INTERNATIONAL CONFERENCE ON EDUCATION, TECHNOLOGY, AND SCIENCE

Improving The Quality of Education To Face The Impact of Technology

University of Muhammadiyah Purwokerto

December 28th, 2013

PROCEEDINGS

International Conference on Education, Technology, and Science

NETS 2013

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Universitas Muhammadiyah Purwokerto

Purwokerto, December 28th, 2013

Preface
Rector of UMP

Assalamu᾽alaikum wr. wb.

Alhamdulillah, that UMP will carry out prestigious event namely "National Olympiad and International Conference on Education, Technology, and Science (NETS) 2013" is a very great news for me. NETS 2013 is the first event which is conducted in collaboration between UMP and PWM Central Java. It is a great event which is constructively supported by ITB, UNiSA, UTeM, and several institutions under UMP partnership to smoothen the event.

Recently, technology grows very fast. This fast growth affects on the quality of education in Indonesia. Based on this condition, UMP and PWM Central Java formulate a program which later it is formed into "NETS 2013". This event is also a contribution to Islamic Higher Education Institution to prepare candidate of future leaders who have competitive skills to compete positively in comprehending knowledge and technology.

In NETS 2013, there are some events which are arranged in a sequence such as: International Conference on Education, Technology, and Science (ICETS) with Prof. Dr. Ir. Imam Robandi, M.T., Mr. Ganjar Pranowo, Mr. Simen Lourds, and Dr. Hiroshi Takeda; Seminar (Call for Paper) including some disciplines of science covering Education, Engineering, Medicine, Science, Social, Politic, Religion, Law, Culture, Arts, Agriculture, and Technology; National Olympiad for Student and Teacher (NOST) which is joined by students, teachers, and schools; and Expo. In NETS 2013 competitions, participants are fighting over trophies, medals, certificates, and advisory fund reaching up to Rp250.000.000,- ; furthermore, there is also a fellowship to study in UMP.

As the Rector of The University of Muhammadiyah Purwokerto, I do really expect that conducting this event could encourage all of us to be more advanced nation not only on economic side, but also on social life. It is also expected that this event will increase our awareness on how important it is to develop and advance technology in education.

That is all I could deliver now, for further information you may access our website on www.ump.ac.id.

Last but not least, "Let᾽s join and support NETS 2013 in UMP".

Wassalamu᾽alaikum wr. wb.

Purwokerto, 28th Decembe 2013
Rector,

Dr. H. Syamsuhadi Irsyad, M. H.

Preface
The Chairman of NETS 2013

Assalamualaikum, wr. wb.

Today is the valuable and precious milestones for education in Indonesia in general and Muhammadiyah in particular because all levels of education from elementary schools to university get together to build relationship and networking in the national Olympiad and international conference hosted by University of Muhammadiyah Purwokerto.

We deserve rejoice and pride because there are more than 1705 participants, 215 officials and 300 invited guests. This is also a great honour for University of Muhammadiyah Purwokerto to have the Governor of Central Java and the staffs, the regents from four regions and the staffs, the chief of Central Muhammadiyah Board , the Education division of Muhammadiyah Board, the directorate of higher education, Rectors of University of Muhammadiyah throughout Indonesia and rectors of universities in Purwokerto, companies and stake holders, media , travel biro as well as the colleagues, persistent fighters for Muhammadiyah in the region and territory.

As the chairman of this events, I ʻd like to report that there are more than 1616 teachers and students who will be joining the national Olympiad and there are more than 311 researchers, lecturers and students will be taking part in the International Conference. Again, I'd like to emphasis that this event is really a pride for us because the participants are coming representing five big islands in Indonesia, they are Sumatra, Kalimantan or Borneo, Java and Sulawesi.

This event holds thirty one types of competitions and organizing six international conferences. There are twenty five competitions for students, four competitions for teachers and three competitions for schools. The international conference covers fields of Educations, Engineering, Science and Agriculture, Health and Medicine, Culture and Arts, social, Politics, Economics, Religion and Law.

We are proud to mention that we have at least fifteen experts coming from higher education, one from high schools, two industries and one national research centre (LIPI). The experts and scholars are coming from some outstanding universities and institutes such as University of South Australia, Tottori University Japan, Institute Teknologi Melaka, Malaysia, Henderson Secondary School Singapore, Boromanjani College of Nursing Thailand, Surabaya Technology Institute, Bandung Technology Institute, Gadjah Mada University, Bogor Agriculture Institute, and University of Muhammadiyah Purwokerto.

On behalf of the committee, we'd like to express our deep gratitude and thanks to all sides for their sincere helps and supports that make this event possible to happen in UMP. Last but not least, we have tried and done our best in organizing this event, however, we realized that weaknesses and shortcomings may exist. And for that particular reason we'd like to apologize to you all. Hopefully, the next year NETS will be much better and much improved. Have a great competition and conference!

Wassalamualaikum wr.wb.

Purwokerto, 28th Decembe 2013

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Regawa Bayu Pamungkas, ST., MT.

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Editor : Sularso, Amd.
Nur Afifah Indriyani

Keynote and Invited Speakers

Keynote Speakers

Prof. Imam Robandi (ITS, Indonesia)
Mr. Simen Lourds (Singapore)
Dr. Hiroshi Takeda (Tottori University, Japan)

Invited Speakers

Elvia Shauki, Ph.D. (University of South Australia, Australia)
Prof. *Dr*. Mifedwil Jandra Mohd. Janan (UTM, Malaysia)
Panarut Wisawatapnimit (Boromarajonani College of Nursing, Bangkok, Thailand)
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Telehealth Implementation Using an Online Meeting Application for the Remote Area Health Services

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Abstract

The increase of population growth in Indonesia is followed by greater demand of health professionals, especially medical doctors. Currently, ratio between number of doctors and patients in Indonesia is still below the normal line that leads to less health care. On the other hand, health care introduces cost aspect moreover for the patients living in remote areas experiencing the problem by the distance to the health services. This study proposes the technique to overcome these constraints through the implementation of telehealth using an online meeting application of Team Viewer.

The subjects used for the research study are doctors, nurses and patients in a *clinician to patient consultation* scenario, using video teleconferencing support based on the online meeting application of Team Viewer. To justify the success of the tested model, this research has collected the perception data of the subject at ease aspects of the consultation process. From the work done, the results show that the telehealth model using an online meeting application is easily implemented and give a positive perception of the doctor and the patient.

Introduction

According to the Central Bureau of Statistics (2010), current population of Indonesia has reached 237.556. 363 people. It is estimated that number will increase up to 273.65 million people by 2025. Inline with increasing number of people, the life expectancy of population is also increased up to 73.7 years in 2025. Both numbers show an implication to the increasing of health care needs especially hospitals and health professionals, both doctors and paramedics, as well.

Currently, the needs of health professionals especially doctors in Indonesia are still not ideal, particularly in remote areas. This lack is indicated by the low ratio between the number of doctors to the patients of 3 doctors for 10,000 peoples (1 : 3.300) refers to the ideal ratio of 1:2.500.

On the other hand, the government has been introducing a regulation to improve health services such as the enactment of the National Social Security System on January 1, 2014, unfortunately that effort is still not sufficient with availability of doctors. As a result, health services conducted by various health institutions around Indonesia is not optimum. For the case in remote areas, health care problems will be more serious due to the insufficient number of health professionals especially doctors only in urban areas.

To overcome this problem, some countries have implemented and evaluated the concept of telehealth on their health care systems, such in the UK through the Whole System Demonstrator Action Network project (Giordano, 2011), in the United States backed the legislation Telehealth Promotion Act (Boucher, 2013), and in Australia through projects under the coordination of the National E-Health Transition Authority (Doha, 2012).

Boucher (2013), defines telehealth as the use of medical information exchange system from one place to another via electronic communications to improve patients' health service. In implementation, telehealth appears in the following four forms as mentioned by Puskin (2006) and Boucher (2013): (1) patient care, (2) medical education and mentoring, (3) consumer medical and health information, and (4) remote patient monitoring. In practice, telehealth aims to (1) change the behavior of patients to keep consulting of healt care when getting ill; (2) improve the patient satisfaction due to lower operating costs, and (3) lowering the cost of acute care.

By considering the insufficient number of doctors, in a geographical aspect that population is dispersed from the urban to the remote areas, this situation leads the economic condition of the average community is not strong. Therefore, the concept of telehealth can be used as one of the right choices to improve health services in Indonesia.

According to Boucher (2013), telehealth is similar to the distance learning in higher education which requires the information technology support such as video teleconferencing in its implementation. Currently, many applications of technology information was developed that can be used to support the implementation of video teleconferencing.

One application that is relatively easy to obtain and inexpensive is an online meeting application by the Team Viewer Corporation. This is because the company provides a free license version that can be downloaded from the provided website. This application also provides completed features that can be used to support the data exchange from text and images to a video format. In addition, this application has proven to be effective and easy to operate as tools for implementing online learning model for digital engineering practicum in college (Muchlas, 2012). This study has developed the models of patient care using telehealth based on online meeting application of Team Viewer.

Method

The model used in this study is the clinician to patient consultation of Trusson (2012) as shown in Figure 1 below.
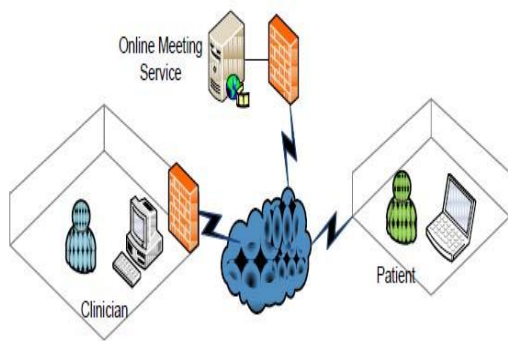

Figure 1. Model of *Clinician to Patient Consultation.*

On the patient side, the system is run by an operator. During the consultation, the patient is accompanied by a nurse that previously sending the first supporting data of the patient such as blood pressure, height, weight and body temperature. Meanwhile in the doctor's side, the system is operated directly by the physician such as host in online activity.

To run this system, the developed telehealth in this research requires PC or laptop supported by peripherals that support the video conference facilities. Meanwhile in the software aspect, this system requires an online

meeting application of Team Viewer and its user interface as shown in Figure 2. Meanwhile online meeting panels is shown in Figure 3.
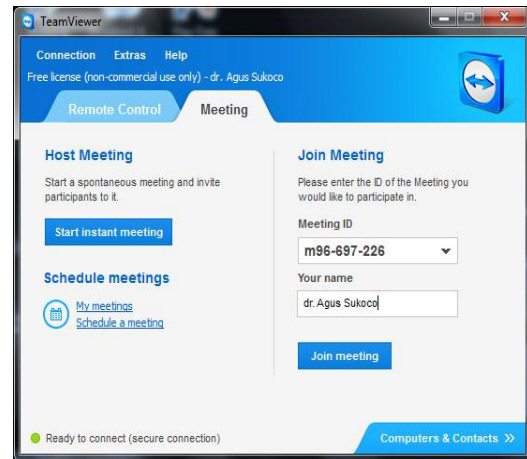

Figure 2. The interface of online meeting application from Team Viewer.
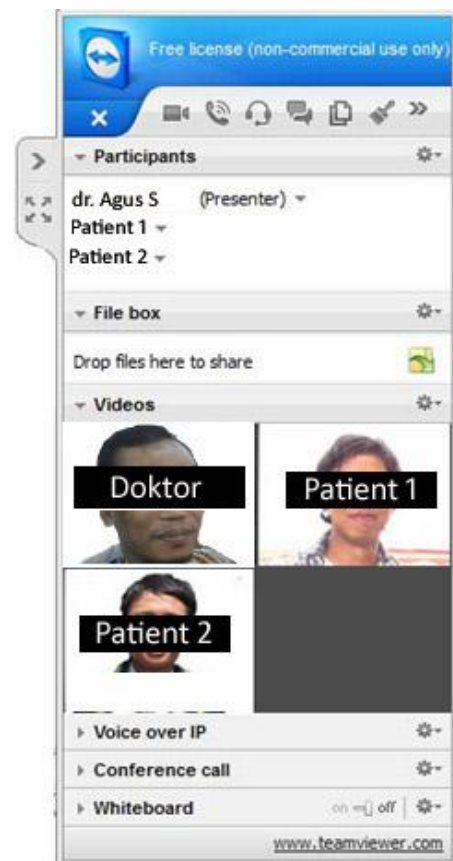

Figure 3. The Panels of online meeting application from Team Viewer.

In this study, the success of the developed telehealth models is indicated by the result of

subjects perceptions test of physician. To find out the doctor's perceptions, this research has been conducted a live interview.

Result and Discussion

The research done has produced a telehealth system for the purpose of patiens consultation based on an online meeting application software. The developed system uses the clinician to patient consultation model that follows the stages as follow.

Stage 1

In this scenario, the doctor become a host in online meeting activity. Through the interface of online meeting application, the doctor will get an meeting ID.

Stage 2

Doctor doing abroad casting the meeting ID to all nodes of patients via email or message based on mobile communications devices.

Stage 3

Operators around the patient nodes receiving the meeting ID sent by the doctor. Furthermore, the operator doing a join meeting using the meeting ID received from the doctor.

Stage 4

After doctors and operators in patien nodes have joined in an online meeting forum, both doing to set the video share in ON mode.

Stage 5

In a patient node, nurses conduct a preliminary physical treatment of the patient who will consult to the physician by collecting data such as blood pressure, height, weight and body temperature. Furthermore, through the operator, the nurse sends the data using a File Box facility to the doctor. Before the consultation, the doctor has to download first a file of preliminary physical data that already sent by a nurse, also via File Box facility.

Stage 6

Physician doing the dialog consultation to the patient via video teleconferencing assisted by nurse in the node patient location.

Stage 7

Doctor writing the medical recommendation using Word application and send it to the patient via the File Box facility in online meeting application.

Stage 8

Nurse that is assisted by an operator at patient node will download the recommendation file sent by the doctor, then printing it into a paper to be delivered to the patient.

The result of test shows that in general, the system has worked well, although produces some technical problems. From the aspect of video transmission (video streaming), delays are found for the system transmission in some segments. This is due to the low capacity of available bandwidth to support video conferencing activities. To overcome these problems, the system has been equipped with voice over internet protocol (VoIP) that can be used to change the pattern of video communication to voice communication. In fact, if the transmission of video and sound are not working, the system will provide text conferencing through chat facility. Thus, the telehealth system has provided variety of digital communication hierarchy of video conferencing, audio conferencing to text conferencing that all of these are running on a synchronously mode.

From the aspects of health consultation mechanism, doctor hasgiven a perception in which the system is less suitable for physical, especially for patients who suffering acute diseases and illnesses that require the intensive of physical. In this case, the physical handling of the patient should be done directly. This is because to determine the type of disease suffered by the patient, the doctor has to do physical handling to get the diagnonis data accurate.

In addition to the perceptions of consultation mechanisms, physicians also provide their perceptions of the usefulness of these systems to support collaborative work among the doctors. The doctor has gave perception that the system can be used to support online discussion from various hospitals.

Conclussion

The research study has shown that telehealth can be implemented easily using the online meeting application from Team Viewer. The proposed telehealth system run based on that technology is a type of medical consultations between doctor and patient. In physician perception, the developed telehealth system can run well and useful as a media for consultation between doctor and patient and also can be used to support the programs to improve health services in remote areas.

The telehealth system developed provides three different communication hierarchy *i.e.* video teleconferencing, teleconferencing audio, and text conferencing.

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