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Stimulating Teacher Educators and Teacher Trainees for Digital Teaching

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Abstract – The rapid and speedy expansion of information and communication technology has produced a number of innovative changes in teaching learning process. It is putting a lot of pressure on the education system around the world to teach the students knowledge and skills they require in the globalised world. Now the teaching profession is emphasizing the shift from teacher centered instructional approaches to student centered l approaches. This is leading to a challenging task to the teacher educators and teacher trainees as they need training not only in computer literacy but also in the pedagogical application of those skills to improve teaching and learning for successful integration of ICTs into teacher education. Preparation of professional teacher educators and teacher trainees mainly depends upon the teacher education institutions (TEIs). For this, the teacher education institutions will have to provide sufficient and adequate infrastructure, equipments and facilities for developing skills for the use of digital tools during the preparation of teacher educators and teacher trainees. It must be mandatory in their training that they have to prepare content related to their teaching subjects by the use of digital tools and practices in real class room situations. Empowering teacher educators and trainees to use new technologies in their teaching practices is the need of hour for digital age learners. An attempt has been made in the present paper to discuss various techniques and strategies for stimulating the teacher educators and teacher trainees for the use of digital tools and content in the present digital era.

Key words: Information and Communication Technologies (ICTs), Teacher Educators, Teacher Trainees, Innovative learning.

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INTRODUCTION

Educational systems around the world are under increasing pressure to use the new information and communication technologies (ICTs) to teach students the new knowledge and skills they need in the post-globalization. Information and Communication Technologies (ICTs) are considered to be a set of tools enabling, supporting, and reinforcing educational reform that fits the educational demands of the knowledge society. Designing and implementing successful ICT-enabled teacher education programmes are the keys to fundamental, wide-ranging educational reforms. In the present scenario Teacher Education in India is being renovated and redesigned to make it constructive. New opportunities and possibilities especially those in electronic and other related applications for skill development arrangements stimulate the initiative for constructivist teacher education and the reform of the existing educational provisions.

In the past, the focus was on teachers for ICT-integration in education which though desirable could not effectively meet set objectives. The professional development of teacher-educators is essential. Unless teacher educators model effective use of technology in their own classes, it will not be possible to prepare a new generation of teachers who effectively use the new tools for learning.

In the present digital age, teacher training institutions (TTIs) are expected to prepare pre-service teachers to adequately use technology in their educational practice. TTIs around the world have, therefore, engaged in various efforts to re-shape their curriculum. More specifically, they have infused technology into the entire curriculum, giving pre-service teachers the opportunity to understand the pedagogical reasons for using technology by experiencing first-hand how it can support teaching and learning across different subjects.

The professional development of teacher educators and trainee-teachers mainly depends upon the teacher training institutions who are preparing them. For this, teacher training institutions should have to provide adequate facilities with respect to their infrastructure and training to the teacher educators and trainee teachers so that they become more competent to use digital tools and contents for future learners, because without the availability of proper

equipments, facilities and training in these institutions professional development of teacher educators and trainees is beyond imagination.

With the advancement of digital technologies and globalizations our nation demands new knowledge and skillful generations. The nation demands will only be fulfilled when we have digital competent teacher educators and trainee-teachers. It has been observed in Indian classrooms that there is a least use of digital tools and contents in teaching- learning- process.

There are a few numbers of teachers who use digital tools in teaching because they have limited understanding of how to use digital tools in their teaching. There is a dire need of today to stimulate teacher educators and trainee teachers to use digital tools and contents for innovative learning. Now questions arise:

- Why do we need digital empowered teacher educators or trainees?
- Who are responsible for making teacher educators more professional to deal with digital tools?
- How to develop competency among teacher educators and trainees to use digital tools and contents related to their teaching subjects?
- What are the factors affecting teacher educators not to use digital tools?
- What are the major steps for stimulating teacher educators to use digital tools?

The present paper highlights the answers to all these questions:

NEED OF ICTS EMPOWERED OR DIGITAL COMPETENT TEACHER-EDUCATORS

The digital competence is defined as "skills, knowledge, creativity, and attitudes that everybody needs in order to use digital media for learning and functioning in the knowledge society. There is a dire need of the ICT empowered or digital competent teacher-educators as:

- It can stimulate deeper subject knowledge, learning, and understanding.
- Use of digital technologies in education have shifted their focus to the increased role of ICT in the knowledge-based society, its role in learners' personal lives, and its role in the development of appropriate knowledge, skills, competencies, and attitudes for lifelong learning.(Voogt, Erstad, Dede, & Mishra, 2013).
- They prepare students digital competent, or their abilities and skills to use technology and digital environments effectively. This also depends on how well teachers and future teachers are able to implement and use ICT in an effective and appropriate manner for teaching and learning.
- This digital competence or digital literacy has the potential to promote student subject learning, and equip students with the necessary digital skills and attitudes to function in the twenty-first century knowledge society. Due to the rapid development of digital technologies in the emerging information society, today's workforce requires individuals to be able to employ a variety of cognitive skills in order to solve problems in digital environments.

Thus, it has been argued that both students and teachers must acquire a certain level of computer-literacy to keep up with the growing digital societies.

- To make 21 centaury learner more innovative and skillful for post globalization.
- To fulfill the demands of society as well as nation
- To improve students self-knowledge
- To acquaint students with their internal potential and creativity
- To develop self-confidence among students to compete with digital technology

AUTHORITY FOR DEVELOPING ICTS EMPOWERED TEACHER EDUCATORS

Professional development of teacher educators depends upon the teacher training institutions (TTIs) who are preparing them as future teacher educators. The major roles of the TTIs are as follows:

- TTIs must have proper infrastructure facilities such as equipments, computer labs, proper training regarding digital technology.
- They should have designed e-content materials to teach teacher educators and trainee teachers
- They must have proper knowledge and understanding about digital technologies.
- They should organize various workshops regarding digital teaching
- They should collaborate with ICT experts

- They should practice the trainee teachers with digital lesson plan

- In their teaching practice, it must be mandatory to prepare the lesson plan regarding their teaching subjects by using digital tools and present them in real class room situations

- Teacher training institutions should focus on skills, attitudes, and competencies such as digital competence. However, the research literature suggests that among in-service teachers, teacher educators, and trainee teachers there "seems to be a gap between technical knowledge and knowledge on how to employ technology in a learning context" (Haugerud, 2011, p. 227).. The TTIs must focus on these gaps and provide better training during their practices.

- TTIs should improve technology literacy competencies of teacher educators and trainee teachers by organizing workshops, conferences, presentations and computer training by ICT experts. Several studies (Kirschner & Davis, 2003; Krumsvik, 2014) emphasize that teacher education programs must properly educate trainee teachers in the use of ICT in order to develop their digital competence.

FACTORS RESPONSIBLE FOR NO USE OF DIGITAL TOOLS BY TEACHER EDUCATORS AND TRAINEE TEACHERS

Lack of Proper Training Opportunities and Support: By reviewing the related literature most of the researchers found that teacher educators and trainee-teachers have not been provided proper training and opportunities and technical support regarding the digital tools and content related matter. Due to this lack of training and opportunities they are not capable to use these technologies during their teaching and practices. They need more training and technical support resources.

Lack of Knowledge: Research on teacher education depicts an overall lack of knowledge among trainee teachers and teacher educators on how to utilize ICT in a pedagogical and didactical manner (Haugerud, 2011)**.** If teacher educators and trainee teachers are to prepare their students to be technologically capable, they need to have, at the very least, basic technology skills. First, teacher educators need knowledge of the technology itself. Without right knowledge of technology they can never use digital tools and content in their teaching learning process.

According to Shulman (1986), teachers'knowledge includes knowledge of the subject (content knowledge, CK), knowledge of teaching methods and classroom management strategies (pedagogical knowledge, PK), and knowledge of how to teach specific content to specific learners in specific contexts (pedagogical content knowledge, PCK). Teacher educators need to broaden their conception of good teaching to include the idea that teaching is effective only when combined with relevant ICT tools and resources. To use technology to facilitate student learning, teachers need additional knowledge and skills, including technological pedagogical content knowledge (TPCK); pedagogical technology integration content knowledge (PTICK).

The knowledge about how to use technology hardware (e.g., digital camera, science probe) and software (e.g., presentation tool, social networking site) is not enough to enable teacher educators to use the technology effectively in the classroom. Teaching with technology requires teachers to expand their knowledge of pedagogical practices across multiple aspects of the planning, implementation, and evaluation processes. While using technology as an instructional tool, teacher educators and trainee-teacher must know how to: develop plans for teaching software to students, select appropriate computer applications to meet the instructional needs of the curriculum and the learning needs of their students, and manage computer hardware and software. According to Hew and Brush (2007), Lack of these technology-related management skills can inhibit technology integration.

To achieve technology integration that targets student learning, teachers need knowledge that enables them to:

- Identify which technologies are needed to support specific curricular goals

- Specify how the tools will be used to help students meet and demonstrate those goals

- Enable students to use appropriate technologies in all phases of the learning process including exploration, analysis, and production

- Select and use appropriate technologies to address needs, solve problems, and resolve issues related to their own professional practice and growth.

Technophobia: The problem of technophobia is fairly common (Weil and Rosen 1995). Erktin and Gülseçen (2001) defined it as an important psychological factor efficacious in the use of computers in education. According to Rosen and Weil

(1992), the technophobic is an individual evidencing at least one of the following, ranging from severe reactions to mild discomfort: anxiety about present or future interactions with computers or computer related technology, specific negative cognition or self critical internal dialogues during actual computer interaction or when contemplating future computer interaction.

Attitude towards Technology: Teachers mindsets must change to include the idea that "teaching is not effective without the appropriate use of information and communication technologies (ICT) resources to facilitate student learning." The attitudes of the teachers can be influenced and changed positively during the early periods at the teacher training institutions. By creating a learning environment which promotes professional development, teacher candidates should be made aware in terms of the ways in which they could benefit from existing ICTs tools.

Self-Efficacy of Teacher Educators: Teacher educators and trainee teachers use of ICT may be influenced by their self-efficacy beliefs (Mueller et al., 2008), the need for teachers to have strong self-efficacy for teaching with technology. Although knowledge of technology is necessary, it is not enough if teacher educators and trainee teachers do not feel confident using that knowledge to facilitate student learning. In fact, evidence suggests that self-efficacy may be more important than skills and knowledge among teacher educators and trainees who use technologies in their teaching or real classroom situations. Wozney, Venkatesh and Abrami (2006) found that one of the two greatest predictors of teachers' technology use was their confidence that they could achieve instructional goals using technology. This suggests that time and effort should be devoted to increase teachers' confidence for using technology, not just to accomplish administrative and communicative tasks, but to achieve student learning objectives.

How do we help teacher educators to gain this confidence?

The most powerful strategy to help teacher educators to gain confidence, appears to be helping teacher educators and trainee teachers to gain personal experiences that are successful (personal mastery), although other methods can also increase self-efficacy (e.g., vicarious experiences, persuasion). The following suggestions for building computer or technology self-efficacy are offered in the literature:

- Giving teacher educators and trainee teachers time to play with the technology.
- Focusing new uses on teachers' immediate needs.
- Starting with small successful experiences.
- Working with knowledgeable peers.
- Providing access to suitable models.
- Participating in a professional learning community.
- Situating professional development programs within the context of teachers' ongoing work.

ICT Training Inputs for Teachers and Teacher-Educators

Teacher educators have to work in multiple contexts-both the home institution and the field where students are placed to observe and practice teaching. They may be more influenced by the absence of the essential conditions for ICTs in teacher education.

Awareness: The first stage for each individual is awareness, and the appropriate response at this stage is to provide information about a relevant application of ICTs and appropriate ways that it may be used in the individual's current professional or personal concerns.

Learning theories and technology integration: Traditional and modern views of learning, shift from teaching to learning, constructivism, role of ICTs in lifelong learning.

Basic hardware skills : Hands on experiences in operating (a) the PC and laptops-switching on, shutting down, and networking, (b) storage devices-using floppy drive, CD ROM drive, flash drive, and burning CD-ROM, (c) output devices-using printers and speakers, (d) input devices-using keyboard (Including shortcuts), mouse, modem, scanners, web cam, digital camera, camcorders, date loggers and (e) display devices- data projectors, and interactive white boards.

Understanding system software: Features of desktop, starting an application, resizing windows, organizing files (Creating, editing, saving and renaming), switching between programs, copying etc.

Using application/productivity software: Word processing, spreadsheet, database, presentation, publishing, creation of Portable Document Format (PDF) files, test generation, data logging, image processing etc.

Using multimedia*:* Exposure to multimedia CD ROMs in different subjects, installing programs, evaluating CD ROMs, approaches to using CD ROMs, creating multimedia presentations.

Using internet: e-mail, community forums, blogging, wiki: subscription to mailing lists, e-mail and internet projects, web searching strategies (navigating, searching, selecting, and saving information), videoconferencing, designing web pages, freeware and shareware, evaluating website resources, virtual

fieldtrips, learning opportunities using the web, and netiquette.

Pedagogical application of ICT tools: Specific use of application software in different subjects, appropriate ICT tools and pedagogy, unit plan integrating ICT tools, approaches to managing ICT-based learning groups, assessment of learning, electronic portfolio and assessment rubrics, creating teacher and student support materials, supporting students with special needs.

ICT for professional and personal productivity*:* ICT for administration, record keeping, reporting and transfer of information, attendance, research, careers in computers and professional development opportunities.

Learner centered approach: learner-centered nature of the approach must be used by teacher educators and trainee teachers during digital teaching.

Exploration: Teacher educators then explore the use of the application. They need support to put this ICT application into practice in a timely manner and to reflect on its effectiveness.

Only after teacher educators have gone through these stages are able to adapt their practice to make better use of ICTs, and then move toward the final stage to become innovators and modelers of excellent practice for their students and colleagues (UNESCO, 2002).

In addition to the hands on experiences every training program could include an ICT awareness /familiarity quiz, exhibitions of ICT books and multimedia CD ROMs by commercial agencies, poster sessions on success stories, case study presentations and analysis, ICT based demonstration lesson in the schools (whole class, small group, internet based, etc) exhibitions and presentations by commercial agencies on emerging technologies.

APPROACHES TO BE USED BY TEACHER EDUCATORS AND TRAINEE TEACHERS

The following approaches can be used by teacher educators and in-service mentor teachers who are responsible for promoting technology training to trainee teachers through their teacher education and field experiences:

1. Collaboration

Collaboration approaches and co-operative learning, here used interchangeably as done by Johnson and Johnson (2008), refer to technology training situations where two or more trainee teachers "work together to maximize their own and each other's learning". To develop trainee teachers' digital competence, training should be offered through synchronous and asynchronous collaborative knowledge-building technologies including online forums, discussion boards, and learning networks, social networking sites and other interactive Web 2.0 applications, weblogs or blogs, computer-mediated communications software and virtual environments, and collaborative software. Through a collaborative writing task where the trainee teachers had to write a reflective essay, they "get acquainted with collaborative tools, and develop skills and competencies in implementation in educational tasks" (Brodahl et al., 2011, p. 90).

2. Metacognition

Metacognition approaches or reflective practices usually revolve around what Schön (1983) refers to as reflection-on-action, where trainee teachers analyze and document their thoughts, reactions, and/or consequences of their actions surrounding a situation involving ICT. The use of online bulletin-boards, forums, blogs, or discussion groups and multimedia artifacts and video cases to stimulate the trainee teachers' reflection and learning as well critically assess classroom uses afforded by websites and software appropriate for the secondary school grade level.

3. Blended learning

Blended learning or a multimedia instruction approach for ICT-training of trainee teachers through the use and combination of both face-to-face and online teaching, and the combination of different modes to create meaning through electronic media such as with video, animations, diagrams, photos, illustrations, written and spoken texts (Garrison & Kanuka, 2004; Mayer, 2014). This approach involved developing trainee teachers' digital competence through technology rich experiences in their teacher education using blended learning or multimodal teaching, having trainee teachers interact with and create digital artifacts, and engage in various multimedia activities.

4. Modeling

Modeling involves teacher educators, in-service teachers, mentors, and peers promoting particular practices and views of learning through "intentionally displaying certain teaching behaviour", which could play an important role in shaping "trainee teachers' professional learning" (Lunenberg, Korthagen, & Swennen, 2007, p. 589). This involves demonstrating how to use PowerPoint, the Internet, creating a webpage using html code, and the use of data logging tools.

5. Authentic Learning

Authentic learning refers to a "pedagogical approach that situates learning tasks in the context of real-world situations" or "the context of future use" (Herrington, Reeves, & Oliver, 2014, p. 401). By using this approach trainee teachers develop their digital competence, while being assigned to explore, create, and assess digital technologies for use in their future classrooms. This approach can also be used in teacher education programs using field experience where teacher educators and in-service mentor teachers can actively support trainee teachers' lessons with technology during their teaching practicum in an attempt to "transfer technological skills and processes learned during the method classes into the student teaching experience, and later."

6. Student-Active Learning

A student-active learning approach or learning by doing involves a shift of pedagogical control from the teacher to the individual where learners are supported, actively engaged, and involved in meaning making and the learning process. In this, trainee teachers learn to integrate technology for their future teaching by actively engaging in learning and meaning-making processes through experiencing, interacting with, and creating classroom-related digital resources

7. Assessment

An assessment approach can be used in ICT-training of trainee teachers through the use of various types of technology-based forms of assessment. This includes course designs and learning environments, but also more programs specific assessment forms and requirements such as electronic portfolios and ICT related assignments.

8. Bridging Theory/Practice Gap

The gap between theory and practice refers to the enduring tension and disconnect trainee teachers experience between the content taught in teacher education campus-based courses, and the realities of teaching facing them during their field experience and future teaching profession (Zeichner, 2010). Through this approach, the trainee teachers learn how to integrate technologies with appropriate pedagogy into their classroom teaching through an online learning environment and related Internet websites, and that the use of a technology team-teaching model (TTT) leads the pre-service teachers to a better understanding of the theories and stimulates their thinking for technology teaching.

CONCLUSION

Educational reform efforts have consistently purported student-centered practices as the most effective way to prepare the students for the 21st century (Voogt, 2013). To achieve the kinds of technology uses required for 21st century teaching and learning, teacher educators and trainee teachers need to be helped to understand how to use technology to facilitate meaningful learning which may enable students to construct deep and connected knowledge, to be applied in real class room situations. Hence, it is very important to stimulate teacher educators and trainee teachers to use digital tools and content for innovative learning. It is the primary duty of TTIs that they should provide all the facilities, equipments, computer labs, proper computer training for teacher educators and trainee teachers. If the teacher educators and trainee teacher have good knowledge, skills and competency to use these technologies only then they can disseminate their knowledge among 21st centaury learners. In addition to this, teacher educators and trainee teachers must have a positive attitude, high self efficacy and good knowledge and skills to prepare their teaching by using various digital tools and practice in real class room situations.

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