA Lidah Wetan and Ketintang

campuses with braille writing, 3) authentic assessment tools as a success in the model of orientation and social mobility of communication based on android applications. The product prototype based on the resulting Android application can then be used by all people with visual impairments who want to visit the UNESA campus in Lidah Wetan and Ketintang by downloading the PSLD web.

SUGGESTIONS

The recommendations in this development research are based on the findings and are aimed at future development. This was followed by expert validation tests, accuracy tests, and effectiveness tests on the prototype model of social mobility orientation and communication based on android applications for problem based learning to comprehend the concept of the UNESA campus environment for the visual impairment.

References

Aldridge, J; Goldman, R. 2002. *Current Issues and Trends in Education*. Boston : A. Pearson Education Company.

Alja'am, J. M., El-Seoud, S. A. & Mwinyi, M. U. (2017). Design and implementation of a multimedia based technology solution to assist children with intellectual disability to learn. *International Journal of Emerging Technologies in Learning, IJET, 12*(4). doi:10.3991/ijet.v12i04.6698.

Andajani, Sri Joeda, and Asri Wijiastuti. (2020). E-Learning Development for Special Education Postgraduate Students. *International Journal of Emerging Technologies in Learning (iJET)* 15(14): https://doi.org/269. 10.3991/ijet.v15i14.13893.

Andajani, Sri Joeda. Et al. (2018). *Development of Social Mobility¬Orientation Models and Problem Based Learning-Based Communication for Understanding Environmental Concepts in visually impaired Students.* LP2M UNESA , Research Results.

Ardhi Widjaya. *(2013). ATN ins and outs. Yogyakarta: Java Litera.*

Arikunto, Suharsimi. 2010. *Research Procedures A Practical Approach*. Jakarta: Rineka Cipta.

B. Jatmiko, B.K. Prahani, Munasir, P. Pandiangan, I. Wicaksono, N. Erlina, R. Althaf, & Zainuddin, "The comparison of oripa teaching model and problem-based learning model effectiveness to improve critical thinking skills of pre-service physics teachers", Journal of Baltic Science Education, vol. 17, no. 2, pp. 300-319, 2018.

Cole, P.& Lorna, Chan. (1990). *Methods and Strategies for Special Education.* Sydney : Prentice Hall Ltd.

Depdiknas. (2014). *Specialty Development Program*. Jakarta: Depdiknas.

Effendi (2009). "Definition of Concept Understanding". *http://www.usershare.net.accessed tanggal 18 Oktober 2014*.

Friend, M. (2005). "*Special Education, Contemporary Perspectives for School Professionals*".*United States of America: Pearson Education Inc.*

G. Pretto and G. Curró, (2017). "An approach for doctoral students conducting context-specific review of literature in IT, ICT, and educational technology," New Rev.Acad. Librariansh., vol. 23, no. 1, pp. 60–83. https://doi.org/10.1080/13614533.2016.1227861.

Gall, Borg, W.R. and Gall, M.D. (2003). *Educational Research: An Introduction.* London: Longman, Inc.

Hasrulbakri. (2010). *Interactive Multimedia Learning Steps. MEDTEK*Jurnal. Accessed 18 Oktober 2014.

Heinich,Molenda.Russel.1999. *Instuctional Media And The New TechnologiesOf*

Hosni, Irham. (1996). *Orientation dan Mobility.* Jakarta: Dikti.

Husamah, 2013. *Outdoor Learning Strategic Design Develops Fun, Innovative and Challenging Learning Methods. Pustakaraya Achievement Publisher*, Jakarta Indonesia.

Husamah, 2014. *Blended Learning. Skilled in Combining the Advantages of Face To Face Learning, Offline-Online E-Learning and Mobile Learning.* Published by Prestasi Pustakaraya, Jakarta Indonesia.

Instruction. Printed in the United State Of America.

J. E. Prescott, K. Bundschuh, E. R. Kazakoff, and P. Macaruso, (2018). "Elementary school–wide implementation of a blended learning program for reading intervention," J. Educ. Res., vol. 111, no. 4, pp. 497–506. https://doi.org/10.1080/00220671.2017.1302914.

J. Ismaili, (2017). "Mobile learning as alternative to assistive technology devices for special needs students". Education and Information Technologies, vol. 22, no. 3, pp. 883-899. https://doi.org/10.1007/s10639-015-9462-9.

Jackson, Richard M. (2012). *Audio-Supported Reading for Student Who are Blind or Visually Impaired*. Wakefield, MA: National Center on Accessing the General Curriculum.

K. Abdillahi Barreh and Z. Wati Abas, (2015). "A framework for mobile leanring for enhancing learnign in higher education," Malaysian Online J. Educ. Technol., vol. 3, no. 3, pp. 1–9.

Kemendikbud. (2014). *Specialty Development Program: Guidelines for Development of Mobility, Social and Communication Orientations for visually impaired Students*. Jakarta: Kemendikbud.

Kingsley, Mary. (1999). *The Effect of Visual Loss, dalam Visual Impairment.* (editor: Mason & McCall). GBR: David Fulton, Publisher.

Lahav, O and Mioduser, D. (2002). *Multisensory virtual environment for supporting blind persons' acquisition of spatial cognitive mapping, orientation, and mobility skills.* Hungary: Intl Conf. Disability, Virtual Reality & Assoc. Tech., Veszprém. diakses pada tanggal 15 oktober 2014.

Lydy Reidmiller, Lauri (2003), *Art For The Visually Impaired And Blind:A Case Study Of One Artist's Solution*. The Ohio State University: Dissertation.

Mercer, Cecil D & Mercer Ann R. 1993. *Teaching Student with Learning Problems.* Ohio: Published by Merrill Publishing Company,A Bell & Howell Information Company. diakses pada tanggal 15 oktober 2014.

Nandi (2012). *The Use of Interactive Multimedia in Learning Geography in Schools*. Jurnal. Accessed 18 Oktober 2014.

Ngalimun, (2014). Learning Strategies and Models. Yogyakarta : Aswaja Pressindo.

S. Salleh and K. Laxman, (2015). "*Examining the Effect of External Factors and Context Dependent Beliefs of Teachers in the Use of ICT in Teaching: Using an Elaborated Theory of Planned Behavior*," J. Educ. Technol. Syst., vol. 43, no. 3, pp. 289–319. https:// doi.org/10.1177/0047239515570578.

Seels, B. Barbara & Rita C. Richey. 1994. *Teknologi Pembelajaran :Definisi dan Kawasannya. (Terjemahan:Instructional Technology: The Definition and Domains of The field).* Jakarta : Unit Percetakan Universitas Negeri Jakarta.

Smaldino, Sharon E & Russell, James D. 2005. *Instructional Technology and Media for Learning.* Ohio, Columbus: by Pearson Education, Inc.

Sunanto, Juang. (2005). *Mengembangkan Potensi Anak Berkelainan Penglihatan.* Jakarta,: Departemen Pendidikan Nasional Direktorat Jenderal Pendidikan Tinggi Direktorat Pembinaan Pendidikan Tenaga Kependidikan dan Ketenagaan Perguruan Tinggi.

Warsita, Bambang. 2008. *Learning Technology: Foundations and Applications.* Jakarta: published by PT Rineka Cipta.

Widjaya, A (2013). *Visual Impairment Forms & Learning Strategies*. Yogjakarta : Javalitera.