Human Computer Interaction Direct Manipulation

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***Abstract*— this document is going to discuss about the "Direct Manipulation", which is one of the components of the Human computer interaction. In the Direct Manipulation, the concept of applying the virtual reality in Tele presence, Tele Pathology, Tele medicine, augmented reality, Robotic surgery and Mobile learning is discussed here. Especially, the theme discussed here is, the hospitals providing the facility to common man to get recover successfully from his critical physical problems easily without moving from their cities. And, the female students from remote area are getting benefits successfully with the interaction styles of direct manipulation for the various disciplines of science. The organization is providing the facility through JUMP which is a multi platform and an interface between the students and the teachers.**

***Index Terms*—Public satisfaction, JUMP, Students' Progress**

I. INTRODUCTION

Human Computer Interaction is the interdisciplinary science between human and computer and it combines knowledge and methods associated with professionals.

Different kinds of professionals are interacting with computer using some interaction styles. Among those styles Direct Manipulation is a topper one which breaks physical law and allows to access and/or to do the task even though user is in remote location. Virtual reality brings the effect of presenting in a remotely located venue and makes the experience with mental immersion and physical immersion. This virtual reality concept is used in Tele presence, Tele Pathology, Tele medicine and Robotic Surgery.

In Jazan University, due to circumstance, students belonged in remotely located city are studying through the MOBILE LEARNING system. University is facilitating the students through JUMP software.

II. TELE PRESENCE

It makes the human to experience the computer generated environment consisting of interactive simulations and computer graphics. It brings the reality to the user.

For example conferences can be conducted via tele presence. From Jazan University, interested students can participate the conference whichever across the province like Riyad, Jeddah and Damam. The same concept is used in tele pathology, robotic surgery and in JUMP too. So via JUMP, without physical presence the students are attending the lecture as regular students and their doubts will be cleared then and there.

Even students from Jazan university, are provided live lecture through this tele presence concept for some special conferences, workshops and seminars across the province.

III. TELE PATHOLOGY

A pathologist examines tissue samples and body fluids under a remotely located microscope. Transmitting workstation has a high resolution camera mounted on a motorized light microscope. The pathologist at the receiving workstation can manipulate the microscope using a mouse or keyboard and can see a high resolution image of magnified sample.

In case of accident or serious injuries, immediately the harmed person is given general treatment. But for the special cases without harming the patient through the tele pathology the body fluid would be tested across the city where the facilities are available and within 10 to 15 minutes the tested report would be suggested to get the medicine. Without knowing anything, like a magic, very easily a common man from Jazan city can get the experience and benefit with tele pathology. Hence the public get full satisfaction with this technique.

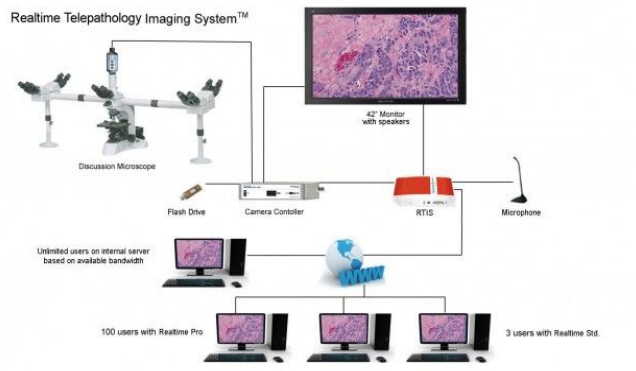


Fig. 1: Transmitting Station

Fig.1 and fig.2 describe the transmitting and receiving of body fluid.

Mobile learning students can enjoy the lecture through JUMP. However, due to the expense of instruments, they have to visit the University for the Practical Experience. But they

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are experiencing the direct manipulation technologies across the universities for this kind of tele pathology work.



Fig. 2: Receiving Station

IV. TELE MEDICINE

It allows physicians to examine patients remotely and surgeons to carry out operations across continents. Medical care will be delivered over communication links.

Same way as tele pathology, telemedicine concept is used in Jazan hospitals. The specialist doctors who observed the patient across the city prescribe the medicines to be taken over the tele communication.

V. ROBOTIC SURGERY

It is the concept of tele operation, in the case of complicated and critical situation or unavailability of the some special doctors and at the situation of patient has to go under the emergency treatment, robotic surgery is useful. The surgeon who is in remote place do the operation for the patient and the physician, who observes and care the patient, assist the surgeon by monitoring the robot closely and can control physically if the need arise.

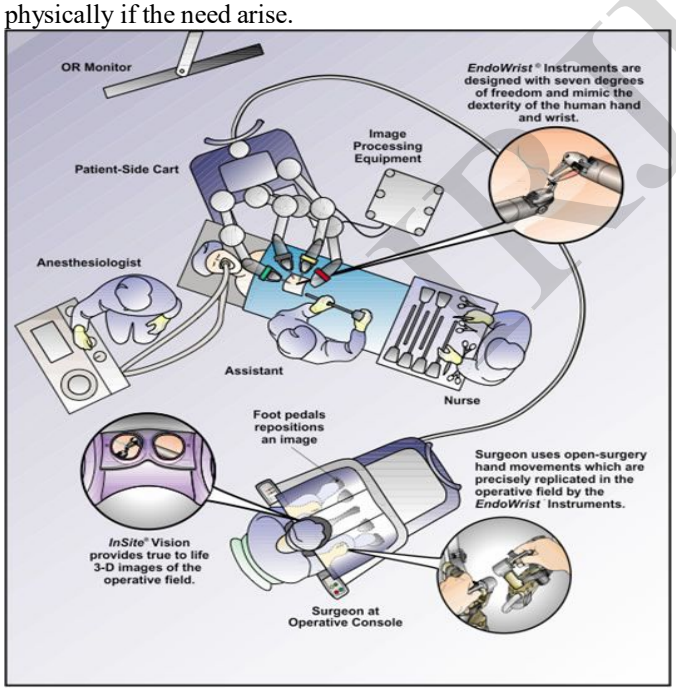


Fig. 3: Robotic Surgery

This Robotic Surgery is somewhat mixing of tele presence, tele pathology, telemedicine and haptic technology too. Surgeon at operative console wears gloves or has some hand held devices to control the robot hands which would do the operation physically for the patient.

VI. MOBILE LEARNING

The students who are residing remote side of country are unable to go to the University for their higher education. And some of the students who are busy with their life schedule are provided the higher education through JUMP system.

A. Lecture Hour- Tele Presence

Students are allowed to register in the Jazan University and they got enrolled with the system. They are allowed to choose the subject and design their lecture time schedule. According to their schedule teachers' time tables are mapped and appropriately they are assigned with the students. As per the schedule the teacher can give the lecture from the University and student can attend their lecture from their place, no need to visit the University. Attendance is checked by the system with their bio metrics password at their appropriate time schedule. See Fig.4. While the teacher and students are in online at their right time they can interact together and clear their lecture doubts. Hence both teacher and students can experience the tele presence in virtual reality environment.

As the JUMP is a multi platform, Course coordinator and Course teachers are provided personal site to maintain their course file, which is monitored by any higher officials like Head of the department, College coordinator or by the Dean. See Fig.6.

B. Managing History in the Virtual Environment

In this direct manipulation concept of tracing the history is difficult as we are in real life, we cannot get back the past time. For the students' facility to give an opportunity for the absentee, the lecture hours are recorded and uploaded in the system. So, the absentee can get back the class and even the attended students can refer their previous class while they study for their exams through the JUMP. See Fig. 7.

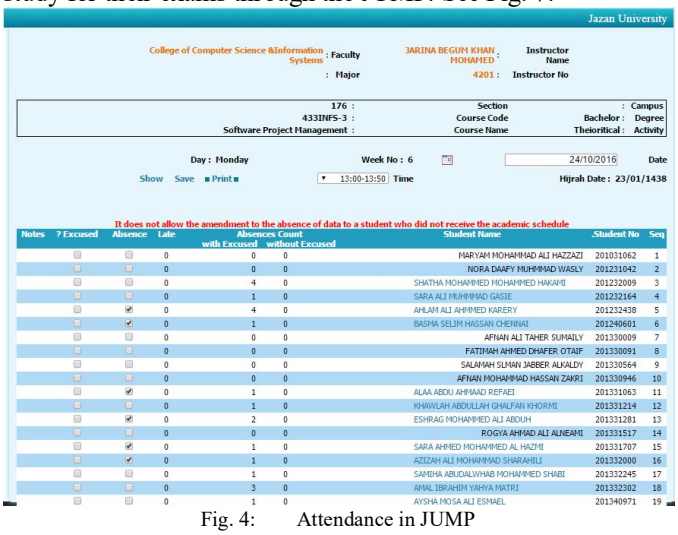


Fig. 4: Attendance in JUMP

In this JUMP system students are given a separate site which is learning management system through which students would be are uploaded with course description, road map and

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lecture handouts and notes. So there is less chance to miss the topics. Even homework, regular class works and exam announcement is given through the LMS (Learning Management System). The LMS and LCMS (Learning Content Management System) are linked together to upload course content and delivered via LMS. Hence the student can access their course needs through the LMS. See Fig. 7.

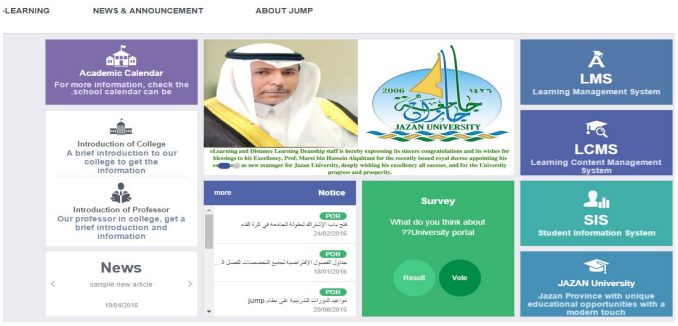


Fig. 5: JUMP site- home page

This is the site (Fig.5.) used to communicate with the students in off line for uploading the lecture notes and giving them the home work like assignments, collecting, evaluating and displaying the marks to the students.

See (Fig.6.) course coordinator and course teacher can maintain the course file like record of works done throughout the semesters and communicate with each other for their clarifications. And history of the semester would be maintained.

C. Exams in the Virtual Environment

Finally, semester exams would be conducted through the tele presence concept. Still for practical exams students are immensely needed to visit the university, because generally students would be provided to enjoy the experience with the licensed software or highly expensive instruments by the university.

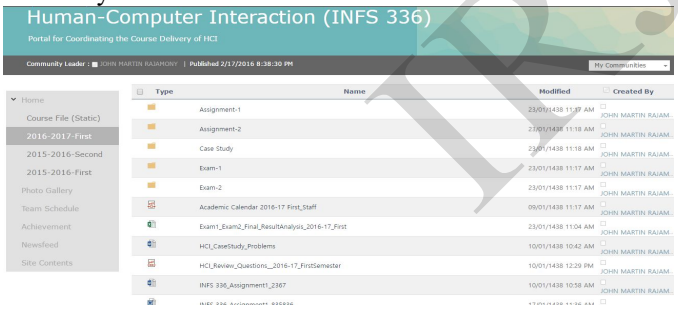


Fig. 6: Subject- HCI

During the exam time, students are checked with their bio metrics password and enrolled for the exam attendance. Then up to finish the exam their face recognition and typing impression and speed will be monitored by the system to avoid the fraudulent practice. The exam will be asked with choose the correct answers questions only. Description questions will be asked with open book system like heuristic type. If the student tries to do the copy paste work also she will miss the time and her exam site will exit her. So there is a 99.99% chance for the successful organizing of university through the mobile learning.

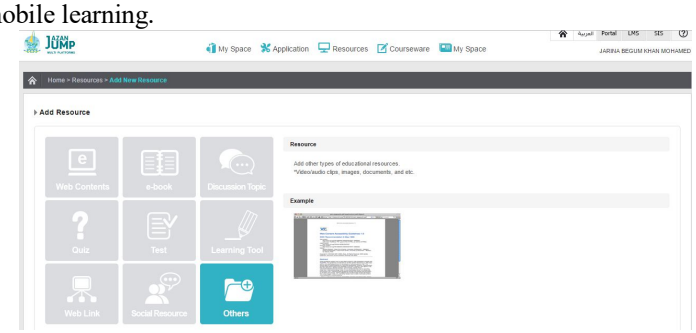


Fig. 7: LCMS (Learning Content Management System)

The exam result would be uploaded in the Jazan university website, and student can come to know their results and they can go ahead for their next level.

In fig.8, grade "F" means failure students. Pass grade starts from 60% marks which is D grade, remaining grades higher grades according to the marks from right to left.

D. Result Analysis

HUMAN COMPUTER INTERACTION

Grades	No. of Students	Percentage
A, A+	2	6%
B, B+	8	24%
C, C+	17	52%
D, D+	6	18%
F	0	0%
Total	33	100%

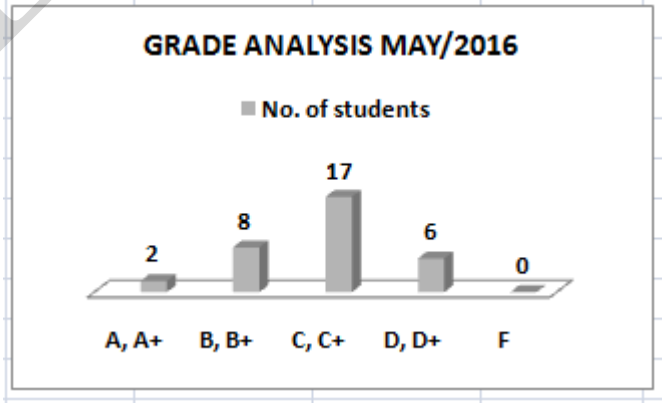


Fig. 8: Result Analysis of mobile learning system

Since last year, this JUMP system has been used by the mobile learning students and it has been going as a test system. This year it got improved. Still it is under observation to facilitate the students more. And students also show more interest in this system, thus the strength of the students is improved comparing to last year. Surely I can say that Jazan university's mobile learning students get benefits as similar as regular students with JUMP system and feel proud.

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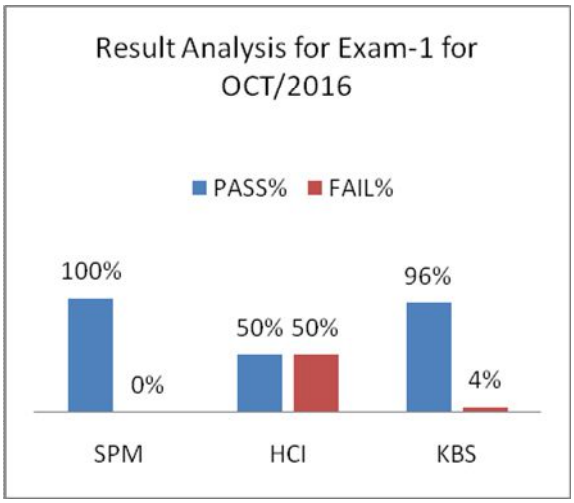


Fig. 9: Result analysis for internal exam

- SPM – Software Project Management
- HCI – Human Computer Interaction
- KBS – Knowledge Base System

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