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SEPTEMBER 9-12, 2017
FACULTY OF EDUCATION
KHON KAEN UNIVERSITY | THAILAND

CERTIFICATION

THIS IS TO VERIFY THAT

SRI JOEDA ANDAJANI

HAS BEEN A PRESENTER OF
ORAL PRESENTATION
IN THE CONTEXT OF THE SCIENTIFIC PROGRAM OF
THE 10th INTERNATIONAL CONFERENCE ON EDUCATIONAL RESEARCH
HELD IN KHON KAEN, THAILAND
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M. Inprasitha

MAITREE INPRASITHA, PH.D.
ON KAEN INTERNATIONAL SYMPOSIUM
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THE 12th APEC-KHON KAEN INTERNATIONAL SYMPOSIUM

"Innovation of Mathematics Education through Lesson Study
Textbook Development for SDGs,STEM, and Energy by Cross-border Education"

THE 10th INTERNATIONAL CONFERENCE ON EDUCATIONAL RESEARCH

"Challenging Education for Future Change"

FACULTY OF EDUCATION
KHON KAEN UNIVERSITY | THAILAND

SEPTEMBER
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Rationale

People around the world inevitably face the influence of globalization. Their value and the way of life would be challenged. Education could be one solution for providing citizens to survive with knowledge and skills so that they are able to adjust appropriately to the changing world. To ensure the anticipated outcomes, challenging education and sustainable development seems to be a promising approach. Educators and stake holders, who involved in human resources development, may be enhanced learning community and challenging education for future change.

The goals of the ICER 2017 are to give international educators the opportunity to share ideas and form networks while working together on *challenging education for future change*. It is anticipated that the exchange of ideas and research findings will contribute greatly to future generations.

Sub-themes

1. Teacher Education and Professional Development
2. Curriculum and Instruction, Learning in classroom contexts
3. Educational Measurement and Evaluation
4. Educational Climate: *cultural and social context*
5. Educational management: *planning, policy implementation and assessment*
6. Lifelong Education: *non-formal and informal learning*
7. Education for Diversities: *gender, underprivileged, marginal groups, special needs*

Message from the Host

Greeting to all participants and welcome to Khon Kaen University

The International Conference on Educational Research (ICER) 2017 is the 10th annual conference to celebrate the 49th anniversary of the establishment of the Faculty of Education, Khon Kaen University (KKU). It is jointly organized by **Khon Kaen University** of Thailand, the **Education University of Hong Kong** of China, **State University of Surabaya** of Indonesia, **Mindanao State University-Iligan Institute of Technology** of Philippines, **Thailand Education Deans Council**, and the **Consortium of Sixteen Education Deans** of Thailand (Group 16). This year we are pleased to have the **Central University of Technology, Free State** of South Africa to join co-hosting the conference as our new university partner.

The goals of the ICER 2017 are to give international educators the opportunity to share ideas and form networks while working together on ***challenging education for future change***. It is anticipated that the exchange of ideas and research findings will contribute greatly to future generations.

During the ICER 2017 event, the APEC-Khon Kaen International Symposium 2017 with its theme "*Innovation of Mathematics Education through Lesson Study Textbook Development for SDGs, STEM, and Energy by Cross-border Education*", in collaboration with the **University of Tsukuba** of Japan and sponsored by the **Office of the Higher Education Commission** of Thailand, is also held at KKU starting from September 9 to September 12, 2017. So the two events will share the plenary sessions during the first two days of APEC symposium.

On behalf of the Faculty of Education, KKU, I would like to express my gratitude and my sincere appreciation to our co-host institutions, the guest speakers and the organizing committees for their efforts. I also would like to thank all delegations and participants who come from afar to join this event.

Associate Professor Maitree Inprasitha, Ph.D.
Dean, Faculty of Education
Director, Institute for Research and Development in Teaching Profession for ASEAN
Director, Center for Research in Mathematics Education
Khon Kaen University
Thailand

Message from Co-host

The Faculty of Education and Human Development is young faculty that aspires to contribute in meaningful ways to education development in the Asia Pacific Region. It is an integral part of The Education University of Hong Kong - a multidisciplinary education focussed institution with a strong research emphasis. The University has a growing international reputation for excellence in preparing globally aware professional educators, providing culturally enriched educational experiences, and producing research of distinction. Central to the University's values is a commitment to developing international and regional networks that will facilitate the integration of intercultural and global dimensions into its teaching, learning, and research.

At EdUHK we particularly value collaborative research with international partners. We seek to understand better the contexts that influence people in the Asia Pacific region and to identify ways of improving social outcomes for all. We see international partnerships as important opportunities for enhancing the impact of our research.

EdUHK is proud to join with Khon Kaen University to co-host the 2017 International Conference on Educational Research.

Professor Allan Walker
Joseph Lau Chair Professor of International Educational Leadership
Dean, Faculty of Education and Human Development
The Education University of Hong Kong
HONG KONG SAR
People's Republic of China

Message from Co-host

The College of Education of Mindanao State University-Iligan Institute of Technology (MSU-IIT) has been a partner of Khon Kaen University, Thailand in sponsoring the International Conference on Educational Research (ICER) in the recent years. In this 10th ICER on September 9-10, 2017, we renew such commitment to collaborate with Khon Kaen University in promoting educational research as instrument to disseminate scientific knowledge and competencies in the field of teaching and learning.

Nowadays, change in culture and technology happens constantly. These are challenging times for the educational institutions to be at the forefront of the changing socio-cultural landscape to guide peoples and communities towards a wholesome, productive and sustainable future. Collaboration as key to its attainment can be enhanced through an international gathering such as the ICER.

I am hopeful that in this yearly conference, the country delegates can attain deeper understanding of the 21st century educational thrusts. May they gain the greater passion to apply in various contexts the wisdom shared and learned in the sessions. Let me congratulate the Faculty of Education of Khon Kaen University for spearheading this conference. To the organizers, resource persons, facilitators, and paper presenters, may your presence inspire friendship with everyone.

Associate Professor Josefina M. Tabudlong, Ph.D.
Dean, College of Education
Mindanao State University-Iligan Institute of Technology
Mindanao, Philippines

Message from Co-host

Welcome to the International Conference on Educational Research (ICER) 2017: Challenging Education for Future Change which will be held during September 9 – 10, 2017 in Faculty of Education Khon Kaen University.

The ICER 2017 is the 10th annual conference with aims to provide an opportunity for both stakeholders, lecturers, students, and teachers to expand and enhance their knowledge and their vision for creating better education practice in each country. As education is a fundamental human right and is indispensable for each generation. Besides, through this conference wider networks will be formed, so it will ensure that each of us can contribute optimally for sustainable education in the future. Moreover, this is also in line with the vision of Universitas Negeri Surabaya which is excellent in education and strong in science.

As a co host of the International Conference on Educational Research (ICER) 2017, that the success of the conference depends ultimately to all of us who have supported our members of university to join the conference. In particular, we thank to Khon Khaen University in organizing the technical program; the Program Committee for their thorough and timely reviewing of the papers, and all committee who have helped us to for all participants. Recognition should go to the Local Organizing Committee members who have all worked extremely hard for the details of important aspects of the conference programs and seminar. Admittedly, thank you to the partners who jointly organize this great and extraordinary event.

Thank you to all participants of ICER 2017 who have spread as well as shared idea, insight and cooperation concern with a better world civilization through education. I believe by this conference togeteher we can create foundation of life with education and take part in realizing sustainable development goals (SDG) especially for quality education. So that we expect to get technical insight and tremendous opportunities for formal and informal networking which will be useful for every aspect of life.

Sujarwanto
Dean, Education Faculty
Universitas Negeri Surabaya
Indonesia

Message from Co-host

The Central University of Technology Vision 2020 statement is*: "By 2020, Central University of Technology, Free State shall be an engaged university that focuses on producing quality social and technological innovations for socio-economic development, primarily in the Central Region of South Africa"*. In other words, by 2020, CUT will be a centre of knowledge, innovation and excellence producing a critical mass of innovators that directly contributes to prosperity-creation.

In fulfilling the above said Vision, Central University of Technology (CUT), South Africa has realised that it's needs to strengthen its relations with international partners, especially institutions of higher learning, who not only share similar values and strategic objectives as CUT, but institutions who are committed in responding to international demands and challenges through the application of quality academic programme programmes, a knowledgeable teaching staff, cutting edge research, collaborative research initiatives, responsive community engagement projects, cultural exchange and regional and international partnership developmental endeavours.

We at CUT are therefore extremely proud to be a co-host to the 10th International Conference on Educational Research (ICER) 2017: *Challenging Education for Future Change*, which will be held during September 9-10, 2017 in the Faculty of Education, Khon Kaen University, Thailand. The Faculty of Humanities at CUT is further committed to support and strengthen MoU activities between Khon Kaen University and the Central University of Technology.

CUT further expresses its utmost gratitude to the ICER Local Organising Committee members, under the leadership of Prof. Dr Maitree Inprasitha for planning and overseeing the duties, arrangements and logistics for the upcoming event. I have no doubt that the other partner universities, attending ICER will also pledge their full support and commitment to the success of this international landmark event.

Professor Wendy Setlalentoa
Acting Dean, Faculty of Humanities
Central University of Technology
South Africa

Keynote
Address

Interactive Multimedia Scale Media Based Orientation and Mobility to Implant Mastering Concept of School Environment to Blind Students

Sri Joeda Andajani [1] *(sriandajani@unesa.ac.id)*

Abstract

Developing interactive multimedia scale media based orientation and mobility to implant mastering concept of school environment strived to help solving the blind students' problem so that they could study with comfortable, safe and happy, brave walking autonomously and hope continuously to be success person to do daily activity. In specific, this developing research had purpose to produce the prototype of interactive multimedia scale media based orientation and mobility to implant the mastering concept of school environment to the blind students in Special School. This developing research used Educational Research Development (R&D) model design from Borg & Gall. The prototype product of interactive multimedia scale media based orientation and mobility to implant the mastering concept of school environment to blind students in Special School contained the realization of product arrangement, i.e. 1) the guide of building and road access to various places of school environment with the concept of audio program and Braille writing, 2) the form of multimedia scale media in the direction, 3) operating how to strike the keys suitable with the destination intended and being provided to the scale media of school environment building, and 4) assessment instrument for mastering environment concept with authentic assessment as the success in orientation and mobility. The prototype product of interactive multimedia scale media based orientation and mobility to implant the mastering concept of school environment to blind students produced could be used as the effort of recognizing social environment with comfortable, safe and happy.

Keywords: *Interactive Multimedia Scale Model, Mastering Environment Concept*

Introduction

The effect of blindness shows that her/ his can not get the complete knowledge of the environment. Persons with visual impairment who has a disorder in physiological structure, she/he will change the function of her/his sense of sight to another sense to perceive the environment. In connection to the blind student with the minimum concept in the environment, so that it could give impact toward the ability of orientation and mobilization which owned by each of students and it has the negative influence for her/his surrounding recognition. When the student has a problem in mastering the environment concept, then it will disturb her/his orientation and mobilization automatically. The blind student has a tendency to be a passive person, specifically in body movement. It happens because he/she feels worry about getting an accident or stray when walking around. In a spacious place such as school environment, sometimes he/she feels confuse when walking in a location that rarely accessed even though he/she has good ability in both of orientation and mobilization. This situation showed by the number of activities which done through the society independently. However, the vagueness in recognizing a certain place can make the ability of mobilization and orientation which possessed by the blind student can not help much.

[1]*Lecturer, Special Education Departments, Faculty of Education, Universitas Negeri Surabaya, Indonesia*

One of the mobilization and orientation are which known by the blind student is school environment. Visual impairment school is the second environment after home beside family. For 8 hours a day or at approximately 33% of the time was spent by blind students at the school. Moreover, those who live in the hostel, declare that school is regarded as the most important environment in conducting various life activities. On the other hand, a teacher not only takes an utilize of one specific room during teaching and learning activities. A teacher tends to engage the student to move from one class to another one which is appropriate with the lesson during the learning process. The student will be left behind if he/she does not have good comprehension of school environment concept. Therefore, the introduction of the school environment is an essential for the blind student. This matter is an appropriate curriculum for the Orientation and Mobilization development which one of the basic competencies stated that blind student has to be able to walk independently in the outdoor or indoor room.

In introducing the school environment to the blind student the teacher can use a learning method based on environment (learning environment). By utilizing the school environment, the student is directly invited in obtaining the concept and experience understanding which is refered to the essential of an object outside of him/herself. Learning by utilizing a school environment outside of class is an appropriate concept when applied in teaching orientation and mobilization. In connecting with it, many students are trained in performing the orientation of an object or objects which are can be done outside of the class environment. By conducting learning activity outside of class, it can create the independence toward student activity. Mobilization training is also a good method when it is done outside of class. In an outdoor environment, blind student are trained to find landmarks/terrain characteristics and clue or signs that can be used as the direction when walking around.

The finding of field data that is supported by the result in January 2015 interview with several blind students on mastery of concept toward school environment, clarify that blind students are still confused when walking in the school environment that they rarely visited. Blind students are more familiar to the environment around their classroom. Another weakness of blind students a lack of understanding the condition of all the building position and road access that exist around school.

To overcome these problems, there are two ways that should be done by a teacher. The first step is by giving the blind student an orientation and mobilization skills. These skills can be used as a guide for them to perform various activities at school. While the second step is to develop a media that can provide an idea about the school environment. The Development of the multimedia scale model is based on learning technology. To choose an appropriate media for blind students, it is necessary to consider the student's characteristic. Visual impairment is an individual who use more feeling and hearing during the sighting. So that the media which is presented have to be able in optimizing blind student through these two things. Besides, the selected media must be directly controlled by the student and capable to creating an interaction between blind student and an object or other friends. Therefore, interactive multimedia is an appropriate media which is presented for the blind student to install the mastery of school environment concept. Interactive multimedia has been widely used by an educator in order to improve the student achievement. The result of it is very positive. As the research that is conducted by Nandi (2012) on the use of interactive multimedia in geography teaching at schools. The result is the students are to be more motivated to learn geography, so that the learning performance also increased.

Based on the explanation above, in developing the interactive multimedia scale model based on orientation and mobilization to install the mastery of school environment concept in the blind student. Amran, (1997: 106), mentioned that scale model is a form of imitation of

something in a small size. Scale model media provide an impression of a three-dimensional scale model of a real object whether it is life or not. Scale model a multimedia interactive or models are very helpful to communicate the essence of a variety objects, even bigger, wider, too far, and others.

In link with a multimedia scale model, it is designed with an audio program to provide guidance for blind students to get the various places at school environment. Furthermore, this design is completed with Braille letter in each building, so that it ease the blind student to recognize every building when she/he want to get there. The completeness of audio program which heard by the student is the direction to get to the various places that available at school, and this will be recorded and remembered in the student's brain as the knowledge. These knowledge understanding will be confirmed by blind students through their feeling; one of it is use an interactive multimedia scale model that is equipped with Braille letter.

The orientation of an interactive multimedia scale model through palpation, hope that the student can imagine the position of each imitation building at school, so that the scale model that already touched can be said as a concept understanding. The impact of it is he/she can obtain real performance at school environment. This interactive multimedia scale model as an alternative to instill the concept of school environment that can be designed on the environment (outdoor) wider, so that blind students can easily understand the condition of the social environment. The assertion Ungar, Blades, and Spencer (1999), shows that to provide the mastery concepts for blind student, one of them is the use of map and scale model arise in informing the understanding of learning, while the result will be better by setting the environment (outdoor) which is relative stranger for the student.

Based on these conditions, show that blind students have difficulty in mastering the concept of the school environment, so that give an impact of the weak ability in their orientation and mobilization. The spacious and wide environment of school is very difficult to be oriented by blind students overall. The complexity of road access and building orientation perceived the wrong position by blind students, so they often hampered during mobilization and even wrong in heading to a certain place.

These problems occurred because blind students lack imagery/mapping toward school environment. Therefore, the development of interactive multimedia scale model can represent the existence of a school environment that can be observed through blind student tactile. Furthermore, interactive multimedia scale model which is based on the orientation and mobilization as an alternative to instill mastery of concepts about school environment in the blind student. The use of scale model in Indonesia has been widely used as a learning media with a very satisfactory result.

The embodiment result by using scale model media not only about the concrete image of the wider and spacious environment, but it have the potential to motivate and please the spirit of learning for students. Therefore the existence of scale model nowadays requires a development to be an interactive multimedia which is more interesting, and could ease blind student to learn and understand the concept. This insistence can exist by realizing the development of interactive multimedia scale model which is based on orientation and mobilization to install the mastery of school environment concept in the blind student. Based on the explanation, it's come the research problem on how does the development of the result of interactive multimedia scale model based on orientation and mobilization to embed the mastery of school environment of blind students in Special School.

Literature Review

Lowenfeld in Lydy Reidmiller,Lauri (2003), stated that there were three forms of limitation as for the blindness effect : (1) the limitation of concept and experience diversities

(2) the limitation of environment interaction (3) the limitation of orientation and mobilization. It can be said that blind student often encounters the movement limitation in her/his environment. This situation happens because the blind student does not master the good concept toward surrounding. The complex problem of blind students in mastering the concept of low environmental orientation and mobilization within the board school environment, so that complicate to understand the school condition. Besides, the information that obtained by students concerning the school environment is merely verbalises in the form of words from a teacher or other friends. In obtaining the information it could be understood incorrectly by one of the blind students. The basic facts found that blind student was having problems in understanding the board object such as school environment.

To cope with this problem so it is necessary to develop a media that can provide an idea about the school environment. The Development of the multimedia scale model is based on learning technology. Learning technology (instructional technology) in design, development, utilization, management and evaluation of processes and resources for learning (Seels, B. Barbara and Rita C. Richey. 1994). Learning technology strive to design, develop, and utilize a variety of learning resource, so that it ease or facilitate someone to learn in anywhere, anytime, by anyone, and by any learning resources which is appropriate to the condition and need.

According to Heinich, Molenda, Russell and Smaldino (1999: 229) said that multimedia refer to the various combinations of two or more media formats that are integrated into the form of information or program instruction. Interactive multimedia is a multimedia which is equipped with a controller that operated by the user, so the user can choose what they want for the next process. The most important characteristic of an interactive multimedia is the students not only pay attention to media or objects, but also required to interact during learning.

Method

1. The Approach and Type of Research

This study uses *research and development* (R & D) approach as a type of research development from Borg and Gall (1983). This research produces a product of interactive multimedia scale model based on orientation and mobilization to embed the mastery of school environment concept on Special School's blind student. On this research development, SPECIAL SCHOOL's blind student is the subject of the study.

2. Model of Research and Development

This research development uses ASSURE as the model design which is developed by Smaldino, Sharon E & Russell, James D (2005), they confirmed that the product development is not only in the form of learning media, but it can be a procedure, instrument, and learning process. Moreover ASSURE model as the first step of research to produce the product of interactive multimedia scale model based on orientation and mobilization to embed the mastery of school environment concept on Special School's blind student. Deployment and implementation is done when the developed product has fulfilled the eligibility standard and the final product which has good result during testing. In a research procedure of Borg and Gall (1983) can be seen schematically from the table below.

a. Preliminary and collection study of data & information, consist of.
   1) Theoretical study on the development of interactive multimedia scale model based on orientation & mobilization to embed the mastery of school environment concept in Special School's blind student

2) The data and field situation on the development of interactive multimedia scale model based on orientation & mobilization to embed the mastery of school environment concept in Special School's blind student

b. Planning, drafting a development of interactive multimedia scale model based on orientation & mobilization to embed the mastery of school environment concept in Special School's blind student.

c. Text expert for the development of interactive multimedia scale model based on orientation & mobilization to embed the mastery of school environment concept in Special School's blind student. The final result of the development of interactive multimedia scale model based on orientation & mobilization to embed the mastery of school environment concept in Special School's blind student.

Interactive multimedia scale model which is based on orientation and mobilization to embed the mastery of school environment concept on Special School's blind student that have been developed in this study is expected to have a high degree of feasibility. Dealing with that, it is necessary to do a series of validation test of the product and making a revision based on the validation test. Validation test is done through the review of both of blind and media expert. The test subject is done by 1) multimedia experts, 2) information technology experts, and 3) an expert of special education blindness.

The type of data on the development of this form of descriptive qualitative data. Qualitative data in the form of (1) the information field of the learning program orientation and mobility were obtained through interviews with teachers school of dissability and principal, (2) information about the learning program orientation and mobility were obtained through interviews with the students with visual impairment, (3) review of references of articles and books on the development of multimedia interactive mockups based orientation and mobility. Data collection techniques in this study using observation and performance results manufacture of products.

Findings/Analysis

1. Development of the result

In this analysis, the needs of orientation and mobilization learning are focused on the development of its learning curriculum. One of the basic competency stated that blind student has the ability to walk independently in outdoor and indoor. Introducing the school environment to a blind student, a teacher could use a learning method which refers to the environment (*environment learning).* By utilizing the school environment, the student will obtain the important of experience and concept understanding which refer to an object outside of himself. Learning by utilizing an environment outside of class, is an appropriate method if it is applied in mobilization and orientation learning. In learning process, the students are trained to do an orientation for a certain object and it is done by them outside of class. During learning and teaching outside of class, it can help the students to be more independent in doing their activities. Outdoor is the best place to do the mobilization training. In outdoor, the blind student was trained to find landmark or clue that can use as the direction when walking around.

To achieve the goal from the development of interactive multimedia scale model based on orientation and mobility in installing the mastery of school environment concept in blind student, it needs several steps below.

a. Assessment

The development of orientation and mobilisation assessment is a systematic method to know about

1) What has been mastered
2) What hasn't been mastered
3) What is needed

The development material which is already known or yet unknown, but it is not required then the material does not need to be programmed. While the material that has not been mastered yet an unneeded it needs to be programmed to teach the blind student.

b. Establish the priority of training material

Based on the assessment, when there is an indication of the material that has not been mastered is more than one, then a teacher has to choose a certain priority material to be trained.

c. Establish the training purpose

After finishing the material establishment, then a teacher drafting and establish the goal that to is achieved and it must have several elements below.

1) A= Audience means who will reach the goal
2) B = Behavior means performance behavior
3) C = Condition means in what condition the behavior should be presented by the audience
4) D = Degree means as a performance behavior criteria show the successful in mastering skills and knowledge.

The development of the product multimedia scale model which is based on orientation and mobilization have the shape of building and room which is used as a learning activity. Below are the room and area depiction which is used in the school environment as the direction design of orientation and mobilization for the manufacture of an interactive multimedia scale model.

a. Classroom
b. Teacher room
c. Room of head of school
d. Computer laboratory
e. Library
f. Pray room
g. Hall
h. Sport yard
i. Girl's hostel
j. Boy's hostel
k. Restroom/toilette
l. Schoolyard
m. Storehouse
n. House of school keeper

The product of this research is interactive multimedia scale model which is based on orientation and mobilization as the effort of cultivating the mastery of school environment concept toward blind student in Special School as shown in figure 1 until figure 3. This Interactive multimedia scale model which is based on orientation and mobilization are developed to apply benefits toward blind students to acquaint the school environment. The interactive multimedia scale model is made by an audio program which contains the guidance of access to any places inside the school. in comprehending each building on scale model is

by handing with information in the form of *braille,* which is useful as a mediator to give the sight in the environment.

There products of Interactive multimedia scale model which is based on orientation and mobilization to cultivate the mastery of school environment concept toward blind student are in the following:

1. Access guidance of building and path to go to any places around school by the audio program and braille concept.
2. The construction of a multimedia scale model which contains direction guideline.
3. Operation system by pressing the button of place where the students intend to go which exist in the scale model.
4. An evaluating tool as the mastery of environment concept with authentic scoring as the achievement in orientation and mobilization.

The urgity of product development interactive multimedia maket based on the orientation and mobility by special education expert, including :

1. Material depth and mobility need to be concrete with supporting display.
2. The blind students are feeling as a visual aid.
3. Requires an integrated way when blind students change places of learning to avoid or reduce the mistakes of the intended space.
4. For sure blind students dare to travel from one place to another.
5. Setting criteria for foresight and mobility

Similarly, the direction given by educational technology experts to manufacture products based on interactive multimedia mapping orientation and mobility to instill mastery of the concept of school environment, the following.

1. Orientation and mobility learning objectives are more targeted
2. In evaluation to be more qualified to be categorized successfully
3. Direct observation when blind students perform such orientation and mobility activities
4. Learning more directed at the ability of learners to be independent

Then the electrical engineering experts argue that the product of interactive multimedia model maket based on orientation and mobility to instill mastery of the concept of school environment in blind students, that is.

1. The sounds raised on the interactive multimedia mockets when operated must be clear
2. The security level of cable flow from one place to another needs to be revisited
3. Guide book interactive multimedia mockups based on orientation and mobility of language use easy to understand students with visual impairment

Furthermore, civil engineering experts provide exposure to the form of interactive multimedia maket building based on orientation and mobility between one place to another which is directed the existence of concrete in the material directions. Then the alignment of electronic devices with the size of the building of interactive multimedia model requires attention and thoroughness to produce products that have the potential to help the visually impaired and mobility.

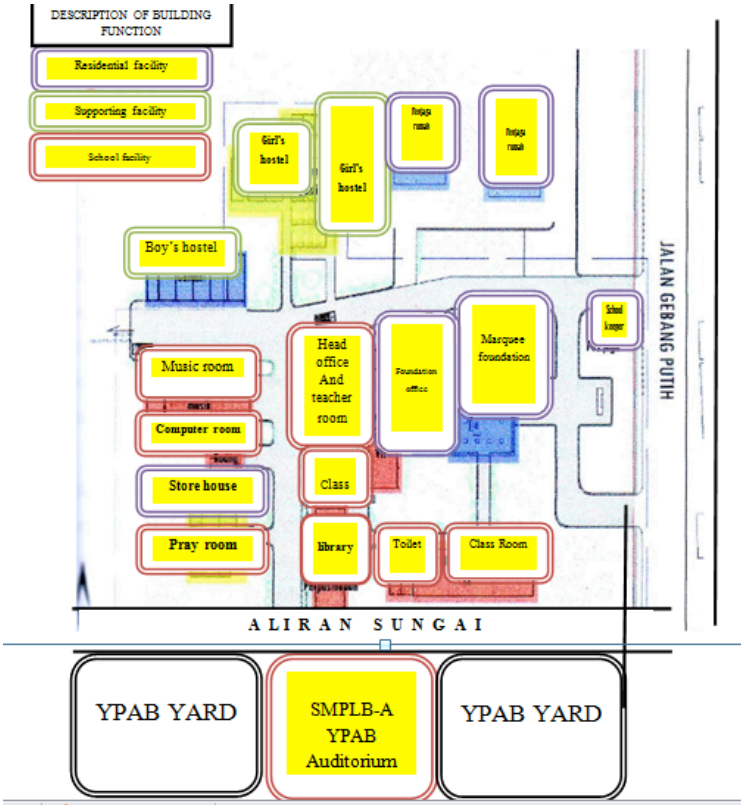

Figure. 1. Landscape scale model

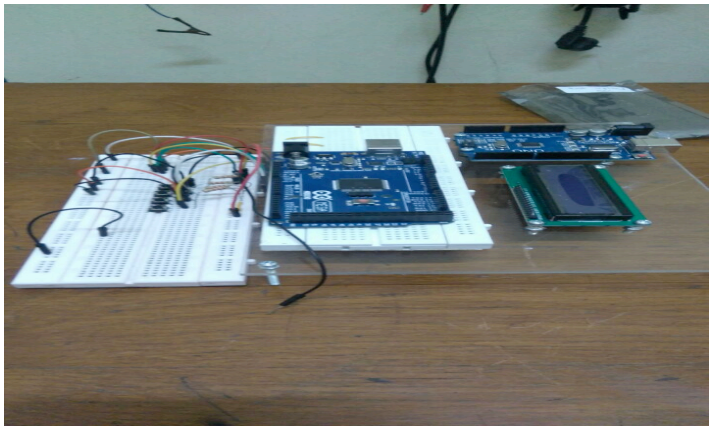

Figure 2. Audio generator electronic circuit was built on that scale model

Figure. 3..Interactive scale model for orientation and mobility

Sudjana and Rifai (2005) argued that scale model is replicates of three dimension of several real objects which have a bigger size, too much further, too much smaller, too much expensive, too much rare, or too much complicated to be shown in class and learned the students from the original object. Based on that view, it can be understood that scale model as learning media three dimensions is replicates of the real object to connect any barriers that may appear, if providing the object directly in the class. In this case, the view of the real object is still can be felt by students without cutting down the real structure, so the learning process can be more meaningful. Scale model concept as replicates of three dimension object which is built to represent the existence of the real object which is too much bigger, smaller, distant, wider, so it can be observed directly by students through their feeling.

While multimedia is emphasized by Nandi (2012), a combination from least two input or output media. The media can be audio (sound, music), animation, video, text, graphic and images. Later on, another definition is asserted by Bonk, Curtis J and Graham, Charles R. (2006), argued that multimedia literally is electronic media to storage and display multimedia data. Based on definitions above, it can be concluded that multimedia is the combination of two media that can be an audio (sound, music), animation, video, text, graphic and images which are used as mediator learning to public.

Interactive multimedia is as one multimedia which is completed by a controlling system which can be operated by users so they can choose what action to be done next. Interactive multimedia combines and synergizes all media which consist of: a) text; b) graphic; c) audio; and d) interactivity (Bonk, Curtis J and Graham, Charles R, 2006). The use of interactive learning multimedia technology is one of learning mediator, has several basic power.

a. Mixed media

   By using multimedia technology, all conventional media which exist can be integrated into one kind of interactive media, such as text media (whiteboard), audio, video, that if being separated will require more media.

b. User control

   Multimedia technology can be used by users to go through learning material, that is suitable with ability and background knowledge.

c. Simulation and visualization

Simulation and visualization are the specific function which exists in interactive multimedia, thus through animation technology, computer simulation and visualization, the users will gain information which is more real than abstract information. At some curriculum is needed complex comprehension, abstract, dynamic process and microscopic, thus by simulating and visualizing, students can developmental model in their cognitive aspect. However, for blind students, simulation function is more emphasized since they can try directly on its use.

d. Different learning model

Interactive multimedia has potential to accommodate users with different learning model. Nandi (2012), said there are six criteria to evaluate interactive multimedia; (1) easy of navigation, (2) cognitive contain, (3) information percentage, (4) media integration, (5) artistic and esthetic and (6) has all function.

Problem complexity of blind students in comprehending environment concept which is too wide makes them difficult to understand school situation. Besides, information which is gained by students about their environment is only verbally that is in the form of spoken by teacher or other friends. The information may be understood in wrong way by students. The basic fact found that students undergo a problem in understanding an object which is too wide such school environment.

In order to overcome the problem, there are two ways to be done by a teacher. The first step, give specific skill orientation and mobilization toward blind students. With skilled orientation and mobilization, it can be used as guidance to do any activities inside the school. the second step, develop learning media which can give a view about school environment toward students. Development of multimedia scale model is wrapped in instructional technology basics. Instructional technology is in design, development, usage, the operation also evaluation about process and source to study (Seels, B. Barbara & Rita C. Richey: 1994). Instructional technology affords to build, develop and use any learning sources thus make it easy or facilitate someone to study anywhere, anytime with any sources of learning which is suitable with condition and necessity.

Lahav, O and Mioduser, D. (2002), argues orientation is the ability to understand the relation between one object with another; the creating from one mental pattern of the environment. Meanwhile, mobilization covers skilled achievement and technique which make people who obtain blindness can mobilize easier in their environment. In mobilization orientation, direction and destination concept are two important things that must be mastered by blind students. By understanding direction and destination concept, thus students are able to mobilize accurately and effectively. Accurately refers to students can afford destination as they will, while effective refers to students are able to go to a place they want to on time.

Concept understanding of direction is very useful to build students' independence in doing orientation and mobilization at school. this concept gives and cultivates comprehension toward students about certain height direction and the way to decide angle which is made by certain direction. The direction is very important to understand by doing direct practice. However, for blind students which belong to child age, left, right, front and back are direction concept which can be taught earlier.

The distant concept also must be understood well. this is important to be learned so that students are able to go to a place they want to. In orientation and mobilization, distant measures commonly use the meter, fathom and footstep. But, to make it easy for students to understand the distant concept, it only needs foot step measurement.

However, other than distant and direction concept, there is one important matter which must be mastered to understand school environment well. it is the mastery of concept

about school environment which is pictured in students mind. In order to cultivate this concept, it is not easy to picture the environment in their mind. Students which undergo blindness since their birth, they are a lack of concept so it is difficult to give some images of certain objects. Furthermore, the objects are only told verbally. The same thing occurs towards students who undergo blindness after they could see, the concept they own is not adequate to support creating cognitive mapping towards an object that is too wide. That is why it needs media with the concrete construction which can be felt and observed by students directly through their hearing and feeling.

Recommendation

Below are conclusions which show developing blind students mastery of environment concept through an interactive scale model which is based on orientation and mobilization to cultivate concept comprehension in the school environment by blind students. Produce interactive multimedia scale model which is based on orientation and mobilization product to cultivate environment mastery comprehension to blind students which consist of a) guideline access of building and path to any places in the school with audio program and braille, b) the construction of interactive multimedia scale model which contains direction, c) operating by pressing the button which is suitable to destination in the scale model and d) evaluation tool to master the school concept by evaluating authentically as the achievement in orientation and mobilization. So it is recommended to give education and training for blind students in Special School to use the products of interactive multimedia scale model which is based on orientation and mobilization for mastering school environment concept.

References

Adri, Muhammad.(2007). *Strategi Pengembangan Multimedia Instructional Design. http:// ilmu komputer.com.* diakses pada tanggal 16 oktober 2014.

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

Anderson, Ronald. 1994. *Pemilihan dan Pengembangan Media untuk Pembelajaran. Diterjemahkan oleh Yusuf Hadi Miarso, dkk dari buku aslinya: Selecting And Developing Media for Instruction*. Jakarta : Penerbit Raja Grafindo Persada.

Ariyani, Niken, dkk. (2010). *Pembelajaran Multimedia di Sekolah: Pedoman Pembelajaran Inspiratif. Konstruktif dan Prospektif.* Jakarta: Prestasi Pustaka.

Bahri (2008). *Pengertian Konsep Menurut Para Ahli*". *http://Satria 2008,* diakses pada tanggal 15 oktober 2014.

Bonk, Curtis J and Graham, Charles R. (2006). *The Handbook Of Blended Learning.* San Fransisco: Published by Pfeiffer, by John Wiley & Sons, Inc.

Borg, W.R. and Gall, M.D. (1983). *Educational Research: An Introduction.* London: Longman, Inc.

Chambers, D., & Coffey, A. (2013). *Development of a mobile-optimised website to support students with special needs transitioning from primary to secondary settings. Australasian Journal of Special Education, 37* (Special Issue 1), 79-91.

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

Effendi (2009). "Definisi Pemahaman Konsep". *http://www.usershare.net.diakses tanggal 18 Oktober 2014*

Hadi, Purwaka. (2005). *Kemandirian Tunanetra*. Jakarta: Depdiknas.

Heinich. Molenda. Russel. 1982. *Instuctional Media And The New Technologies Of Instruction*. Printed in the United State Of America.

Hasrulbakri. (2010). *Langkah-langkah Pembelajaran Multimedia Interaktif. MEDTEK* Jurnal. Diakses tanggal 18 Oktober 2014.

Heinich, Molenda, Russell dan Smaldino. (1999). *Instructional Technology and Media for Learning.* Ohio, Columbus: by Pearson Education, Inc.

Husamah, (2014). *Pembelajaran Bauran* (*Blended Learning). Terampil Memadukan Keunggulan Pembelajaran Face To Face, E-Learning Offline-Online dan Mobile Learning.* Penerbit Prestasi Pustakaraya, Jakarta Indonesia.

Husamah, (2013). *Pembelajaran Luar Kelas (Outdoor Learning) Ancangan Strategis Mengembangkan Metode Pembelajaran Yang Menyenangkan, Inovatif dan Menantang.* Penerbit Prestasi Pustakaraya, Jakarta Indonesia.

Kementerian Pendidikan dan Kebudayaan. (2014). *Program Pengembangan Kekhususan Pedoman Pengembangan Orientasi Mobilitas, Sosial dan KOmunikasi Untuk Peserta didik Tunanetra.* Dirjen Pendidikan Dasar : Jakarta.

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.

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.

Mukhtar, dan Iskandar. (2012). *Desain Pembelajaran Berbasis TIK.* Jakarta : Penerbit Referensi.

Nandi (2012). *Penggunaan Multimedia Interaktif Dalam Pembelajaran Geografi Di Persekolahan*. Jurnal. Diakses tanggal 18 Oktober 2014.

Nurjannah (2006). *Pengertian Konsep Menurut Para Ahli*. *http://Satria2008.*diakses pada tanggal 19 oktober 2014.

Pranata, Moeljadi. (2010). *Teori Multimedia Instruksional.* Malang : Universitas Negeri Malang.

Rogow. (2005). A Developmental Model Of Disabilities. Vol 20 - No. 2 Schwiebert, L Valerie; Karen A. Sealander and Jean L. Dennison. 2002. Strategies for Counselors Working With High School Students With High School Students With Attention-Deficit/Hyperactivity Disorder. Journal of Counseling and Development Volume 80 Number 1 Winter: 3-10.

Seels, B. Barbara & Rita C. Richey. (1994). *Instructional Technology: The Definition and Domains of The field.*Washington, DC : Association for Educational Communications and Technology.

Schalfer, Charles. (2000). *Bagaimana Membimbing, Mendidik dan Mendisiplinkan Anak Secara Efektif, (*terjemahan R. Tarman Sirait). Jakarta: Radar Jaya Ofset.

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