Design and Built Interactive Whiteboard Application as Learning Support Using Game Controlling

Wandana Narayana Putra[1], I AA Ketut Agung Cahyawan[2] and Nyoman Piarsa[3]

**[1]Department of Information Technology, Udayana University
Bali, 80119, Indonesia**

**[2]Department of Information Technology, Udayana University
Bali, 80119, Indonesia**

**[3]Department of Information Technology, Udayana University
Bali, 80119, Indonesia**

Abstract

Learning in the classroom aims to build student knowledge or skill in a particular field of study. Learning itself is a process of interaction and communication with educators and learners learning resources in a learning environment. In the process of learning in the classroom between teachers with students certainly needed a media to convey the material of the board. In using these media markers are needed as a tool for writing, eraser board to remove and ink refill for ink on marker. Therefore, to solve problems in the form of learning media do not need to use white board markers, erasers and ink refills, it is proposed to be made of the interactive whiteboard, a large touch screen panel that can function as an ordinary whiteboard or a projector screen computer that can control the images in the computer by touching the surface of the panel without using mouse or keyboard. From research conducted by Steve Kennewel and Alex Morgan 2003, as much as 95% of the students and teachers that are observed in the UK states that interactive whiteboards can add value to learning, although 76% felt that the presence of the interactive whiteboard this would add to their preparation time, like to learn how to operate effectivel. Based on the problems in the areas of learning required and the use of interactive whiteboard technology Nintendo used to replace the function of the board in general, ie write and erase.

Keywords: *Interactive Whiteboard, Learning Media*

1. Introduction

Learning in the classroom aims to build students' knowledge or skills in a particular field of study. Learning itself is a process of interaction and communication educators and learners with learning resources in a learning environment. In other words, learning occurs in the classroom because there is interaction and communication between learners with educators. (Chaeruman, 2009). In the process of learning in the classroom between teachers with students certainly needed a medium to deliver material that board. In using the media as a tool board marker needed for writing, board eraser to remove and refill ink for ink on board marker. Chalkboard has a certain size limit educators in presenting the material so that the material that was submitted previously will be removed by educators because of limited space on the board. and teaching materials written in the media cannot be recorded so that the delivery of content cannot be captured well by learners. Therefore, to solve problems using the media learning form the board does not need to wear board marker, eraser and ink refills, it is proposed made interactive whiteboard, which is a panel large touch screen that can be serves as a regular whiteboard or as a projection screen computer can control the images in computer by touching the surface panel without using a mouse or keyboard. This technology allows the users to write or draw directly on the surface and save it to the computer. (Glover and Miller 2002). From research conducted by Steve Kennewel and Alex Morgan, 2003, as much as 95% of the students and teachers observed in the UK states that interactive whiteboards can provide value added to learning, although 76% felt that the presence of This will add to the interactive whiteboard their preparation time, as it should be learn how to operate effectively. However, in its application to create a whiteboard needed technology that can capture the movement of an object that transmit signals in the form of infrared. In addressing the above problems apparently there is a technology that RAM / ROM. can be considered as alternative settlement issue. The technology used for solve the problem is control devices issued by the Nintendo company generally used as a control in Nintendo DS game play. Equipment It is called the Wiimote, technology Wiimote is a technology that take advantage of the motion sensor allows users to

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interact with the object - the object on the screen through motion detection with using accelerometer technology. From technology could serve as a mouse replacement controller could use on a display screen allows users to write something on the screen like any writing on the blackboard. Based on the problems in interactive learning areas needed whiteboard and use of gaming technology Nintendo used to replace the function of the board in generally the write and erase.

2. Theoretical

Nintendo Wii (Wiimote)

Wiimote is a device wireless communication that transmits and receive data via bluetooth media. Wii has a bluetooth feature with Broadcom driver type 2042. These chips Bluetooth is a grade 2 fully supports the Bluetooth HID (Human Interface Device) with 8051 16 bit microprocessor and memory on-board. Wiimote does not require authentication or encryption to connect to the other devices. Wiimote contains EEPROM chip 16 KB where part of the 6 KB can be freely readable and writable by the user. It is easy to do storage and transport data. Several hardware and calibration settings software, and interface options can be stored in the Wiimote in fashion and can be accessed anywhere in accordance the user desires. Hardware components of the wii used for this project is infrared camera located at the end remote future. On May 12, 2006, PixArt announced a strategic relationship with Nintendo to provide technology object tracker specifically for Nintendo Wii Remote. This camera has a resolution of 1024x768 with hardware installed infrared to track up to 4 points at 100Hz. This camera contains Charge Coupled Device (CCD) with additional infrared filter that can recognize the light in in the near infrared spectrum, the wavelength of 800nm. Each infrared light source can be traced to degree, including incandescent lamps, torches, candle and the light of day. Infrared LED (Light Emiting Diodes) are available to tracked accurately and efficiently with match the infrared wavelength and a small active area makes them suitable for use in applications using an optical sensor Wiimote. According to recent reports, the source of 940nm infrared detected about 2 times intensity equal to the source 850nm, but not well resolved at close range. If the infrared filter removed of the cameras, it can track objects brighter other. Movement of remote sensed by 3-axis linear accelerometer located at the front of the remote. Circuit The combined accelerometer type ADXL330 is produced by Analog Devices. This device is physically assessed to measure acceleration in range of + / - 3g (gravitational) with sensitivity of 10%.

Figure 1. Wiimote

Four of them are the direction as shown in the picture above, and others scattered around controls. For infrared camera located in the bottom of the front with 4 LEDs blue. LEDs are used for showed that the Wiimote in mode of detection and in game play used to indicate the power level battery.

Bluetooth

Bluetooth is a wireless communication technology (without cable), is operates in the 2.4 GHz frequency band unlicensed ISM (Industrial, Scientific and Medical) using a frequency hopping transceiver capable provide data communication services and sound in real-time between the hosts Bluetooth with a distance range of services limited (about 10 meters). Bluetooth card itself can be a form and function is similar to the card used for wireless local area network (WLAN) that use frequency IEEE 802.11 radio standards, only the Bluetooth has a range of distances shorter services and capabilities lower data transfer.

Basically, Bluetooth invented not only to replace wire usage on information transfer, but also giving a good feature for low cost wireless mobile technology, low power wireless mobile technology, promising interoperability, easy usage and capable of serving many variant of services. To illustrates the more details on the bluetooth technology Relatively new to the reader, The following are described on the history of the emergence of bluetooth and development, technology used in the system and bluetooth aspects of the service that can be provided, as well as little description of the comparative method modulation spread spectrum FHSS (Frequency Hopping Spread Spectrum) used by bluetooth in comparison to the spread spectrum DSSS (Direct Sequence Spread Spectrum).

Figure 2. Bluetooth

UML

UML is one of the most important tools in the development of the system today. UML allows developers to create a blueprint that fatherly system catch their vision in a standardized, easy to understand and can be communicate among themselves in a team. Communicating a vision is something that is very important. Before proceeding UML, system developers often try to capture proposals. Analysis of the system trying to catch the needs of their clients, give it to the programmers, and hope the end result as desired by the analyst. Due to system developers are human beings, it is potentially an error in any stage process. Analysis may facing misunderstanding with the client. Analysts may produce documents where the client does not want. The results of the draft analysts may not be clear to programmers, so that programmers produce programs that are difficult to use by the client and not a solution of the problems of their client base. History of UML by Boogs (2002), UML is the brainchild of Grady Booch, James Rumbaugh, and Ivar Jacobson. They work in organizations that separate between the 80's to early 90's. They planned a methodology for analysts and object-oriented design. In the mid-90s they borrowed ideas from others, so they plan to complete their work together. In 1994 Rumbaugh joined Rational Software Corporation, where Booch been working there. Jacobson enroll in the following year. They said the draft version of UML starting software industry and generate feedback changes substantially. Many companies claim that the UML will serve their strategic objectives, a consortium of UML. Hewlett-Packard, Intellcorp, Microsoft, Oracle, Texas Instruments, Rational, and others. The consortium produces UML version 1.0 and submitted to the Object Management Group (OMG) and the OMG request for submission as a standard modeling language. The consortium developed producing version 1.1 and submitted to the OMG, which was adopted in late 1997. In 1998, OMG UML maintain and produce two revisions. Finally, UML is a de facto standard in the software industry. UML consists of a number of elements that combine to chart in the form of a diagram. Because it is a language, UML has rules for combining elements. The purpose of these diagrams is to generate multiple views of the system, and a set of views is called model. UML model of a system one day like a scale model of the building. It is important to note that the UML models describe what the proposed system to work. Not how to implement them.

WiimoteLib

Wiimote Library is a library to manage third party interaction with the Nintendo Wiimote connecting via bluetooth. This library exposes two different ways of interacting with the Wiimote.
• Event driven - every time if there is a change in the circumstances of one of the Wiimote the event will be triggered.

• Polling - Wiimote questioned the distance interval for the situation

C#

C # is often regarded as the successor to the C + + language or advanced version, as it was assumed that the # sign is a combination of four plus signs are arranged in such a way as to form a hash mark. However, regardless of whether or not these assumptions, C # is a programming language that is object-oriented which was developed by Microsoft and became one of the supported programming languages. NET Programming with Visual Studio. C # is based on the C programming language. C # also has similarities with several programming languages such as Visual Basic, Java, Delphi and C course. C # has a syntax such as the ease of Visual Basic, and of course the toughness such as Java and C + +. Similarities is certainly a programmer from a variety of backgrounds programming languages do not need a long time to master it, however, because C # is simpler than languages like C and Java. C # was designed by designer program from Microsoft, Anders Hajlsberg. Prior to working at Microsoft, Anders worked on Borland, where he wrote the Pascal compiler. Before developing C #, Anders knows a variety of deficiencies in the language C + +, Delphi, Java, and Smaltalk, because it is the language C # Anders creates a more formidable. This also explains why C # has a resemblance to some languages. (Tim rides Computers, 2008).

InfraRed

Infrared radiation is the energy with frequencies below the sensitivity of our eyes, so we cannot see. Although we cannot see the frequency of the sound, but we know that it exists, we can listen to them. Although we cannot see or hear the infrared, we can feel it through our senses skin, when you hold your hand in a fire or a warm element, you will feel the heat, but you cannot see it. You can see the fire because of other types of radiation emitting visible by your eyes, but it also emits a lot of infrared that only you can feel on your skin

3. Analysis and System Design

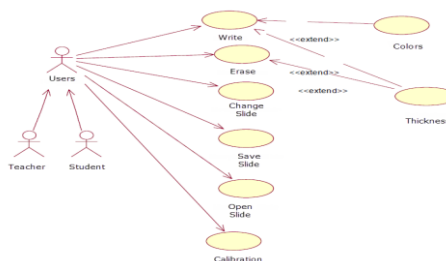Use Case Diagram of the application shown on the Interactive Whiteboard picture as follows:

Figure 3. Use Case Diagram Interactive Whiteboard Application

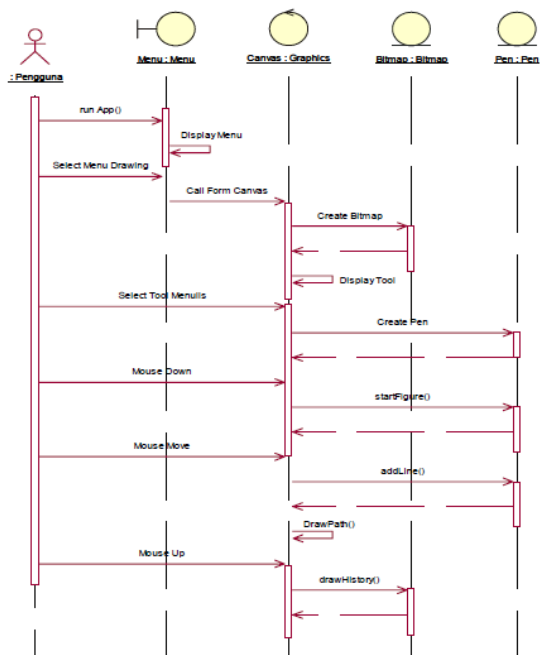While for most applications activity diagram shown in figure 4 and 5.

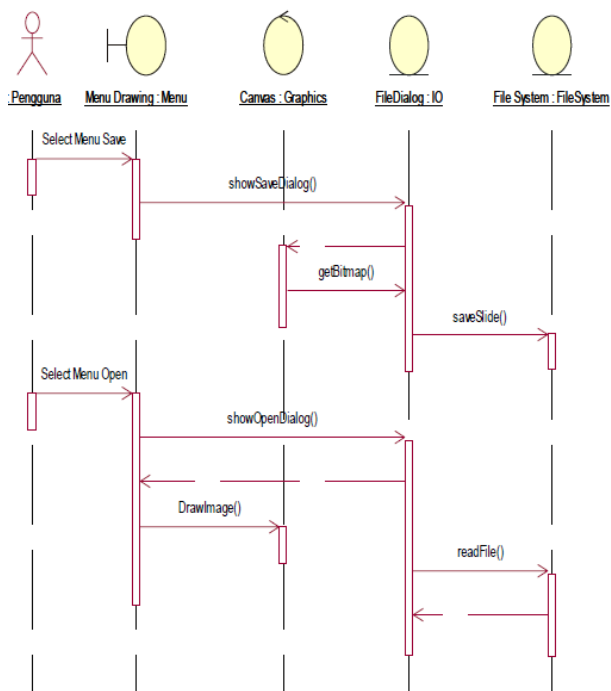**Figure 4. Writing Activity Diagram**

Figure 5. Opening and Saving Slide

4. Result and Analysis

The main menu Form appears when you open the application in this form, there are 3 main menu calibration, drawing and exit. The images can be seen in Figure 6.

Figure 6. Main Menu Form

Calibration Form

This form appears when selecting the calibration menu. In this form the system already determine the coordinates for the top, right, bottom and left according to the size of the screen. Users simply point the IR Pen to a symbol on the target that already provided by the system and push button switch to on to proceed to the next position of the target to 4 point target.

Figure 7. Calibration Form

Drawing Form

In this form the system provides several features such as "save" to save the slide, "open" to open the slide. There is a toolbox that is used for writing, remove and change

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the color as you wish. Users can also change the slide by pressing the previous button to move to the previous slide or press the next button to move to the next slide.
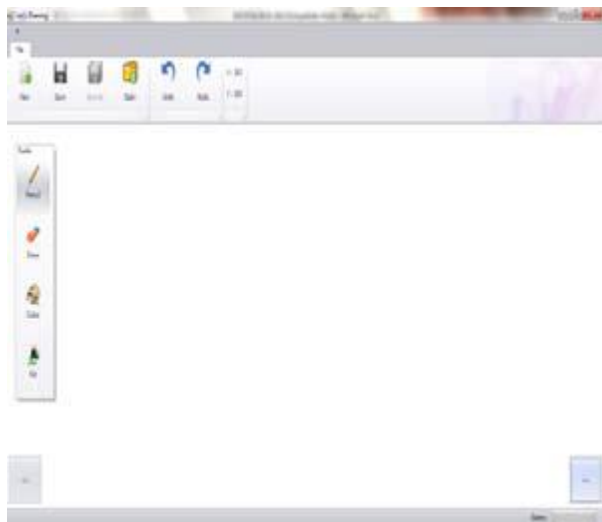

Figure 8. Drawing Form

4. Conclusion

Based on the implementation and evaluation has been done, it can be concluded that:

1. With this application makes the user in terms of the process like teaching writing and erasing become more practical.

2. This Application can save the results of teaching that has been written on the screen so that the students do not have to get confused if you miss a note or forget about matter what was said earlier in the classroom.

3. Helping application users in correcting errors in writing by using the undo or redo.

4. Submission of material that has been written is not limited by space because applications not only have one canvas as a medium for writing on the screen but can be up to 20 screens so users do not have to remove the material that has been submitted previously and could review again without having to write it again.

Acknowledgments

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Wandana Narayana Putra study in Information Technology, Department of Information Technology Udayana University since August 2008, and now working her research for S.Ti. degree in Information Technology. Working as RF Transmission Network Optimization Engineer at Huawei Services Indonesia

AA Ketut Agung Cahyawan, ST., MT received his ST degree and MT degree in Electrical Engineering from Institut Teknologi Bandung. He is lecturer at Electrical Engineering Department (major in Computer System and Informatics) of Udayana University, lecturer at Information Technology Department of Udayana University

Nyoman Piarsa, ST., MT received his S.T degree in Informatics Engineering from Institut Teknologi Sepuluh Nopember University, his MT. degree in Electrical Engineering from Gajah Mada University and his Dr. degree in Electrical Engineering from Gajah Mada University. He is lecturer at Electrical Engineering Department (major in Computer System and Informatics) of Udayana University, lecturer at Information Technology Department of Udayana University.