Abstract

*CCC for AAA : Tapping Creativity, Collaboration & Cooperation for Quality in Teacher Education**

Information and Communication Technology in education is changing the way we teach, learn and conduct research. Today we have WIRE, WEB and WINDOWS leading to CONNECTIVITY, NETWORKING and APPLICATIONS. Not surprisingly the National Council of Teacher Education, (NCTE) India, decided to make ICT Literacy a compulsory part of the Pre-service course at the Secondary level.

For any new programme to be of value, quality assurance should be ensured through appropriate steps right from the planning stage till the feed back stage. Unlike developed nations, India which cannot afford to invest heavily in ICT literacy for Pre-service courses. The paper suggests that networking of Teacher Education institutions can play a crucial role in maintaining quality.

But what should he the nature of the input, process and output of ICT enabled Teacher Education? What involves in the Planning, Implementation , Monitoring, Supervising and Evaluation of an ICT integrated Teacher Education programme where Networking plays a key role? The author proposes a **CCC** formula (**C**reativity, **C**ollaboration and **C**ooperation) to approach these questions . He also draws up a feasible plan for integrating ICT in Teacher Education programmes and goes on to suggest ways of drawing the rewards of Networking.

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CCC for AAA : Tapping Creativity, Collaboration & Cooperation for Quality in Teacher Education

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Introduction

The educational system in India is showing signs of moving forward…Innovational instructional media are being widely adopted and have become an integral part of teaching"[1] ." Technology has entered the classrooms as a support system in the form of television literacy and computer literacy, which includes WIRE, WEB, and WINDOWS leading to CONNECTIVITY, NETWORKING AND APPLICATIONS."[2] India has witnessed the launch of the Edusat, and the beaming of classroom instruction to every nook and corner of the country. Today, UGC-CEC is avidly engaged in training teachers in instructional design based method of packaging knowledge which will shortly be available in the virtual world. Universities too have started introducing ICT as a compulsory part of Teacher Education programmes.

Experienced educationists know that for any new programme (here ICT enabled Teacher Education) to be of value, **Q**uality assurance should be ensured through appropriate steps right from the planning stage till the feedback stage. But what should be the nature of the input, process and output of ICT enabled Teacher Education? What involves in the Planning, Implementation, Monitoring, Supervising and Evaluation of an ICT integrated Teacher Education programme where Networking plays a key role? This paper attempts to answer these questions by drawing up a feasible plan for integrating ICT in Teacher Education programmes and suggesting ways of drawing the rewards of Networking.

I will begin by explaining the relevance of Networking in Teacher Education institutions and then go on to suggest ways of drawing on the rewards of Networking by tapping **C**reativity, **C**ollaboration and **C**ooperation. This will be followed by identification of ways of applying the CCC formula while deciding the Input, Process, Output and in the Planning, Implementation, Monitoring, Supervising and Evaluation stages of ICT enabled Teacher Education.

Net working

The term networking is defined as a group or system whose members are connected in some way.[3] The growth of information and Communication Technology and the concept of networking has made it possible for the first time to reach almost every single community on the planet and to create societies of life long learners.

Computer networks

The merging of computers and communications through wide area networking can profoundly influence the way in which information is transmitted. There are several advantages in the networking of computers. In addition to being a powerful communication medium, it helps in resource sharing, access to remote information, person to person communication, cost reduction and even socializing or interactive entertainment. Well designed and facilitated virtual environments will provide places capable of establishing

professional discourse across and between communities.[4] Incidentally, a website dedicated to literacy that was in the news recently is that of Google which has pulled together books, video, mapping and blogging services to help teachers and educational organization share reading resources.[5]

Networking of educational institutions

The aim of networking of educational institutions is almost always systemic change. They consist of a number of educational institutions including universities that work together over extended periods of time, with the support of educationists and organizations with an interest in supporting improvement efforts. Because they meet over time, this creates opportunities for a wide variety of agreed intervention strategy by university staff and others, and for changes in the focus of their work together.

Advantages of networking of educational institutions / Teacher Education institutions

Huberman[6] who is in favour of research- based, cross-school networks believes that if networking focuses on bridging the gap between peer exchanges and the interventions of external resource people, it has the likelihood of actual change at the classroom level. Though building collaborative learning networks takes time, S.M Hord[7] suggests that there are significant benefits for both staff and students. Among these are:

* Reduction in the isolation of teachers.

* Increased commitment and vigour to work to strengthen the mission of one's institution.

* Higher likelihood that teachers will be well informed , professionally renewed, and inspired to inspire students.

* Significant advances into making teaching adaptations for students.

* Higher likelihood of undertaking fundamental systematic change.

An additional advantage of networking for Teacher Education is that it throws open a plethora of avenues for interaction. The use of telephones, writing of letters, emailing, chatting, making available resources of ones institution on the website and of course the arranging of peer meeting or Video Conferencing throws open a gold mine of opportunity for improving quality in Teacher Education. A few avenues worth exploiting, by applying the **CCC** formula (the tapping of **C**reativity, **C**ooperation and **C**ollaboration suggested in the title of this paper) include:

* Clarification of doubts regarding pedagogical content.

* Exchanging of ideas on appropriate strategies that produce results in teaching . This also provides scope for polishing, pruning and updating of ones pedagogical knowledge.

* Familiarizing with innovative approaches to curriculum transaction adopted in any of the teacher education institution connected through networking.

* Improving trainee performance by enabling them to watch video clippings of Demonstration Lessons and Micro Teaching sessions and familiarizing them with model Lesson Plans made available on the Database. It may be noted that for many institutions this is perhaps the only way for improving **Q**uality.

Networking in the context of ICT enabled Teacher Education

The idea of networking of Teacher Education Institutions and University Education Departments was mooted way back in 1986 in the National Policy of Education.[8] But one major problem institutions are likely to face in ICT enabled Teacher Education is the non-availability of highly trained professionals for imparting instruction. From breakdowns while using of systems to the unraveling of the subtleties of various software packages, the problems that confront institutions are numerous.[9]

Perhaps the greatest advantage of inter-institution learning networks is that, in addition to providing solutions for the problems mentioned above, we get access to experts which result in collaborative dialogues which in turn can lead to promotion of life long learning. Even the isolation and hopelessness which might creep in when a teacher, works all alone, can easily be broken through networking.

Further, the teaching of Information and Communication Technology ,includes instruction, tutelage, mentorship, fostering, supporting ,scaffolding, facilitating etc. It is an art and a craft which a trainee can appropriate through cognitive apprenticeship. To achieve mastery, one must

have significant procedural knowledge. The teacher demonstrates skill in the craft (his/her use of ICT) and the apprentice observing learns the craft, skill by skill. The apprentice gradually gains competency, and develops clusters of skills for performing definite tasks and knowledge of procedures.

In a typical class of a Teacher Education institution, an average teacher cannot concentrate/ give attention to all the trainees to enable them to become fully knowledgeable and skilful. Further , observation which is essential in the acquiring of a skill if missed , the trainee is unable to repeat or explain the move. Consequently the trainee has to work for days until the teacher perchance repeats the move. During this long break it is beyond a trainee's ability to remember the detailed mental picture of all relevant accompanying circumstances. Here if the teacher's move is captured on video, and if the best teaching practices of master teachers are shared with novice teachers through the Data base of a networking of Teacher Education institutions, learning becomes easy.

The Data base of a network of Teacher Education institutions should have not just demonstration classes but study material, research work , materials on education, student assignment etc which can be utilized. Teachers and learners alike can collect, select and deliver materials via Multimedia CD ROM's, DVD's and WWW resulting in vital interaction through computer generated virtual reality, which is the real reward of networking.

CCC for AAA (Creativity, Cooperation and Collaboration for Quality)

One way of tackling the issues related to the implementation of ICT enabled Teacher Education which I would like to propose, is to apply the **CCC** formula – which stands for **C**reativity, **C**ooperation and **C**ollaboration. I have arrived at this formula after studying the various aspects of **Q**uality in education and the definition of the same put forward by Sir John Daniel , President and CEO , Commonwealth of Learning. He defined quality as "fitness for purpose at minimum cost to society."[10]

The quality in ICT enabled Teacher Education which we, a developing country can fix is likely to be far inferior to the kind of quality a highly developed nation like the US can conceive. This is obviously because it involves an exorbitant investment to get the best expertise and the best PC's for ICT enabled Teacher Education .It is in this context, that I would like to suggest that we whole heartedly adopt Sir John Daniel's definition of **Q**uality and implement it through the **CCC** formula which I am proposing in this paper.

By **C**reativity, I mean the ability to produce original ideas and to perceive new relationships among unrelated things. By using the term **C**reativity, I am drawing attention to the fact the Indians have proved to the world that they are brilliant at innovative software design and development. Even though many may deny it , we do have a culture that encourages the growth of creativity among individuals who work in isolation.

Cooperation could be in the form of sharing of resources and ideas between teachers and institutions and also between trainees and other institutions.

Collaboration could be between trainees who have innovative ideas or feasible projects and technologists or skilled ICT teachers not necessarily from the same institution.

Resources produced through the application of the **CCC** formula would be ones that have been polished through the cooperative endeavour of local experts. These, I believe when made available on the Database of Teacher Education institutions, can lead a developing nation like ours to achieve Quality without heavy investment. That is to say, through Networking and by the tapping the three C's- **C**reativity, **C**ooperation and **C**ollaboration we can achieve **Q**uality in Teacher Education.

Input, Process and Output of ICT enabled Teacher Education

While deciding on the input, issues related to content, technology and pedagogy have to be tackled first. Discussing the introduction of Technology , Koehler and Punya points out that

" …good teaching is not simply adding technology to the existing teaching and content domain. Rather it is the introduction of technology that causes the representation of new concepts and requires developing sensitivity to the dynamic, transactional relationship of three aspects viz: Content, Technology and Pedagogy."[11]

Several Universities[12] in India have already made ICT a component of the BEd. course .

Broadly the content areas regarding theory/ practical are decided as follows:

- Introduction to Computers
- Introduction to Operating Systems
- Application of Computers in Teaching
- Functions of Computer
- Knowledge of M.S.Office and other related packages and Computer languages
- Application of Computers in Education
- New trends and techniques in Computer Education (EDUSAT etc)
- Knowledge of Internet, World Wide Web etc

Several strategies can be employed for delivering the input. It could be in the form of lecture, lecture-cum-demonstration, guidance in the handling of equipments or even instruction through networking facilities with scope for clarifying doubts.

This naturally leads us to the issues related to process. Effective ICT enabled Teacher Education should ultimately make learners collect, select, analyze, organize and present knowledge using diverse sources of ICT hardware and software. The Teacher Educator has the role of promoting collective work and facilitating individual and group activities which encourages **C**reativity, **C**ooperation and **C**ollaboration , resulting in the following types of activities:

-Using Search engines, evaluating and integrating data retrieved from different sources.

- Searching and evaluating information from a large amount of data and connecting them together by building coherent entities.
- Seeing objects from different angles and accentuating peculiar details etc.

- Collecting and selecting visual information, to pinpoint and highlight the essential.

- Acquiring and storing digital photos, videos and audio recordings.

- Processing and presenting data using graphic software.

- Constructing information objects using templates and wizards.

- Creating, editing, composing and arranging objects and images of the real world by means of ICT.

- Creating a gallery of portraits of peers or historical personalities and fixing their life moments in global information space.
- Creating a catalogue of Internet resources- Constructing trainees own space for information – reference sources to be used later in life.

- Transmitting ones thoughts and emotions to others by various means- Email, Blog etc

The list is obviously not exhaustive and can be added on depending on the needs of the Curriculum / individual trainee . The process in short involves exploring, designing, discovering, inventing together and learning experientially along the way.

The kind of output to be expected can be identified well before the commencement of the course. In the case of the Computer too the dictum, practice makes perfect is quite true. So the quality of the output in terms of tangible products and the competence in handling the computer will be dependent on the kind of training received and the opportunity the trainee has for honing his/ her computer skills. One way of ensuring quality by employing the **CCC** formula is to insist on the creation of innovative products through **C**ooperative and **C**ollaborative efforts of trainees. Of the products the ones that deserve special mention include:

1. Multimedia Presentations

The trainees presentations provide the opportunity to develop the communicative dimension of information competence. Instrumental support to textual theses, quotations visual images, and sounds help organize more succinctly the thoughts and speech delivery of the trainee.

2. Project and Process Design

For example, a design for classroom decoration, such as colouring and wall-painting, arrangement of plants, setting up of an aquarium or a playground design can remain at the programme design stage on a computer screen.

3. Creation of a Digital Portfolio

This records educational events and activities of the trainee. The contents may include classification, annotation, indexing, connections with digital materials used in learning, and the work of peers. This portfolio may be used by the learner as well as professors and future employers.[13]

4. Foreign Language Learning/ Assessment

The best of modern computer environments for learning a foreign language, simulate an immersion environment. This is achieved by placing the trainee in a situation interesting to the trainee, providing linguistic commentaries and checking the trainee's progress especially in providing automated recognition of the trainee's speech.

Computer-based testing of the trainee level in a great number of areas is easily possible. These include among others General Knowledge, Grammar, Arithmetic and Communication Skill. Despite limitations, Computer–based testing proves very beneficial in a Teacher Education programme.

Without strong models for the effective and appropriate use of ICT's to enhance the teacher-training process, knowledge of ICT skills will be of little value to education. For these reasons we must teach the trainees things that are relevant to them. Further, only proactive "hands on" teaching and learning-by-doing can bring about palpable results in this field.

What does this mean in the context of our endeavour ? It means that we should minimize lecturing and maximize seminars, workshops and design sessions.

Planning , implementation, Monitoring, Sequencing and Evaluation of ICT enabled Teacher education

Planning

A shared vision is indispensable in any planning activity . One has to consider the global context of Teacher Education and recent advances in its theoretical foundation, standards and guidelines, while planning to integrate ICT to Teacher Education programmes. Our prime responsibility should be to infuse ICT's in Teacher Education in ways consistent with India's modern context and culture. The aim should be the building of information and communication competencies of trainees including the habits of mastering the means of information and communication technologies through **C**ooperation and **C**ollaboration. For this an array of technology-based learning resources should be made available to the trainees.

Implementing

Implementing ICT in Teacher Education in developing countries like India, tend to focus heavily on costs. Sharing of Computer Laboratory facilities with neighbouring educational institutions, given the fact that our Government is investing heavily to make our States Computer literate, is worth considering.

One way of cutting down unnecessary expenses and making the maximum use of Computer Laboratory facilities is to indulge in **C**ollaborative dialogues with Teacher Education institutions who have already installed a Computer Laboratory. Through this, institutions stand to benefit from learning from others and also help avoid making the mistakes others have committed. In this context, it may be noted that for years schools in the northern hemisphere have invested large sums on ICT suites but have not utilized its full potential. According to Leach etal [14], recent research from the UK and else where suggests that ICT can be used far more effectively for teaching in a range of curriculum areas, when one(or more) machine is integrated into the 'normal' classroom environment than in using the ICT suites alone for instruction.

The non availability of ICT trained teacher educators is one problem institutions are likely to face. This can be solved by getting the services of a IT professional. The professional can be employed by the institution on a part–time basis. He/ she can provide heuristic and conceptual support at those moments when an urgent and ill-defined problem presents itself to the teacher educator working alone. The professional can also participate as a co-teacher in classes given by a teacher educator. Working in conjunction with the content and schedule of the teacher educator's course, the professional can participate in three distinct steps :

1. Choosing the same subject areas and cognitive tasks as that of the teacher educator as a field for application of particular ICT tools

2. Solving specified teaching and learning problems

3. Supporting the trainee's independent work in a task-oriented way within the frame work of the course.

Monitoring

At the monitoring stage the focus should be on using ICT as :

* a scaffolding tool, to support the trainees construction and understanding of non- professional knowledge

* an environment and context for learning , enabling trainees to experience non situations, practices and knowledge

* a communicative tool , facilitating social participation structures (eg; Collaborative Tasks which fulfils the **CCC** formula)

* A meta cognitive tool, enabling reflection of the learning process, both at individual and group level.

Supervising

Supervision of ICT enabled Teacher Education should focus on the optimum use of the following tools [15] which can result in the consequent literacy activity. Further , **C**ooperative and **C**ollaborative effort should be encouraged if **Q**uality is to be aimed at.

ICT Tools	**Literacy activity**
Word processing, Email, Computer conferencing Digital Cameras, Voice recording software	Computer Texts
Email, Computer and video conferencing Desktop publishing , web authoring Databases and spread sheets	Focussing on audience/purpose
Multimedia software; Presentation software	Presenting texts

Word Processing; Desktop Publishing Hypermedia	Transforming texts
CD ROM : Internet, Video conferencing Electronic mail	Exploring information
Internet; CDROM, Talking Books	Reading Texts
Simulation, Data bases: Internet text Debates; Video conferencing	Asking " what if" question
Word Processors; Text disclosure Programe	Identifying features of a text
Text disclosure programmes, Internet; CDROM	Developing knowledge about language

Evaluation

Evaluation has to be done in terms of the technological context together with the tools and software used by the trainees and teachers. Writes Salamon "… a whole cloud of correlated variables –technology, activity, goal setting, teacher's role, culture…" is to be taken into account while evaluating ICT enabled teacher education.[16]

Research shows that the quality of learning can be significantly enhanced when ICT is utilized as an intellectual (multi-tool).[17] ICT can also enhance

* Critical thinking
* Information handling skills
* High level conceptualization and
* Problem solving

The literature [18] also shows that ICT can facilitate :

* the refining of understanding
* giving and receiving feedback
* Collaborative tasks;
* joint decision making and reflection
* complex group interaction

Hence evaluation should help highlight to what degree the quality of learning has been enhanced and to what extent it has facilitated cooperative and collaborative group work resulting in the production of creative outputs.

Conclusion

In India ,we have witnessed the mushrooming of Teacher Education Institutions, where in addition to the lack of essential infrastructure, there has been a dilution in the **Q**uality of instruction. So the need of the hour, is Pre-service Teacher-Training programmes where networking plays a key role. The trainees have to be groomed and polished in terms of the skills needed. We have to instill in them a favourable attitude towards using ICT.

There can be no doubt about the fact that tomorrow's students would be techno- savvy. So the aim of Teacher Education programmes should be to develop appropriate knowledge and skills for using and integrating the right technology in the right manner. In short, they should be given appropriate training for developing skills needed for facing the challenges and demands of life long learning. Providing training in ICT may be a complex endeavour. But this can be effectively tackled through Networking of Teacher Education Institutions that attempts to tap the three **C**'s – **C**reativity, **C**ooperation and **C**ollaboration resulting in **Q**uality in Education.

Notes and References

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2. Mamota Das , *ICT Enabled Teacher Education* in **Edutracks** , September 2005

3. **Oxford Advanced Learner's Dictionary**

4. Many such environments now exist and are beginning to be sustained across time. The Commonwealth of Learning for instance has hosted regular highly successful online professional forums for debating of key issues such as **Empowerment through Knowledge and Technology**. See http://www.open.ac.uk/eci/forum/forset.html]

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8. See **National Policy on Education** Para 9.6

9. G. Sheela and Nagaraj studied the relationship between knowledge of ICT and attitude to the inclusion of ICT in Teacher Education. They found that Teacher Educators with more experience have a less favourable attitude towards teaching of ICT than their younger counterparts. (See *Knowledge of Information and Communication Technology(ICT) and Attitude Towards Teaching ICT Among Teacher Educators* **Experiments in Education** Vol XXXIV No. 8 , Aug 2006]

* Other problems include :

i) Rising infrastructure costs – the need for more PC's per trainees (at least one PC for three trainees)

ii) The lack of a proper model of instruction to follow

iii) Unavailability of service engineers to set things right ,then and there

iv) Inability of Teacher Education institutions to cope with the need for raising the instructional hours for practical training for each trainee

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