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Research Paper

E-Learning: Revolutionizing and Redefining Diploma Education in West Bengal, India

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Abstract— The 21st century is the era in which every sphere of human life is directly or indirectly ruled by technology. 'Tradition' is a word which is slowly losing its significance and 'innovation' is another word which is gradually gaining prominence and dominance in all human work arenas. The above context is strikingly applicable for diploma education in West Bengal which at present lacks the required form to encourage and inspire young students to develop fruitful diploma education ambitions. Diploma education in West Bengal urgently needs to be revolutionized so that it can be accessible to promising students of all financial levels. E-learning by the use of tablet computers has the potential to establish location and time independent, self-paced, low-cost, easy and enjoyable diploma education throughout West Bengal. A state-of-the-art e-learning model is discussed in this paper which can be understood and considered as an effective solution to the current scenario of diploma education in West Bengal.

Keywords— e-learning, tablet, digitization of learning materials, mobile learning, virtual lab, online lab

I. INTRODUCTION

We understand e-learning as education in its electronic form, i.e. education in which students study all softcopies of various subjects and no hardcopies. E-learning refers to the system of learning which involves the use of computers (desktops, laptops and tablets) and internet. E-learning implies the day and age in which students are no longer forced to study thick and dull text books by purchasing them at exorbitant rates from the book market but simply switch on their respective computers, open the required electronic book already stored in them and study whenever and wherever they want. In a nutshell, it can be said that e-learning is learning by using technology. E-learning is facilitated by a set of fabulous education technologies such as Digital Classroom, Digital Tutorials, Digital Library, Digital Laboratory, Digital Group Discussion System (or DigiChat) and Digital Examination System. These technologies are available both in Offline Mode (without the use of internet) as well as Online Mode (with the use of the internet). E-learning has made education portable, concise, compact, interactive, fast, easy and enjoyable. It has given education a new dimension, complexion and above all a new definition.

A. Virtual Lab:

We are all familiar with the scenario of real world school, college or university laboratories of various Science subjects such as Physics, Chemistry, Biology (Botany and Zoology) and Computer Science. There are many educational institutions in West Bengal in which Science laboratories lack the required number and quality of equipments and students do not get experienced lab instructors to help or guide them. Talented and meritorious students of rural West Bengal simply yearn for attending standard laboratories to prepare their respective practical lessons. An effective solution or a proper answer to such situation is the concept of Virtual Lab. A Virtual Laboratory is an electronic (or digital) form of its corresponding real world laboratory which is designed and developed as a robust desktop or web application by some fantabulous technologies. It is an amazing alternative or a substitute of its equivalent real world laboratory. Here, each and every required scientific experiment is first done by the subject expert(s) to near perfection and the required results are obtained. The video of each experiment from start to finish is recorded with the best picture and sound quality. All the recorded videos are arranged in the correct order and are stored as *the collection or list of experiments* in the process of developing a state-of-the-art Virtual Lab. Students studying any Science subject use this technology as an indispensable tool to thoroughly understand the practical portion of that subject. All they need to do is to simply open this application and watch the required experiment videos. A student, who finds it difficult to understand a particular experiment on the first play, can play the experiment again and again till he/she understands it completely. A Virtual Lab as a desktop application does not require internet connection to use but if it is to be used as a web application, then obviously, high speed internet connection is required. [7]

B. Mobile Learning:

An era has come in which portable tablet computers are highly used by people for a wide range of purposes including communicating with friends, colleagues and clients in voice or non-voice (message) mode, surfing the internet, sending

and receiving e-mails and others. Such a tablet computer is an impeccable combination of the utilities of a mobile phone and a computer. This electronic device is also used to store huge amount of academic documents in electronic form which can be studied anytime and anywhere. A student using such device also can study any specific subject at his/her comfortable speed according to his/her grasping ability. Mobile Learning can be considered as an excellent future alternative to rigid real world learning for physically challenged or mentally retarded students and is possess the potential to immensely facilitate distance education. [1]

C. Online Labs:

The Online Labs is based on the idea that lab experiments can be taught using the Internet, more efficiently and less expensively. The labs can also be made available to students with no access to physical labs or where equipment is not available owing to being scarce or costly. This helps them compete with students in better equipped schools and bridges the digital divide and geographical distances. The experiments can be accessed anytime and anywhere, overcoming the constraints on time felt when having access to the physical lab for only a short period of time. [6]

II. THE PRESENT SCENARIO OF DIPLOMA EDUCATION SYSTEM IN WEST BENGAL IN COMPARISON TO OTHER STATES OF INDIA

We are very much familiar with the scenario in West Bengal in which students passing their class X Board exams with appreciable aggregate percentages step forward to pursue various diploma engineering courses from various educational institutes. The quality of libraries, laboratories, laboratory instructors and faculties available in these diploma degree offering institutes are below the standard level as compared to those available in institutes which offer classes XI and XII or graduation and post-graduation degrees. The majority of institutes which offer diploma degrees have laboratories lacking adequate lab equipments. Moreover, the quality of the existing equipments is extremely poor and thus fails to earn student satisfaction. These institutes employ lab instructors who lack the required experience to effectively guide curious and ambitious students. The libraries of these institutes offer dull text books which fail to fulfill the knowledge thirst of ambitious and brilliant students. They do not get high quality reference books to extend their learning and explore any topic. The majorities of faculties who work and teach in these institutes usually come from ordinary higher educational backgrounds and tend to fail at satisfying the knowledge requirement of bright and brilliant students. It can be clearly said that many promising diploma students are unable to perform to their potential and climb their respective career ladders because of unsatisfactory quantity as well as quality of education which they experience at the institutes from which they pursue their respective diploma degrees.

In comparison to West Bengal, the corresponding scenarios in other states of India such as Karnataka, Andhra Pradesh, TamilNadu, Kerala, Maharashtra etc are near opposite and appreciably bright. Students pursuing diploma degrees from various institutes are very much satisfied with the educational facilities which these institutes offer.

III. THE PROPOSED MODEL

The e-learning model proposed here is targeted at successfully overcoming all the above-mentioned educational challenges currently faced by diploma students in West Bengal. The first and foremost feature of this project which draws mass attention and interest is the portable form of education which it ensures. According to this model, all the required or recommended study materials for each academic subject are already installed in each tablet. These study materials are impeccably organized as concise and visually stimulating modules in a tablet. Each of these modules consists of sub-modules. Each such module consists of separate chapters, experiments and solved exercises (which are the sub-modules stored inside the module). Each chapter is written in simple English using concise sentences avoiding verbosity and complexity so that each sentence or paragraph is understandable for students of all levels of grasping capability. Charts, tables and diagrams are provided wherever necessary for fast and easy understanding.. From the modules in a tablet, a student can learn several extra essential topics which are beyond the diploma syllabus taught in the real world. The study materials installed in such tablets also include a number of indispensable education technologies including *Digital Library*, *Digital Laboratory*, *Digital Classroom* and *Digital Mock Test* System. The Digital Library contains a huge number of essential reference e-books on each and every Diploma subject. The Digital Laboratory contains all the important lab experiments of each Diploma subject which were performed by the respective subject experts and thereafter recorded. Each such experiment is available with the best video and audio quality for ensuring best quality learning. The Digital Classroom contains videos of each and every chapter of any specific subject taught by renowned faculties of that specific subject, offering step-by-step guidance. The Digital Mock Test System is a state-of-the-art application by which a student can assess his/her individual preparation of any subject. Using this application, a student can appear for an examination on any specific subject for a pre-specified time duration. Immediately after his/her examination gets over, he/she sees the total marks which he/she has obtained on giving the examination. Students who perform appreciably brilliant in such examinations are likely to receive invaluable *certificates* which add value to their respective CVs. In each of these tablets, several *real world projects* are also pre-installed. When the Diploma students need to start working on their final year projects, they can develop a clear idea about real world project design and development by thoroughly studying the sample projects installed in their respective tablets. Another outstanding feature of this proposed model is that all the above-mentioned educational technologies or applications are available in a tablet in *Offline Mode* and internet connection is not required to use them. This feature of this model can ensure the affordability and significance of these tablets among students of all financial levels. Eliminating real world classroom rigidities, this e-learning model also enables students to study at their respective comfortable learning speeds. Using a tablet, if a weak

student finds it difficult to grasp any concept or chapter, he/she can go through that concept or chapter again and again patiently and perseveringly till full understanding and self-satisfaction. This model, thus on implementation is sure to establish location-independent, low-cost, self-paced, fast and easy Diploma Education throughout West Bengal. [5]

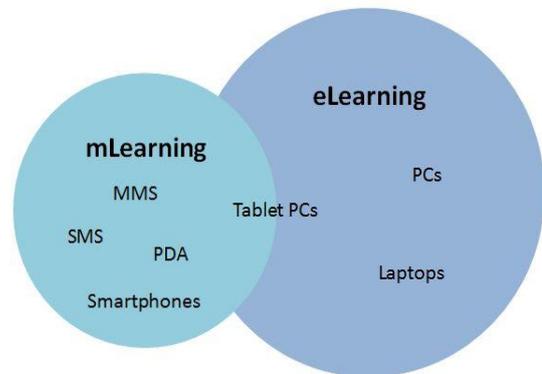Fig 1: tablet-a potential replacement for of learning (books)

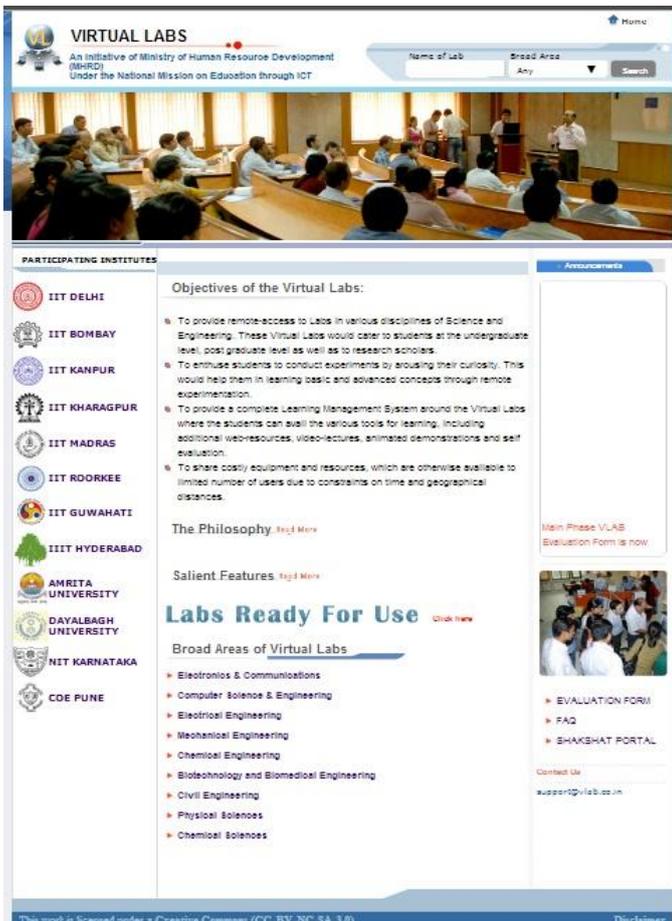Fig 2: m-Learning: an instance of e-Learning traditional form

Fig 3: Virtual Lab portal, India

Fig 4: Online Lab Portal, India

IV. **HOW THE MODEL WILL BE IMPLEMENTED**

West Bengal State Council of Technical Education (WBSCTE) is the governing body of Diploma education in West Bengal for all government and private polytechnic colleges. A total of 29 different diploma branches administered or supervised by WBSTCE. At the time of registration in a college, each and every student is provided a tablet in which all the recommended as well as required course study materials are already pre-installed. Through an external mock exam, the respective preparation of all these students will be assessed such that each student can get a clear graphical result sheet and effectively understand his/her prepared areas and at the same time which areas he/she needs to work more on.[8]

STEPS TO BE FOLLOWED:

- ✓ *Course curriculum design for different subjects*
- ✓ *Animation, Video and e-materials for a specific topic*
- ✓ *Installation of all the subject modules in tablet using integrated programming*
- ✓ *Students get tablet after registration*
- ✓ *Activation of the tablet with student registration id*
- ✓ *Study of these modules*
- ✓ *Mock test*
- ✓ *Performance Statistics*

Step 1: Get Tab

Step 2: Study more

Step 3: Improve more

Step 4: enjoy more

V. FUTURE PLAN:

As of now, this e-learning model is planned to be implemented in Offline Mode which eliminates the requirement of high speed internet connection. This feature of the model is essential for the state-wide affordability, use and importance of the tablets. Keeping an eye on the financially weaker section of Diploma students in West Bengal, the e-learning model will be implemented first with no internet connection. Diploma students of remote areas in West Bengal will find a ray of hope to pursue high quality portable diploma education and can think of pursuing diploma degrees from esteemed universities in Kolkata in Distance Mode. [2]

On implementation, if this e-learning model is observed to be highly successful and on demand from diploma students state-wide, sometime in the future, this model will be further extended and advanced based on student's feedback, by our own education technology experts and thereafter will be re-implemented both in *Offline* as well as *Online* Mode. The Online Mode will require high speed internet connection for using the tablets for study purpose. In Online Mode, all the learning applications will be designed, developed and deployed by Cloud Computing technology. [3] [4]

VI. CONCLUSION:

The e-learning model described above presents itself as a trend-setting technology and it promises to revolutionize diploma education throughout West Bengal. Students coming from financially weak family backgrounds can dream of a useful diploma degree by learning all the diploma course contents using the provided tablets. Diploma students, using the tablets can study anytime and anywhere without the need of high speed internet connection. The tablet will appear as a one-stop, self-paced, self-preparation '*edu-gym'* for the diploma students offering all the required preparation facilities. On implementation, this e-learning model can ensure a better and brighter tomorrow for diploma students of West Bengal.

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