

Role of Educational Qualification and Ownership of Personal Computer on Pre-service Teacher's Digital Empowerment

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Abstract— The present study studied the role of Educational Qualification and Ownership of Personal Computer on Pre-Service Teachers' Digital Empowerment. The descriptive research method was used. The sample included 611 fourth-semester Pre-Service Teachers pursuing 2-year Bachelor of Education program in the Colleges of Teacher Education affiliated with Rajiv Gandhi University, Arunachal Pradesh. It consisted of 211 Males and 400 Females, and 267 Postgraduates and 344 Undergraduates. Data was collected using 'The Student Teachers' Digital Empowerment Scale (STDES)' based on the 5-point Likert Scale developed and standardized by the researcher. The scale consisted of 51 items under 4 dimensions viz. a) Technological Competence (TC); b) Technical Access (TA); c) Digital Collaboration & Communication (DC); and d) Digital Security & Ethical Usage of Technological Resources (DE). Reliability was established through Internal Consistency with Cronbach's Alpha value of $\alpha = 0.867$ and Spearman-Brown Coefficient value of 0.866 indicating the scale has good internal consistency. Validity was established through content validity by eight experts' opinions and judgements and construct validity using dimension-wise item-total correlation and inter-dimension correlation method. The findings indicated a significant mean difference at .05 level of significance in pre-service teachers' digital empowerment with their educational qualifications in favour of Postgraduates and a significant mean difference at .01 level of significance in pre-service teachers' digital empowerment with their ownership of personal computers/laptops in favour of those who own their personal computers/laptops.

Keywords: Digital Empowerment, Educational Qualification, Ownership of Personal Computer, Pre-Service Teachers

I. INTRODUCTION

The study on the concept and meanings of digital empowerment has recently seen momentum among researchers working towards identifying the relationship between technology and empowerment. As such, the concept of digital empowerment has been related to the digital participation of communities, adaptation towards digital technologies to access information, and the ability to use digital technologies for maximum benefits of the societies (Akkoyunlu & Yilmaz, 2011).

Digital empowerment refers to '*a process through which an individual is making fit to the digital technology and harvesting the maximum potentials of the technology with reference to psychological, legal, economical and technical competency*' (Kirti et al., 2017).

Digital empowerment is considered a process whereby members of the communities learn innovative ways to interact and discourse. It consists of components such as "*awareness, technical access, motivation towards learning, and developing skills and competencies*" (Mäkinen, 2006). According to Mäkinen (2006), awareness and motivation are paramount variables that functions as a fuel in the process of becoming empowered, as it is the desire that drives the person to use the technology available to him/her which is again influenced by how much aware the person is, towards the benefits and utility of the technologies.

In recent days, the connections between the communities depend largely on the potentiality of humans to exchange ideas and information and the ways it is being communicated (Floridi, 2015). Humans are becoming more and more reliant on information as a primary and fundamental source (Bruno & Canina, 2019). As a result, human societies are co-evolving alongside technology and in turn, are modifying the essence of who we are and how we interact and perceive technology as being a crucial element of our existence. Further, in days to come, technology will slowly fuse and become intrinsic and an embedded part of our existence that it will not even bother us as a separate entity which we will not even recognize to be an external source (Bruno & Canina, 2019) that co-existence of humans with technology may lead to the generation of new species that can be termed as the era of '*digibionts*' (symbiosis of humans and digital technologies).

In this context, teachers act as a driving force for making changes in any society, thus, there is an urgent need to incorporate the practicality and functionalities of digital technologies in the curriculum of pre-service education, whereby prospective teachers are being introduced and empowered with the potentialities of new technological interventions in their teaching-learning process which they can further incorporate during their school practice as well as in their future teaching profession.

Alongside this, ICT development and the digitisation of every aspect of life have resulted in structural mechanisms for empowerment and disempowerment. As such, one's potential to become empowered is defined by their degree of digital proficiency and ICT usage. In fact, our ability to think transforms as we are empowered digitally (Odongo & Rono, 2017).

Even though digital empowerment plays a pivotal role in all aspects of human development, however, its research has been mostly limited (Akturk & Emlek, 2016; Iyengar et al., 2017; Kong et al., 2019), therefore, the current research which focuses on the digital empowerment of pre-service teachers based on their educational qualification and ownership of personal computers/laptops, has incorporated interrelated concepts viz. ICT literacy, digital competence and digital literacy to compare the research findings.

II. OBJECTIVES

1. To study the Digital Empowerment of Pre-service teachers based on their Educational Qualification (Postgraduate and Undergraduate).
2. To study the Digital Empowerment of Pre-service teachers based on their Ownership of Personal Computers/laptops.

III. HYPOTHESES

H₀₁: There is no significant mean difference between the Postgraduate and Undergraduate Pre-service Teachers' Digital Empowerment

H₀₂: Ownership of personal computer/laptop does not have a significant mean difference in the Pre-service Teachers' Digital Empowerment

IV. DELIMITATION OF THE STUDY

The present study is delimited to Pre-service teachers enrolled in the 2-year B.Ed. Program in the Colleges of Teacher Education (CTEs) affiliated with Rajiv Gandhi University, Arunachal Pradesh.

V. METHODOLOGY

V.I. RESEARCH DESIGN

A descriptive research method was employed in the present study.

V.II. SAMPLE

All the fourth-semester pre-service teachers N=931 pursuing 2-years B.Ed. Program in the CTEs were taken as a sample. All ten CTEs currently affiliated with Rajiv Gandhi University, Arunachal Pradesh took part in the present study. However, only 611 voluntarily completed the survey which consisted of 211 Males and 400 Females, and 267 Postgraduates and 344 Undergraduates.

V.III. TOOLS AND TECHNIQUES USED

The researcher has developed and standardized '*The Student Teachers' Digital Empowerment Scale (STDES)*' based on the 5-point Likert Scale type of items comprising options viz. 'Always', 'Very Often', 'Sometimes', 'Rarely', and 'Never'. The scale consisted of 51 items under 4 dimensions viz. a) Technological Competence (TC); b) Technical Access (TA); c) Digital Collaboration & Communication (DC); and d) Digital Security & Ethical Usage of Technological Resources (DE). For item analysis, data was collected from 150 student teachers in Arunachal Pradesh other than the actual samples. The items were selected based on their Critical Ratio (CR) 't' values; thus, items having calculated CR value ≥ 2.00 were selected and those below 2.00 were omitted (tabulated 't' value = 2.00 with df=78). The reliability of the test was established using Internal Consistency. Cronbach's Alpha value of $\alpha = 0.867$ and Spearman-Brown Coefficient value of 0.866 were obtained which indicated that the Student Teachers' Digital Empowerment Scale (STDES) has good internal consistency. The content validity and face validity of the scale were established based on the agreement of Eight experts' opinions. Additionally, the construct validity of the STDES was established using the dimension-wise item-total correlation and inter-dimension correlation method.

V.IV. DATA COLLECTION

Data was collected using the self-developed and standardized 'The Student Teachers' Digital Empowerment Scale (STDES)' from February to April 2023 from fourth-semester pre-service teachers N=931, of which 611 voluntarily completed the survey.

VI. RESULT, FINDINGS AND DISCUSSIONS

H₀1: There is no significant mean difference between the Postgraduate and Undergraduate Pre-service Teachers' Digital Empowerment

Table-1

Independent Sample t-test for Mean difference in the Postgraduate and Undergraduate Pre-service Teachers' Digital Empowerment

*EQ	N	Mean	Std. Dev.	Degrees of Freedom (df)	Cal. 't' value	p (2-tailed)	Level of Sig.	Remark
PG	267	162.692	14.462	609	2.502	.013	.05	Sig.
UG	344	159.593	15.726					

*EQ: Educational Qualification

Interpretation of results

The result of the independent samples t-test indicates that there exists a significant mean difference between the Postgraduate (PG) and Undergraduate (UG) pre-service teachers with df (609) at .05 level of significance as the calculated t-value i.e., Cal. (t)=2.502 is greater than (>) the table (t) value (1.96) with a mean score in favour of those having Postgraduate as their educational qualification. Thus, the null hypothesis is not accepted.

Therefore, the findings suggest that educational qualifications influence the digital empowerment of pre-service teachers in Arunachal Pradesh. The present study finding is corroborated by previous research findings (Demirtaş & Mumcu, 2021; Nurzhanova et al., 2024) which reported a statistically significant difference between pre-service teachers studying in higher and lower grades in their TPACK competence and digital literacy with mean scores in favour of those pursuing higher grades. However, no significant differences were also reported between PG and UG pre-service teachers' digital literacy (Varghese & Arya, 2024), and pre-service teacher's digital competence (Yang, 2023). Such contradictory results in the literature on the influence of educational qualification however suggest that beyond academic qualification other variables may also play a role in influencing the digital empowerment of pre-service teachers.

H₀2: Ownership of personal computer/laptop does not have a significant mean difference in the Pre-service Teachers' Digital Empowerment

Table-2

Independent Sample t-test for Mean difference in the ownership of personal computer/laptop in Pre-service Teachers' Digital Empowerment

*OPC	N	Mean	Std. Dev.	Degrees of Freedom (df)	Cal. 't' value	p (2-tailed)	Level of Sig.	Remark
Yes	339	163.472	14.655	609	4.643	.000	.01	Sig.
No	272	157.801	15.423					

*OPC: Ownership of Personal Computer/Laptop

Interpretation of results

The result of the independent samples t-test indicates that there exists a significant mean difference between Pre-service teachers having ownership of Personal Computers/Laptops with those who don't possess at .01 level of significance with df (609) as the

calculated t-value i.e., Cal. (t)=4.643 is greater than (>) the table (t) value (1.96) with a mean score in favour of those having Personal Computers/Laptops. Thus, the null hypothesis is not accepted.

Therefore, the findings suggest that having ownership of Personal Computers/Laptops significantly influences the digital empowerment of Pre-service teachers in Arunachal Pradesh. The present research finding is supported by other research findings which suggest that ownership of devices like computers and laptops has a significant influence on the ICT competence of pre-service teachers (Demirtaş & Mumcu, 2021) and that those pre-service teachers who utilize computers in their education have higher digital literacy than those who utilize smartphones (Atar & Bağcı, 2023). Similarly, the use of computers by pre-service teachers has been linked positively with digital literacy (Akkaya, 2023; Atar & Bağcı, 2023) and digital empowerment (Akturk & Emlek, 2016). Alongside these, it was also reported that those who had limited access to digital technology tools demonstrated a low level of ICT competence (Irwansyah & Hardiah, 2020).

It is clear that in order to improve the digital empowerment of pre-service teachers, certain infrastructural adaptations have to be made as access to technology is the first step towards equitable and attainable digital empowerment. Access to both hardware and software and their necessary support is essential for pre-service teachers (Kay, 2006) to be proficient in their future teaching jobs. Many studies both quantitative and theoretical have shown that access to computers (Goktas et al., 2009; Tezci, 2011), ownership of personal computers (Tezci, 2011) and ICT infrastructure (Iyengar et al., 2017) are strong predictors for leveraging ICT competencies, digital literacy and digital empowerment.

VII. CONCLUSION

The present study highlights the significant role of educational qualifications and device ownership in shaping the digital empowerment of pre-service teachers in Arunachal Pradesh. The findings affirm that higher educational attainment is positively associated with digital empowerment and inter-related areas such as ICT literacy, digital competence and digital literacy. Likewise, the study supports the critical influence of personal computer/laptop ownership in strengthening digital empowerment, ICT competence and digital literacy. Overall, these insights emphasize the need to bridge digital access gaps and enhance digital empowerment among pre-service teachers. Educational institutions should thus, focus on providing equitable access to digital resources and integrating comprehensive digital literacy programs across academic levels to foster well-rounded digital empowerment.

VIII. ACKNOWLEDGEMENT

The researcher would like to extend her gratitude to the supervisor Dr. Naraginti Amareswaran Reddy who is also the co-author of the study for his constant support, guidance and motivation throughout the research. Special thanks to the Head of the Department and all esteemed faculty members, non-teaching staff as well as co-scholars of North-Eastern Hill University, Shillong for their approval and help. Gratitude is also conveyed to all the Principals of the Colleges of Teacher Education affiliated with Rajiv Gandhi University located in Arunachal Pradesh for giving their permission to conduct the research and to the heads of Departments of Education of Apex Professional University, Pasighat and Arunachal University of Studies, Namsai for given their consent to conduct the try out for the present study. Sincere thanks are also conveyed to all the respondents who have voluntarily participated in the research. Additionally, the authors would also like to express sincere gratitude to the reviewers for their constructive feedback as well as to the publishers.

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