

# How Digitalization Makes Education Easier

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**Abstract**— Now-a-days we are living in an era where technological innovations are so fast that each day a new technology is evolved, giving rise to more and more advanced knowledge. Now we are dragged on a stage where we cannot survive without latest technologies. The impact of this major revolution has greater influence on the society and also on country's economy because many analysts consider literacy rates as a crucial measure for value of regions human capital. In this paper we have discussed some latest Technological innovation that was possible only because of Digitalization.

**Key words:** E-learning, Digitalization

## I. INTRODUCTION

Before 18th century the students used to assemble around the teacher under the tree. They also faced the great difficulty for preparing notes. There was no proper knowledge. Public schools in 18th century had only one room. All kids were in some room. Students of all ages were in same class. Class was grouped by what book they were using. Hence it was very difficult to concentrate on each and every student.

Education is evolving so rapidly in the way of technology which makes it hard for the world to keep up. J. Johnson, C. Chapman and J. Dyer state, "The past three decades have seen the rapid development of new and emerging technologies revolutionizing the way we live, work, and learn". Education started off as a traditional classroom and is now integrating more toward technology based learning. Considering Indian scenario, it was 74.04% in 2011; well below world average literacy rate of 84%. India currently has largest illiterate population.

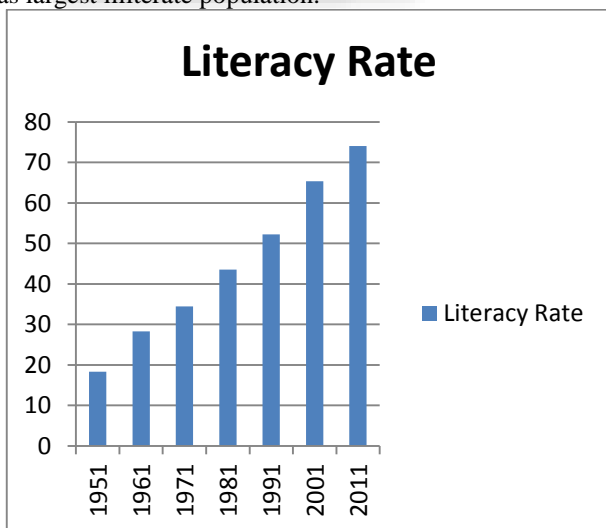


Fig. 1: India's Literacy Rate

From the above figure it's clear that India is on progress, but the rate at which it is progressing is far slower than its neighboring countries. Digital education gives real time experience to the students & lifts the level of learning. Education is the only thing through which we can write the story of peaceful & developed world.

## II. DIGITALIZATION IN EDUCATION

Digitalization is expanding the education ecosystem beyond traditional lecture halls and classrooms to accommodate learners' preferences for time, place, style and previous levels of attainment. Digital content is focusing on an interactive online model rather than a static textbook representation.

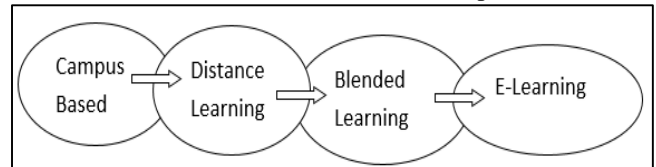


Fig. 2: Revolution by Digitalization

As shown in above figure combination of digitalization with internet has changed the whole world. Every information is available on our finger tips. Learning is one of the latest revolutions, where student can learn sitting from home itself. Distance education is another example. Webinars are on a steady rise. Also virtual reality has changed the way, we see, we realize, we act and learn.

### A. Issues Addressed By Digitalization

- 1) Increased literacy rate.
- 2) Increased speed of learning.
- 3) Changed students from listeners of knowledge to generators of knowledge.
- 4) Able to provide more advanced and latest knowledge.

## III. INNOVATIVE REVOLUTION BY DIGITALIZATION

### A. E- Learning

E-learning refers to the use of electronic media and information and communication technologies (ICT) in education. E-learning is broadly of all forms of educational technology in learning and teaching. E-learning is delivered to user through computer using standard Internet Technology. CD ROM, Web TV Web Call, Phones, pagers and aids other digital devices. E-learning includes numerous types of media that deliver text, audio, images, animation, and streaming video, and includes technology applications and processes such as audio or video tape, satellite TV, CD-ROM and computer-based learning, as well as local intranet/extranet and web-based learning. Information and communication systems, whether free-standing or based on either local networks or the Internet in networked learning, underly many e-learning processes.

E-learning can occur in or out of the classroom. It can be self-paced, asynchronous learning or may be instructor-led, synchronous learning. E-learning is suited to distance learning and flexible learning, but it can also be used in conjunction with face-to-face teaching-learning refers to the use of technology in learning and education. There are several aspects to describing the intellectual and technical development of e-learning.



Fig. 3: E-learning

### B. Moodle

Moodle (acronym for *Modular Object-Oriented Dynamic Learning Environment*) is a free software e-learning platform, also known as a Learning Management System, or Virtual Learning Environment (VLE). As of June 2013 it had a user base of 83,008 registered and verified sites, serving 70,696,570 users in 7.5+ million courses with 1.2+ million teachers.

#### 1) Features of Moodle

Moodle has several features considered typical of an e-learning platform, plus some original innovations (like its filtering system). Moodle is very similar to a learning management system. Moodle can be used in many types of environments such as in education, training and development, and business settings.

Some typical features of Moodle are:

- Assignment submission.
- Discussion forum.
- Files download.
- Grading.
- Moodle instant messages.
- Online calendar.
- Online news and announcement (College and course level).
- Online quiz.
- Wiki.

### C. Cognitive Tutor

Adaptive scaffolding on algebra problems. More than 5,00,000 students per year, middle and high schools. Effective sizes: 1.2 and 0.7 on experimenter designed tests; 0.3 on standardized tests. 25% more passed state standardized exams; 70% greater likelihood of courses.

### D. IIT Video Conferencing

Video conferencing (VC) allows people located at two or more remote locations to see, hear and interact with each other in real time using computer and communication technology. Each video-conferencing system consists of a number of audio and video sources connected to a CODEC (Coder Decoder) which is the heart of any VC system. The

video sources could be cameras and PC. The remote video is usually displayed on a Monitor/TV or projection system. The audio of the remote speakers are available from CODEC through audio amplifier and speaker system.

The local and remote systems (CODEC) can be connected either through Internet or ISDN. Besides the CODEC and all associated audio-video components and networking connection, other essential centralized components of any VC system are Gatekeeper, Gateway and MCU (Multipoint Conferencing Unit). All VC systems in a network are assigned with a unique IP or ISDN No. and they are registered with the gatekeeper. The gatekeeper takes care of the function of address translation of all registered VC systems as well as bandwidth management.



Fig. 4: Video Conferencing

### E. Pearson Brings a World of Discovery into Your Classroom

Pearson, world's largest education company, brings to you Digi Class - an ICT-based solution that combines state-of-the-art hardware with syllabus-compliant, multimedia-based interactive content. This solution draws upon Pearson's global expertise in digital content and its vast experience in educating over 100 million people worldwide. Digi Class solution empowers teachers to transform traditional blackboard-and-chalk classrooms into interactive sessions. The multimedia content enables teachers to better explain complex concepts, due to which students can retain information for a longer period of time. Digi Class is based on the Cognitive Learning Approach - a widely accepted theory on the learning process. This preloaded repository has several thousands of animations, self-explanatory diagrams, 3D interactive animations, worksheets, quizzes, e-books and several hours of experiments - all designed to make the classroom session more engaging. Digi class is constantly upgraded with new features and content. The Digi Class solution is currently being used by over 4,000 schools in India and abroad (Maldives, Nepal, UAE, Bangladesh, etc.,)

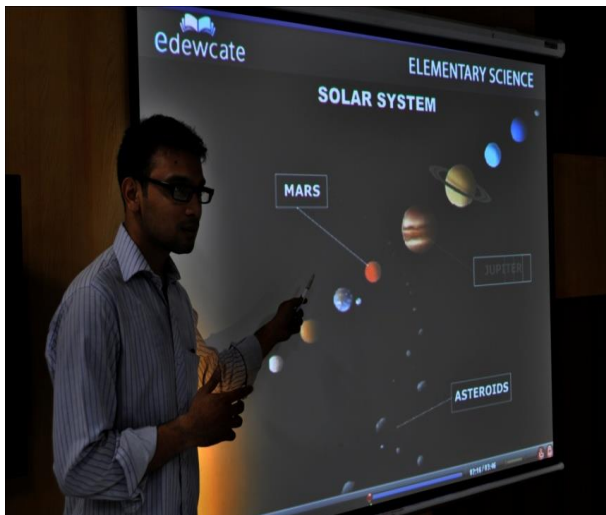


Fig. 5: Digital Class

#### IV. USING DIGITAL LEARNING OBJECTS TO IMPROVE STUDENT PROBLEM SOLVING SKILLS

Universities across the country are adopting new technologies to support the teaching mission. Much of this support is needed in the area of online education (McPherson and Nunest, 2008). The rise of online education has been met with some resistance by faculty and administrators. Concerns over student and faculty interaction and the interaction of students to course material have always been an issue (Rabe-Hemp, et.al. 2009). Efforts have been made to address some of these concerns and one area of emphasis has been developing methods for conveying highly technical content to students at a distance. The evolution of technology has led to increased opportunities for teachers to share more technical educational materials with students.

##### A. Evolution to the Pen Based Technology

Efforts at the University of Tennessee at Martin to deliver online materials began in 2003 with the introduction of an online graduate program in agriculture. This program was delivered completely at a distance, with students rarely coming to campus. Over the years, faculty has experimented with different tools with hopes of more effectively delivering content. The most common tool used by faculty is Adobe Presenter, which is a plug-in for PowerPoint. This tool is very effective at delivering materials that are in a traditional lecture format using the instructor's voice. However, tools of this type do not allow instructors to develop dynamic mathematical problem solving examples for students without working out the problems in advance. An effective tool for demonstrating mathematical problems to students was needed. This need led faculty to use a Tablet PC along with a screen capture program to develop a pen-based solution for demonstrating mathematical problems to students. The screen capture feature allowed faculty members to add their voice to create a dynamic digital learning object. The Tablet PC and screen capture combination worked well for developing step-by-step problem tutorials. Once the learning objects were created they were easily posted into a course management system for students to download and review. As technology changed, new options became available that did not require a Tablet PC and a screen capture technology. Several UTM faculties tested various digital pen products to

determine if they were effective for developing mathematical tutorials that included the instructor voice. One of the products selected was the Live scribe Smart Pen developed by Live scribe. The pen was cost effective and allowed the instructors voice to annotate their notes as they were developed. The audio and written notes were synced together and produced a digital file that could be placed in a course management program. This tool did not require a separate screen capture program and had a low learning curve.

##### B. The Application of Virtual Instrument Technology to Demonstration Experiment Teaching of Science and Engineering

Virtual instrument technology is the combination of modern computer technology and instrument technology. The teaching system of demonstration experiment is composed of virtual instrument, experimental device or circuit, multimedia computer etc. It is the third generation of instrument technology which developed through simulation apparatus, intelligence apparatus and is an important application in the field of Computer Assistant Test(CAT).It can demonstrate many experiments such as the physical experiment, electric experiment, electronic technology experiment, automatic control principle experiment, etc .It not only improves the visibility and effect of demonstration experiment teaching but also enhances the efficiency and level of demonstration experiment.

##### C. The Application of Virtual Instrument Technology to Demonstration Experiment

It takes on a special teaching task in science and engineering. Through the intuitive demonstration, experiment can inspire students' interest in learning and students will get deep sensitive feeling about it. It develops students' observing ability, thinking ability and makes them grip scientific experiment method. It also improves students' discovery, analysis and problem-solving abilities and enhances their capability of doing experiments and comprehensive qualities. However, the traditional demonstration experiment is restricted by the time and space, the preparation of it is complex, the operation of it is difficult and it has poor visibility. While doing some demonstration experiments, it is difficult to make sure that the whole class can clearly see the experimental device, the structure, operation processes; Virtual instrument is widely used in experiment teaching. Using virtual instrument can produce various signals for experiment demands, display the signal waveform and frequency spectrums, measure physical quantities in experiments such as voltage, current, temperature, pressure, magnetic field intensity, etc

##### D. The Application of Virtual Instrument Technology to Physics Demonstration Experiment

Electromagnetic induction phenomenon is a demonstration experiment in physics classroom teaching. Doing this experiment, firstly we can display the schematic diagram and wiring diagram on the screen and then link the actual coil to the virtual voltmeter's external probe. Then through the virtual instrument panel on computer screen, we use the mouse to adjust the virtual voltmeter and choose an appropriate range. Then the demonstration experiment could begin. With the magnet's insertion and taking-out, virtual voltmeter's pointer swings dynamically, the size and

direction of it shown intuitively to the students. Here cumbersome voltmeter is replaced by the virtual instrument in the computer, but the methods and the instrument's adjustment as same as the traditional experiment. Students could see the actual physical phenomena and experiment process. Using virtual instrument to demonstrate physical experiment will not weaken the training of students' practical operation ability, but its demonstration effect is better.



Fig. 6: Virtual Voltmeter

## V. IMPACT ON SOCIETY

Due to digitalization in education the following are few of the impact which are stated below:

- Improved intelligence.
- Faster learning.
- Increase in global literacy rate.
- Distant learning.
- Improved thinking capability.

## VI. CONCLUSION

Education has progressed immensely over the last fifteen years. It has gone from lectures and textbooks to digital cameras and computers in the classroom. Everybody is working together to make this transition from a traditional-centered classroom to a technology-integrated classroom. The future of education is the key to our children's learning process and their opportunities ahead. "It is difficult to predict how education will change over the next decade let alone the next century, but there will most certainly be changes in pedagogies which more readily recognize the way young people learn with new technologies"

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