

A STUDY ON THE USE OF ICT IN PRE SERVICE TEACHER EDUCATION IN DELHI

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ABSTRACT

In using technology in the classrooms, the efficiency of the teachers is directly proportional to the outcomes it follows. In the present study, the researcher tried to study the impact of ICT on the achievement level (in Mathematics Education) of elementary teacher trainees in Delhi and their opinions about using ICT in the classroom. The elementary teacher trainees of Delhi were the sample population for the current study. The opinions from various teacher educators, parents and teacher trainees were collected. The qualitative and quantitative data collected from different stakeholders were analysed and synthesised. It was found that the learning of all trainees was improved through the use of ICT in the classroom. However, the high achievers were more benefited than the low achievers.

Moreover, trainees think that the use of technology in their classrooms has a positive impact on their academic scores, and they find learning easy with the use of technology. Trainees did not accept the positive role of technology in the learning of co-curricular subjects. Further, trainees with better technological infrastructure available in institutes performed better on achievement tests. Despite having better technological infrastructure, trainees do not like the idea of total dependency on ICT with the 'no teacher in class' method. They preferred and voted for the active role of educators in the classrooms. However, parents (mainly mother) consider that ICT has a positive impact on trainees' learning. The interviews with teacher educators concluded that the trainees' basic writing, reading, calculating etc., were improved significantly by using ICT. However, they refused to accept any pedagogical advantage of using computers/overhead projectors in the teacher training programme.

KEYWORDS: Information and Communication Technology (ICT); E-learning; Achievement level; Mathematics Education; classroom; Elementary Teacher Education

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INTRODUCTION

Information and Communication Technology (ICT) does not require an introduction at all. It is gaining more and more critical in the current world scenario. No part of human life is untouched by technology; from waking up with the alarm clock and having coffee with the automatic coffee maker to sleeping with reading digital books and using reminders, we are using technology excessively in every corner of our lives.

Education, as no exception, has been entirely influenced by the use of technology. In the previous decade, the focus was on the education of technology, but now we are more concerned with how it is being used to impart knowledge among students, that is to say, education through technology. Aguilar (2012) states that "The transformation of ICT has allowed these (gadgets) to become educational tools that could further improve the educational quality of the student and revolutionize the way information is obtained, managed and interpreted". Thus, the combination of ICT and Education creates a unique learning context in which kids play an essential part

in the learning process; time is no more a barrier, and neither is the distance.

The introduction of ICT in this era has brought about a new and revolutionary change in how education is delivered to the young ones. In terms of benefits, it has tremendous effects and multiplying impacts on school-going students' achievement level. According to Parra (2012), technologies are heavily impacting our schools in the way they function. It has an impact on the way teachers teach and the way students learn. Technology has become one of the essential parts of education nowadays. According to Diaz-Barriga (2013), the inclusion of ICT into education is gaining more importance in today's world, and its implications are going beyond technological tools. It helps nurture the educational environment. Kids of the present century are born in high tech time and are more technologically advanced; this means that their learning needs and learning style directly related to technology. Not using technology in education will be a disadvantage to the kids. This is the reason why the idea of teaching and learning is primarily based now. The teachers' efficiency and the familiarity of kids with technology play a

significant role in educational effectiveness. The use of ICT should be strengthened in every part and at every level of education.

To prepare the future teachers technologically advance, we require structural changes in the pre-service and in-service teacher education. As the teachers' efficiency in using technology in the classroom is directly proportional to the results/outcomes, it follows. It is amusing to think about the impact of the use of ICT in Teacher Education.

It inspired the researcher to study the impact of the ICT on the achievement level of teacher trainees of Delhi, opinions of teacher trainees about the use of ICT in their classrooms and views of different stakeholders about using ICT in pre-service teacher education.

OBJECTIVES

The followings were the aims and objectives for the current study.

1. To study the impact of the ICT on the achievement level (Exclusively on paper titled "Mathematics Education") of teacher trainees of Delhi.
2. To study the opinions of teacher trainees about the use of ICT in their classrooms.
3. To study the views of different stakeholders about the use of ICT in pre-service teacher education.

LITERATURE REVIEW

The use of ICT is increasingly playing a prominent role in teacher education. It is used globally and locally. ICT is thoroughly used in agriculture, banking, insurance, commerce, production, engineering, medical and education. "ICT has the potential to contribute to substantial improvements in the educational system" (Moursund, 2005). However, we all know the level of potential we have reached till now. "It is also widely acknowledged that ICT can be used to improve the quality of teaching and to learn in the educational system" (Yusuf, 2000).

According to Castro Sanchez and Aleman (2011), students and teacher-trainees are more engaged in using technology and computers for their study. They access the information, select the relevant one, organize it, and use it using technology. In short, ICT supports self-direct learning and support learners in their learning. Chai, Koh and Tsai (2010) state that ICT ensures better learning. It provides more creative solutions to different problems in skill development and learning. The use of e-

books, e-magazines, podcasts etc., are creating a creative and favourable learning environment. According to Koc (2005), ICT helps in communication, sharing, and working together collectively; in other words, it promotes collaborative learning. This is more importantly used in teacher education for understanding the different practices in different parts of the world to improve the kids' learning outcomes.

Further, "ICT helps learners focus on higher-level concepts rather than less meaningful tasks" (Levin and Wadmany, 2006). In McMahon's study (2009), it was shown that "there were statistically significant correlations between studying with ICT and the acquisition of critical thinking skills". In contrast to the above benefits, ICT can make the teacher trainees more anxious. According to Frederick, Schweizer and Lowe (2006), "...mobility, special needs, and anxiety over standardized test results are the main challenges associated with ICT use". There was no research regarding the impact of technology on pre-service teacher education in Delhi.

METHODOLOGY AND RESEARCH DESIGN

The opinions from various teacher educators, teaching to pre-service teachers, were collected. Around 10 parents were

also interviewed to gather their opinion on the theme, the impact of ICT on teacher trainees' learning. The qualitative data collected from different stakeholders were analysed and synthesized. Many policy documents were also analysed for findings on the impact of ICT on teaching and learning. 100 pre-service teacher trainees were the significant sample population for the current study, and 12 teachers were interviewed. Their opinions were recorded from virtual (telephone) and face to face communication and through record sheets. An experimental research design was followed for understanding the impact of the ICT on the achievement level of trainees. The pre and post-test were conducted, and the test item included pedagogical content-based questions. Some data was extracted from the secondary sources and also from the literature available. The collected data was analyzed statistically; the data has been represented in percentage throughout the paper for keeping the comparison simple. This research was done from August 2019 to October 2019

RESULT AND DISCUSSION

A pre-test of Mathematics Education was conducted as a baseline test to compare scores on all trainees. To assess the impact of using ICT on the teacher trainees'

learning (exclusively on Mathematics Education), the trainees of both the years were divided into 2 groups, namely 'A' and 'B'. These groups were formed randomly. Group A was an experimental group, while group B was a control group.

These two groups were taught the following units (please refer to table-1). These both units, i.e. Unit-3 and unit-4, were taught to different groups. The first

group ('A'- The experimental group) was taught using ICT tools (audio, videos, podcasts, PPTs, etc.), and the second group ('B'- The control group) was taught using the standard method (without using ICT tools).

Then the post-test on the subject matter taught was conducted. The questions of pre and post-tests were based on the subject based pedagogy of the content.

Table 1: Content of Experiment

| S. No. | D. El. Ed. 1 st year | D. El. Ed. 2 nd year |
|--------|---|---|
| 1 | Unit-3 Approaches to teaching Mathematics | Unit-3 Practical Arithmetic and Statistics |
| 2 | Unit-4 Joy of Learning Mathematics | Unit-4 Geometric Ways of Looking at Space and Shape |

Table 2: Scores of Pre and Post Test

| S. No. | Year | Group | Pre-test | Post-test | Gain (Post-Pre) |
|--------|------------------------------|-------|----------|-----------|-----------------|
| 1. | D.El.Ed 1 st Year | A | 56.7% | 71.5% | 14.8% |
| | | B | 56% | 58.7% | 2.7% |
| 2. | D.El.Ed 2 nd Year | A | 62.9% | 76.3% | 13.4% |
| | | B | 63.3% | 66.8% | 3.5% |

Note: the marks shown in the above table are the aggregate (mean marks) in each class/group.

The use of ICT has shown considerable improvements in the academic results for the test administered. The above table shows a significant improvement in trainees' achievement level using ICT in a classroom for both year trainees. However, we could observe no significant

improvement in the control group (Group-B). The comparison of scores of group A and B is exact that the use of technology may increase teacher trainees' academic achievement.

Form table-2 *“In the experimental group, we have seen a larger increase in the*

achievement level of trainees. In the 1st year, there is an increase of 14.8% in the experimental group's achievement level compared to a 2.7% increase in the score of the control group. Similarly, for 2nd year there is a sharp increase of 13.4% in comparison to a 3.5% increase."

Therefore, there is a significant difference between achievement level on subject pedagogy in Mathematics Education and

classroom transaction of the content using ICT. Thus, to conclude, we can say that the use of ICT in the classroom may significantly increase teacher trainees' achievement level.

The use of ICT in the regular classroom has impacted the learning outcomes of the trainees. The further analysis of these marks obtained is given below in the following table.

| S. No. | Achievement | Pre-test | Post-test | Gain (2-1) |
|--------|---------------|----------|-----------|--------------|
| 1. | Low achiever | 36.1% | 41.2% | 5.1% |
| 2. | High achiever | 72.6% | 83.3% | 10.7% |

Note: the marks obtained in the pre-test of group A were the determinant for determining the low and high achievers, and the marks are mean.

Observation of the above table makes us realize that the learning of all trainees was improved through the use of ICT in the classroom. High achievers were more benefited than low achievers. However, the impact may be short term, and the study may continue to assess the long-term impact.

From different secondary data, we know that when comparing the institutes based

on technological infrastructure, that is to say, having more or less number of ICT tools, it was found that the institutes with higher computer/projector to pupil ratio performed better in achievement tests. Thus, the ICT tools available in the institutes have a significant impact on teacher trainees' learning.

After obtaining the impact of ICT, we tried to assess trainee teachers' perception of technology in their learning. To assess the opinions of the following information is sought out of them through questionnaires.

Table 3: Do you find learning easy with the use of ICT in classes?

| S.No. | Opinion | Trainees' response |
|-------|-----------|--------------------|
| 1. | Always | 19% |
| 2. | Mostly | 51% |
| 3. | Sometimes | 28% |
| 4. | Never | 02% |
| Total | | 100% |

The trainees' responses were mixed, but most of the trainees said they could learn the subject matter quickly if there is a use of ICT in the regular classrooms. The

uneasiness in learning with ICT is not a concern here. Only 02% of the total trainees could not learn with ease if ICT is used in class.

Table 4: Are you satisfied with the quality of ICT support that is being provided to you?

| S.No. | Opinion | Trainees' Response |
|-------|---------|--------------------|
| 1. | Yes | 58% |
| 2. | No | 19% |
| 3. | May be | 23% |
| Total | | 100% |

58% of the trainees responded that they are satisfied with the ICT support, which is being provided to them during their course

duration. However, a significant share of students is found to be dissatisfied, and almost 23% were found to be unsure.

Table 5: It is difficult to learn using only the ICT method (No face to face teacher meeting-in person mode).

| S. No. | | Trainees' Responses |
|--------|-------------------|---------------------|
| 1. | Strongly Agree | 11% |
| 2. | Agree | 40% |
| 3. | Neutral | 21% |
| 4. | Disagree | 23% |
| 5. | Strongly Disagree | 05% |
| Total | | 100% |

Around 51% of trainees agree that it is difficult for them to learn using the only ICT with no teacher in class; 11% of trainees endorsed it with pressure. More than half of the trainees find it difficult to learn any task or assignment if the instructions are delivered using ICT only and with no teacher's physical presence in the classroom. When we further enquired to assess reasons for the same, we got the following perceptions;

Teachers are a mandatory part of classrooms; their presence is essential. It is challenging to believe in machines only with no support of teachers. ICT should not eliminate teacher from classrooms-Trainees.

When parents were interviewed about the impact of ICT on their wards' learning, they responded positively. Parents (mainly mother) consider that ICT has a positive impact on trainees learning *because they are using computers!*

Table 6: These subjects can be taught (in teacher education) effectively using ICT.

| S. No. | Subjects | Strongly Agree | Agree | Neutral | Disagree | Strongly Disagree |
|--------|--------------------------|----------------|-------|---------|----------|-------------------|
| 1 | Language | 26% | 34% | 11% | 19% | 10% |
| 2 | Mathematics | 9% | 11% | 25% | 35% | 20% |
| 3 | Science | 10% | 19% | 21% | 27% | 23 |
| 4 | Social Science | 22% | 41% | 17% | 12% | 8% |
| 5 | Arts and Craft Education | 1% | 5% | 10% | 34% | 50% |
| 6 | Physical Education | 7% | 7% | 28% | 39% | 29% |

In the above figure, the trainees' responses to understand their inclination toward using ICT for different subjects are recorded. Trainees think that language teaching can be made effective using ICT, and around 60% of trainees responded to use ICT in the language classroom. The picture is quite the opposite for mathematics teaching; around 55% of

trainees disagree that the best method of teaching Math is through ICT. Further, trainees responded negatively to using ICT in co-curricular subjects such as Arts & Craft Education and Physical & Health Education. Trainees also responded positively to the use of ICT in social science classrooms.

Trainees prefer the traditional method of learning Mathematics, arts, health and physical education and other co-curricular subjects. They said that *traditional methods are more suitable and convenient*

for these subjects' learning because we feel more easy and comfortable in the traditional way. We find the old method as environmentally appropriate.

Table 7: Overall Impact of ICT on academic domain-Opinion of trainees

| S. No. | Impact | Response |
|--------|-----------|----------|
| 1 | Positive | 60% |
| 2 | Negative | 19% |
| 3 | No effect | 21% |
| Total | | 100% |

In the above table, the opinions of trainees about the impact of ICT on the academic domain are given. 60% of the trainees said that they were benefitted academically from the use of ICT. Around 19% of trainees responded negatively.

The interviews with teachers concluded that the trainees' basic writing, reading, calculating etc., were improved significantly by using ICT.

Table 8: I feel that the teacher's personal touch is missing when the teacher uses excessive technology?

| S. No. | Opinion | Trainees' Responses |
|--------|-------------------|---------------------|
| 1. | Strongly Agree | 24% |
| 2. | Agree | 56% |
| 3. | Neutral | 12% |
| 4. | Disagree | 08% |
| 5. | Strongly Disagree | 0.0% |
| Total | | 100% |

One of the significant adverse impacts of excessive technology use is that the teacher's personal touch is missing while using excessive technology. Around 80% of the trainee teachers responded that they find the teacher's personal touch missing in

the classes where ICT is used excessively. Trainees said that *"there should be a limit on the use of technology in classrooms; the role of the teacher should not be undermined."*

Interactions with teacher educators helped us in understanding the impacts of ICT on the learning of trainees. According to them (3/4th), trainees are more motivated and attentive when ICT is used in classrooms, and it also improves the communication, behavioural and process skills of trainees. However, many teachers refused to accept the computers' pedagogical advantage and overhead projectors in teacher training classrooms.

MAJOR FINDINGS

ICT can have tremendous effects on teacher trainees' achievement level because the use of ICT in the classroom facilitates creating a unique learning environment. Technologies are heavily impacting teacher education in Delhi. Preparing future teachers to teach effectively to the young generation (digital generation) is the need of the hour, and thus, some structural changes are required for the same. The insights gained from the study are summarized in the following points;

1. The use of ICT in teacher education shows considerable improvements in academic result in Mathematics Education.
2. There is a statistically significant relationship between ICT use in teacher education classrooms and achievement level on subject pedagogy of Mathematics Education among teacher trainees.
3. In teacher trainees, subjects like math, arts, and physical education are problematic if the technology is used excessively. On the other hand, the learning of languages is effective with more technological tools.
4. Teacher Educators refused to accept the pedagogical advantage of using ICT in the classroom. However, they accepted that the trainees' necessary skills in 3Rs and motivation level have improved. Further, the engagement level of the teacher trainees was found to be improved by using ICT.

CONCLUSION

No part of human life is untouched by technology, and thus we are excessively using technology in every corner of our lives. In this decade, Education is entirely influenced by the use of technology. It has brought about a new and revolutionary change in how education is delivered to the young ones. In the present study, the researcher was interested in finding out the Impact of the ICT on the achievement level (Mathematics Education) of teacher

trainees of Delhi, opinions of teacher trainees about the use of ICT in the classroom and views of different stakeholders about the use of ICT in pre-service teacher education. The teacher trainees of Delhi were the sample population, and the qualitative and quantitative data collected from different stakeholders were analyzed and synthesized using statistical tools.

It was found that the use of ICT has shown considerable improvements in the academic results of teacher trainees. Learning levels of all the trainees were improved, but high achievers were more benefited than the low achievers. Further, institutes with better computer/projector to pupil ratio performed better in achievement tests. Hence, the ICT tools available in the institutes have a significant impact on teacher trainees' learning. More than half of the trainees find it difficult to learn any task or assignment if the instructions are delivered without the teacher's physical presence in the classroom. "Teacher in class is important for learning",-they said. Trainees think that language teaching can be made effective using ICT, but the picture is quite the opposite of teaching mathematics and co-curricular subjects. Around 60% of trainees believe that their learning will improve by using ICT in the regular

classroom. Trainees are not in favour of using excessive technology in classrooms. However, teacher educators refused to accept the computers' pedagogical advantage and overhead projectors in teacher training classrooms.

The major limitation of the present study is that it measured only a short term impact. The long term impact may be assessed by continuing the study for a long time.

REFERENCES

1. Aguilar, M. (2012). Aprendizaje y Tecnologías de Información y Comunicación: Hacia nuevos escenarios educativos. *Revista Latinoamericana de Ciencias Sociales, Niñez y Juventud*, 10 (2), 801- 811
2. Parra, C. (2012). TIC, conocimiento, educación y competencias tecnológicas en la formación de maestros. *Nómadas*, 36, 145-159.
3. Díaz- Barriga, F. (2013)(sf). La innovación en la enseñanza soportada en TIC. *Una mirada al futuro desde las condiciones actuales*. Recuperado de <http://www.oei.es/tic/santillana/Barriga.pdf>

4. Moursund, D. G. (2005). *Introduction to Information and Communication Technology in Education*, University of Oregon, Eugene, <http://uoregon.edu/~7emoursund/Books/ICT/ICTBook.pdf>.
5. Castro Sánchez, J. J. and Alemán, E. C., 2011. Teachers' opinion survey on the use of ICT tools to support attendance-based teaching. *Journal of Computers and Education*, vol. 56, pp.911-915.
6. Chai, C. S., Koh, J. H. L. and Tsai, C.-C., 2010. Facilitating preservice teachers' development of technological, pedagogical, and content knowledge (TPACK). *Educational Technology and Society*, vol. 13, pp.63-73.
7. Koc, M. 2005., Implications of learning theories for effective technology integration and preservice teacher training: A critical literature review, *Journal of Turkish Science Education*, vol. 2, pp.2-18.
8. Levin, T. and Wadmany, R., 2006. Teachers' beliefs and practices in technology-based classrooms: A developmental view, *Journal of Research on Technology in Education*, vol. 39, pp.417-441.
9. McMahon, G., 2009. Critical thinking and ICT integration in a Western Australian secondary school. *Educational Technology and Society*, vol. 12, pp.269–281.
10. Frederick, G. R., Schweizer, H. and Lowe, R., 2006. After the inservice course: Challenges of technology integration, *Computers in the Schools*, vol. 23, pp.73-84.