Integration of ICT in Teacher Education for Enhancing Competency Based Teaching

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Abstract

The progress of any country depends upon the quality of education offered and its practices. Indian education was well known for its Gurukul system of education in the Vedic age. Education in India has undergone various phases and stages of development starting in the Vedic age to the post-independent period. The great Indian thinkers had emphasized on developing the inner potential of individuals by reflecting on unique potential of individuals. The recent developments in technology have changed the world outside the classroom. The information technology has made learner WWW-afflicted. This is because technological developments have brought developments in two ways: First, by enhancing human capabilities by helping people to participate actively in social, economic, and political life in a society at large. Secondly, by giving advantage to technological innovation as a means for human development due to economic progress and increased productivity. As ICT is becoming an integral element for educational reforms and innovations at secondary schools, this situation calls for an enhancement of pre-service education on ICT for prospective teachers. The present paper focuses on the use of integration of ICT into pre service level for both trainees as well as for teacher-educators.

Keywords: ICT, Technological revolution, transformation, innovation, pre-service education, in-service education

Introduction

The 21st Century Society is an entrepreneurial Society- A century of knowledge and century of mind. Knowledge explosion, communication revolution, technology advancement, application of science to all aspects of life and above all rising aspirations of the society are the hallmarks of this century. Mind is reflective, analytical, visionary, global, integrative and synergic all at the same time. Hence development of appropriate Mind-set of our young generation is the need of time. The education and training, therefore has to be at premium and teachers role being very important in child's education, they will have to be continuously trained and their mind updated and kept pragmatic and realistic. They must value life-long learning along with learning for life and learning through life. It is necessary that, they continuous have training and retraining in order to enable them to play their role more meaningfully and effectively.

As it is widely known, the integration of Information and Communications Technologies with their teaching is a necessity for the teachers of present times. Nevertheless, the challenge of incorporating technologies into the teaching and learning process might not be as easy as it seems. It's not just a matter of finding new resources and trying to use them as part of traditional courses, but it involves encouraging learners to interact with ICT equipment and Web 2.0 tools to enable them to co-construct their own learning. This makes them quite different from students of the last millennium.

Hayes indicates that "vision of the teacher's role needs to shift from that of the information provider to one of the catalyst, model, coach, innovator, researcher, and collaborator with the learner throughout the learning process" .In order to do that, educators and administrators in the 21st century need to embrace the multi-media culture around them and accept that it is not a print-centric world any longer; they need to recognize the benefits of being media-literate. Educators must replace existing practices; not just use computers as typewriters and call it innovation.

Restructuring Teacher Education Programme through ICT

Teacher Education, as a profession, is a product of many interacting imperatives, government policies, agendas of professionals, institutions, and organizations; and benchmark of teaching accreditation agencies. Thus, conversation and innovation, policy and outcome, curriculum and pedagogy, relevance and utility are all inter-connected features of Teacher Education programmes.

The UGC panels on teacher education and NCTE have also suggested suitable reforms from time to time. These are on one side and the real teacher preparation that is going on, is on the other side. Probably all these agencies have focused on removing structural constraints in teacher education. But what is most desired is to change the inside story of teacher education programme, change is needed in the methods, materials, approach and skills adopted by teacher educators. One of the main weaknesses of teacher education system is the total mismatch between practices being taught by teacher educators and practices being followed by them. There are many examples of this. For example, theoretically pupil teachers are taught to adopt modern technology for improved communications in classrooms but the teacher education institutions that use modern communications media can be counted on the fingers. Similarly strategies to improve evaluation system like continuous comprehensive evaluation, internal assessment and grading system are taught to the pupil teachers but we are unable to adopt these procedures and practices in teacher education which would make evaluation of pupil teacher more relevant, valid or reliable. Is it possible to expect positive attitudes, desirable motivation and commitment from the students, if the same are lacking amongst the teacher educators who are preparing the teachers?

The world has entered the information age. In an effort to renovate teacher education, educational technology has been accorded a special importance. For intranet/internet enabled and technology distributed education and training a virtual teacher education centre can be created. All the necessary skills and training can be provided in different modes on the network but the reality is somewhat very different, even today our classroom processes are mostly based on 'chalk and talk'. This needs to be changed. All teachers have to be made ICT literate. All pre-service and in-service teacher education programmes should include intensive training in the use of modern tools of ICT, including offline and online electronic resources such as CD-ROMS, multimedia and Internet. ICT should incorporate all the available ICT facilities like teleconferencing, data travelers in teacher education. One of the most powerful reasons for considering integrating ICT in Teacher Education is that they put learning in the hands of users.

Utility of ICT in Teacher Education (TE)

- Major changes can be accelerated both in pre-service teacher training   as well as in in-service teacher professional development through ICT.

- ICT – based teaching –learning programmes can overcome a teacher's isolation by breaking down their classroom walls and connecting them to colleagues, mentors, curriculum experts and the global teacher community.

- Use of ICT in Teacher Education changes teaching and learning behaviour. Instructions are increasingly conducted electronically. Students attend to lectures broadcast at their homes, residence halls or workplace and draw reference materials.

- CT facilitates the educational transactions between providers and users by keeping teacher –learner in contact through e-mail, chat sessions, etc., encouraging active learning, sharing ideas, providing immediate feedback, encouraging paced learning and allowing for effective mapping of learning pathways.

- The information through Internet& online databases helps teachers to develop or improve lesson plans, exchange ideas, obtain information and find free animation and simulation to enliven their lessons.

- The new ICT enables self-paced learning through various tools such as online assignments, e-tutorials sessions, and computer facilitated continuous assessment of students' progress. With the result, the teaching-learning enterprise has become more result-oriented.

So the question is: How can we improve competencies in ICT among Faculty members?

For faculty to develop their competence in ICT they must comprehend what successful 21st century learning should look like. The 21st century addresses a rapidly changing world filled with fantastic new problems as well as exciting new possibilities and methods so teaching and learning need to change to meet the very different needs of this generation. A 21st century classroom employs project based learning, the inquiry process and Bloom's revised taxonomy; engages in authentic assessment; connects to the global audience; and ultimately it will exploit technology as a tool to engage learners in collaborative knowledge-building . Given that, today's students are referred to as digital natives, and today's educators as digital immigrants, it is quite possible and even expected that students may be more proficient than their teachers in terms of their technology know-how. This fact can lead to a fear of failure among faculty and many of them may feel they do not receive the guidance they require to cultivate these skills within themselves or their students. Since the role of faculty is to prepare students to navigate this new world, both teachers and students must become literate in all 21st century literacy's: multicultural, media, information, emotional, ecological, and financial and cyber literacy.

Pre-service Teacher Training

It is need of the hour that all parties within the education industry- from foundation to post-graduate- must work together with institutions of teacher education to make pre-service training for teachers, modern and international. While there is very little evidence anywhere to show that teachers are being trained to teach using technology, some studies indicate that benefits of participating in educational technology activities during pre-service teacher training include developing professional knowledge of instructional media and technology , increasing graduating teachers' willingness to integrate it into their own classroom curricula,

encourage development of learning communities for focused critical reflection of classroom ICT practice, and in increasing the number of teachers who are using technology for their own learning, collaboration and research. The younger teachers have grown up as digital natives yet they need to have experience in the field to understand how to apply their technical knowledge to their profession.

Actually, in reality teachers are by and large not well prepared to use technology in their practice. The best way to prepare teachers for ICT oriented teaching is to have them experience it. All institutions involved in preparing educators, should provide technology-supported learning experiences that promote and enable the use of technology to improve learning, assessment, and instructional practices. This will require teacher educators to draw from advances in learning science and technology to change what and how they teach. The same imperatives for teacher preparation apply to ongoing professional learning. Professional learning should support and develop educators' identities as fluent users of advanced technology, creative and collaborative problem solvers, and adaptive, socially aware experts throughout their careers. Effective teaching in the 21st century requires innovation, problem solving, creativity, continuous improvement, research, diagnostic use of data, and flexible and personalized approaches to meeting students' diverse needs and strengths. As a result, the most effective educators are professionals with complex knowledge, expertise, and competencies and not the one who are merely deliverers of content and managers of well-behaved classrooms.

Teachers must learn to use technology for their own use, to research, collaborate, prepare lesson plans, and do the administrative work but also how to use technology in the classroom. Although the publications and research on this are not sufficient, field service can be the catalyst for the new teacher to understand how technology can be used with their students.

The role of the 21st century teacher is very different, it has become a facilitator's role, helping the students find, understand and use the tools to learn and create more knowledge. From a very lonely job it is becoming a team effort using peers, students and remote expert's assistance. To be successful, the training must help pupil-teachers in learning to collaborate, to practice with modern technological tools in the classroom and have peer reviews and mentoring.

UNESCO has recently established what they called Information and Communication Technologies (ICT) Competencies Standards for Teachers (CST). Being aware of the need of leading faculty to develop those skills (competencies) required in making them comfortable with the incorporation of ICT in the educational process, this project stated that: *Teachers need to be prepared to empower students with the advantages technology can bring. Schools and classrooms, both real and virtual, must have teachers who are equipped with technology resources and skills and who can effectively teach the necessary subject matter content while incorporating technology concepts and skills.* UNESCO ICT-CST project is based on three approaches in the use of ICT that should be considered as three progressive steps to be followed one by one by faculty in order to acquire the needed skills for facing the new millennium teaching challenges:

- The technology literacy approach
- The knowledge deepening approach and
- The knowledge creation approach.

As it would become a hard and even an impossible task to identify the particular needs and characteristics that implementation of each of these three approaches demand in different countries, the project framework is defined just in general lines. This allows each institution to adopt the project in such way that it would be

easy to adapt it to its particular context and requirements. In doing so, it would be necessary to take into account the six components of the educational system:

- Policy and vision
- Curriculum and assessment
- Pedagogy
- ICT
- Organization and administration
- Teacher professional development.

The three approaches and the six components already mentioned are combined in such way that they form a matrix, in which each intersection between an approach and a component becomes a module for training teachers in ICT issues.

If education within the technology ecosystem is the way to the future, then all educators need opportunities to improve their ICT confidence and proficiency. One internationally recognized ICT training opportunity is the International Computer Driving License certification (used in over 148 countries in 41 languages making it accessible to almost every educator) [4]. Teachers will also need support and professional development on a consistent basis to encourage technological risk-taking in their classroom practice.

Training Teachers in New Millennium Competencies

Every educational institution must be aware of the importance of providing teachers with the adequate tools in order to help them to face the new challenges within their own classrooms. UNESCO also recognizes the important role of teachers in the successful implementation of ICT in the educational process. This implementation "*will depend on the ability of teachers to structure the learning environment in non-traditional ways, to merge new technology with new pedagogy, to develop socially active classrooms, encouraging cooperative interaction, collaborative learning, and group work*".

Peters (2003) goes beyond the need of training faculty in ICT issues, and suggests considering the pedagogical changes derived from the arrival of the knowledge society, in which the use of ICT is implied. The next competencies which people, teachers and students must have for facing the challenges of the knowledge society are:

- Media competence
- Competence in dealing productively with plurality
- Competence to deal productively with change
- Competence to active, conscious and responsible life planning
- Social competence (relating with others)
- Communication competence
- Competence for collaboration
- Information competence

- Competence in knowledge management

Institutional Role in Faculty Training

The way institutions help teachers to develop these needed skills could be responsible of the success or failure of the training efforts. The faculty development practice in an institution is strongly influenced by the institution's overall approach to the use of technology for teaching. Following are some of the strategies that should be part of the institutional ICT culture in order to lead faculty to incorporate ICT in their teaching job:

- A strong strategic plan in which the use of technology for teaching played a prominent role

- Extensive investment in technology infrastructure

- Support from senior leadership for the use of technology for teaching

- Support, in a wide variety of ways, for faculty members who wished to use technology for teaching

- Support for students through computer access, Internet accounts and financial support

There are many institutions that are working to help schools and teachers to acquire these 21st century skills. The International Society for Technology in Education (ISTE) has published the National Education Technology Standards NETS for Students, teachers and administrators. This standard is being used in many countries around the world.

Although there are a variety of challenges for educators to improve their ICT competencies, many teachers are achieving success, as the following studies highlight:

- The teachers in the "Developing conceptual frameworks for creativity, ICT and teacher education" study in the UK highlighted the affordances of ICT to try out lots of ideas, collaborate, be creative, edit and trial as well as the immediacy of their work results (Loveless, Burton and Turvey, 2004)

- As indicated in the "Outcomes for Teachers & Students in the ICT PD School Clusters Programme" in New Zealand, ICT PD lead to improved competence in graphics (81%), spreadsheets (67%), databases (57%) and multimedia packages (72%) and the great majority (86%) of teachers reported at least some element of positive change in their classroom practices due to integrated ICT (Hal, 2007)

- Teachers who have received training on how to integrate ICT within the classroom are significantly more likely to be integrating ICT within their classroom (44%) than those who had not undertaken such training (34%). (Western Australia. Dept. of Education and Training. Evaluation and Accountability Directorate, 2006)

- In the Netherlands the study "Which factors obstruct or stimulate teacher educators to use ICT innovatively?" Showed that teacher educators described as 'personal entrepreneurs', created possibilities to experiment with ICT applications, researched the use of ICT in their education, reflected on their outcomes, and exchanged ideas with colleagues (Volman, 2005)

- In India, Intel's 'Teach to the Future' nation-wide initiative targeted teacher training using the tools of ICT is an example of corporate support of teachers to utilize ICT in education as described in the "ICT in Pre-Service Teacher Training" study (Prasad, 2005)

- Barriers to progress

In the majority of teacher education institutions, the syllabi exhibit less weight to practical than theoretical aspects. Since the nature of ICT subjects is more practical and application-oriented, there needs to be more practical than theoretical input. This aspect seems to be neglected in designing and framing curricular objectives.

- The present approach for ICT integration is dismal as an "add on" approach for ICT course is adopted:

- ICT basics are taught to teacher trainers focusing on technical issues, but little emphasis is given to the pedagogical aspects

- Educational technology courses are taught in a rather traditional way and show little evidence of using new technology to support instructional innovations

- Students don't know how to use new technology in their classroom instruction when they go to schools

- Technology input is not integrated in the curriculum courses, especially course of the papers related to methodology.

These are certain basic problems associated with the integration aspects of technology. These are major hurdles in the integration of ICT in the teaching/learning process. This scenario shows that the objectives of introducing ICT at the pre-service level are developing only technological know-how and awareness regarding various other technologies and software packages. Further, the time spent for practical sessions is less, as more time is spent for theory sessions. The total approach of introducing ICT at the pre-service level is not very serious. It is very clear that pupil-teachers are not getting training to integrate ICT in curriculum or the teaching/learning process. In teacher training programs at the secondary level, the ICT education scenario is struggling with the following problems:

- Only at the awareness development level are objectives being achieved, but higher order thinking and skill development is not occurring.

- Technology, pedagogy and content area integration is a rare feature. All components are dealt separately which creates confusion for students.

- There is a serious discrepancy among syllabi of teacher training institutions and secondary schools. Syllabi at various institutions are not on a par with school level curriculum.

- Time duration of the courses related to ICT education is too short to develop knowledge and necessary skills among students to achieve higher order thinking skills.

- There is a lack of availability of proper infrastructural facilities at most of the institutions.

- There is a mismatch between required and available hardware as well as software to develop required learning resources.

- Support from technical staff for maintenance is dismal.

There are still many barriers to progress, the most often cited are:

1. Access to working technology in schools is still very limited in many countries.

2. Lack of training and practice to use computers in teaching.

3. Lack of connection between personal uses of ICT to teaching students to learn with technology.

4 Attitude towards computers and lack of self confidence in ICT.

5. Lack of Technical support.

6. Lack of instructional support.

7. Lack of mentor teachers.

Some specific examples of barriers to developing faculty competencies in ICT are indicated below:

- In Australia, a study was done to provide a reliable assessment of the level of ICT skills among teachers. The analysis of this study indicated that the greatest limitation to developing ICT competence in teachers was the insufficient access to technical support and inadequate numbers of computers (Western Australia. Dept. of Education and Training. Evaluation and Accountability Directorate, 2006).

- In Cambodia, a project that involved training teacher trainers on software and hardware was conducted. This study demonstrated that the most omnipresent inhibitor to ICT integration was lack of ICT equipment, namely computers (Richardson, 2009).

- An ICT cluster project that analyzed the outcomes for Teachers & Students in use of ICT in New Zealand concluded that teachers identified significant concerns: about access to ICT equipment for students (38%); reliability of the equipment (36%); and lack of time for themselves to become familiar with the range of ICTs (37%) (Hal, 2007).

- The Assessment of Nigerian Teacher Educators' ICT Training report indicated that the training had no impact on classroom practices because so many teachers required word and data processing skills and only 2% of the educators who had previous ICT training had been taught the skill of teaching with computer. In fact almost 50% of teachers had never used a computer before (Jegede, 2009).

- An investigation entitled "Integrating ICT into Pre-Service Teacher Education: The Challenges of Change in a Turkish Faculty of Education" revealed numerous barriers: accessibility to ICT resources; inadequate training; preference for other teaching methods; lack of support from mentor teachers and technical/organizational issues (Alev, 2009).

- A study entitled: "Singapore's pre service teachers' perspectives in integrating (ICT) during practicum" suggested more ICT support and modeling is required throughout the teacher preparation programme and especially the teaching practicum to inspire pre service teachers (Choy, Wong and Gao, 2005).

- In India the "Survey Report on Pre-service Teacher Training on ICT Use in Education in Asia and the Pacific" concluded that the significant urban-rural imbalance in infrastructure, instructional facilities and human resources for the use of ICT; a lack of electricity; and high costs of hardware, software and other infrastructure facilities were huge barriers to consistent integration of ICT by teachers (Prasad, 2005).

- In "Teachers Facing ICT The Case of Greece" the study shows that although teachers believe in ICT they are reluctant to introduce it into primary schools (Kiridis, A., Drossos, V. & Tsakiridou, E., 2006).

Conclusion

The objective of integration of ICT at pre-service level is not to prepare technocrats, but to develop techno-pedagogues. Teachers should be in a position to integrate technology into teaching / learning as well as to develop the art and skill of "webogogy" (i.e., to make use of Internet technology, exploring it, accessing information from it to use in teaching learning, etc.). So, objectives must be set at the attainment of application and skill levels rather than just at the knowledge and understanding levels. The professional development of teachers needs to be given importance. There must be congruence between the school curriculum and teacher training curriculum at the secondary level. Otherwise, teachers are not ready to utilize their knowledge to effectively design teaching/learning processes, project work, and assignments. In addition to offering ICT as a compulsory and special course, integrated approaches need to be studied along with methods courses. This will help pupil-teachers to develop the concept of 'techno pedagogy' to a greater extent.

Thus, management of change in teacher education is a complex and demanding task involving comprehension, concern, caution, and contemplation. Planners and administrators of teacher education have to provide academic leadership to prepare reflective teachers who can manage the educational system efficiently at various stages of education at the pre-primary, primary, elementary, secondary, and higher secondary levels. Effective change in schools is possible only when there are corresponding changes in the management of teacher education programs.

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