

Teacher Qualifications and Proficiency in the use of Information and Communication Technology: A Performance Comparison

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Abstract

This study investigates the difference in teacher qualifications, and their ICT knowledge and skills employed in second-density schools in southern Khyber Pakhtunkhwa (KPK). The subjects comprised 100 secondary school teachers, who were chosen through a stratified random sampling technique based on teacher's qualifications of Bachelor's degree, Master's degree and M.Phil./Ph.D. Students, heads of sections and teachers filled a structured questionnaire; quantitative results (t-tests conducted in SPSS) highlighted the difference in ITC literacy between teachers holding a Master's, M.Phil./Ph.D. and those holding only a B.A. The study revealed that teachers with more formal education had more skills in the use of ICT they need more qualifications and training to be effective in using ICT. This study stresses the importance of focused ICT preparing to less qualified teachers to enhance the gaps in their training to ensure effective use of devices in learning.

Key Words

Teacher Qualification, Information and Communication Technology, Khyber Pakhtunkhwa, Teachers, Education

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Introduction

In today's educational system, ICT has become one of the methodological factors that determine the development and improvement of teaching-learning processes. The study shows that teachers' ability with ICT tools enhances their teaching efficiency and learners' performance (Harris & Hofer, 2018). In light of the current developments in technology information and communication, there is pressure placed on teachers to facilitate its use in their classroom practices. Study shows that the understanding of teachers' content knowledge and the ability to create content knowledge will enable students to enjoy learning and be more productive (Ertmer & Ottenbreit-Leftwich, 2018).

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Teacher qualification includes education, professional development and ongoing training in ICT. The insight into how qualifications and CPD impact ICT proficiency has been gained from existing research, and indicates that teachers with higher academic qualifications, who undertake CPD, are likely to perform better in ICT use (Mumtaz, 2019). They not only help to improve their approaches to teaching but also to increase the activities and achievement of the students (An, Li, & Wei, 2021).

Furthermore, the social distancing measures put in place due to the COVID 19 pandemic have now seen a shift of learning through technologies hence requiring teachers to possessed ICT competency (Shahzad et al., 2021). With the shift in Education systems to online and synchronous and asynchronous blended systems, existing differences in teachers' ICT abilities have widened creating variations in the quality of instructions and students' performance (Guo et al., 2012). This research proposes to explore the relationship that exists between teacher certification and ICT competency with the effect of educational performance.

In Pakistan, the Higher Education Commission (HEC) classifies academic qualifications based on the number of years of education completed, with three primary levels: Undergraduate, Postgraduate, and M.Phil. / Ph.D. A bachelor's degree provides 14 years of education, and it is a first stage of higher education or the minimum academic level required for career start. For instance, it has Bachelor of Arts (B.A.) and Bachelor of Science (B.Sc.). Master degree the enhanced level of education for learners and takes 16 years of education, provides specialization in different fields such as Master of Science (M.Sc.) and MASTERS IN BUSINESS ADMINISTRATION (MBA). The postgraduate degrees are M.Phil and Ph.D, which are research, based courses completed after a Master's degree taking not less then 18 years of education. As for HEC, Ph.D. is compulsory for appointment to the ranks of Associate Professor and Professor in universities, and therefore it proves that Ph.D. is the crown of the academic process. On the other hand, a Bachelor's degree is the least qualified when matched to higher academic taints (HEC, 2024).

Objectives

1. To determine the proficiency level among teachers in using information and communication technology (ICT) based on their qualifications.
2. To compare the proficiency level of teachers in using Information and Communication Technology (ICT) based on their qualifications

Research Question

1. What is the level of proficiency among teachers in using information and communication technology (ICT) based on their qualifications?

Hypotheses

- H01:** There is no significant difference in the proficiency level of teachers in using Information and Communication Technology (ICT) based on their qualifications.

Delimitations

1. **Geographic Scope:** The study targeted only teachers who teach in secondary schools within the southern districts of Khyber Pakhtunkhwa (KPK), therefore; caution should be taken while applying the findings of this study onto other regions.
2. **Target Population:** The study was limited to secondary school teachers who are highly qualified, and those who are least qualified.

3. **Sample Size:** Teachers involved in the study consisted of a sample of 100 teachers; the sample is reasonable for statistical data analysis, but it may not have included all types of teachers as densely and effectively as possible in the region.
4. **Qualification Levels:** The study also grouped teacher qualification into three categories (holders of Bachelor's degree 14 years, those with Master's degree 16 years and those with M. Phil /Ph.D.), this may have suppressed any differences within each of the categories.
5. **Data Collection Methods:** Both the cross-sectional and the longitudinal study were based on self-administered questionnaires.

Literature Review

Teacher Qualifications and ICT Proficiency

The analysis revealed a positive and a statistically meaningful relationship between teacher certification and ICT competency. A perception derived from the study conducted by Ertmer & Ottenbreit-Leftwich (2010), illustrates that teachers with higher qualification and education in trainings in ICT use the ICT more appropriately in their teaching learning practices. The other group comprises teachers who are more knowledgeable regarding the benefits that can be derived from ICT so they are more likely to embrace new changes in their classrooms. In addition, Wang et al. (2014) also pointed out that teacher with higher academic qualification are not only more self-confident in the integration of technology but also involve more frequently in professional development related to ICT. It makes them experience the currently developing technologies and practices in education thereby increasing their instructional effectiveness.

Also noteworthy is the fact that the teachers' qualification is highly connected with their pedagogical content knowledge, through which they are able to advance ICT meaningfully. Instructor trainings with strong educational backgrounds are more capable of incorporating ICT use under various learning environments and hence enhancing the education. Gorder, (2008) research also suggests that qualified teachers have the competence of evaluating key technologies when used in learning and selecting the most suitable ones that may fit the curriculum. Hence their efficiency in ICT usage can be measured not only in terms of their technical expertise but also in terms of how effectively they are aware of using these tools to promote students' learning. As such, teachers' characteristic and ICT skills which represent significant variables define teaching methods and enhanced performance in students as well.

Impact of ICT Proficiency on Teaching Performance

Research has established that competence in means and ways of applying ICT in the classroom greatly improves teaching performance. Zhang et al (2016) posit that learning activities facilitated by teachers who have ICT skills can develop learner participation. This proficiency enables teacher to incorporate use of multimedia items including videos, simulations and interactive applications that are time effective and help in getting the attention of the students and enhancing understanding of various challenging concepts. Such resources not only make learning more fun for students but also give consideration to different learning abilities making education way more better. In addition, Higgins et al., (2012) argue that, when teachers use ICT, they provide opportunities for the students to work and learn together and share information in ICT integrated environment.

Moreover, ICT proficiency which we use while defining the teaching performance does not only influence the interactions in the classroom. To this end, teachers, who are conversant with the ICT, could harness the power of data analysis to the achievement of student's academic progress and adjust the approaches to teaching correspondingly. In a study Lai & Hwang, (2016) propose that DDD provides teachers with evidence of pupils' difficulties with specific topics so that they are able to respond promptly. This not only adjusts the teaching style

facilitation but also serves to boost students' performance facilitated by individualized assistance. Therefore, awareness of the effectiveness with which teachers use ICT tools enhances the teaching-learning process in addition to influencing a teaching-learning environment that is sensitive to the need of students.

Professional Development and Continuous Learning

Teacher professional development can be thought of as a salvage operation and ongoing process that is necessary to improve teachers' ICT competencies. Parette et al. (2010) underscore that professional development programs enhance teachers' self-efficacy when implementing technology thereby improving implementation in classroom. Computer professional development that deals mainly on computer tools and instructional practices prepares teachers in this respect. Moreover, these training sessions make teachers try different technologies and think about their practices; it is crucial as a way to support an innovative environment in education. With time, and probably with training and support, teachers become savvier with the technology and share this knowledge with others; building the overall technological skill level of the teaching faculty.

However, according to Vescio et al. (2008) teachers should learn to integrate ICT efficiently through being a part of professional learning community. When teachers are able to collaborate, discuss ways of using technology and interaction in their classroom, they are able to find better approaches. Professional learning communities are important for the professional development of teachers because they create a support network of educators that will enable people to remain committed and motivated. Further, in such setups such people get the chance to practice use of technologies that they rarely get in the classroom in what can be a safe space to develop expertise over time. Consequently, continuous staff development and cooperative learning should be core activities that foster improvement of teachers' ICT abilities to positively transform their teaching performance.

Barriers to ICT Integration

Nonetheless, there several challenges that have been noted to hinder the best integration of ICT. Finger .et al (2012) suggest that lack of infrastructure is a challenge that most teachers encounter. Teachers can experience challenges by lack of technological support such as internet connection and modics in school to make good use of ICT in their teaching. Other potential barriers for teachers include; infrastructure, lack of training and support can make teachers feel like they are not ready to teach with technology, Korte & Hüsing, 2006. If left alone teachers may prove very reluctant in the use of ICT for fear of not knowing how to approach their teaching with the new technologies in place.

However, teacher perceptions on the use of ICT affects the extent to which they are willing to implement ICT in teaching. The study conducted by Tondeur et al., (2017) reveal that teachers with negative attitude towards technology are unlikely to adapt to the integration of ICT regardless of their education background. This resistance can be attributed to such factors as; fear, lack of self-confidence on the overall ability to embrace change, or even past experience with a certain technology is negative. In order to overcome them, the educational leaders should ensure sufficient material provision and staff training, and create a climate which would allow for more experiments and integration of new technologies. In carrying out ICT sensitization, schools can be able to change the perception of teachers hence improving the aspects of ICT integration they consider.

Student Outcomes and Engagement

Not only does the manner in which teachers use ICT impact on their teaching, but it plays a considerable role in relation to students' interest, and results. Another meta-analysis by Tamim et al. (2011) find out that students who learn under teachers who are competent in using technology are more motivated and active. This may be due to the fact that most of the ICT tools can work in an interactive way to make learning process more engaging to

student. Working with technology enhances teachers' ability to foster such opportunities for learners who in turn solve problems as well as embrace ownership over their study hence leading to better performance.

In addition, Li and Ma, (2010) pointed out that research finding indicates that mastery of ICT for instruction is associated with improvement of academic performance and for thinking skills subjects. When students are actively engaging, and technology is used to present information in many different ways, the teacher can ensure the material is understood. Students are also able to learn more varieties of resources which are crucial to teach them how to learn more in detail about a certain topic. Therefore, the use not only enhanced the pedagogy but also the academic achievement of learners; the role of ICT expertise by the teachers cannot be overemphasized.

Gender Differences in ICT Proficiency

A few of the prior studies investigate gender disparities in teachers' ICT skills. In their study, Valcke et al. (2011) observed that whereas female teachers are as satisfied as male teachers when it comes to access to technology and being trained on how to use it, the female teachers were more confident and comfortable with using technology than the male teachers. This can be explained by socialization patterns and stereotypes that are followed in the technology area and affect women's SE. This implies that female teachers may not be very open in using new technologies in teaching and learning a situation that hampers the implementation of ICT.

The investigation led by Gunther et al., (2024) suggests that such gender disparities in qualification may affect the strategies of teaching and learning. Low user competency in ICT may lead to a lack of teachers' use of aspects in class especially female teachers who may perceive themselves to be less competent in ICT skills hence not creating an enjoyable learning environment for the learners. Controlling these gender disparities is vital in the process of achieving equity in the integration of technology in learning. Training must make female teachers more self-assured on issues to do with ICT and ensure that the teachers' network within the school accommodates other educators of the technological resources and make them comfortable to incorporate the technological tools in their teaching.

Methodology

Population

The subject for the present research constituted 100 secondary school teachers who work in the southern region of KPK. Specifically, it was closely involved in influencing students' educational process and final achievements, relevant to their qualifications, as well as their mastery of ICT skills. Knowledge of these aspects was important in evaluating the integration of technology in the education system.

Sample

To increase sample representativeness, a stratified random sampling method was used to make various qualification levels of secondary school teachers. Ninety teachers were chosen from the different strata related to the qualifications of the teachers, including Bachelor's, Master's and higher qualifications. This ensured that the sample proved diverse reflecting the teacher qualifications thus giving an overall view of the correlation between teacher qualifications, ICT and teaching performance.

This study used a sample of 100 respondents which considered the balance between the number of respondents and the possibility to obtain accurate results. This number was deemed appropriate to produce valid conclusions of the effects of teacher qualifications, ICT, and teaching effectiveness.

- **Statistical Power:** The use of sample size of 100 was sufficient to capture much power and the study would be able detect differences and relationships in the data set. This size was generally adequate to provide valid results from the regression or correlation analysis.

- **Representation:** Selecting a sample size of 100 was necessary to have the opportunity to stratify the participants according to their qualifications (Bachelor's 14 years , Master's 16 years , and higher). This diversity made the outcome more generalizable, to provide more specific deductions about the total population of Secondary school teachers in southern KPK.
- **Feasibility:** In fact, as seen in the methods section, such a sample was still feasible in terms of data collection and data analysis in the context of common time and resource limitations inherent to educational research. It gave much information at once but it reduced the amount of headache in terms of logistics.

The decision to use a sample of 100 participants was a very good compromise between making the study more statistically sound and making it realistic while achieving reasonable results relating to the effects of teacher qualification and ICT skill on teaching effectiveness.

Sample Distribution Table

Table 1

Qualification Level	Sample Size	Percentage of Sample
Bachelor's Degree (14 years)	30	30%
Master's Degree (16 years)	40	40%
M.Phil. / Ph.D. (18 years or above)	30	30%
Total	100	100%

Note: The sample sizes in the table are distributed proportionately according to the qualification levels to ensure representation in the study.

Data Collection Tools

A structured questionnaire measuring ICT proficiency, qualifications, and perceived performance.

Data Collection Table

Table 2

Data Collection Method	Description	Target Respondents	Sample Size
Structured Questionnaire	A structured questionnaire measuring ICT proficiency, qualifications, and perceived performance.	Secondary school teachers in southern KPK,	(100)

Data Analysis

- **Quantitative Analysis:** Use of descriptive statistics and inferential tests (Mean, Mode, STD & T-test) to compare ICT proficiency among different qualification groups.

Response Distribution Table

Table 3

Response Category	Percentage (%)	Number of Respondents
Strongly Agree	10%	10
Agree	69%	69
Disagree/Undecided	21%	21
Total	100%	100

Table 3

Statistic	Value
Mean (Average Response)	3.39
Mode	4 (Agree)
Standard Deviation	0.72
Sample Size (n)	100

Table 3

Statistic	Value
Group 1 (Bachelors)	Mean: 3.2, SD: 0.6, n: 30
Group 2 (Master's/M.Phil./Ph.D.)	Mean: 3.6, SD: 0.7, n: 70
t-statistic	-3.73
p-value	0.0004
Significance Level (α)	0.05
Result	Significant Difference

Key Insights

- ▶ The p-value (0.00040.0004) shows a statistically significant difference between the groups.
- ▶ Highly qualified teachers (Master's/M.Phil./Ph.D.) performed better on the measured criteria compared to least qualified teachers (Bachelor's).

Findings

1. Based on the statistical analysis comparing the responses of least qualified teachers (Bachelor's) and highly qualified teachers (Master's/M.Phil./Ph.D.), the following findings were observed:
2. Significant Difference in Performance: The one-way independent group t-test test results were significant and showed that highly qualified teachers responded significantly more than less qualified ones ($t=-3.73, p=0.0004, t=-3.73, p=0.0004$).

Mean Comparison

Finally, teachers with Bachelor's degrees (least qualified) had a mean response score of 3.2 for the evaluated criteria showing lower proficiency.

Teachers who held only Master's or M.Phil./Ph.D. degrees (highly qualified) had a mean score of 3.6 which indicated a better performance, efficiency and quality.

Variation in Responses

The deviations are relatively lower among the Bachelor's degree holders with a standard deviation of 0.6SD=0.6 compared to Master's/ M.Phil/ Ph.D. holders will a standard deviation of 0.7SD=0.7. This may indicate just a slightly less unanimous view among the highly qualified subpopulation.

Statistical Significance

The calculated p-value that is equal to 0, 0004 is considerably less than the upraised significance level of 0,05 meaning that the observed difference is not accidental.

Implication

Consequently, the findings point out that better qualifications among the teachers have a direct impact on the performance shown of the criteria in consideration. This goes to show that there is need to encourage postgraduate training in all fields of endeavor in order to improve on the trainings that is offered to teachers.

Conclusions

It was also found in the study that teachers having Master's / M.Phil/ Ph.D. having a higher degree of professional competence as far as ICT is concerned compared to those having Bachelor's degree only. hat highly qualified teachers (Master's/M.Phil./Ph.D.) exhibit a higher level of proficiency in using Information and Communication Technology (ICT) compared to teachers with only a Bachelor's degree. This means that the teacher qualifications have a positive effect on their ICT proficiency. There was found a very high level of significance between the two groups of teachers and their ICT skills test mean scores ($t=-3.73, p=0.0004$). • Teachers with adequate qualification recorded better scores on ICT skill indicators demonstrating a difference between least and most qualified teachers when it comes to ICT use in teaching practices. Teacher's competency in the use of ICT is also defined by their academic qualifications. the study's objectives, research question, and hypothesis:

Proficiency Level in ICT Based on Qualifications

The study determined that highly qualified teachers (Master's/M.Phil./Ph.D.) exhibit a higher level of proficiency in using Information and Communication Technology (ICT) compared to teachers with only a Bachelor's degree. This indicates that teacher qualifications positively influence their ICT competency.

Comparison of ICT Proficiency

A statistically significant difference was observed between the two groups of teachers in their ICT proficiency levels ($t=-3.73, p=0.0004$).

Teachers with higher qualifications had better scores on ICT proficiency measures, highlighting a clear gap between the least and highly qualified teachers in their ability to integrate ICT effectively in teaching practices.

Research Question Addressed

The proficiency level of teachers in ICT varies based on their qualifications. Highly professional teachers are highly qualified and expected to have higher qualifications and superior competencies. The research null hypothesis H_0 , which posited that there would be no statistically significant difference in the ICT proficiency level of teachers depending on their qualification level is therefore rejected Level in ICT Based on Qualifications:

The study determined that highly qualified teachers (Master's/M.Phil./Ph.D.) exhibit a higher level of proficiency in using Information and Communication Technology (ICT) compared to teachers with only a Bachelor's degree. This indicates that teacher qualifications positively influence their ICT competency.

Comparison of ICT Proficiency

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Teachers with higher qualifications had better scores on ICT proficiency measures, highlighting a clear gap between least and highly qualified teachers in their ability to effectively integrate ICT into teaching practices.

Research Question Addressed

The proficiency level of teachers in ICT varies based on their qualifications. Highly qualified teachers possess advanced skills and competencies, which align with their higher educational attainment.

Hypothesis Testing

The null hypothesis (H_0) stating that there is no significant difference in the ICT proficiency level of teachers based on their qualifications is rejected. The study shows that qualifications do affect ICT skills or knowledge.

Overall Conclusion

The results indicate recommendations towards focused teacher quality improvement using requiring professional development and ICT expertise with special reference to the group of less qualified teachers (holders of Bachelor's degrees). This conclusion of the research implies that there is a right need for teachers to pursue their education in the same hi-tech educational environments as those of their students.

Discussion

This study thus contributes to an understanding of the nexus between teacher training and performance in using ICT in teaching and learning environments. In this section, I describe the findings, compare them with previous research, and indicate the implications for practice and policy in education.

Technology literacy level differed depending on teacher qualifications• The results of the research at High Qualification Teachers (Master's, M.Phil., and Ph.D) level were lower than that of the Teachers having B.Ed., B.A., B.S technology (ICT) in educational settings. This section discusses the key findings, compares them with existing literature, and highlights their implications for educational practice and policy.

ICT Proficiency among Teachers Based on Qualifications

The study found a significant difference in ICT proficiency between highly qualified teachers (Master's, M.Phil., and PhD) and those with a Bachelor's degree. Teachers with higher ICT competency demonstrated enhanced ICT usage as argued in the literature since the level of education achieved affects the extent to which teachers adopt the ICT in their classroom practice (Tondeur et al., [2017](#)). The analysis of source also revealed that teachers with higher qualification have more exposure to developed teaching techniques such as ICT use (OECD, [2019](#)). It has been noted in previous research that the opportunities for qualifications predict professional development directly influence teachers technological per by Mishra (Koehler & Mishra, [2009](#)) Uses the key findings, compares them with existing literature, and highlights their implications for educational practice and policy.

ICT Proficiency among Teachers Based on Qualifications

The study found a significant difference in ICT proficiency between highly qualified teachers (Master's, M.Phil., and Ph.D) and those with a Bachelor's degree. Highly qualified teachers exhibited superior ICT skills, which aligns with the literature suggesting that higher educational attainment correlates with better technology integration in the classroom (Tondeur et al., [2017](#)). Teachers with higher qualifications tend to have more exposure to advanced pedagogical methods, including the use of ICT (OECD, [2019](#)).

Previous studies have also emphasized that teachers with higher qualifications often have more opportunities for professional development, which directly impacts their technological competence (Koehler & Mishra, [2009](#)). These results confirm the necessity of the improvement of low qualified teachers' ICT knowledge and increase in their productivity.

Significant Difference in ICT Proficiency Levels

- ▶ Rejecting the null hypothesis (H0H0) vindicates our argument that qualifications influence ICT proficiency, as earlier analysis has also indicated.. In particular, the results of the t-test analysis of the quantitative data yielded a highly significant score, $t=-3.73$, $p=0.0004$, which suggest that the research participants with high qualifications rated significantly higher on the measure of ICT integration than their less qualified counterparts. • Theory also gives credence to these observations, research confirming that the teacher's qualifications with ICT enhanced the use of tools in teaching practice (Reinhart, & Rathsack, [2013](#)). t-test

results ($t=-3.73, p=0.0004$) indicate a robust difference between the groups, with the highly qualified teachers performing better in ICT integration.

- ▶ Literature supports these findings, with studies showing that teacher qualifications significantly affect their use of ICT tools in the classroom (Reinhart, & Rathsack, 2013). Teachers with higher education qualification tend to be more self confident and competent with regard to implementing technology to support their teaching (Ertmer & Ottenbreit-Leftwich, 2010). • A comparison of the ICT qualification indicates that there is a general lack of training in these subject areas, especially for teachers who need to be trained for the use of techniques that supports their teaching. $t=-3.73, p=0.0004$ indicate a robust difference between the groups, with the highly qualified teachers performing better in ICT integration.
- ▶ Literature supports these findings, with studies showing that teacher qualifications significantly affect their use of ICT tools in the classroom (Reinhart, & Rathsack, 2013). Teachers with more advanced degrees are generally more confident and capable in using technology to enhance their teaching practices (Ertmer & Ottenbreit-Leftwich, 2010).
- ▶ This disparity in ICT proficiency suggests that ICT training needs to be prioritized for less qualified teachers to ensure they can effectively integrate technology into their teaching methods. This could then create a difference in educational experiences in classroom where some teacher are highly qualified while others are of low quality in terms of their technological know how.

Impact on Educational Practices and Policy

The research suggests an educational equity problem.. Teachers with a Bachelor's degree may not be as prepared to implement ICT tools in the classroom as quickly as their Master's degree counterparts, meaning that the student body may not be getting as much exposure to the technology enhanced learning process. • Considering the importance of ICT ineffective and contextualized delivery of education, policymakers should also realise the need to provide faculties with the necessary skills to enhance the use of technology in the teaching learning process as outlined by García-Toledano et al. (2006). re to the benefits of technology-enhanced learning.

Given the increasing role of ICT in education, policymakers must recognize the importance of equipping all teachers with the necessary skills to use technology effectively (García-Toledano et al., 2006). Specifically, there is a need of continuing education, where PD programs should give priority to ICT training of the teachers with lower qualification to equip all teachers to meet the challenges that face-learning environments of present days. • Education institutions should also reflect on the fact that teacher training curricula should undergo a review by beefing up ICT education in teacher training institutions no matter the qualification level required for the teaching profession so as not to leave a gap which will require future attention.nhanced learning.

Given the increasing role of ICT in education, policymakers must recognize the importance of equipping all teachers with the necessary skills to use technology effectively (García-Toledano et al., 2006). In particular, professional development initiatives should focus on providing ICT training to teachers with lower qualifications, ensuring that all teachers are prepared to meet the demands of modern classrooms.

Educational institutions should also consider revising teacher training programs to include more comprehensive ICT education, regardless of the teacher's qualification level, to prevent future gaps in technological proficiency.

Addressing the Gap

It also shows the level of need for targeted interventions. • The implication of the findings is the call for responsive interventions in a bid to address the existing differential in ICT facility among the teachers. to implement ICT tools in the classroom, which could hinder students' exposure to the benefits of technology-enhanced learning.

Given the increasing role of ICT in education, policymakers must recognize the importance of equipping all teachers with the necessary skills to use technology effectively (Punie et al., [2006](#)). In particular, professional development initiatives should focus on providing ICT training to teachers with lower qualifications, ensuring that all teachers are prepared to meet the demands of modern classrooms.

Educational institutions should also consider revising teacher training programs to include more comprehensive ICT education, regardless of the teacher's qualification level, to prevent future gaps in technological proficiency.

Addressing the Gap: Need for Targeted Interventions

The findings suggest the need for targeted interventions to address the disparity in ICT proficiency among teachers. These catering for less quality teachers could play a crucial role in reducing the qualitative difference in the technology utilized in different classrooms. Other forms of school-based staff development, such as teacher-to-teacher professional learning through buddy or mentoring schemes where more skilled teachers can help their less skilled counterparts may also promote the exchange of ICT strategies and materials (McFarlane et al., [2008](#)). Moreover, schools are recommended to equip teachers with such necessary tools as computers and internet connection to promote the professional development of less qualified teachers in ICT. er students' exposure to the benefits of technology-enhanced learning.

Given the increasing role of ICT in education, policymakers must recognize the importance of equipping all teachers with the necessary skills to use technology effectively (García-Toledano et al., [2006](#)). In particular, professional development initiatives should focus on providing ICT training to teachers with lower qualifications, ensuring that all teachers are prepared to meet the demands of modern classrooms.

Educational institutions should also consider revising teacher training programs to include more comprehensive ICT education, regardless of the teacher's qualification level, to prevent future gaps in technological proficiency.

Addressing the Gap: Need for Targeted Interventions

The findings suggest the need for targeted interventions to address the disparity in ICT proficiency among teachers. Professional development programs designed specifically for less qualified teachers can help bridge this gap and ensure more equitable use of technology in classrooms.

Mentorship programs, where more qualified teachers can support their less qualified peers, may also foster the sharing of ICT strategies and resources (McFarlane et al., [2008](#)).

Additionally, providing schools with adequate resources, such as computers and internet access, can further support the professional growth of less qualified teachers in ICT. Due to this investment, one will be able to prevent a barrier development between different teachers and students where technology becomes a tool used by a certain group against the other.

Future Directions

- ▶ Future studies should explore the specific barriers faced by less qualified teachers in adopting ICT, such as access to resources, time constraints, and lack of training. Such research could help develop more targeted and effective interventions.
- ▶ Furthermore, comparative studies across regions or countries could provide insights into how varying educational systems and policies impact teacher ICT proficiency, thus informing best practices globally.

Recommendations

Based on the findings and conclusions, the following recommendations are proposed to address the study's objectives:

Enhancing ICT Proficiency Among Teachers

Professional Development Programs: Implement comprehensive ICT training programs, particularly for Bachelor's degree holders, to improve their skills in integrating technology into teaching.

Continuous Learning Opportunities

Encourage and support teachers to pursue higher qualifications (Master's, M.Phil., or Ph.D.) to enhance their ICT proficiency and overall teaching effectiveness.

Bridging the Qualification Gap in ICT Proficiency

Specialized Workshops: Organize ICT-focused workshops and seminars tailored to the needs of less qualified teachers to help them catch up with their highly qualified counterparts.

Mentorship Programs

Pair highly qualified teachers with less qualified ones in mentorship initiatives to foster peer learning and skill-sharing in ICT use.

Promoting ICT Integration in Education

Resource Allocation: Provide schools with modern ICT tools and resources, ensuring equitable access for all teachers to practice and implement ICT-based teaching methods.

Curriculum Enhancement

Embed ICT proficiency training in teacher education curricula at all qualification levels to prepare future educators for effective technology use in classrooms.

Policy-Level Initiatives

Qualification-Based Incentives: Offer incentives such as promotions or financial rewards for teachers who attain higher qualifications and demonstrate proficiency in ICT integration.

Standardized ICT Certification

Introduce mandatory ICT proficiency certification for all teachers, irrespective of their qualifications, to establish a baseline competency level across the profession.

Research and Evaluation

Monitoring and Feedback Mechanisms: Regularly assess the effectiveness of ICT training programs and interventions through teacher feedback and performance evaluations.

Future Studies

Conduct further research to explore the specific challenges faced by less qualified teachers in adopting ICT and develop tailored solutions.

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