Evaluation of the Use of Interactive Whiteboard for ICT Assisted Education at the University of Indonesia

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Abstract – In this paper we review the utilization of a new equipment called Interactive Whiteboard to assist teaching and learning process at the Department of Electrical Engineering, University of Indonesia. Interactive whiteboard is a board that is connected to a computer in which a user can touch the whiteboard to give some input instruction to the system. The Interactive Whiteboard was initially purchased to support some work related with virtual reality research. Meanwhile the interactive whiteboard has also been tested and used by a few lecturers to help them in improving their teaching method. In this paper we assess the use of the output devices called Interactive Whiteboard in research and teaching. This paper describes the benefit and some hindrance in fully utilizing the touch large screen equipment. Some assessment of user opinion on the use of this device for 3 Dimension or virtual reality presentation as well as computer assisted education has been conducted and reported in this paper.
Key words: CAI, Virtual Reality, Croquet, Second Life, Interactive whiteboard, Stereoscopic Equipments.

INTRODUCTION

Information and communication technology has been widely used at higher education institutions to improve the teaching and learning processes as well as the quality of education. At the University of Indonesia the utilization of large screen projector which has been used since the last part of 1980s has transformed the way the lecturers prepare and conduct teaching and learning. In early part of the year 2000, most classes at the University of Indonesia have been equipped with large screen LCD projector, as the lecturers found it easier and cheaper to prepare the lecturer in power point slides rather than preparing transparent sheet using Overhead Projector. The transformation to utilized ICT has been triggered by the wide use of personal computers/Laptops and Internet for teaching and learning. ICT was first used by the hard sciences faculty members, and than followed enthusiastically by the soft science faculty members.

In the year 2005, Department of Electrical Engineering at the University of Indonesia put some effort to find other equipment which can be used interactively for 3D images. The Promethean™ Interactive Whiteboard was successfully installed as the first such equipment in Indonesia, according to the manufacturer.
In the following part of this paper we will review some issues, i.e. the Interactive white board, computer assisted education at the University of Indonesia, the utilization of interactive white board for research and as a presentation enhancement tools.

**INTERACTIVE WHITEBOARDS**

Interactive whiteboard is a whiteboard which enable us to directly interact with the output image projected by a projector which is connected to a desktop computer using a special pen. The connection between the projector and the computer can use USB plugged cable or Bluetooth connection. The connection between the whiteboard and the computer is managed by a particular driver. This driver transforms the information of the contact of a special pen in a particular position to be a function of a mouse click. Before this device can be used, it must be calibrated by pointing the four corners of the rectangle of this whiteboard [1]. Considering that the large size of this device, it can not be use as mobile equipment. It tends to be installed and used in a particular room to be used as daily presentation equipment.

At the moment in the world, there are only limited number institutions which have 3D or Virtual Reality presentation equipments. This is due to the large cost of purchasing Virtual Reality enabled equipment such as the CAVE. CAVE is a complete system of projection room, in which a few cameras and stereoscopic equipments made the user feels his/her presence in a virtual world. Instead of having the 8 sides equipment, some institutions replaced it with only two sides presentation images and use google to provide the virtual reality presence.

**VIRTUAL REALITY FOR COMPUTER ASSISTED EDUCATION**

Virtual reality is a technology which allows a user to interact with computer simulated environment. One way to provide the experience of being part of a virtual world is through computer screen or a special stereoscopic display, as well as other sensory devices such as google or haptic tools for force feedback [2].

Within the last few years, a Virtual Reality Applications called Second Life has become the most prominent virtual world based on the Internet developed in the world. This system was developed by Linden Lab. To be part of this virtual world, every resident can interact with others through an avatar, and participate in the individual and group activities as well being exposed to the virtual world.

Second life has become a successful game and a new learning space as the virtual space users have to buy a virtual land and pay an amount of real dollars to make a group to become an authority in the virtual world. Most of the virtual world is developed by the residents who use a Second Life tools to make virtual buildings, scenery, vehicles and machines to be used, exchanged, and sold. Second life can become an educational resource as it provides virtual classroom from many universities in the world. At the moment Second Life has become a major example of a virtual world developed collaboratively in the world, and projected to be a good educational resources.

Second Life has proven that virtual reality and 3 Dimensional worlds can become the next computer assisted education approach. As the speed of processing power improved and the cost of bandwidth reduced, the world of 3D collaboration in learning and playing is open to the Internet users.
EVALUATION OF THE UTILIZATION OF INTERACTIVE WHITEBOARD

On the completion of a few hours training on some approach to utilize the Interactive Whiteboard Devices, some lecturers already use the equipment for presentation purposes. Some assessment of the utilization of the devices has been conducted. From the survey to ten users using a Lickert scale questioner and open questions depicted in Table 1, it could be summarized that this device benefits the teaching and learning process as lecturers can innovate in the way they conduct their lectures. Previously, input instruction to computer must be conducted through a movement of mouse and a mouse click, which should be done in close proximity to the computer. In using the Interactive Whiteboard the interaction with the program is conducted in the projection screen which can be seen by every one in the presentation room.

Some lecturers also reported that this new presentation method takes more lecturers’ effort and energy to move from one part of the board to other parts which are significantly different from only sit down or stand up close by the computer. However this interactive equipment is superb in delivering lecture in mathematic, for example. Virtual presence in a virtual museum can also be implemented using a large touchable screen projection using new devices such Interactive Whiteboard [4].

Table 1 shows the average responds to the statements regarding the utilization and problems related to the use of the Interactive whiteboards in teaching and learning. It is found that not many lecturers have actually used the new equipment for the problem of lack of training and preparation for example to install the driver in their laptop computers. Not more than half of the lecturers attended the introduction and training for the utilization of the equipment in the beginning, and further trainings are required.

Some advance functionalities of the system require more time to be tested and embedded in the teaching and learning processes. It is also discovered that some lecturers identified the use of the IW for 3D presentation. The problem of front light projection has been found by some lecturers as nuisance in using the system. Event though most lecturers stated that they must spend more energy to use the system by physical movement to draw and describe some points, but they thought they this equipment is useful and should be use more in classrooms in the university. Figure 1 shows a lecturer use the IW for teaching.

![Figure 1: The use of Interactive whiteboard for teaching and learning](image_url)
Table 1. The average responds to the questioner (1=not agree, 5=agree)

<table>
<thead>
<tr>
<th>No</th>
<th>Questions</th>
<th>Average Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>I can easily use the interactive whiteboard</td>
<td>1.75</td>
</tr>
<tr>
<td>2</td>
<td>I have joined a training before using this IVW</td>
<td>3.5</td>
</tr>
<tr>
<td>3</td>
<td>I need further training to use this IVW</td>
<td>3.125</td>
</tr>
<tr>
<td>4</td>
<td>This IVW helps me in teaching and learning processes</td>
<td>1.625</td>
</tr>
<tr>
<td>5</td>
<td>This IVW helps me in 3DAR research</td>
<td>2.675</td>
</tr>
<tr>
<td>6</td>
<td>I feel distracted with the cover of the projection from the projection lamp in using</td>
<td>2.75</td>
</tr>
<tr>
<td>7</td>
<td>The quality of lights and focus in this IV is very good</td>
<td>2.5</td>
</tr>
<tr>
<td>8</td>
<td>I have not seen such equipment functionalities as this IVW before</td>
<td>3.75</td>
</tr>
<tr>
<td>9</td>
<td>I will regularly use this IV if it is placed at the classrooms</td>
<td>3.75</td>
</tr>
<tr>
<td>10</td>
<td>I think that this kind of IV should be provided more in our university</td>
<td>3.675</td>
</tr>
<tr>
<td>11</td>
<td>I need to spend more energy to teach and use IV compared with common Power Point presentation equipment</td>
<td>4.25</td>
</tr>
</tbody>
</table>

Some obstacles are found in the utilization of this whiteboard system, for example the problem of the front projection of this device. On having someone stands up in front of the whiteboard to use it, he/she will prevent the projection light to be projected to the whiteboard. Therefore it is quite hard to properly use the equipment to give the feel of presence and experience the real situation of touch screen input on the large screen projector, without having to minimize the distraction of light. Figure 2 depicts the problem of light distraction on the projection.

![Figure 2: The problem of front light screen projection to the full screen image](image)

The evaluation of the sharpness of the image shows in these devices revealed that most users found the quality of the image is not very good and can be improved to show a more detailed figure in enhancing the reality of 2 or 3 dimensional images. Figure 3 shows the utilization of the Interactive whiteboard for virtual reality experiments based on Croquet [3].
Figure 3: Utilization of Interactive Whiteboard for 3D experience

CONCLUSION

In this paper we have presented the evaluation of the utilization of stereoscopic equipment for teaching and learning at the University of Indonesia as can be seen in Figure 3. Although the device is useful, there are some points raised before the device can be promoted to be widely used in more classes within the University.

The Interactive whiteboard can help lecturers to move freely from the computer to inputting the instruction through a large screen. However, some disadvantages of this equipment such as front light distraction will need to be solved to make the most out of the new devices which enables lecturer to innovate in computer assisted education.

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REFERENCES