



## **ICT BASED APPROACHES TO PROFESSIONAL DEVELOPMENT OF PROSPECTIVE TEACHERS**

**Geeta Singh, Prof,**

*UGC-Academic Staff College, B.P.S. Mahila Vishwavidyalaya,*

*Khanpur, Sonapat, Haryana-131305, India*

### ***Abstract***

*Teaching is becoming one of the most challenging professions in our society where knowledge is expanding rapidly and modern technology is demanding teachers to learn how to use these technology in their teaching. Although valuable lessons may be learned from best practices around the world, there is no one formula for determining the optimal level of ICT integration in teachers' training. Overall, governments and teacher training institutions seem to recognize the importance of integrating ICT in education and teacher's training. In many cases, the national vision for ICT use in education has been integrated into teacher training. Information and communication technology (ICT) can provide more flexible and effective ways for professional development for teachers, to improve pre- and in-service teacher training, and connect teachers to the global teacher community. This paper provides a holistic view about various ICT based approaches to prospective teachers' professional development i.e. ICT use as main content focusing on teachers' training, ICT use as part of teaching methods, ICT as core technology for delivering teachers' training, ICT used to facilitate teachers' professional development and networking that are found in different countries and discusses how will the use of ICTs be helpful in prospective teachers' professional development via. Motivating to learn, facilitating the acquisition of basic skills, and enhancing teachers' training. Further the researcher throws light on the skills like digital age literacy, inventive thinking, high order thinking, working ability in interdisciplinary teams and effective communication are needed in the work place of prospective teachers and provides an insight towards whether ICTs will replace the teacher? It also provides keys to effective use of ICTs in prospective teachers' professional development and further it refers desired ICT competencies for prospective teachers. The paper also points out the prospective teachers' professional development via use of ICT. In the light of various ICT based approaches to prospective teachers' professional development, the researcher concludes with the discussion of some key challenges e.g. access, teacher preparedness, teacher motivation, quality resources, new structures, sustainable professional development, capacity building, and financing the cost of ICTs use etc. that ICT has brought to ICT integration into teacher training and networking and suggestions and implications of*

*the effective use of ICTs in prospective teachers' professional development in terms of prospects for the future, will then be drawn.*

**Keywords:** *ICT, ICT Based Approaches, Professional Development, Prospective Teachers.*

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## INTRODUCTION

In recent years, ICT and the Internet have emerged as dependable media of interaction. Unlike the broadcast media, the Internet can facilitate the participation of the periphery in an eminently democratic discourse, which can be empowering (Bowes, 2003). And if properly deployed, quality concerns hitherto forced by economic and power considerations to be confined to the haves can now be within the reach of everyone (Collis & Jung, 2003). Although information and communication technology (ICT) is not a panacea for all educational problems, today's technologies are essential tools for teaching and learning (Capper (Ed.), 2011). To use these tools effectively and efficiently, teachers need visions of the technologies' potential, opportunities to apply them, training and just-in-time support, and time to experiment. Only then can teachers be informed and confident in their use of new technologies (Bowes, 2003).

Today teaching is becoming one of the most challenging professions in our society where knowledge is expanding rapidly and much of it is available to students as well as teachers at the same time (Perraton, Robinson & Creed, 2001). Teachers need to use a variety of teaching activities in their classrooms, and that variety should include technology whenever appropriate. Technology can be used not only as an information management tool, but also as a means of reaching students of diverse backgrounds (Torres, 2006). As new concepts of learning have evolved, teachers are expected to facilitate learning and make it meaningful to individual learners rather than just to provide knowledge and skills. Use of technology can help teachers relate to today's students who are very media aware, prompt new approaches to curriculum, and encourage developments in teaching skills (*Teacher Education through Distance Learning: Technology, curriculum, cost, evaluation*, 2001). It can also assist teachers in helping students make connections with a worldwide community (Lee, 2001). Appropriate use of technology is but one aspect of teaching that pre-service teachers must demonstrate as reflective practitioners who evaluate choices for presentation of content, for monitoring and measuring students' understanding of content, and for students' explorations

of a variety of resources in the learning process. Technology exists in classrooms not just for the sake of its presence, but also to enhance the learning process (Policy Perspectives in Teacher Education: Critique and documentation, 1998).

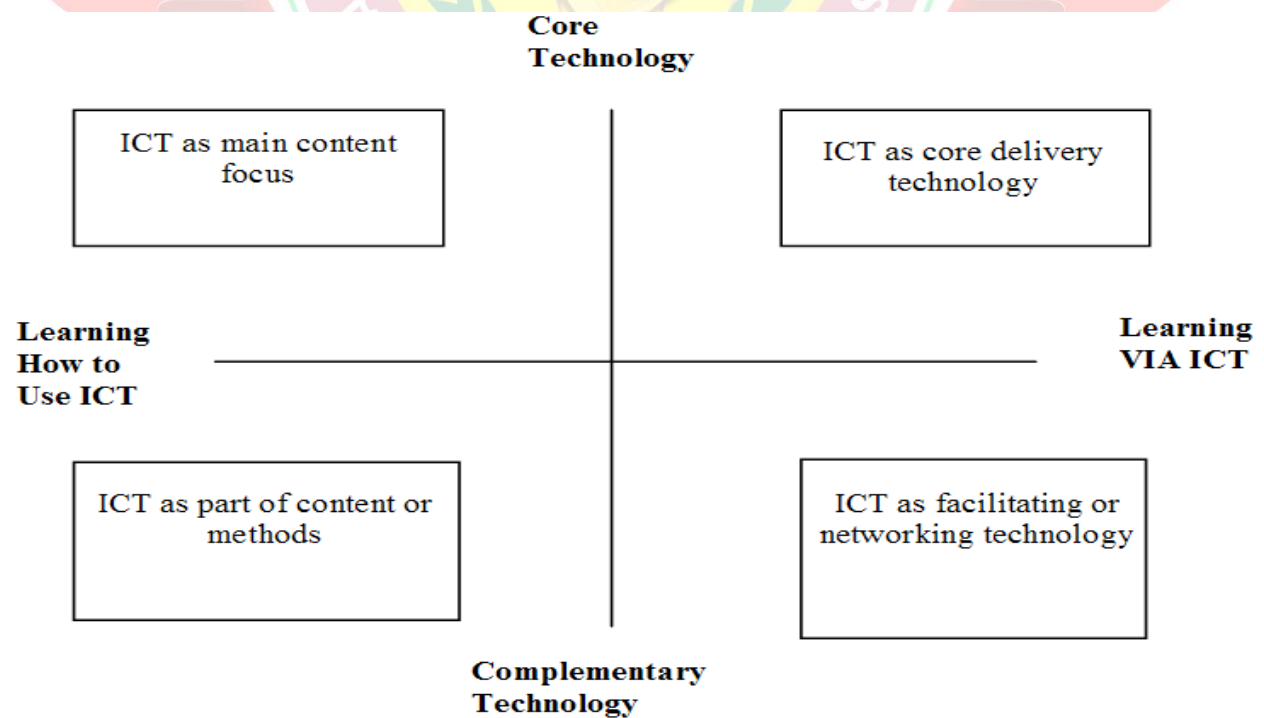
The need of the hour is, therefore, to recognise this potential, promote universal access, facilitate participatory forums, and develop communities and interest groups (Policy Perspectives in Teacher Education: Critique and documentation, 1998). Left to market forces alone, the reach is bound to remain limited. The Internet can be a sound investment for continuous on-demand teacher training and support, research and content repositories, value-added distance education, and online campuses aimed at increasing the access, equity, and quality of education (Fontaine, 2000). Modern developments of innovative information and communication technology (ICT) have provided new possibilities to teaching professions, but at the same time have placed more demands on teachers to learn how to use these new information and communication technology (ICT) in their teaching (Robinson & Latchem, 2003). These challenges ask teachers to continuously retrain themselves and acquire new knowledge and skills while maintaining their jobs (Carlson & Gadio, 2002). Then what can be done to help teachers meet these challenges?

In fact, there has been increasing evidence that ICT may be able to provide more flexible and effective ways for lifelong professional development for today's teachers because of rapid development in ICT, especially the Internet, traditional initial teacher training as well as in-service continued training institutions worldwide are undergoing a rapid change in the structure and content of their training and delivery methods of their courses (Pacey, 1999). However, combining new technologies with effective pedagogy has become a daunting task for both initial teacher training and in-service training institutions. Today, a variety of ICT can facilitate not only delivery of instruction, but also learning process itself (Teacher Education Guidelines: Using Open and Distance Learning, 2002). Moreover, ICT can promote international collaboration and networking in education and professional development. There's a range of ICT options – from video conferencing through multimedia delivery to web sites - which can be used to meet the challenges teachers face today (Pacey, 1999).

**Various ICT Based Approaches to Prospective Teachers’ Professional Development:**

ICT can change the way teachers teach and that it is especially useful in supporting more student-centred approaches to instruction and in developing the higher order skills and promoting collaborative activities (Haddad, 2003). Recognizing the importance of ICT in teaching and learning, a majority of the countries in the world have provided ICT in teacher’s training in a variety of forms and degrees. Even though many teachers report that they have not had adequate training to prepare themselves to use technology effectively in teaching and learning, there seem to be several efforts around the world in which countries are effectively using technology to train teachers, and/or are training teachers to use technology as tools for enhancing teaching and learning (Web-based Education Commission, 2011). ICT teacher’s training can take many forms. Teachers can be trained to learn how to use ICT or teachers can be trained via ICT. ICT can be used as a core or a complementary means to the teacher training process (Collis & Jung, 2003). This paper provides a holistic view *about* various ICT based approaches to prospective teachers’ professional development found in different countries under four categories as follows:

**Figure 1: Categorization of Various ICT Based Approaches to Prospective Teachers’ Professional Development (adapted from Collis & Jung, 2003, p.176)**



❖ **ICT Use as Main Content Focus of Teacher’s Training :**

Most of the early ICT teacher’s training programs in the 1990’s focused on ICT use as the main training content (Collis & Jung, 2003). This approach has an emphasis on teacher training in how to use ICT in the classroom. It addresses issues such as selecting appropriate ICT tools and supporting students in the use of those tools, using ICT to promote learning activities, developing new methods of facilitating learning and evaluating student performance, and so on. The trainee is expected to use ICT while teaching, depending on the school’s ICT infrastructure. The curriculum of ICT Teacher’s Training should cover the learning, thinking and the effective use of instructional technologies in the classroom; instructional planning models; selecting, creating, evaluating, and integrating instructional technologies and resource materials; promoting creativity and complex thinking through ICT project work activities; and organizing and managing instructional activities with appropriate ICT resources in the classroom.”

This approach of using ICT as the main content focus of teacher training emphasizes the development of basic ICT skills, design and development skills, and pedagogical strategies. However, the basic ICT skill development, rather than the ICT-pedagogical integration, has been the major concern of teacher training.

❖ **ICT Use as Part of Teaching Methods :**

This approach integrates ICT into teacher training to facilitate some aspects of training. Two cases below show how a variety of ICT are adopted as part of effective training methods. In these cases, teachers are provided with examples of ICT-pedagogy integration in their training process. They are provided the “examples of real educators and learners using successful practices of technology to support instruction and learning in their classrooms.” Video sequences are viewed by teachers' focus groups who then discuss the strategies and techniques of classroom management, assessment, etc. In this specific case, teachers learn how to use ICT in their classrooms by actually being engaged in the process of ICT-integrated training.

❖ **ICT as Core Technology for Delivering Teacher’s Training :**

In this approach, ICT is used as the major way of providing the learning experience of teacher training and the digital technology is frequently become the core technology of ICT

teacher's training. The content of this approach does not necessarily focus on ICT skill itself but rather covers a variety of ICT applications. An Internet-based online teacher training is recently introduced and has been found to provide a flexible and interactive training environment for teachers (Jung, 2003). However, costs related to the online training cannot be ignored in most parts of the world and effective online training pedagogies for ICT teacher training have yet to be explored.

#### ❖ **ICT Used to Facilitate Teachers' Professional Development and Networking :**

Whereas the use of ICT as core technology for delivering teacher training can be found in limited contexts, there are many examples of ICT, particularly Internet and Web-based communication technologies, being used to support teachers' on-going professional development and networking. Many countries have developed a website or websites to provide online resources for teachers and facilitate teachers' networking based on the assumption that professional development should be an integral part of daily practice for all teachers and the use of the Internet would enhance continuous professional development activities of teachers, connecting teachers to larger teaching communities and allowing for interaction with expert groups.

One of the best ways to develop teachers' ICT skills and promote ICT-pedagogy integration in their teaching is the provision of ICT-based training environments where on-demand access to materials, peers, and networks of experts where expertise and advices can be obtained and active discussion can take place in relation to technology or pedagogy. In this regard, the approach of using ICT to support teachers' on-going professional development and networking can be very effective as long as organized support is provided (Pacey, 1999).

#### **How Will the Use of ICTs be Helpful in Prospective Teachers' Professional Development?**

Improving the quality of teacher education and teachers' training is a critical issue, particularly at a time of educational expansion (Passi, 2000). At the in-service level, ICT based teacher professional development (TPD) should be long-term, teacher-directed, and as flexible as possible. For many under-qualified, overworked, and underpaid teachers in developing countries, effective adoption of ICTs hinges on being given continuous opportunities to learn what they need to learn based on their specific circumstances and experience, when they have the time to learn it. Institutionalized incentives and support for

teachers to pursue ICT based TPD are also critical. This may take the form of promotions for teachers who innovate with (as opposed to merely using) ICTs in the classroom, or simply making sure that teachers have adequate access to technology after training technologies, however, and so even the most ICT fluent teachers need to continuously upgrade their skills and keep abreast of the latest developments and best practices. ICTs can enhance the quality of teacher education as well as may be helpful in prospective teachers' professional development in the following way:

- ❖ **Motivating to Learn:** ICTs such as videos, television and multimedia computer software that combine text, sound, and colourful, moving images can be used to provide challenging and authentic content that will engage the student in the learning process. Interactive radio likewise makes use of sound effects, songs, dramatizations, comic skits, and other performance conventions to compel the students.
- ❖ **Facilitating the Acquisition of Basic Skills.** The transmission of basic skills and concepts that are the foundation of higher order thinking skills and creativity can be facilitated by ICTs through drill and practice (Freeman, 1997). Educational television programs such as *Gyan Wani* use repetition and reinforcement to teach the alphabet, numbers, colors, shapes and other basic concepts (Joshi, 2011). Most of the early uses of computers were for computer-based learning (also called computer-assisted instruction) that focused on mastery of skills and content through repetition and reinforcement (Web-based Education Commission, 2011).
- ❖ **Enhancing Teacher Training.** ICTs have also been used to improve access to and the quality of teacher training. For example, institutions like the Cyber Teacher Training Centre (CTTC) in developed countries are taking advantage of the Internet to provide better teacher professional development opportunities to in service teachers. The government-funded CTTC, established in 1997, offers self-directed, self-paced Web-based courses for primary and secondary school teachers (Web-based Education Commission, 2011). Courses include “Computers in the Information Society,” “Education Reform,” and “Future Society and Education.” Online tutorials are also offered, with some courses requiring occasional face-to-face meetings (Freeman, 1997). At Indira Gandhi National Open University, satellite-based one-way video- and two-way audio-conferencing was held in 1996, supplemented by print-materials and

recorded video, to train 910 primary school teachers and facilitators from 20 district training institutes in Karnataka State(Joshi, 2011).

Research on the use of ICTs in different educational settings over the years invariably identify as a barrier to success the inability of teachers to understand why they should use ICTs and how exactly they can use ICTs to help them teach better. Unfortunately, most teacher professional development in ICTs are heavy on “teaching the tools” and light on “using the tools to teach”(Hannafin and Savenye, 1993). Teacher anxiety over being replaced by technology or losing their authority in the classroom as the learning process becomes more learner-centred—an acknowledged barrier to ICT adoption— can be alleviated only if teachers have a keen understanding and appreciation of their changing role (Web-based Education Commission, 2011).

#### **What Skills Needed in the Workplace of the Prospective Teachers:**

Today teaching is becoming one of the most challenging professions in our society where knowledge is expanding rapidly and much of it is available to students as well as teachers at the same time (Perraton, Robinson, & Creed, 2001). The prospective teachers of today are needed the following skills in their workplace:

- ❖ **Digital Age Literacy:** Functional literacy Ability to decipher meaning and express ideas in a range of media; this includes the use of images, graphics, video, charts and graphs or visual literacy Scientific literacy Understanding of both the theoretical and applied aspects of science and mathematics Technological literacy Competence in the use of information and communication technologies Information literacy Ability to find, evaluate and make appropriate use of information, including via the use of ICTs Cultural literacy Appreciation of the diversity of cultures Global awareness Understanding of how nations, corporations, and communities all over the world are interrelated.
- ❖ **Inventive Thinking:** Adaptability Ability to adapt and manage in a complex, interdependent world Curiosity Desire to know Creativity Ability to use imagination to create new things Risk-taking Ability to take risks.
- ❖ **Higher-Order Thinking:** Creative problem-solving and logical thinking that result in sound judgments.



- ❖ **Working Ability in Interdisciplinary Teams:** Working ability in an interdisciplinary team Collaboration and Ability to interact smoothly and work effectively with others interpersonal skills Personal and social. More so than any other type of ICT, networked computers with Internet connectivity can increase learner motivation as it combines the media richness and interactivity of other ICTs with the opportunity to connect with real people and to participate in real world events.
  
- ❖ **Effective Communication:** Working ability in interdisciplinary teams depends on the way they use ICTs and to learn to use ICTs responsibility for the public good Interactive communication Competence in conveying, transmitting, accessing and understanding information. High Productivity Ability to prioritize, plan, and manage programs and projects to achieve the desired results Ability to apply what they learn in the classroom to real-life contexts to create relevant, high-quality products to listen and become involved in the lessons being delivered ( EnGauge, 2002 ).

### **Will ICTs Replace the Teacher?**

The answer is a resounding NO! In fact, with the introduction of ICTs in the classroom, the teacher's role in the learning process becomes even more critical. What can and should change is the kind of role that the teacher plays. The role of students, in turn, also expands. And since ICTs can open up the classroom to the outside world, the community can also play a new role in the classroom. As learning shifts from the "teacher-centred model" to a "learner-centred model", the teacher becomes less the sole voice of authority and more the facilitator, mentor and coach—from "sage on stage" to "guide on the side". The teacher's primary task becomes to teach the students how to ask questions and pose problems, formulate hypotheses, locate information and then critically assess the information found in relation to the problems posed.

And since ICT-enhanced learning is a new experience even for the teachers, the teachers become co-learners and discover new things along with their students. Additionally, it is not uncommon to see students in an ICT-enabled classroom assume both formal and informal roles as teachers of their peers and younger students, sometimes even of their own teachers. Teachers and students from different schools, subject-matter experts, parents, community and business leaders, politicians, and other interested parties also become involved in the learning

process—as resource persons, critics, mentors, and cheerleaders. Research on the use of ICTs in different educational settings over the years invariably identify as a barrier to success the inability of teachers to understand why they should use ICTs and how exactly they can use ICTs to help them teach better. Unfortunately, most teacher professional development in ICTs are heavy on “teaching the tools” and light on “using the tools to teach.” Teacher anxiety over being replaced by technology or losing their authority in the classroom as the learning process becomes more learner-centred—an acknowledged barrier to ICT adoption—can be alleviated only if teachers have a keen understanding and appreciation of their changing role.

### **Keys to Effective Use of ICT in Prospective Teachers’ Professional Development:**

A number of factors are seen to be critical for the effective use of ICT in prospective teachers’ professional development. These are:

- ❖ Incentives and support for teacher training
- ❖ Teacher-directed training
- ❖ Adequate access to technology
- ❖ Community partnerships
- ❖ On-going informal support and training opportunities
- ❖ Technology Applications in Education: Teachers and Teacher Trainers
- ❖ Technology Tools for Producing Instructional Media
- ❖ Using Leading Edge Technologies for Quality Education

### **Desired ICT Competencies for Prospective Teachers:**

The initial teacher training curriculum implies the desired ICT competencies for teachers, which could be the following:

- ❖ Positive attitude toward ICT
- ❖ Understanding of the educational potential of ICT
- ❖ Ability to use a range of ICT, especially audio, video, print and computers
- ❖ Ability to use of ICT for teaching specific subjects
- ❖ Ability to use ICT effectively in the curriculum
- ❖ Ability to manage ICT in the classroom
- ❖ Ability to evaluate ICT use
- ❖ Ability to ensure differentiation and progression
- ❖ Other technical capabilities

### **Prospective Teacher's Professional Development via the Use of (ICT):**

The demand from ministries of education and teachers themselves for professional development in the use of technology is outpacing the capacity of conventional approaches, such as face-to-face training, to respond (Carlson & Gadio, 2002). There is an additional issue of increased complexity and content of the training required – as the Internet is introduced a whole new set of skills and knowledge is required among teachers far beyond simple computer literacy (word processing)( Teacher Education through Distance Learning: Technology, curriculum, cost, evaluation,2001). Teachers not only have to know their subject matter and basic pedagogy, they are also expected to model higher-order thinking processes, work in interdisciplinary teams, and inculcate leadership and communication skills(Khan, 1998). At the same time, they are supposed to deliver better student results on standardized tests, while addressing larger societal problems (HIV/AIDS, conflict resolution, disintegration of families, etc.)(Harichandan, 2010). Traditional teacher training approaches are simply not equipped to deal with all these new expectations. Teacher professional development in the use of information and communication technology (ICT) should embody and model the forms of pedagogy that teachers can use themselves in their classrooms. These ICT based training programs should –

- Empower teachers to develop their knowledge and skills actively and experientially, in a variety of learning environments, both individual and collaborative.
- Include a variety of learning strategies, including direct instruction, deduction, discussion, drill and practice, induction and sharing.
- Aim at higher-order thinking skills.
- Provide an authentic learning environment so that teachers engage in concrete tasks within realistic scenarios.
- Emphasize ways that information and communication technology (ICT) can facilitate and enhance teachers' professional lives.
- Encourage teachers to be mentors, tutors and guides of the students' learning process (rather than simple presenters of knowledge and information).
- Develop teachers' skills in learning how to learn (define learning objectives, plan and evaluate learning strategies, monitor progress and adjust as needed).
- Promote cooperative and collaborative learning.

- Be sensitive to the culture and diversity of teachers as learners, using a multifaceted approach so as to respond to different learning styles, opportunities, environments and starting points.
- Enable learning independent of time and place (anytime, anywhere learning).

A key for successful teacher professional development programs is a modular structure, corresponding to different levels of teacher expertise and experience using information and communication technology (ICT). Adapting materials to teachers' comfort level and starting points is essential. Finally, these principles of teacher professional development for technology imply the need to build community and systems of on-going support, from peers, mentors and experts. Single training events that leave teachers alone afterwards should be avoided.

### **Key Challenges in Professional Development of Prospective Teachers via Use of ICT:**

Some basic challenges related to ICT use in professional development of prospective teachers are as follows:

#### **❖ Access :**

- **Connectivity:** Being connected within the school and to resources outside the school was a critical issue in teachers' professional development. Without access to, the Internet and without sufficient quantity and quality of equipment, it was felt that teachers are not likely to be highly motivated to participate in professional development activities related to ICT.
- **Software tools:** Easy access to productivity tools and associated learning resources arose as a common concern. The perceived needs were for interconnected databases to demonstrate and promote the use of ICT across and within all disciplines in the curriculum, for other tools to be used in the classroom with the learner, and for resources designed to promote enhanced professional development. Promoting teacher development through the sharing and exchange of resource materials and strategies by schools and teachers was seen as a positive step.

- **Curriculum resources:** The availability of current quality educational resources that will help teachers transcend the utilitarian use of ICT by fully integrating them in the curriculum, and the creation of new models of learning and teaching.

❖ **Teacher preparedness :**

- **Skills and knowledge:** Teachers' basic skills and knowledge in ICT must be upgraded or developed.
- **Attitude toward ICTs:** Teachers do not seem believe that the benefits of ICT for student improvement and teacher fulfilment have been proven through academically justified studies. A careful blend of intensive training, guidance and counselling is necessary to dispel teachers' fear of redundancy and to accept their changed role.
- **Higher order teaching and learning theories:** Teachers need to develop an in-depth knowledge of learning and instructional theories so they can appropriately apply ICT into their classroom teaching, and discover new uses for technology.
- **Teachers' Lifelong Professional Development and Support :** The foremost challenge is to put in place a system of lifelong professional development and support.

❖ **Teacher motivation :**

- **Regular assessment:** Regular assessment of performance linked to defined competencies was seen as an important motivation for building and enhancing ICT knowledge and practice.
- **School culture:** Maintaining sufficient levels of motivation among teachers was also seen to be related to the school culture and the role of technology within this culture.

❖ **Quality resources :**

Teachers' ICT skills are being enhanced through quality resources that are made available to them. These include using technology to teach technology in teacher training programs. Rich content and databases are also provided through ongoing, easy electronic access to exemplar lesson plans and other resources.

❖ **New structures :**

Teachers become part of virtual learning communities where they can share experiences and learn from remote resource persons. Specialized resource centres are also being established to meet their learning needs.

❖ **Sustainable professional development :**

Mentoring was one way of providing the teacher with ongoing encouragement and motivation. Making technical support available was also one way of continuously enhancing the teacher's ICT skills.

❖ **Challenges Related to Capacity-Building:**

Various competencies must be developed throughout the educational system for ICT integration to be successful. Teacher professional development should have five foci:

1. Skills with particular applications.
2. Integration into existing curricula.
3. Curricular changes related to the use of IT (including changes in instructional design).
4. Changes in teacher role.
5. Underpinning educational theories.

Ideally, these should be addressed in pre-service teacher training and built on and enhanced in-service.

❖ **Challenges Related to Financing the Cost of ICT Use:**

One of the greatest challenges in ICT use in education is balancing educational goals with economic realities. ICTs in education programs require large capital investments and developing countries need to be prudent in making decisions about what models of ICT

use will be introduced and to be conscious of maintaining economies of scale. Ultimately it is an issue of whether the value added of ICT use offsets the cost, relative to the cost of alternatives. Put another way, is ICT-based learning the most effective strategy for achieving the desired educational goals, and if so what is the modality and scale of implementation that can be supported given existing financial, human and other resources?

### **Suggestions for the Effective Use of ICT in Prospective Teachers' Professional Development:**

A country's educational technology infrastructure sits on top of the national telecommunications and information infrastructure. Before any ICT-based programme is launched, policymakers and planners must carefully consider the following:

- ❖ Ensure that appropriate rooms or buildings available to the house of technology? In countries where there are many old school buildings, extensive retrofitting to ensure proper electrical wiring, heating/cooling and ventilation, and safety and security would be needed.
- ❖ Ensure the availability of electricity and telephony. In developing countries, large areas are still without a reliable supply of electricity and the nearest telephones are miles away.
- ❖ Ensure the computer-based or online learning is access to computers in schools, communities, and households, as well as affordable Internet service.
- ❖ Ensure that technology is used in an equitable and democratic manner to enhance the self worth and self-image of the poor and the disadvantaged.
- ❖ Counter the tendency to centralise; promote plurality and diversity.
- ❖ Encourage ICT literacy for official and personal use to increase comfort and later enhance creativity in educational work.
- ❖ Enable trainee teachers to access sources of knowledge and to create knowledge.

- ❖ Work towards transforming all schools into ICT-rich environments.
- ❖ Introduce teachers to flexible models of reaching curriculum goals.
- ❖ Train teachers to evaluate and integrate available materials into the learning process.
- ❖ Introduce use of media and technology enabled methods of learning, making it inherent and embedded in the teaching-learning process of teachers.
- ❖ Shift focus from fixed to flexible curricula with competencies and skills identified rather than specific factual content.
- ❖ Deploy ET to enhance open education, which implies openness in curriculum transactions.
- ❖ Ensure opportunities for autonomous content generation by diverse communities.
- ❖ Create opportunities for administrators and educational leaders in the school system to become ET savvy and to be able to use ICTs competently.
- ❖ Create a system of lifelong professional development and support, especially of educational leaders and managers such as headmasters and principals.
- ❖ Support the development of and nurture teachers' self-help groups / professional development groups on the ground as well as online.

### **Implication of ICT in Prospective Teachers' Professional Development:**

Beyond the specifics of content for an ICT teacher's training curriculum, there is a sense that there is so much that a teacher has to learn to become competent in the use of ICT for teaching tasks. There is also the prospect of having to keep up with developments in technology. ICT teacher's training should therefore be considered as a continuing process, with the need for continuing support. The initial training may take place as part of pre-service training, or it could be part of in-service training. Wherever it may take place, the training



should be regarded as a process that must continue even after the formal course has been completed. This would mean making resources available that will enable the teacher to pursue self-directed learning.

### **Future Perspectives:**

Globalization is predicted to lead to increased pressure on developing countries to invest in the Internet and telecommunications infrastructure. As a result, there will likely to be increased investments in educational applications of the Internet. Specifically, this could mean that students and teachers will increasingly make use of technology within open and flexible learning systems. Although the use of ICT in education and teacher training will grow more rapidly than expected, traditional technologies will continue to exist alongside the newer ones. This is because of the tremendous amount of funds it would take to cross the digital divide. Concerted efforts of international organizations and governments will however make significant progress in bridging the chasm. The future prospect of ICT in teacher training may be summarized as:

“In 1999, the status of virtual education was that it was more rhetorical than real. Now, two years later, it appears to be both more rhetorical and more real. And the gap is closing between the reality and the rhetoric!” (Jung, I.S. ,2001) .

### **Conclusion:**

The analysis of ICT based approaches to prospective teachers’ professional development indicates that there are possibilities and challenges in adopting ICT in teacher training and professional development. Although valuable lessons may be learned from best practices around the world, there is no one formula for determining the optimal level of ICT integration in the educational system. Overall, governments and teacher training institutions seem to recognize the importance of integrating ICT in education and teacher training. In many cases, the national vision for ICT use in education has been integrated into teacher training. Teacher training approaches in this paper show that many cases adopt ICT into their training process not just as content of the training but rather as an integrated training environment and thus allow teachers to experience ICT-based pedagogies. Hence, it may conclude that a variety of approaches in ICT-Pedagogy integration in teacher training. Via a variety of examples, the author tries to show that ICT use is not only a matter of new possibilities but that it also brings with it new implications and new challenges. Significant challenges that

policymakers and planners, educators, education administrators, and other stakeholders need to consider include educational policy and planning, infrastructure, language and content, capacity building, and financing.

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