Indian Journal of Educational Technology
Vol.1 (2), July 2019

Research Article

Capacity Building of Teacher Educators for e-Learning Tools: An Experimental Study

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Abstract

The integration of technology in our education system has generated a necessity to place digital practices among teacher educators, who need to use computers more than anybody else as they help in shaping the future teachers. An experiment to study the effect of training on knowledge and acquisition of skills to use e-Learning Tools among teacher educators was conducted. The treatment was designed in form of a training programme. The Analysis, Design, Develop, Implement and Evaluation (ADDIE) model was designed. The results indicated the positive affect of training on the knowledge acquisition and on the skills to use e-learning tools by teacher educators.

Keywords: Teacher Education, Teacher Educators, e-Learning Tools, ICT, ADDIE

Introduction

E-learning uses the various technological tools to reach and give information via internet for the learning process. These tools can make teaching and learning more efficient and productive by enhancing and facilitating the teachers and learners both. This can make the students more creative and independent if the teacher is not present in the classroom. There is wide range of e-learning tools which provide learner the opportunity to create their own digital environment and learn as per need. e-learning is designed for variety of learners and has given range of tools including e-mail, blogs, wikis, podcasts, screen casts, and video streaming etc. which makes the e-learning system more effective.

Government of India (GoI) is increasing awareness about e-learning in tertiary institutions. This has been taken place as blended approaches before going into complete e-learning mode. Blended e-learning involves a combination of the conventional face-to-face and online technology-based learning (Wang, 2010). According to Singh (2003) as cited in Yushu (2006), "*blended e-learning mixes various event-based activities, including face-to-face classroom, live e-learning and self-paced learning. Teachers, being a part of this system, have to embrace technology, so that they can create skilled professionals for our digitized nation*" (Umoh and Akpan (2014)).

According to UNESCO (2010), "*the training of teachers should remain a central focus for maintaining the quality though it is facing a challenge across the world. UNESCO facilitates initiatives related to the integration of ICT in teacher education by supporting existing teacher development communities of practice, multi-stakeholder partnerships, capacity*

building of policy-makers and the development of international standards on ICT competencies for teachers."

NCTE (2014) has come up with new curriculum frameworks, which have modified the complete structure of Teacher Education in terms of duration, curriculum, introduction of new courses, etc. ICT has been included as a compulsory part of curriculum for the first time. As per Teacher Education Planning Handbook (2015-2016) "*Technology in Teacher Education is to be actively integrated in all TE institutions. Satellite transmission communication, content development, MIS, interactive and self-paced learning should be the focus areas for bridging the divide digitally*."

Under the scheme of Pandit Madan Mohan Malaviya National Mission on Teachers and Teaching (PMMMNMTT)various schools of education in the country has set up centres which are working in professional development of teachers. This has provided opportunity to teacher educators to get training at national level and enhance their competencies (PIB on Status of National Mission on Teachers Training (2018).

Need and Importance of study

Though many studies have reflected that the experiments and projects are beneficial for students and teachers but the studies on teacher educators are still negligible which has made the researcher to focus on this. Different ways of experimentation including developing multimedia packages (Khirwadkar, 2008), open source tools for mathematics (Joshi and Pandey, 2012), intel@teach essentials course for teachers (Light, 2009), teachers training through ODL by using MOODLE (Kannan and Narayanan, 2010), E-content for physics (Gershom and Mohanasundaram, 2008) and ICT training module (Gulhane, 2011) have been done to study the impact on teachers as well as on students. Potchelve (2010) studied on various instructional approaches for instruction through ICT and Senapaty (2012) used TPACK model for integration of technology which may be included in education system to improve learning. Smith and Greene (2013) conducted an e-learning programme during teaching practice of pre-service teachers and showed that it was helpful and successful. Martin et al. (2013) also developed a multimedia instructional module based on the ADDIE model which seemed to be effective on the learners. The studies show that the knowledge, attitude, skills were affected and they were ready to adopt technology for their professional growth. So, the need of conducting an experiment for teacher educators is preferred by the researcher.

Operational Definition of Key Terms

- e-Learning Tools –These are associated with e-learning for managing and handling synchronous and asynchronous forms of electronic communication.' They may be chat, email, blogs, wikis, discussion forums, virtual classroom, testing tool, etc.

- ADDIE Model - The ADDIE model of instructional design is a generic instructional model providing an organized process for developing instructional materials.

- Competency - Competency is referred to 'A measurable pattern of knowledge, skills and other characteristics required to operate various e-learning tools successfully.

Objective of the Study

To study the effect of training on knowledge acquisition and skills to use e-learning tools.

Hypotheses of the Study

H_{01}. There is no significant difference in the scores of teacher educators towards knowledge acquisition in pre and post- test.
H_{02}. There is no significant difference in the scores of teacher educators towards skill acquisition in pre and post- test.

Sample for the Study

Thirty (30) teacher educators from Teacher Education Institutions (TEIs) affiliated to Guru Gobind Singh Indraprastha University (GGSIPU), Delhi. The experiment was conducted in confronted situation at one Teacher Education Institution (TEI) only.

Delimitation of the Study

1. Experimental study was limited to only 30 participants randomly selected from the TEIs and conducted in confronted situation as one TEI only.
2. This study focussed on selected e-learning tools for which training has been provided to teacher educators.
3. Both the hypotheses were statistically tested at 0.05 level only.

Method and Procedure

Before this experiment, at first, a study was conducted to analyse the level of competency of teacher educators towards e-learning tools. Results of the study indicated that the competency for using the e-learning tools among teacher educators was less than average. For this research, single group pre-post- test design was chosen as the method which includes all those participants which were the part of survey. This design has been selected because random assignment of participant into experimental and control group was not possible to make. It is often termed as 'compromise designs' (Kerlinger, 1970), an apt description when applied to such educational research where the random selection or random assignment of schools and classrooms is quite impracticable. The researcher has selected a pre-experimental design i.e. the one group pre-test – post-test, in which data was collected on participants' level of performance before the intervention took place (pre-), and after the intervention took place (post). Researcher has selected a group of teacher educators of various Teacher Education Institutions (TEIs) randomly, from those, who were the part of the survey for the treatment for knowledge acquisition and acquiring skills to use e-learning tools. A three (03) days (daily 9:30 am to 5:30 pm) face to face workshop was organized as the treatment. To study the effect of training in the form of treatment, a self-developed and

validated test was applied on the teacher educators as pre-test and post -test, titled "Test for Knowledge and Skills (TKS)". This test has two parts: Knowledge based Multiple Choice Questions and Skill based on Three (03)-point rating scale.
The researcher has planned the experimental by popular instructional design model i.e. ADDIE MODEL, "ADDIE" stands for Analyze, Design, Develop, Implement and Evaluate.

Procedure

The ADDIE model has been used in this research in the context of organization of a treatment for teacher educators and also for designing the content for the treatment.

Analysis

1. Need Analysis for Training

Before the research, an analysis was done by the researcher to study the need of the training. The competency of teacher educators towards e-learning tools has been studied on four dimensions- Basic Computer Competency, Advanced Computer competency, Basic Internet Competency and Advanced Internet Competency (Gupta & Singh (2018)). The major outcomes indicated that in Basic computer competency 66.09% teacher educators are competent, in Advanced computer competency 42.83% teacher educators are competent, in Basic internet competency 54.97% teacher educators are competent and in advanced internet competency only 18.09% teacher educators are competent. The results showed that teacher educators have very less competency to use e-learning tools. One of the factors was due to lack of training.

These results indicated that the teacher educators need to be oriented and trained about e-learning tools, so that they can become competent and use these tools on regular basis in their teaching and other academic work.

2. Context Analysis

Through survey, the researcher has identified that the teacher educators are negligible competent to use e- learning tools. So, a workshop was planned to see the impact of training on teacher educators for usage of e- learning tools. The institution for the workshop was selected once the permission by the Head of the institution was sought. Only one TEI was selected which is affiliated to Guru Gobind Singh Indraprastha University, Delhi.

3. User Analysis

The training was given to randomly selected teacher educators of various institutions teaching B.Ed. course. It was provided by the results obtained through analysis of the scale developed for advanced internet competency. The training was implemented by the resource persons specialized in ICT and who have earlier experiences and undertaking such workshops in various organizations.

4. Learner Characteristics

There were few characteristics of teacher educators, which were identified through the survey, i.e. Age of teacher educators lies between 25 – 50 years approximately; they have some basic competency of using e- learning tools. They were interested to join the training and to learn the skills of using e- learning tools. It was also been identified that most teacher educators have internet access either on desktop at the office or personal laptops or mobile phones. Almost all the teacher educators were comfortable in English medium which helped in the development of modules in English medium only but it was decided that care will be taken to deliver the instruction bilingual.

5. Analysis of the Content

The researcher then analyzed the different e-learning tools for which treatment has to be provided to the teacher educators. The e-learning tools useful in the area of teacher education were identified and discussed with the experts. With the help of this analysis, the e- learning tools for experiment were selected. The selected e- learning tools were:

1) Various Applications of Google i.e. Gmail, Google doc, Google Form, Google Sheet, Google Groups, Google Drive, Google calendar & Google Hangouts.
2) Creating and editing a Wiki Educator page.
3) Creating a Screen cast and making video tutorials.
4) Conducting Web conferencing/virtual meetings through Skype, Google hangouts and WizIQ.
5) Understanding LMS, Creative Commons Licenses and MOOCs.

Design

1. Design for Training

The workshop was designed on the basis of need analysis. A three days' workshop was planned on the theme 'e-learning Tools for Teacher Educators' in one of the affiliated institution of GGSIP University having the objectives: to orient teacher educators for usage of e- learning tools in their teaching learning process, to help them understand the various e-learning tools which may be used in education, to make them practice the usage of various e-learning tools for communication, pedagogy and collaboration and to enhance their technological skills through e- learning tools. Various sessions of the workshop were designed for three days.

2. Planned Instructional Strategies

- Lecture cum demonstration by the experts for the practice of various e- learning tools.
- Discussion among the participants of the workshop and the experts (mentors) before and after each planned session.

- Discussion through online platform in which a Google group was created for the threaded discussions among participants.
- Self-directed learning in which the participants saw the video tutorials made by the researcher and uploaded on Social Network. Along with this, the video tutorial was e - mailed to the participants for their learning at their own pace.
- Collaborative learning environment created through Google docs for writing their opinions. Some activities were also assigned to participants, for their completion and sharing it with other participants.

3. Planned Delivery Methods

- **Face to face and online mode (Synchronous and Asynchronous)**: Presentations in the workshop through face to face mode by the experts in which they demonstrated the usage of various e-learning tools. Various activities were also planned for the online mode like working on Google groups, Google docs, Gmail, video lectures.
- **Multimedia presentations face to face**: Some presentations along with the demonstrations were given in multimedia form explaining the usage of e-learning tools in education along with the conceptual understanding of e-learning tools.
- **Multimedia presentations shared through online groups**: Multimedia presentations of all the sessions were shared though Google Group and participants were allowed to download them.
- **Screencasts shared on Social Network**: Screencasts of all the tutorials were prepared through screencasting software and were uploaded on Social network, which could be downloaded by the participants for future use also.
- **Discussion groups on Google:** Groups made on Google for the threaded discussions to resolve the query (if any) remained unsolved in the face to face sessions.
- **Modules shared through email**: Modules developed by the researcher were shared through mail and groups for the participants.

Various activities were planned during the sessions to give hands on learning to all the participants.

4. Assessment Strategies

Assessment was done through activities given after the instruction in the experiment. The experts and the researcher assessed the activities done by the participants simultaneously and resolved their problems, if any.

5. Design for Content

Design of the modules was planned according to the aims of the experiment. Modules for the study were developed by the researcher and some modules were taken from the internet,

which were under Creative Commons (CC) License. Modules for the e-learning tools created in the form of .pdf file by using screenshots along with the text and distributed to the participants in form of soft copy. Along with this, the multimedia presentations and screencasts were also ready and shared through various online modes like Gmail, Google+, Google Group, etc.

Development of content

In the development phase, the researcher created and gathered the content of experiment as was suggested by the design phase. Two types of modules (textual and video tutorials) were developed by the researcher and the third type (Multimedia presentations) was developed by the experts, who were invited as resource persons in the workshop. Developed modules were content validated to ensure that the developed modules fulfil the aims of the experiment.

Table 1: Content for the Experiment along with instructional strategy and delivery method

S. No.	e-learning tool	Instructional Strategy	Delivery method
1	Gmail	Lecture cum Demonstration, Self-Directed Learning	Face to face, screencasts, email
2	Google Group	Lecture cum Demonstration, Collaboration, Self-Directed Learning	Face to face, screencasts, email, Discussion Groups
3	Google Calendar	Lecture cum Demonstration, Collaboration, Self-Directed Learning	Face to face, screencasts, email
4	Google Drive, Google doc, Google Sheets, Google forms	Lecture cum Demonstration, Discussion, Collaboration, Self-Directed Learning	Face to face, screencasts, email
6	Open Educational Resources (OER)	Lecture Discussion, Self-Directed Learning, Collaboration	Face to face, email, Multimedia
7	WikiEducator	Lecture cum Demonstration, Discussion, Collaboration, Self-Directed Learning	Face to face, email, Multimedia
8	Virtual meeting-Skype, WiZiQ	Demonstration, Discussion, Self-Directed Learning	Face to face, email
9	Screencasting-Jing	Demonstration, Discussion, Self-Directed Learning	Face to face, email
10	Learning Management System (LMS)	Lecture Discussion, Self-Directed Learning	Face to face, email, Multimedia
11	Massive Open Online Courses (MOOCs)	Lecture cum Demonstration, Discussion, Self-Directed Learning	Face to face, email, Multimedia

Implementation (experimentation)

Experiment was conducted as per the schedule planned for the training programme. During the implementation phase, the experts delivered the content according to the modules and suggested instructional strategies.

Evaluation

Evaluation was also done in two phases i.e. before the treatment and after the treatment. For evaluation purpose a Pre and post- test (Test for Knowledge and Skills) was developed by the researcher. This was based on knowledge and skills for specific e-learning tools for which the training was provided to the participants. A pre-test was administered on the teacher educators (participants of workshop) on the first day of workshop and the same test was administered as Post-test after the training.

Analysis of Data

The collected data was analyzed by applying the statistical technique t-test to study the effect of training on knowledge and skill of teacher educators. Out of 30 sample only 26 participants responded completely to the tool. So, the analysis was done for the sample of 26 only.

Results and Discussion

The objectives of the study is to study the effect of training on knowledge and skill acquisition of e-learning tools among teacher educators and the hypothesis was further divided into two sub parts:
H_{01}: There is no significant difference in the scores of teacher educators towards knowledge acquisition in pre and post- test.
H_{02}: There is no significant difference in the scores of teacher educators towards skill acquisition in pre and post- test.

Table 2: Summary of t-test for difference among Pre- & Post -test (Knowledge based)

Knowledge Based test	N	Mean	S.D.	t
Pre-Test	26	12.88	17.07	5.94*
Post Test	26	18.46	5.86	
* p > 0.05 (significant at 0.05 level)				

Results of t-test (Table 2) shows that there is a significant difference in mean scores on knowledge acquisition dimension in pre-test and post- test. The difference between the pre-phase (M=12.88, SD=17.07) and the post phase (M=18.46, SD=5.86) is statistically significant as t- value is 5.94, p > 0.05 level, so the hypothesis (H_{01}) 'There is no significant difference in the scores of teacher educators towards knowledge acquisition in pre and post-

test' is rejected. This analysis shows that there is a significant difference between mean scores of knowledge acquisition of teacher educators in the training group. This clearly indicated that the knowledge of teacher educators for e-learning tools in the training group has improved due to the training provided to them and confirmed that training effects the knowledge of e-learning tools.

Figure 1: Mean difference among Pre- & Post -test (Knowledge based)

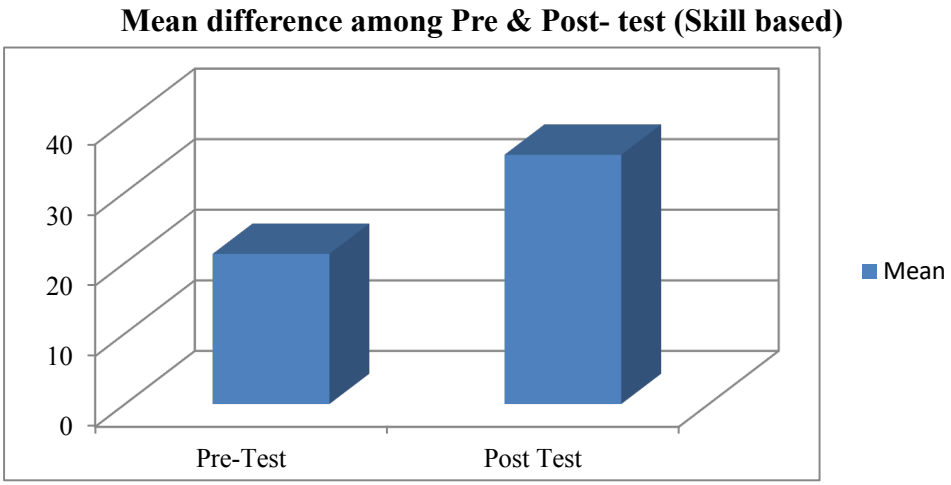
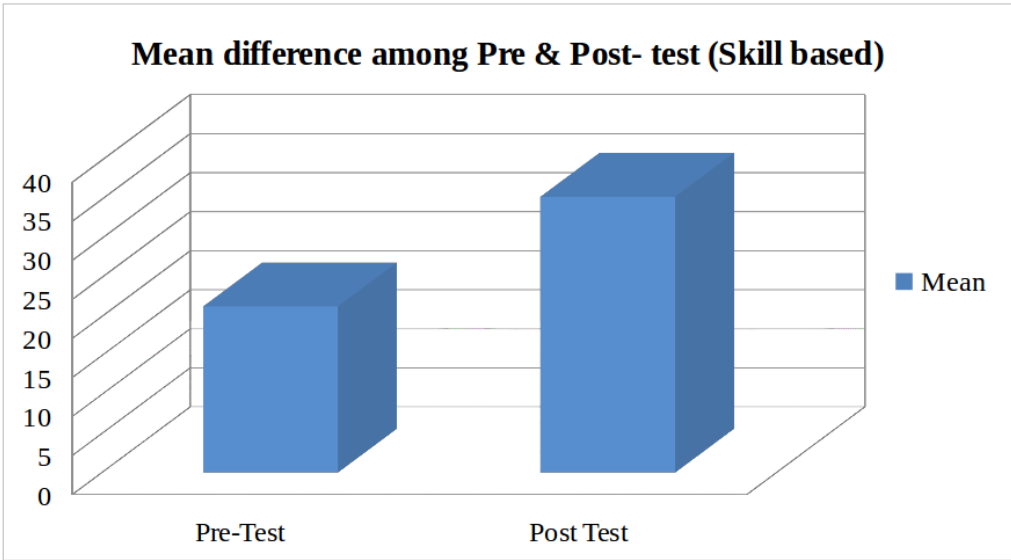


Table 3: Summary of t-test for difference among Pre- & Post-test (Skill based)

Skill based test	N	Mean	S.D.	t
Pre-Test	26	21.27	33.64	10.44*
Post Test	26	35.31	13.34	
* p > 0.05 (significant at 0.05 level)				

SD and t-ratio shown in Table 3 is showing that there is a significant difference in mean scores of skill acquisition in pre-test and post- test of training group. The difference between the pre-phase (M=21.27, SD=33.64) and the post phase (M=35.31, SD=13.34) is statistically significant, as t value is 10.4, $p > 0.05$ level, so the hypothesis (H_{02}) "There is no significant



difference in the scores of teacher educators towards skill acquisition in pre and post- test" has been rejected. This analysis showed that there is a significant difference between mean scores of skill acquisition of teacher educators in the training group. This clearly indicated that the skill of teacher educators for e-learning tools in the training group is affected due to the training provided to them.

Figure 2: Mean difference among Pre- & Post-test (Skill based)

Discussion on Findings for Effect of Training

In the experiment**,** training was provided to teacher educators for various e-learning tools and findings have indicated that the training has a significant impact on both knowledge and skills of using e-learning tools of teacher educators. This result is in tune with Gulhane (2011), Karthikeyan, Shanmugaraja and Jayaraman (2012) and Parida (2010) who also found that training has a significant impact and it is a major factor affecting the usage of e-learning tools.

Many researchers suggested that training has impact on using technology Mehra and Mital (2007). Demetriadis, et al. (2003) reached similar conclusions in their research study that training efforts are generally welcomed by teachers but consistent support and extensive training is necessary in order to consider them able to integrate ICT in their teaching methodologies.

Summary and Conclusion

The usage of e-learning tools is most important now a day in teaching learning process and with the development of blended and flipped learning strategies it could be enhanced. Teacher education curriculum may include the latest topics on e-learning tools as per the requirement of next generation teachers and it may also be integrated in proper way. The policy makers may develop some guidelines in which the innovative approaches like blended, flipped learning; online learning in teacher education programmes may be elaborated. Training plays a very important part in developing the skills and in a similar way ICT component may be embedded in every training programme for teachers. Though many Teacher Education Institutions are lacking the necessary infrastructure, technical support and time but we should encourage teacher educators to integrate ICTs for implementing the curriculum and various other administrative works as well. They should be acceptable towards new approaches of teaching. They should inculcate positive attitude to accept the technology.

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