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The role of Centre for Advanced Communication (CACM) in spreading e-Learning in India

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Abstract
Information and Communication Technology (ICT) has virtually revolutionized the effective teaching and learning process. It has also given rise to the development of smart/e-classroom, which is supposed to bring a big change in the field of education. India still lacks infrastructure in its conventional education system to serve its ever growing population. Distance and e-learning programs have potential and seemingly obvious solutions to this problem. Many initiatives are now being taken for the spread of education to the rural and remotes places of India using ICT. Recently, a new ambitious initiative 'Digital India' is launched by the Indian government. Centre for Advanced Communication (CACM) an anchor company situated at Science and Technology Entrepreneur's Park (STEP), IIT-Kharagpur, is presently the leading company in Eastern India working in the domain of multimedia content delivery and language application. CACM started way back in 1996 with a group of young & energetic professionals. Since its initiation the company had to overcome many hurdles and now progressing steadily under the leadership of the first author. It has its presence in 14 major states of India and has implemented over 200 major projects in the last 12 years. More than 225 language labs/e-classrooms have been developed in various regions of India catering to over 10,000 students or more. CACM has conducted more than 100 training program and has also designed and developed the largest lab in Eastern India. The company has its own application and assessment centre at the Department of Humanities at IIT-Kharagpur.

Keywords: CACM, e-learning, language lab, skilljunction, IIT Kharagpur

1. Introduction
"Education is what remains after one has forgotten what one has learned in school"
...Albert Einstein.

The face of education has experienced a sea change over the decades. Once characterised by the traditional classroom model, education has metamorphosed into learning that is instant, online, self-driven and on the go. The journey of education in India, too, has been dotted with innumerable milestones - the most recent among these is e-learning [1]. E-learning is the online delivery of information, communication, education and training. It is an extended form of classroom teaching where learning is facilitated by the application of information technology. It is the process of education using computer, telecommunication, and network and storage capacity. In the word e-learning 'e' refers to electronic where it would incorporate all educational activities carried out online or offline i.e. synchronously or asynchronously via networked or standalone computers and other electronic devices [2]. A teacher in an e-classroom or smart classrooms can teach using a wide variety of media and with the help of internet real time teleconferencing is also possible. This not only makes teaching easy but also makes learning a fun. Although e-learning has potential in India, adoption has been slow and will need a major marketing and awareness effort. In India, globalization has generated a good vibration and life for education [3].

With a population of over 1.2 billion and over 30% of school age, India boasts the second largest education system in the world. By 2025, India is predicted to be home to the largest working-age population in the world with 25% of the world's workforce [4]. Annually, the demand for higher education is growing globally and India is no exception to it. In fact, in India, the number of applicants is three to five times as against the number of seats in any institution of higher education [5]. Technology may well be the answer to all the ills that are currently plaguing the Indian education system. From dealing with inadequacies in India's

infrastructure for delivery of education to lack of quality teachers – technology can help bridge the gap effectively [6]. E-learning opens new vistas and personalised learning paths which are not possible in conventional classroom settings. Here, teachers can teach anytime, anywhere and students too are liberated from the confining classes. It is also cost-effective and provides access to people in remote locations as well [7].

With the Indian e-learning market size expected to grow to around US$ 40 billion by 2017, both domestic and international players are entering the market with new and innovative products and services [4]. Many companies and firms like Educomp Solutions, NIIT, IIN, Hughes Global Education, 24/7 Learning, eAbyas Solutions, Edutech India, Azim Premji Foundation, Reliance Edge Academy are some of the e-education providers in India.

2. Centre for Advanced Communications

CACM is an anchor company at Science and Technology Entrepreneur's Park (STEP), IIT-Kharagpur, and is presently the leading company in Eastern India working in the domain of multimedia content delivery and language application. CACM under the leadership of the first author started its journey way back in 1996 with a group of young & energetic professionals. After attending training program on language learning course conducted by Industrial Engineering & Management department in IIT-KGP had a profound impact in conceptualizing the ideation process. The general lack of entrepreneurial ecosystem and infrastructural support in Kharagpur motivated to look for an incubation space within the IIT-Kharagpur campus. In the year 2002 CACM got a chance to become an anchor incubated company at STEP. The business accelerator management felt that the entrepreneur had already a product as well as a viable business model existing for commercialization in the market, and he needed support only for the marketing of the product. The space inside the business accelerator provided him access to uninterrupted power; internet and an ecosystem which helped him grow his company incrementally in the next 10 years.

The company was also receiving mentoring support from STEP business incubator, IIT management, faculties working in the language domain that provided with constant feedback to improve the product. An engineering college based at Kolaghat, West Bengal was incidentally the first client to order CACM product and later many academic institutions followed with purchase request. But the dearth of financial support was a hurdle in scale-up of the company. So the local State Bank of India (SBI) branch helped with the working capital. Since the initiation of the company, CACM has progressed steadily. The company is now growing strong with its own dedicated office, satisfied client base and hard working team spread over eastern part of the country including Kolkata, Kharagpur and Bhubaneswar. The company employs over 20 people and another 15-20 people are associated with the company on a contractual basis regularly implementing, sourcing, providing orders for the company. It has its presence in 14 major states of India (table 1) having implemented over 225 major projects in the last 12 years. More than 225 language labs / e-classrooms have been developed all over India catering to over 10,000 Students or more. CACM has conducted more than 100 training program and has also designed and developed the largest lab in Eastern India. The company has its own application and assessment centre at the Department of Humanities at IIT-Kharagpur.

Table 1: Project completed at various states of India

Sl	States	Completed Project
01	West Bengal	112
02	Odisha	91
03	Bihar	5
04	Jharkhand	5
05	Andaman & Nicobar	2
06	Assam	1
07	Tripura	1
08	Punjab	1
09	Maharashtra	1
10	Uttrakhand	1
11	Manipur	1
12	Jammu & Kashmir	1
13	Andhra Pradesh	1
14	Assam	1
15	Mizoram	1

3. The Product (Skilljunction) - Interactive Software Learning System (ISILS) for multimedia content delivery & interaction:

Interactive software Integrated learning systems (ISILS) for multimedia content delivery & interaction is a computer controlled electronic device which is required to deliver multimedia content and interact with the users. The infrastructure for multimedia content delivery and a customized lab is also provided. Marketed under the brand name 'Skilljunction,' the interactive software learning and delivery system is available both in online and offline mode. The technology has been made simpler, easy to use and affordable. The handset and teacher's interface is shown in figure 1.

Fig 1: Hand held teacher's interface gadget

Latest version of ISILS named 'ISILS Essentials' has been developed by the company which has highly integrated features which allow this to stand out of the crowd of Classroom Management System (CMS) available in the market. The entire system is build considering the latest design trend of simplicity in use. There is no fuss of wires, no cubicle, no seating restriction, no bulky computer blocking eye contact between instructors and students. The sleek user interface unit utilizes mobile form factor and allows students to feel the freedom of normal classroom without compromising the features of CMS. Lightning Response System and Very High Audio Quality is integrated

with it. The wireless system has two major signal components to enhance the audio interaction and user interactivity. The interactivity between students and teachers are achieved through latest IEEE 802.15.4 protocol in ISM band. An e-classroom developed by CACM is shown in figure 2.

Training material was prepared with guidance of esteemed professors of the Department of Humanities, Indian Institute of Technology, Kharagpur. Major merits of the system are:

- *Communication is possible between 64 users/students one instructor*
- *Wide range of communication modes are possible & New high speed card for PC interfacing*
- *Additional audio inputs & outputs have been provided*
- *IC based technology & Improved faster digital switching circuitry*
- *The business readiness level of the product was TRL 8 – 9 as the time of initiating the project. Details of which is illustrated in figure 3.*

Fig 2: An e-classroom developed by CACM

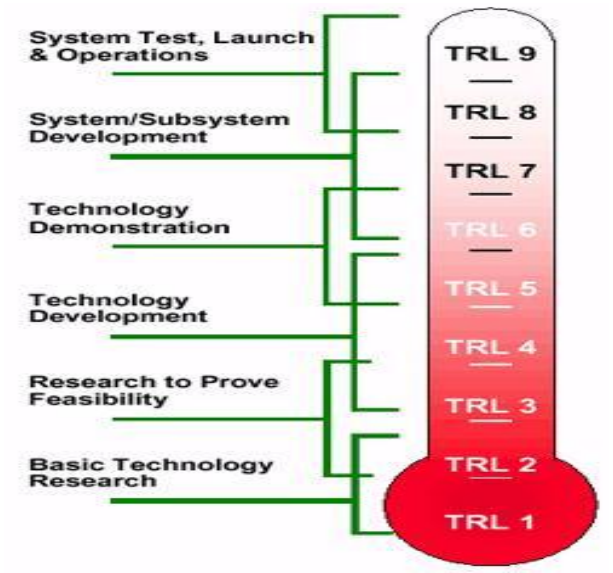

Fig 3: CACM business readiness level

The following renowned institutes where ISIL wireless system are installed by CACM and is running successfully are:

- Indian Institute of Technology [Wireless Lab], Bhubaneswar
- C V Raman Engineering College, Bhubaneswar
- Supreme Knowledge Foundation
- Adamas Institute of Technology
- NSHM Academy, Durgapur
- Academy of Technology
- Dr. Sudhir Chandra Sur Degree Engineering College
- Netaji Subhas Engineering College, Kolkata
- Bengal Engineering & Science University, Shibpur
- Indian School of Mines, Dhanbad
- Indian Institute of Social Welfare & Business Management, Kolkata
- University College of Engineering, Burla
- P.R.M.S. Mahavidyalaya
- Bidhan Chandra College, Asansol
- Hooghly Mahasin College

4. Discussion

Poor literacy remains a barrier to economic empowerment in the developing world. Of particular importance is fluency in a widely spoken "world language" such as English, which is typically a second language for these low-income learners [8]. Despite the presence of more than 1,400,000 schools and over 3,500 diploma awarding (or higher education) institutions across the country, India still lacks infrastructure in its conventional education system to serve a growing population. Distance and e-learning programs are potential, seemingly obvious solutions to this problem. Other drivers for e-learning in India include the large base of English language speakers – largely responsible for the massive uptake in online learning through MOOCs (Massive Open Online Course) internationally; the rapid expansion of Internet connectivity across the country, over 30% population will have connectivity by the end of 2015; the overwhelmingly young population of working age requiring job-ready skills development programs; and the corporate sector's interest in e-learning [4].

Over the past few years, the Ministry of Human Resource Development has been trying to achieve the target of making education accessible to every corner of the country. Still there are many parts of the country, which are in darkness about e-learning [9]. Villages are the backbones of India, but, in villages, less priority is given to education due to many constraints [10]. However, various developmental activates from the education department is now transforming the rural schools with improved infrastructural facilities and internet connectivity. But the development is not uniform in all rural areas due their geographical diversity; still many areas are neglected from having even the very basic infrastructure facilities [11]. The biggest problem is availability of quality teaching staffs [12]. Moreover, many school going children cannot attend school regularly due to their need to work for the family in the agricultural fields or households. E-education is now reaching these children via different means. Recently, a new ambitious initiative 'Digital India' is launched by the Indian government [13]. Digital education could be one of the segments that can be best benefited from the initiative [14].

Right to Education is the primary right of every citizen of India, whether a child resides in a high profile society or in a far away not so developed secluded village, according to the Article 45 of Indian Constitution the basic elementary education must be provided to all the children up to the age of fourteen years [15]. Nowadays people worldwide have recognised that ICT skill is necessary for survival in the 'Information Age' [16]. Among the developing countries India reached a significant position in development of ICTs.

Particularly in the field of education its development is tremendous. There is no doubt in the near future development will based on ICTs. Many training and skill development program may be conducted online. Moreover, online training is no longer the prerogative of the computer sector alone. The impact of such training is all-pervasive and presents attractive opportunities in diverse segments. The growing numbers of public and private sector initiatives are on the incline, the changing mindsets of people, and the unprecedented rise of technology are reflective of the promising future that e-learning in India holds [17].

5. Conclusion

India lacks infrastructure in its conventional education system to serve its growing population, especially those living in rural areas. However, with the help of information and communication technology it is now possible to provide education to people living in remote locations. With rapid proliferation of internet services throughout India e-education has now become a reality. For the spread of e-education CACM at STEP IIT, Kharagpur, has so far constructed more than 225 language labs / e-classrooms in different regions of India. More projects are ongoing and some are in pipeline. There are many challenges that had to overcome for the construction of these labs, many of which are situated in deep remote places. However, the real challenge is to make these labs functional on a daily basis.

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