

Digital Teaching using E-Learning

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Abstract- Digital Learning System (DLS) deals with new technologies of teaching- learning system. This objective is achieved using touch-screen technology. In this paper we describe about digital learning provided to the students along with the audio-video notes. In addition to this, we also focus on the attendance of the students through the attendance software module. Digital Learning System (DLS) preserves the blackboard writing essence making system interactive and user friendly. This paper also provides information on various technologies used to present the digital learning system. DLS not only aims at making the students updated with the classroom teaching but also makes them aware with the activities that are held within the college campus.

Keywords- Touch-screen, DLS, Microphone, Audio-video notes.

I. INTRODUCTION

With the ever-increasing popularity and accessibility of the Internet, it is only natural that the educational community should want to make use of this tremendous resource. Use of the Internet and Web are leading to significant changes in educational models. Effective exploitation of these changes requires adequate attention to understanding the technology, the educational processes and issues, student's characteristics, etc.

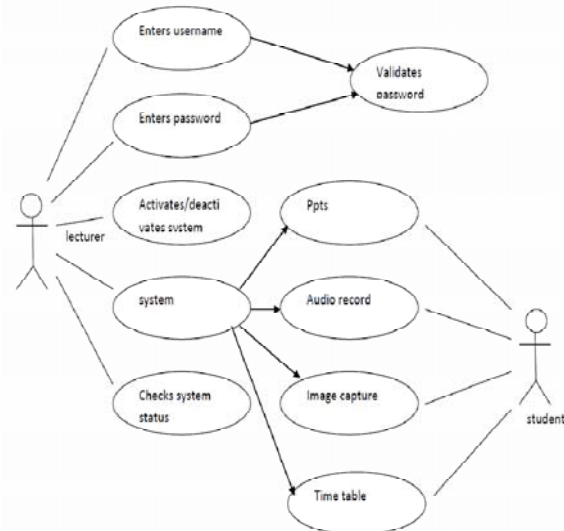
As this use of Internet is increasing, a traditional classroom has shifted to E-Learning. While advancements in communication tools were easily adapted to learning methods, it was the introduction of the personal computer and the development of the Internet that would create the most radical transformation in higher education. Learning by computer can be as easy as communicating with your professor and fellow classmates via email, student utilizing an interactive CD-ROM.

Thus, *E-Learning* can be defined an approach to facilitate and enhance learning by means of personal computers, CD-ROMs, and the Internet. It may be as simple as that teachers may simply post their material on Internet, students can read it online or can download it for further access.

As the world is rapidly developing in the percept of technology, hence we need to use the future technology in enlightenment of the present of the students [4]. Every perceptive of Digital Learning System (DLS) is practicable. Its main objective is to make teaching and learning methods more convenient and interesting from both teachers and students side.

The concept of DLS is related with the next generation technique used in the classroom teaching. The use of this

new technology enables its users to teach and learn in a very efficient and fruitful way.



The above use case diagram depicts the nature of Digital Learning System as what exactly it is about.

DLS is a replacement of traditional black-board teaching used in most of the institutes. DLS replaces the traditional black-board by a multifunctional , single touch digital touch-screen. DLS promises to provide the class-notes and an audio file of a particular session, in a systematic way, to the registered students. It also promises to assist the teacher by the means of various tools. The touch screen or touch panel plays an integral part of the project DLS.

A **touch screen** is an electronic visual display that can detect the presence and location of a touch within the display area. The term generally refers to touching the display of the device with a finger or hand. Touch screens can also sense other passive objects, such as a stylus. The touch screens were first developed by CERN and were first introduced in the worldwide market on 16th of March 1977. Uptill now many developments in the sector of touch screens are made. Touch screens may be of the three types viz Capacitive, Resistive and Surface Acoustic. The touch screens works on the phenomenon of electromagnetic field. Actually touch screen is the display embedded with the mouse. Touch screens are calibrated with the x-y co-ordinate system. The sensitivity of touch screens may vary with its types but still reaction time accommodate in the milliseconds.

The touch screens find its application in many day-to-day life. Few applications of touch screens may be figured out as ATM machines, railway ticket counter, finger print

recognizer etc. With the rapid development of embedded technology, embedded devices have been widely integrated into people's work and life. In order to improve the efficiency of interaction with embedded devices, research on embedded GUI for exchanging information with users has become a focus of study. Introduction of Linux 2.4 kernel based driver of s3c2410 touch-screen and the working mechanism of Qt/Embedded mouse device interface. Also, base on the similarity between the operation style of the touch screen with that of the mouse, this paper rewrites the mouse interface of Qt/Embedded linuxtp and realizes the QT/Embedded touch-screen support[1].

Various technologies are applied to implement the touchscreen concept, one is implementation of webcam-based touchscreen where the main tools used in this work is image processing techniques. Two cameras are employed for acquiring sequence of images. Touching object is recognized and its location is identified. Experiment is carried out to demonstrate and verify the effectiveness of proposed method[2].

The Smart Board is an interactive whiteboard that uses touch detection for user input – e.g. scrolling, right mouse-click – in the same way normal PC input devices, such as a mouse or keyboard, detect input. A projector is used to display a computer's video output on the interactive whiteboard, which then acts as a large touch screen. The Smart Board interactive whiteboard typically comes with four pens, which use digital ink and replace traditional whiteboard markers. Most Smart Board interactive whiteboards register only one touch at a time however, in June 2009, Smart Technologies introduced their first dual-touch interactive whiteboard. The dual-touch Smart Board interactive whiteboard accepts two simultaneous touches, however only on two separate sides of the interactive whiteboard surface.

The Smart Board interactive whiteboard operates as part of a system that includes the interactive whiteboard, a computer, a projector and white boarding software called Smart Notebook collaborative learning software. The components are connected wirelessly, via USB or serial cables. A projector connected to the computer displays the computer's desktop image on the interactive whiteboard. The interactive whiteboard accepts touch input from a finger, pen or other solid object. Each contact with the Smart Board interactive whiteboard is interpreted as a left-click from the mouse. Smart Board interactive whiteboards are also available as a front-projection flat-panel display – interactive surfaces that fit over plasma or LCD display panels.

We will rather utilise a widely used touchscreen technology powered by AOC, in our Digital Learning System. It will have integrated audio-video teaching capabilities as well. Video teaching system is a well-known method for teaching and curriculum practices. It has been used widely in many application such as college teaching. According to the requirement of college teaching, a framework of teaching software system based

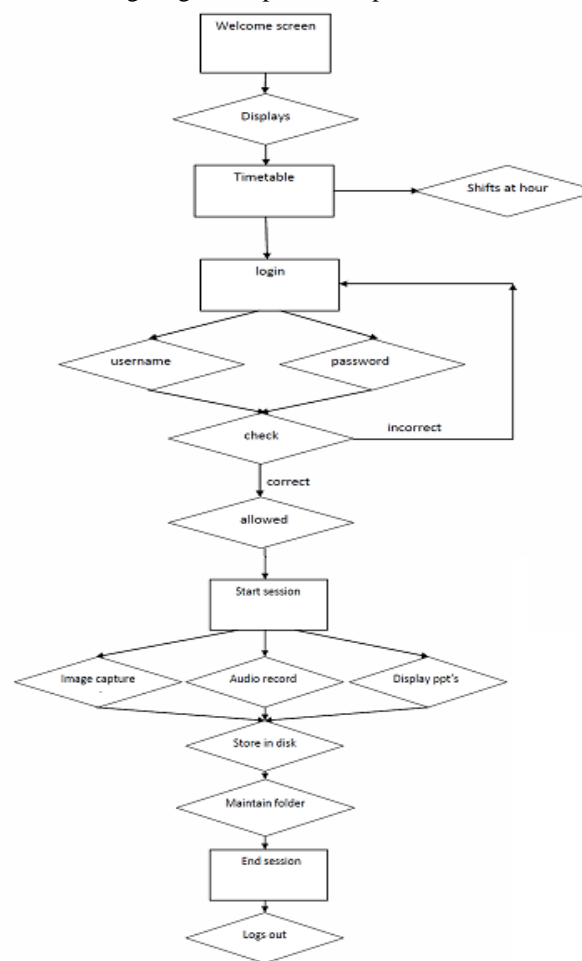
on the video and audio application has been proposed, which is convenient in terms of remote interactive video teaching with other teaching mode[3].



Fig1- Simple smart-board/ white-board

II. PROPOSED WORK

At the start of a session, a home page will be displayed along with the buttons. The buttons provide access to various other pages. One of the buttons is for the lecturer to login into the system. The lecturer logs into the system by providing correct username and password .On doing so, a blank page will be opened having a box in top for the teacher to enter the current Topic to be taught in that particular session. At the same time the microphone provided to the teacher will start recording the audio. The following diagram explains our plan of action.



The teacher can start teaching after that using the touch-screen as a writing panel/writing pad. He/she can utilize the entire page displayed on the screen. After completion of the current page, he can save it and get another blank page by saving Current page and getting new page to continue teaching. He can use as many pages as per his requirements.

At the end of the teaching session, the teacher is required to touch the End Session button which will end the current session along with microphone recording and display the Attendance/Roll List on the screen. The teacher can then call for the attendance and touch the roll numbers of the present students. Thus attendance can also be taken with ease. The DLS can display various documents (PDF, PPT, Word Documents) and also various Videos with the use of digital screen.

We used technologies for implementing above components as follows :

- J2EE (JSP, Java beans, Eclipse): It is a programming platform, belonging to the Java platform, which is used for developing and running distributed java applications.
- WASCE (WebSphere Application Server Community Edition): It is an application server that runs and supports the J2EE and the web service applications.
- DB2 (IBM Database 2): It is a database management system that provides a flexible and efficient database platform to raise a strong "on demand" business applications.
- JAVA: Application architecture.

III. BACKGROUND

In October 2010, Smart Technologies introduced the Smart Board 800 series interactive whiteboard, a line of multitouch, multiuser interactive whiteboards. The 800 series, which includes the 880 and the 885, supports multitouch and multiwrite anywhere on the interactive whiteboard surface, unlike the dual-touch interactive whiteboard, which can only support two simultaneous touches on different halves of the interactive surface. Unlike the previous generations, the Smart Board 800 series interactive whiteboard comes with only two pens. Users can select the ink color then want to use - red, blue, green or black - by pressing the corresponding button on the pen tray. Multiple users cannot write in different colored ink at the same time. The 800 series also supports common multitouch gestures, like those found on the Apple iPod Touch or iPad including pinch, toss, flick and scroll.

TLT which is being used nowadays is the using a Computer and projector in a classroom and using the slideshows/presentations to teach the course content. It's an interactive way of teaching but it has its own drawbacks. It doesn't preserve the effectiveness of Blackboard-Chalk Teaching system and it has proved out to be quite an ineffective TLT.

Yet other e-TLT being used is by utilizing the online learning resources relevant to the Course content. Online

resources include the e-books, Video lectures, Flashes etc. It's a great teaching-learning Technology which is interactive and effective enough to cover the complex course content in a simplified manner. But it too fails to preserve the essence of traditional Teaching system.

Now, Digital Learning System (DLS) is an effective, influencing and interactive Teaching Learning System which preserves the essence of the traditional Blackboard-Chalk Teaching System and utilizes the modern e-learning resources too. Thus DLS is the best suited alternative for the the present Teaching Learning Technologies. As such, almost all the TLT's available today can be implemented in DLS. Thus it is a power packed Teaching-Learning System which has unlimited number of enhancements possible.

DLS, if analyzed on the Value of Investment (VOI) basis, it turns out to be more cost effective than any other present TLT's and the result is shown in Table I.

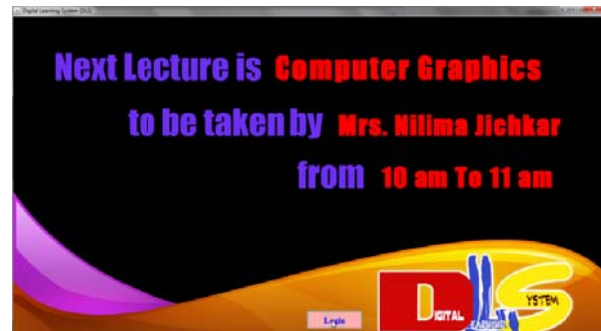
IV. EXPERIMENTATION AND RESULTS



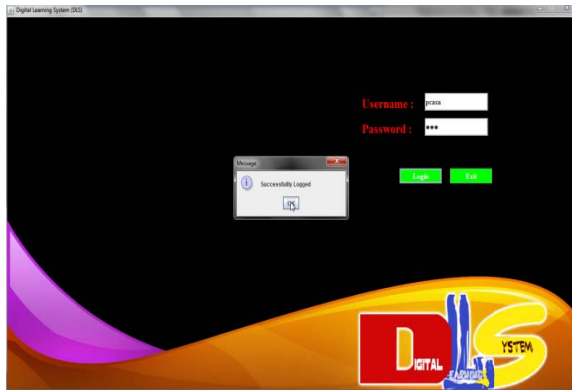
Snapshot 1- Welcome Screen



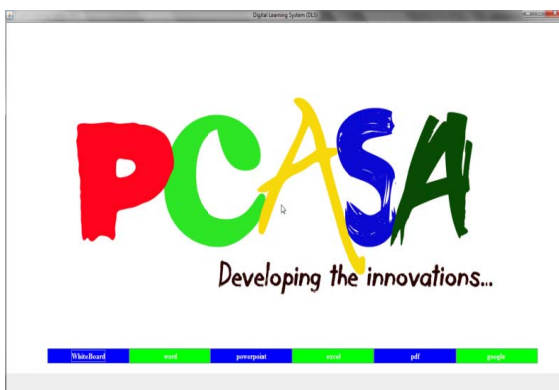
Snapshot 2- Time-table Display



Snapshot 3- Next Lecture button clicked and its details displayed in new window according to system runtime.



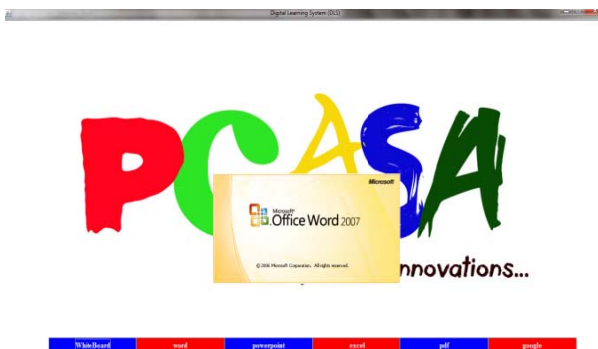
Snapshot 4- Entered Username and Password Verified and ‘Successfully logged’ dialog box displayed.



Snapshot 5- After successful login we enter the “main page” of the system containing various options as the White-board, MS Word, MS Powerpoint, MS Excel, PDF, and even access to internet as google,etc.



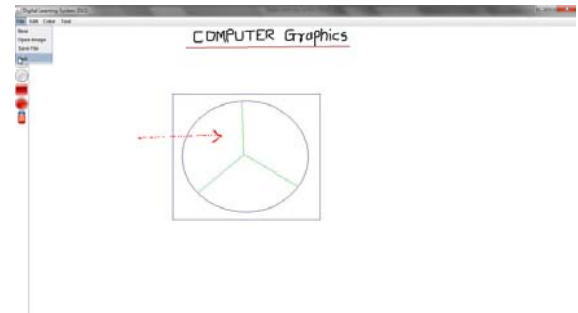
Snapshot 6- Access to google from main page.



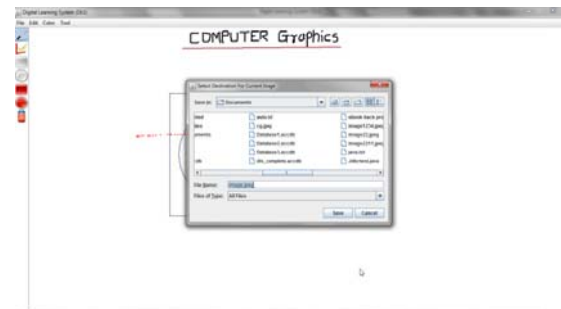
Snapshot 7- Access to word documents from main page. Likewise to excel and pdf, etc documents.



Snapshot 8- Access to blackboard module from the main page.



Snapshot 9- Drwaing or writing on the blackboard as desired.



Snapshot 10 –Destination to Save Current image selected.



Snapshot 11 – Default page for attendance component.



Snapshot 12 – Mark present or absent on respective student and click on “next” for next student’s attendance.

Table 1: Shows the comparison among all the TLTs available and the DLS.

Product	Black Board writing tool	Access to e-learning resources	Time-table alerts	Attendance component	Data saving	Digital Notes transmission to students	Cost(in Rs.)
Traditional black board	Y	N	N	N	N	N	5000/-
Interactive board	Y	Y	N	N	Y	N	1,50,000/-
Projector and computer	N	Y	N	N	Y	N	45000/-
Whiteboard Printer	Y	N	N	N	N	Y	75000/-
DLS	Y	Y	Y	Y	Y	Y	43000/-*

V. CONCLUSION

Digital Learning System (DLS) is being developed with a perspective to make teaching learning experience more innovative, more productive and also more interesting. There are 'n' number of enhancements possible in DLS. In fact we can say that we are just delivering a strong foundation on which n number of stories can be built. DLS is being developed with a pure intention of making teaching-learning more fruitful but we do understand there can be a lots of cons also. But it being a potential concept we think that the pros should be given more thrust and it should be taken in a positive manner. Digital Learning System is developed keeping in mind that the learners too are keen to learn and so they are being facilitated by providing the digital notes. An assumption which has been taken is that Learners are having the suitable receiving devices (Laptops/ Multimedia Phones).To check whether DLS is practicable or not we conducted a comprehensive survey in different engineering classrooms and found that an average of about 74.6% students had a multimedia mobile and 44.2% students had Laptops and 42.2% had both. This survey authenticated the practicability of DLS. Thus DLS is a instantly practicable, innovative and fruitful TLT with a capability to adopt any number of enhancements.

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