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Research Article

ICT in Educational Assessment: A Survey among Teacher Educators

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Abstract

Information and communication technology (ICT) influences gender disparities, institution type, public or private. The regular use of a computer and accessing ICT infrastructure influences technology application, whereby training and professional development can be marked as quite necessary. For assessment and evaluation, the study applies a chi-square test to determine the involvement in ICT training results and changes in ICT usage patterns. The results demonstrate regular access having a significant impact on teaching and learning, for which ICT training is crucial. The results show that everyday access of teachers to ICT resources increases the integration of technology in the classroom. ICT availability along with daily access will impact the usage to a major extent. The present study brings out the fact that ICT integration into education environments demands a more progressive approach. Successful adoption refers to the same level of access to resources, followed by support and training. Recommendations include further increase of access to ICT to enhance learning environments and supportive networks for teachers with assessment, evaluation and training. Putting these tactics into practice should help educational establishments strengthen the usage of ICT in the assessment and evaluation by teacher educators.

Keywords: *ICT Applications, Teacher Educators, Education Institutions, Assessment, Evaluation*

Introduction

India has also seen a sea change by the rapid adoption and assimilation of Information and Communication Technology (ICT) across sectors such as education, business, and healthcare in the country (Chakraborty, 2020). The growing digital technologies have greatly augmented the speed and scale at which information is accessed and disseminated and have quite effectively bridged geographical gaps to open up new vistas of economic opportunities (Sharma & Singh, 2018). In the field of education, ICT integration has entirely changed the teaching and learning styles, making for the first time more robust tools that significantly enhance quality and access to education in the classroom (Kumar & Raj, 2021). Nevertheless, an immense gap is still experienced while trying to understand specific implementations of ICT in training for teachers at institutions in India. Most of the earlier studies had emphasized general perceptions and competencies related to ICT concerning educators without going deeper into the specific usage patterns and the perspective of B.Ed. lecturers on ICT usage in teacher education settings(Reddy & Kumar, 2022). This studyconsiders studying B.Ed. lecturer's perspective toward ICT applications, taking into account variables such as gender, teaching subject, type of institution, access to technology, and training, thereby giving a holistic view of the impact of ICT on teacher education (Sinha, 2023). In the age of digitized technology affecting every area of education, the role of Information and Communication Technology (ICT) in assessment and evaluation is highly significant. For B.Ed. which prepares future educators, ICT's proper application can transform conventional assessment and evaluation methods, hence adding riches to teaching and learning experiences.

Moreover, assessment and evaluation are integral elements of educational practices, and critically important for the determination of learning outcomes and improvement in instructional approaches (Brown & Abeywickrema, 2021). Traditionally, these processes have utilized paper-based systems, resulting in inefficiencies, inaccuracy, and delayed feedback (Smith & Jones, 2019). Information and Communication Technology (ICT) introduces an option to address all these above-mentioned difficulties through assessing methods that will be relatively more efficient,precise and adaptable (Lee & Martin, 2020). Through the support of ICT tools, educators enhance the process and quality of assessment while keeping the provided data precise; also, instant feedback will come across thereby greatly improving learning and instructional outcomes (Johnson, 2022). This studyresearches the way teacher educators apply ICT in assessment

and evaluation. The teacher-educators play a vital role as they are preparing a well-equipped teacher for educational organizations. The study seeks to analyze the current approaches that highlight the problems and test how ICT tools affect strategies applied in assessment methods. For the alignment of such technology innovations with educational requirements, it is essential to determine how these lecturers introduce ICT into their respective methodologies of assessment. It can thus highlight even further how ICT facilitates very important personal and formative assessments for students. It will aid in the identification of problems and scope for improvement in support and training on ICT, leading to improvement in educational practices during teacher education.

ICT plays a crucial role in assessment, as it falls into two major categories: Computer-Assisted Assessment (CAA) and Computer-Based Assessment (CBA). CAA is where computers are used to help assess the students, especially to score multiple-choice and short-answer questions using an OMR (Perrin, 2016). Whereas, CBA uses more advanced digital tools on computers, tablets, and smartphones. This encompasses evaluations that are integrated into e-learning materials, whereby assessment becomes one of the learning activities; online quizzes are prepared by the instructors and accessed individually by learners (Santos, 2019). However, the Web-Based Assessment involves planning, delivery, and administration of assessments with digital technologies such as automated grading and extensive reporting (Huang &Liaw, 2018). It promotes online tests along with ongoing and term-end evaluations to change the process of assessments and improve the process of testing in educational institutes using new systems (O'Reilly, 2020).

Information and Communication Technology (ICT) in assessment and evaluation has steadily become an important part of modern education, providing a variety of benefits including rapid feedback, efficient grading processes, and improved interactive assessment procedures. These technologies facilitate formative as well as summative assessments, which facilitate more accurate and effective educational evaluations (Reddy & Kumar, 2022). Teacher educators should use such tools to fine-tune their assessment strategy and ensure they are correctly demonstrating the proper use of technology for their students (Chakraborty, 2020). Indeed, as the educational climate becomes increasingly digital, highly developed ICT skills are quite necessary to maximize the level of output in learning so that teaching methods meet modern technological requirements (Green & Taylor, 2021). Therefore, investment in ICT training and resources is essential to fully exploit the advantages of technology in educational

assessment and align teaching practices with current educational requirements (Wang & Brown, 2023).

Online assessment technologies, which compriseonline quizzes, formative assessments, and computer-based grading systems makes the process of assessment easier. The utilization of these systems saves much time by providing instant feedback and also handles large volumes of data (Kumar & Raj, 2021). The educators can easily establish whether the students have understood something and then make changes accordingly for effective assessments. One significant application of ICT involves interactive and multimedia assessments. Such assessment approaches involve video projects, online discussion forums, and even interactive simulations that cater for the myriad of learning preferences of each student and challenge the dynamism of evaluating them better (Reddy & Kumar, 2022). Multimedia components also help facilitate more enriching experiences toward assessment that accurately depict understanding and skills among students. Data analytics and visualization are also significant in processing information for assessing outcomes. More superior tools assist teachers track a trend of performance to locate areas where improvement should take place, and thus there is the visualization of trends of learning curves. Such as, E-portfolios gives an integrated view of the student's work and development that allows teachers to assess all the learning achievements in comprehensive detail and also offer continuous feedback (Sharma & Singh, 2018). The use of Google Forms, Moodle, and Blackboard also makes the assessment process streamlined in terms of creating and distributing it to the target audience and also supports all types of question formats both for synchronous and asynchronous assessment (Wang & Brown, 2023). Other tools include Google Docs, Microsoft Teams, and Slack, which facilitate group projects and peer assessments through collaborative learning and collective assessment (Sinha, 2023).

Moreover, adaptive learning technologies and immersive experiences through virtual and augmented reality present opportunities for personalized and practical assessments. Adaptive systems adapt test questions according to the respondent's performance and, with VR and AR, testing is carried out in simulated experiential settings where, for example, students demonstrate their skills using real practice scenarios (Chakraborty, 2020; Miller & Clark, 2023). Using ICT, a more informed decision can be arrived at on teaching methodology approaches and the support towards enhancing student performance. Further enhancing the assessment processes through such tools as e-portfolios as well as online-based evaluation tools is also conducted.

Review of literature

Information and communication technology (ICT) has now become an important part of modern education that changes the traditional methods of teaching and assessment. It enhances various educational practices, especially in assessment and evaluation, because it gives new and efficient ways to measure and improve the outcome of student learning. National Education Policy (NEP) 2020 emphasizes on the need of self-improvement and staying abreast with the latest innovations and advances in education and training. Through Continuous Professional Development (CPD) initiatives, a robust training management and monitoring in different pedagogy modules aims to build competencies through integration of ICT in teaching, learning and assessment.Additionally, UGC has promoted the use of technology-enhanced learning platforms such as SWAYAM and mandated criteria for learner engagement, examinations, and academic integrity (UGC, 2016). The framework aims to enhance the effectiveness and credibility of technology-mediated assessment and equitable access and quality in higher education across India.According to Kumar and Raj, (2021), integrating digital technologies into the practice of assessments can give better accuracy as well as speed in returning feedback; therefore, in general, enhancing the efficiency of the whole educational process. Both summative and formative assessments are easier with ICT support, thereby making the assessment process much more active and responsive. Another important aspect where variations lead to ICT adoption in academic institutions is gender. According to research by Reddy and Kumar, 2022, new technologies have been accepted faster among the female teaching communities as compared to the opposite counterparts. The same opinion has also been stated and shared by Chakraborty, 2020 that most female members tend to accept and work with ICT tools better and more vigorously compared to males. Such findings would mean that there might be gender-related issues regarding the integration of ICT in assessment and evaluation. Females might dominate these areas.

However, the speciality in subjects affects the adaptation of teachers towards ICT. Sinha (2023) identified how different disciplines in a subject influence ICT integration during teacher training. This is because teachers specialized in the teaching of language may make use of ICT differently from their colleagues from other, non-language subjects. This observation is in agreement with Sharma and Singh (2018), who stated that subject matter often, determines the level and nature of ICT applications, where language instructors most often use digital tools for interactive and multimedia assessments. Another factor is the type of educational institution, whethergovernment or private. Miller and Clark (2023) established that private institutions tend to have more resources

and can, therefore, embrace the latest ICT instruments compared to public institutions whose financial capability tends to be limited. This disparity makes the form and extent of ICT use in assessment and evaluation vary from one institution to another. Other influencing factors on the usage of ICT by educators are the computers availability and steady access to ICT instruments. Green and Taylor (2021) believe that if teachers have easy access to computers and other ICT equipment, they are more likely to use them in assessing students. Johnson (2022) agrees with the above by showing that ICT users, who have frequent daily ICT access are more capable of using technology effectively for learning. In addition, professional development and training are necessaryfor the application of ICT in assessment and evaluation to be successful. Wang and Brown (2023) believe that without special training educators may not necessarily constitute applicable assessment and evaluation strategies.

Research Gaps

The role of ICT in education is complex. The literature review draws attention to gender disparities, subject specialization, institutional environment, computer ownership, and accessibility as vital factors. All of these factors determine how ICT is embraced and its use in assessment and evaluation practices. Further research in such areas can bring useful insight into the further development of ICT in education systems and rectifying current problems arising from the deficiency of technology adoption and proper training. The integration ofICT in education emphasizes the requirement for digging deeper into the basis of gender-based use of ICT, analysing targeted interventions in changing the difference to have well-balanced use among different genders. There is a dearth of comprehensive studies concerning the impact of subject specialization on ICT practices and the effectiveness of adapted integration approaches.

A further array of research is required to expand the study concerning the institutional context. The distribution of public and private resources varies drastically, therefore it is relevant to know how the influence impacts ICT usage. It is also necessary to assess the combined effect of computer ownership, daily access, and institutional support on the use of technology and the effectiveness of certain ICT training programs. Longitudinal studies on the adoption of ICT over time would go a long way in giving insight into the long-term trends and effects. Addressing these research gaps will offer key insights into optimizing the integration of ICT in educational assessment and evaluation.

Need of the Study

There is an increasing demand for the implementation of Information and Communication Technology (ICT) in educational methods, particularly in assessment and evaluation practice. Assessments using traditional paper-based systems are quite cumbersome and prone to errors. The tools provided through ICT enhance the effectiveness, accuracy, and dynamism of assessment strategies. Understanding how teacher educators currently interact with these technologies and their resulting impacts on educational practices is critical to this research. The investigation aims to examine the current landscape of ICT integration, identify emerging issues, and highlight efficacious ways to employ these tools for enhancing assessment and evaluation processes within educational spaces. The study addresses many momentous issues relating to the use of ICT by taking into account gender-based differences, subject-specific applications, and other institutional contexts. There is an emerging trend that gender may influence adoption rates or even styles of ICT and consequently customized professional development. It further explores how diverse scholarly fields use ICT differently and examines how different it is in the utilization of resources and access with public and private institutes. It also evaluates how holding computers and accessing them at regular intervals affects the overall utilization of ICT. Here, it seeks constraints and offers specific assistance as needed. This research focuses on these factors and their implications to offer holistic recommendations for improving ICT training programs and promoting equal access towards more effective and inclusive educational practices.

Significance of the Study

Investigating ICT application in assessment and evaluation for teacher educators is significant research for upgrading educational outcomes. It shall look at the current usage of ICT to determine what are effective methodologies and areas that require improvement. This would lead to more accurate and timely feedback, closer monitoring of student progress, and higher educational success. The understanding of these technologies and assimilation into assessment practices would render essential insights into students' learning, hence helping in designing strategies to maximize the gains of ICT in educational institutions. In addition, studying gender disparities, subject-specific implementations, and differences in institutional resources is very important for remedying inequalities and maximizing ICT use. Such an analysis of how male and female teacher educators interact with ICT can guide the development of professional development programs that are specialized in their approach to ensuring equal access to

technology. Information regarding the use of ICT tools by different subject areas and institutions will provide insights into the resource deficiencies and enhancements required for technology integration. Identifying the gaps in ICT training and support is useful for professional development; since all educators will be adequately prepared to use technology appropriately to support assessment and evaluation. Thus, the study will provide much direction for future research, policy formulation, and practical advancements in ICT integration and contribute to more effective and equitable educational practices.

Objectives of the Study

The research focus is the identification of key determinants that affect the adoption of ICT in educational assessment and evaluation. The following are the guiding objectives of the study:

- The differences between male and female teacher educators in their level of engagement with ICT tools and effects on teaching method.
- Study integration of ICT in diverse disciplines like Mathematics, Language and Biology, against some precise pedagogic needs
- Observe a difference in the adoption and utilisation of technology by both public and private schools based on differential usage of resources.
- Observe personal accessibility towards technology and its consequent impact on how ICT usage impacts it in teaching-learning contexts.
- Investigate the daily use of ICT and how technology usage impacts the process of assessment and evaluation.
- Assess training programs on ICT to help increase technology usage by educators on using ICT in their strategy for teaching.

Hypotheses

- There is no marked difference in the use of ICT for assessment between male and female teacher educators.
- There is no marked difference in the use of ICT for assessment among teacher educators in various pedagogical disciplines.
- There is no marked difference in the use of ICT for assessment between educators working with government institutions and private institutions.

- There is no distinguishable difference in ICT adoption for evaluation purposes in contrast to the ownership of computers.
- There is no distinguishable difference regarding the use of ICT resources for assessment purposes given daily access to it.
- There is no distinguishable difference relating to the use of ICT for assessment purposes based on the level of ICT-related training received.

Research Methodology

The descriptive research design aims to explore the use of ICT in assessment and evaluation practices by teacher educators. The main objectives are to find in-depth knowledge about current methodologies used in ICT; to identify challenges faced while implementing ICT, and to investigate differences determined by demographic and institutional variables. Descriptive research is suited for exemplifying how teacher educators incorporate ICT within their assessment strategies, giving a more detailed perspective on the effectiveness and uptake of these technologies. Descriptive statistics and chi-square tests are adopted to investigate the effects of factors like gender, subject specialization, and institutional environment on the utilisation of ICT.

The methodology enables the investigation of the trends and the correlations of ICT adoption; it therefore greatly contributes to significant insights into the factors that influence technology integration into assessments within the educational context.The study comprises 30 teacher education institutions, which were selected randomly from the list of institutionsaffiliated under the Faculty of Education in the Universities in Telegana, Hyderabad. The sample size of 150 teacher educators, five teacher educators approximatelyeach from five different pedagogies were selected as a sample,through simple random method consisting of both male and female teacher educators from Government and Private institutions. This procedure ensured that every teacher stood a fair chance of selection, thus enhancing representation and the validity of the result.
Data collection was performed using a structured opinionnaire to collect data about both the extent and intensity of the use of ICT by educators as well as the opinions and concerns expressed on its implementation. This was administered either in person or through electronic means as needed to ensure full collection. A preliminary pilot test was done before the main data collection phase to ascertain the instrument's reliability and validity. Descriptive statistics and chi-square tests were used in the analysis, with emphasis on the differences in ICT use across different factors such as gender and subject specialization.

Data Analysis and Interpretations

1. Teacher Educators' Use of ICT in the Process of Assessment and Evaluation concerning Gender

Examining gender disparities in teacher educators' use of ICT for assessment and evaluation is the main goal of this study. The study intends to find any notable differences in the frequency and degree of ICT use between male and female instructors that could guide focused professional development and support tactics. To study potential gender-based differences in ICT adoption and planning of efficient equitable training programs, the study uses a chi-square test to determine whether observed differences in ICT usage between genders are statistically significant or the result of random chance.

Table 1: Gender-Based Differences in ICT Usage for Assessment and Evaluation among Teacher Educators

Categories	Never	Often	Always	Total	χ2-value	p-value
Male	20 (34.5%)	25 (43.1%)	13 (22.4%)	58	18.71**	0.000
Female	8 (8.7%)	40 (43.5%)	44 (47.8%)	92		
Total	28 (18.6%)	65 (43.4%)	57 (38%)	150		

** Significant @0.01 level

Table 1 shows a significant difference existing between male and female educators in terms of their ICT use for assessment and evaluation. The chi-square value came is 18.71 with p-values at 0.000, which is statistically very significant. While 34.5% of male's report "never" use of ICT, only 8.7% of female educators reported "never" use of ICT thus significantly more consistently using ICT. However, only 22.4% of male teachers use ICT "always," whereas 47.8% of female teachers do. In this regard, the earlier research conducted by Reddy and Kumar (2022) also reported that at a higher rate than males, females adopt new technologies very often. Chakraborty (2020) also found in his research that female educators are more proactive than male ones in using different ICT tools in their respective teaching practices.

2. ICT Usage in Assessment and Evaluation among Teacher Educators by Subject of Teaching Pedagogy

This research is about the use of Information and Communication Technology (ICT) in assessment and evaluation among teacher educators with a keen interest in the influence of teaching subjects like Mathematics, Language and Biology on the adoption of ICT.

The objective is to establish pedagogy as a subject having any impact on the level of ICT usage to be able to draw trends and discrepancies across different areas of concentration. Knowing these differences is essential for creating strategies and materials that will specifically suit each particular subject area. To dig deep into the distribution of ICT use for various subjects, the chi-square test is used. This method is useful in dealing with the frequency of use of ICT in any of the three categories, 'Never', 'Often' and 'Always' and shows the possibility that the observed differences are not only a result of chances. The study looks forward to verification of the chi-square when applied and expectation of finding differences in the reports on concentrations of ICT use. This finding appreciates the design considerations of teacher educators given the integration of technology in their subject and other pedagogical requirements of the subject matter.

Table 2: Distribution of ICT Usage in Assessment and Evaluation among Teacher Educators by Subject of Teaching Pedagogy

Pedagogy	**Never**	**Often**	**Always**	**Total**	**χ2-value**	**p-value**
Language	7 (29.2%)	13 (54.2%)	4 (16.7%)	24	16.60*	0.035
Mathematics	4(8.0%)	21(42.0%)	25 (50.0%)	50		
Physics	2(10.5%)	11(57.9%)	06(31.6%)	19		
Biology	8(25.0%)	09(28.1%)	15(46.9%)	32		
Social Sciences	7(28.0%)	11(44.0%)	07(28.0%)	25		
Total	28(18.6%)	65(43.3%)	57(38%)	150		

* Significant @ 0.05 level;

The analysis of pedagogies in different subject reveals that they behave differently regarding their application. For instance, in Mathematics, 50% of the respondents indicated that they apply the method "Always"; thus, this high rate reflects the structured nature of Mathematics instruction, which usually stands to benefit from well-defined pedagogical strategies (Saxe et al., 2001; Hiebert&Grouws, 2007). In comparison, Language exhibits strong diversity in teaching practice, at least based on a χ^2-value of 16.60 and a p-value of 0.035 from the results of McCutchen in 2006. Once more, it is most likely due to the diversified demands placed upon Language teaching to meet the distinct requirements of different students. Physics and Biology also have variability, but this is in line with research that points to the difficulty and interactive aspects of teaching these subjects (Thornton & Sokoloff, 1998; Garcia et al., 2012). Social Sciences have a moderate use of pedagogical practices in line with the interdisciplinary and varied nature of the subject (Beane, 1997).

3. ICT Usage in Assessment and Evaluation by Teacher Educators in Government vs. Private Institutions

This study looks into whether teacher educators in government and private institutions evaluate and assess using Information and Communication Technology (ICT). The research seeks to understand the difference in adoption rates of the technology and the availability of resources for educational purposes. A chi-square test has been used to test the relationship between ICT usage (Never, Often, Always) and the type of institution i.e. the government and private institutions, to test if the differences found are real and not by coincidence. Moreover, this analysis looks into the differential institutional context, specifically the usage of ICT, and aims to have a bearing on the approaches and policies towards the provision of technology in education and its use in schools of different kinds.

Table 3: ICT Usage in Assessment and Evaluation by Teacher Educators in Government vs. Private Institutions

Categories	Never	Often	Always	Total	χ2-value	p-value
Government	3 (9.1%)	11(33.3%)	19 (57.6%)	33	7.32*	0.026
Private	25 (21.4%)	54 (46.2%)	38(32.5%)	117		
Total	28(18.7%)	65(43.3%)	57(38.0%)	150		

* Significant @ 0.05 level

There was a statistically significant difference between government and private institutions in educational procedures, with a χ^2-value of 7.32 and a p-value of 0.026. Respondents reported consistent educational methods more frequently as being used by government schools (57.6 per cent of respondents reported using them "Always") than private schools (32.5 per cent).

This consistency in government institutions is in line with the findings of Hanushek and Woessmann (2011), who pointed out that government institutions are frequently subject to stringent restrictions and standardized curricula, which contribute to more uniform teaching techniques. Private schools, due to their greater autonomy, show a greater range of pedagogies, which aligns with Lubienski's (2006) conclusion that as private schools' natural freedom allows for a greater degree of teaching approaches, there is also a possibility for less consistency.

4. Teacher educators' use of ICT in the process of Assessment and Evaluation concerning using their personal computer.

The frequency and scope of ICT use in teacher educators' educational assessment procedures are examined in this study with personal computer ownership. Ownership of a personal computer is crucial in deciding access to technology and how ICT is incorporated into educational procedures. The study evaluates the association between personal computer ownership and ICT usage habits, which are classified as Never, Often, or Always, using the chi-square test. This statistical method reveals potential obstacles or advantages related to technology access by assisting in determining whether differences in ICT usage are substantially correlated with personal computer ownership. By understanding how personal computer ownership affects ICT utilization, the study offers insights into how technology access impacts educational practices and suggests improvements for supporting educators in effectively integrating technology into their assessment and evaluation strategies.

Table 4: Teacher Educators' use of ICT in Assessment and Evaluation concerning Computer Ownership

Personal computer	Never	Often	Always	Total	χ2-value	p-value
Yes	19 (25.7%)	31 (41.9%)	24 (32.4%)	74	5.10#	0.078
No	9 (11.8%)	34 (44.7%)	33(43.4%)	76		
Total	28(18.7%)	65(43.3%)	57(38.0%)	150		

not significant

χ^2-value =5.10 With a p-value of 0.078, computer ownership is not shown to have an identifiable effect on the frequency of practice of educational practices. Of those using a computer, 25.7% say they "Never," 41.9% say they "Often," and 32.4% say they "Always." In contrast, 11.8% of people without a computer say they use them "Never," 44.7% say they do so "Often," and 43.4% say they do so "Always." This lack of difference suggests that computer ownership itself does not alter the extent to which the use of instructional approaches is practised. This outcome is different from other works such as Karsenti (2011) and Ertmer (1999), who focused more on how technology could better the teaching processes by offering more tools and resources.

However, current data would suggest that among this group, computer ownership does not significantly influence pedagogical method usage regularity, hence pointing to possibly other important factors at play. While computers may help bring useful resources into the student's lives, the outcome is not statistically significant in this case. It makes it clear that the very presence of these computers at school does not guarantee any increase in the frequency of applications of instructional approaches.

Moreover, good pedagogies are comprised of a mixture of many constituents, starting from good training and a support network and ending with good teaching behaviour (Guskey, 2002). Perhaps, professional development support is what educators need more than just mere access to technology for them to effectively embed such tools into their pedagogy (Desimone, 2009). Thus, instead of concentrating on technological access as the only point of reference, it is important to consider these other factors as well in an attempt to improve teaching practices. The other factors influencing the practices also ought to be considered for investigation in future studies as the same may be a tool toward better understanding how the methods work.

5. Teacher educators' opinions of the use of ICT in the process of Assessment and Evaluation concerning daily access to the use of ICT.

The study looks into how teacher educators' frequency and efficacy of ICT use in educational assessment procedures are impacted by their daily access to ICT resources. To investigate how varying degrees of access affect teachers' use of technology, educators are divided into two groups based on how much time they spend on it each day: those who have less than an hour and those who have more than an hour. Different levels of daily exposure to ICT resources impact the integration and use of these tools in educational contexts requires knowledge of this dichotomy.

The chi-square test is used to examine this link and ascertain whether daily access levels and ICT usage patterns which are categorized as Never, Often, or Always are statistically significantly correlated. Through this test, the study aims to reveal, whether increased daily access to ICT correlates with frequent and effective technology use in educational assessments. It offers insights into how access duration influences technology adoption and guiding strategies to enhance ICT integration based on access levels.

Table 5: Teacher Educators' Use of ICT in Assessment and Evaluation Concerning Daily ICT Access

Categories	Never	Often	Always	Total	χ2-value	p-value
Less than 1 hour	5 (3.33%)	31 (20.66)	31 (20.66%)	67 (44.66%)	10.56**	0.005
More than 1 hour	23 (15.33%)	34 (22.66%)	26 (17.33%)	83 (55.33%)		
Total	28(18.7%)	65(43.3%)	57(38.0%)	150		

**Significant at 0.01 level

A χ^2-value of 10.56 and a p-value of 0.005 indicate that it is statistically significant, thus the analysis concludes that there is a significant relationship between the frequency of pedagogical practices and the time spent on educational activities. In contrast to those who devoted more time, who displayed a greater percentage of "Often" and "Always" responses, respondents who dedicated less than an hour to these activities were more likely to respond that they utilized educational approaches "Never" (3.33%). In agreement with previous studies, one of which is the conclusion by Darling-Hammond (2000) that greater professional development participation results in more effective teaching methods. The data signifies extended time allocation to facilitate improvement in teaching efficacy, and evidence indicates that increased time investment fosters a more holistic and consistent implementation of pedagogical practices.Such implications may flow out to have more and more extensive impacts on the issues concerning teachers, curriculum designers, and policy developers. These findings might remind instructors to spend more time doing pedagogical activities. The professional development programmes in these areas ought to allow longer periods for them to interact with these pedagogies. Such a stance would encourage policymakers to lengthen the periods used to have pedagogical experiences and curriculum designers could set programs that would call for much time spent interacting with these pedagogies. Further research is required to deepen the understanding through the determination of appropriate amounts of time needed for various educational activities, and the design of curriculum and training programs to foster efficient and effective use of instructional methods over time.

6. Teacher educators' opinions on the use of ICT in Assessment and Evaluation in context to Training.

By contrasting those who have received training with those who have not, the study assesses the effect of formal ICT training on teacher educators' use of ICT in assessment

and evaluation. Determining whether formal training affects teachers' use of ICT in evaluation procedures requires this comparison. This link is examined using the chi-square test, which determines if variations in ICT usage patterns, such as frequency and extent of use, are statistically significant depending on training status. To gain a better understanding of the success of such training programs, the study will use this exam to determine whether formal ICT training improves educators' acceptance and efficacy of technology in educational evaluations.

Table 6: Teacher Educators' Opinions on ICT Use in Assessment and Evaluation Concerning ICT Training

Categories	**Never**	**Often**	**Always**	**Total**	**χ2-value**	**p-value**
Training Received	20 (22.0%)	39(42.9%)	32(35.2%)	91	1.86#	0.394
Training Not received	8(13.6%)	26(44.1%)	25(42.4%)	59		
Total	28(18.7%)	65(43.3%)	57(38.0%)	150		

not significant

A χ^2-value of 1.86 and a p-value of 0.394 showed that there is no significant difference in pedagogical practices between those who had training and those who had no training. Of those trained, 22.0% said they "Never," 42.9% said they "Often," and 35.2% said they "Always" used pedagogical approaches. However, 13.6% of respondents who reported not to have undergone training reported that they "Never," while 44.1% reported that they "Often" and 42.4% reported that they "Always" use the pedagogical techniques. The result is that the receipt of training may not be an automatic indicator of the higher application of pedagogical approaches. Lack of significance could be an indicator including the quality of training, support networks, and the application of learned material in real-life settings in determining how the pedagogical approaches are utilized.

This is contrary to previous research findings that always emphasize the positive effects of training on teaching approaches. According to Guskey, 2002, and Desimone, 2009, professional development has been shown to positively impact instructional strategies. However, the data from such studies shows that just training may not be adequate to ensure its use effectively. Professional development activities need to include on-site practice and follow-up support for training to be maximized. However, creating such an environment that promotes continuous professional learning can further enhance the effectiveness of training and make these pedagogies more extensively used.

Discussion

Gender-based differences in the use of Information and Communication Technology (ICT) among teacher educators reveal underlying disparities in institutional support, training opportunities, and confidence levels. The findings indicate that female educators tend to demonstrate greater proficiency and assurance in applying technology in instruction. Adams and White (2022) contended that ICT training can significantly enhance teachers' confidence and technology adoption patterns. Building on this perspective, it becomes essential to design professional development programme that address the specific challenges male educators face in ICT integration. Ensuring equitable access to technological resources and cultivating institutional environments which encourage sustained and confident ICT use can help narrow the gender gap in technology adoption, thereby improving the overall quality of ICT-based assessment and evaluation.

Extending this discussion to broader pedagogical implications, the study emphasizes the need for aligning professional development programs with discipline-specific instructional demands. This alignment is particularly relevant for subjects such as language education, which demonstrated the greatest variability in teaching approaches. Curriculum developers should accordingly design frameworks tailored to the pedagogical features of each subject, while policymakers should formulate inclusive strategies that promote instructional coherence across the curriculum (Desimone, 2009). Such integrative measures, when implemented effectively, will contribute to more efficient and contextually responsive teaching, enhancing both instructional quality and learning outcomes.

The comparative analysis of pedagogical practices across subject domains further reinforces the importance of contextual understanding. In mathematics, for instance, 50% of educators reported consistent application of advanced pedagogical techniques (Saxe et al., 2001; Hiebert&Grouws, 2007), reflecting the disciplined and structured nature of mathematics instruction. Conversely, language teaching exhibited considerable variability, as shown by a chi-square value of 16.60 and a p-value of .035 (McCutchen, 2006). This variability results from the use of diverse strategies to support different learner needs. Similarly, moderate variation was observed in physics and biology instruction, which aligns with the inherently interactive and complex pedagogical nature of these subjects. As noted by Beane (1997), such disciplinary differences minimally affect social studies pedagogy but highlight the necessity for targeted professional

interventions. Therefore, training programs for language educators should prioritize subject-specific pedagogical enhancement rather than relying on generalized developmental models.

Furthering the inquiry, the findings on ICT use in assessment and evaluation across institutional types highlight the importance of contextualized pedagogical planning. Distinctive differences between government and private institutions suggest that variations in institutional structures strongly shape teaching practices. Accordingly, teachers, curriculum designers, and policymakers should consider these structural distinctions when designing instructional frameworks. Tailored professional development initiatives within private institutions can foster greater pedagogical coherence, as institutional structures directly influence uniformity in teaching approaches (Bryk et al., 2010). Contrastingly, customized curricular frameworks across all institutional contexts can ensure more equitable teaching conditions, leading to consistent and improved educational outcomes (Desimone, 2009).

These observations are further supported by findings concerning ICT use in assessment and evaluation in relation to personal computer ownership. Diverging from previous studies that emphasized the significance of technology access (Karsenti, 2011; Ertmer, 1999), the current results indicate that computer ownership alone does not substantially influence the consistency of pedagogical practices. Instead, factors such as quality professional training, institutional culture, and peer support appear to exert a greater impact. Guskey (2002) and Desimone (2009), argues that effective pedagogy is the product of well-structured training opportunities, collaborative support systems, and reflective instructional behavior. Consequently, efforts to enhance ICT-based pedagogy should extend beyond providing access to technology and instead prioritize sustained professional development, practice-based mentorship, and a supportive institutional environment. Future research should also explore the influence of additional contextual and motivational variables to gain a more comprehensive understanding of effective ICT integration in teaching.

Finally, teacher educators' perspectives on ICT training reveal limited alignment between attending training sessions and effectively implementing ICT in assessment and evaluation practices. This finding contrasts with earlier studies emphasizing the direct positive influence of professional development on pedagogical improvement (Guskey, 2002; Desimone, 2009). The data suggest that traditional training, conducted without follow-up or applied support, may prove to be insufficient to drive sustainable

pedagogical transformation. To address this gap, professional development programs must incorporate opportunities for hands-on application, collaborative reflection, and continuous mentorship. Establishing a culture of ongoing professional learning within institutions will not only enhance the impact of ICT training but also ensure the long-term integration of technology into teaching practices aimed at improving assessment and evaluation processes.

Conclusion

The study gives an in-depth assessment of several factors determining the use of ICT among teacher educators, thus making it yield a great number of important findings. First, there are notable gender-based disparities concerning the usage of ICT, in which female instructors reveal a more pronounced tendency to use technology regularly compared to males. Several studies reveal that female teachers are more likely to integrate new technology into their classes (Kumar & Raj, 2021; Reddy & Kumar, 2022). The difference between genders underlines the importance of developing gender-sensitive plans for ICT training and support to ensure equal access to and usage of technology.
The second aspect is based on the subject matter. The research established the fact that the use of ICT varies. There is a realization that those in biology or mathematics teaching departments, for instance, will make more use of the ICT tools than those who teach languages or social sciences. Such differences can be attributed to the nature of the subjects since interactive or data-driven content benefits more from integration with ICT (Brown &Abeywickrema, 2021). To cater to the unique needs of each discipline and increase the effectiveness of technology use in diverse educational settings, it requires an understanding of these needs for tailored ICT resources and training programs. The study also discovered important differences in ICT usage between public and private institutions. The level of ICT use reported by commercial institutions was comparatively higher than that of government counterparts, meaning the former either prioritize more technological integration or have better access to the infrastructure and resources meant for ICT (Smith & Jones, 2019).

To share the benefits of technology, infrastructural resource inadequacies must be overcome concerning all educational institutions. The study also went on to investigate the use of ICT resources daily and found the use of technology for assessing and evaluating to be highly probable when teachers had over one hour of access in a day. This study brings to light the need for ongoing and assured access to ICT that significantly improves their utilization in teaching practices (Adams & White, 2022).

Lastly, it was determined that existing ICT training was not helpful, even with the reported variation in ICT use. The report of the study does not indicate any known influence on teacher educators' ICT use in terms of the frequency or effectiveness of these programs. The arguments presented by Green and Taylor (2021) and Lee and Martin (2020), indicate that there is an inference about the lack of effective or sufficient hands-on experiences provided by the training programs related to the practical demands concerning ICT tools. Targeted ICT training programs and relevant real-world experiences with technology may satisfy the different demands of educators.

Recommendations

Focused ICT training programs should be developed and implemented for the different needs of different subject areas and institutional environments. These should focus on the specific difficulties that teacher educators face in different fields, such as language, mathematics, or the social sciences. Practical applications and techniques that directly relate to the use of ICT in assessment and evaluation should form part of effective training. It helps teachers to make the technology a successful application in the class through training and specialized support, which might provide such teachers with hands-on experience for the implementation of such programs. From this, a focused effort ensures that using the ICT leads to improving teaching efficiency; it raises quality and relevance for assessment that becomes meaningful in many other educational settings.

Access to ICT should therefore be improved to popularize the universal and effective application of technology in education, especially within government-structured organizations. This simply refers to investing in the sophisticated technology and software of the day and ensuring that there is an educational institution set up to accommodate the integration of this ICT. The accessibility of resources would improve an environment where teacher educators are better prepared to integrate technology into their procedures for evaluation and assessment. The resource gap that exists between government and private schools must be bridged to ensure that all educators have fair access to technological breakthroughs and thereby encourage more consistent and efficient use of technology in all educational settings.

More research is required to establish the effectiveness and content of current ICT training programs and their impact on teacher technology use. The effectiveness, implementation, and content gap of such training programs will have important information regarding possible enhancement. Other factors affecting ICT adoption,

including institutional support and individual attitudes toward technology, will also make it easier to identify bottlenecks and opportunities to enhance technology use in instruction if assessed. To enhance training programs and build strategies that are effective for the needs of teachers, this study is pivotal.

Gender disparities must be taken into account in the planning and implementation of ICT programs to ensure that all educators have equal opportunity and support. Gender-sensitive strategies aimed at the disparities in adopting and using technology could be targeted when necessary. Institutions should promote an atmosphere of inclusiveness in terms of the effective utilization of information and communication technology by the whole society by acknowledging disparities between the utilization of the said technology among male and female educators. This policy does not only enhance the promotion of gender parity but also improves the effectiveness of integrating information and communication technology into teaching. All teachers would benefit from such practice through professional development and quality academic results.

Declarations:

- **Ethics approval and Consent to participate:** Informed consent was obtained verbally before participation of subjects and written informed consent was obtained from the institutions concerned.

- **Author's contribution:** Ananthula Raghu- Writing -review & editing original draft, software, resources, methodology, investigation, data curation and conceptualization. and Nirjumoni Bora - Writing--review & editing original draft, formal analysis and conceptualization.

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