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A STUDY OF E-LEARNING READINESS IN RELATION TO TEACHER EFFECTIVENESS AMONG TEACHER TRAINEES

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ABSTRACT

The rapid integration of digital technologies in education has necessitated a deeper understanding of teachers' preparedness to effectively adopt e-learning practices. The present study investigates the relationship between e-learning readiness and teacher effectiveness among teacher trainees, with special reference to gender and locale differences. The study was conducted on a sample of 200 teacher trainees (41 males and 159 females) selected from educational colleges from the districts of Amritsar and Gurdaspur, Punjab, using the convenience sampling technique. The descriptive survey method was employed for the study. Data were collected using the E-learning Readiness Scale developed by Badoni and Mehra (2023) and the Teacher Effectiveness Scale by Suraiya and Shakir (2023). Statistical analysis was carried out using mean, standard deviation, t-test, and Pearson's product moment correlation. The findings revealed that there is no significant difference in e-learning readiness and teacher effectiveness between male and female teacher trainees, indicating that gender does not play a significant role in determining digital preparedness or teaching effectiveness. However, a significant difference was found between urban and rural teacher trainees with respect to both e-learning readiness and teacher effectiveness, highlighting the influence of infrastructural and contextual factors on technology integration in education. Furthermore, the study found a significant positive relationship between e-learning readiness and teacher effectiveness, suggesting that higher levels of readiness for digital learning are associated with greater teaching effectiveness. The results emphasize the importance of strengthening e-learning infrastructure, digital competencies, and institutional support, particularly in rural areas. Enhancing teachers' readiness for e-learning can play a crucial role in improving instructional quality and overall educational outcomes. The study highlights the need for targeted professional development programmes to foster digital competence and promote effective technology integration in teacher education institutions.

1 INTRODUCTION

The contemporary educational landscape has witnessed an unprecedented shift toward technology-mediated instruction, compelling teacher education institutions to critically examine the digital competencies of prospective educators (Tondeur et al., 2012). As e-learning environments become increasingly central to pedagogical delivery, the intersection between teachers' technological readiness and their overall instructional effectiveness has emerged as a vital area of scholarly inquiry (Hung et al., 2010). Teacher trainees, positioned at the threshold of their professional careers, must demonstrate not only mastery of subject content but also the capacity to navigate digital learning ecosystems with confidence and pedagogical purposefulness (Mishra & Koehler, 2006). Research suggests that e-learning readiness-encompassing technological self-efficacy, access to resources, and adaptive teaching strategies-significantly influences instructional quality and student engagement outcomes (Martin et al., 2020). This study explores the relationship between e-learning readiness and teacher effectiveness among teacher trainees, addressing a critical gap in understanding how digital preparedness shapes emerging educators' professional competence.

E-learning Readiness:E-learning readiness refers to the preparedness of individuals, institutions, and technological infrastructure to effectively adopt and implement online learning systems (Mercado, 2008). It encompasses the psychological, technological, and pedagogical dimensions that determine whether learners and educators possess the necessary skills, attitudes, resources, and competencies to engage successfully in digital learning environments (Chapnick, 2000). For teacher trainees, e-learning readiness becomes particularly crucial as it influences their capacity to navigate online platforms, integrate technology into teaching practices, and adapt to the evolving demands of 21st-century education (Hung et al., 2010). This multifaceted construct includes factors such as computer self-efficacy, technological access, motivation toward online learning, and institutional support systems (Smith, 2005). Understanding e-learning readiness among prospective teachers is essential, as their comfort and competence with digital tools directly impact their future effectiveness in facilitating technology-enhanced learning experiences for students (Keramati et al., 2011). In the present study, E-learning readiness was the scores obtained by teacher trainees on E-learning readiness scale developed by Badoni and Mehra, 2023.

Teacher Effectiveness: Teacher effectiveness encompasses the multifaceted capacity of educators to facilitate meaningful learning experiences and foster holistic student development through competent instruction and positive classroom management. According to Stronge (2018), effective teachers demonstrate mastery in content knowledge, pedagogical skills, and interpersonal relationships that collectively enhance student achievement and growth. Campbell et al. (2004) emphasize that teacher effectiveness extends beyond academic outcomes to include the cultivation of students' social, emotional, and cognitive competencies.

In the contemporary educational landscape, teacher effectiveness has evolved to incorporate technological proficiency and adaptability to diverse learning environments (Darling-Hammond, 2006). For teacher trainees preparing to enter the profession, developing effectiveness requires not only theoretical understanding but also practical readiness to utilize emerging instructional modalities, including e-learning platforms, which have become integral to modern pedagogical practice (Tschannen-Moran & Hoy, 2001).In the present study, teacher effectiveness was the scores obtained by teacher trainees on the teacher effectiveness Scale by Suraiya and Shakir (2023).

Review: Research on e-learning readiness reveals diverse preparedness levels and influencing factors across educational contexts. Multiple studies indicate inadequate readiness among educators, with So and Swatman (2006), Trayek et al. (2014), Navani and Ansari (2016), Kiilu et al. (2018),Farazkish and Montazer (2019) and Mncubeet al. (2019) collectively demonstrating that teachers require substantial improvement in technological preparedness for e-learning implementation. Conversely, Kaur and Abas (2004), Lakshmi et al. (2020), and Chung et al. (2020) found predominantly positive attitudes and advanced readiness levels, though content development training remains necessary. Infrastructure emerges as a critical determinant, with Lopes (2007) and Akaslan and Kul (2017) emphasizing computer and internet access as foundational requirements. Demographic variables show mixed significance: while Mandana (2013) identified discipline, age, status, and gender as significant factors, and Teddy et al. (2010) found gender differences in ICT proficiency, Baradyana (2003) and Panayiota (2009) collectively highlight that individual, institutional, social factors, organizational culture, management support, and technological infrastructure constitute critical determinants of e-learning readiness.

Research examining teacher effectiveness demonstrates complex relationships between demographic variables, attitudinal factors, and professional competence. Demographic characteristics yield inconsistent findings: Vijayalakshmi (2002) and Sreevrind (2005) identified age as significantly impacting effectiveness while gender and institutional status showed no influence, whereas Kumar and Kumar (2010) and Halder and Chel (2020) found no significant differences based on gender, department, or service type. However, Pachaiyappan and Raj (2014), Sagar and Parveen (2017), and Roy and Halder (2018) reported significant variations in effectiveness across locale, stream, and gender. Attitudinal and environmental factors demonstrate stronger relationships: Puri (2008), Sodhi (2012), Babu and Kumari (2013), Maity (2015), and Dash and Barman (2016) collectively established positive correlations between teacher effectiveness and teaching attitudes, organizational climate, school location, and ICT utilization. Professional development emerges as crucial, with Behera and Mukherjee (2019) and Sumer (2021) reporting moderate effectiveness levels.

Emergence of the Problem: The present study emerges at a critical juncture when educational institutions worldwide are experiencing unprecedented transformation toward digital learning environments, necessitating a comprehensive understanding of teacher trainees' preparedness for

technology-integrated pedagogy. The COVID-19 pandemic accelerated the adoption of e-learning modalities, revealing significant gaps in educators' technological readiness and competencies (Mishra et al., 2020). As Hung et al. (2010) assert, e-learning readiness significantly influences the successful implementation and sustainability of online educational programs, making it imperative to assess teacher trainees' preparedness before they enter the profession. This study holds particular significance as it explores the relationship between e-learning readiness and teacher effectiveness, two constructs that are increasingly interdependent in contemporary education (Martin et al., 2019). Understanding this relationship can inform teacher education programs about necessary competencies and interventions required to develop technologically proficient and effective educators. Moreover, as Guri-Rosenblit and Gros (2011) emphasize, the digital divide extends beyond access to technology, encompassing psychological, pedagogical, and institutional dimensions that require systematic investigation. This research addresses a critical gap in existing literature by examining how teacher trainees' readiness for e-learning correlates with their perceived effectiveness, potentially offering insights for curriculum reform in teacher education programs (Trust, 2018). The findings may guide policymakers and teacher educators in designing comprehensive professional development frameworks that cultivate both technological competence and pedagogical excellence, ultimately enhancing the quality of education in an increasingly digital world.

Hypotheses of the study

H_{01}: There will be no significant difference in E-learning readiness between male and female teacher trainees.

H_{02}: There will be no significant difference in teacher effectiveness between male and female teacher trainees.

H_{03}: There will be no significant difference in E-learning readiness between urban and rural teacher trainees.

H_{04}: There will be no significant difference in teacher effectiveness between urban and rural teacher trainees.

H_{05}: There will be no significant relationship between E-learning readiness and teacher effectiveness among teacher trainees.

METHODOLOGY

Research Design: The present study falls under the domain of descriptive research.

Sample: The sample consists of 200 teacher trainees (41 male and 159 female) selected from education colleges in Amritsar and Gurdaspur districts of Punjab using convenience sampling technique.

Tools Used: Following tools were used:

1. E-learning Readiness Scale by Badoni and Mehra,2023
2. Teacher effectiveness Scale by Suraiya and Shakir (2023)

INTERPRETATION AND DISCUSSION OF RESULTS

Hypothesis 1: Therewill be nosignificantdifferencein E-learning readinessbetween male andfemale teacher trainees.

To test this hypothesis, mean, S.D., S. E_M and t-value of E-Learning Readiness and Teacher Effectiveness between male and female teacher trainees was calculated and has been presented in the table 1.

Table 1:Showing Mean, S.D., S. $E_M$and t-value of E-Learning Readiness and Teacher Effectiveness between male and female teacher trainees

Variables	Gender	N	Mean	S. D	S. E_M	t-Value
E-learning Readiness	Male	41	122.15	19.25	3.07	**1.85**
	Female	159	127.47	15.62	1.24	
Teacher Effectiveness	Male	41	179.02	17.50	2.83	**1.19**
	Female	159	182.68	17.41	1.38	

(Critical value 1.96 at 0.05 level and 2.58 at 0.01 level, df = 198)

The table 1 reveals that male teacher trainees (N=41) obtained a mean score of 122.15 with a standard deviation of 19.25, while female teacher trainees (N=159) achieved a mean score of 127.47 with a standard deviation of 15.62 on E-learning readiness. The calculated t-value is 1.85, which is lower than the table value of 1.96 at 0.05 level of significance. Since the obtained t-value (1.85) is less than the critical table value at both significance levels, the difference between male and female teacher trainees' E-learning readiness is statistically non-significant.

This indicates that E-learning readiness does not differ significantly based on gender among teacher trainees. Consequently, the null hypothesis stating "There will be no significant difference in E-learning readiness between male and female teacher trainees" is accepted. The findings suggest that both male and female teacher trainees possess comparable levels of readiness to engage with e-learning technologies and digital learning environments.

The non-significant difference in E-learning readiness between male and female teacher trainees can be attributed to the widespread digital exposure and equitable access to technology in contemporary teacher education programs. Modern teacher training institutions provide similar technological infrastructure and training opportunities to all trainees regardless of gender, thereby minimizing traditional gender-based digital divides (Teo, 2008). Additionally, the proliferation of smartphones and affordable internet connectivity has democratized digital literacy across genders in recent years (Venkatesh et al., 2003). This finding aligns with studies by Oye et al. (2012) and Alharbi and Drew (2014), who reported no significant gender differences in e-learning readiness among university students. However, contradictory findings were reported by Cubeles and Riu (2018) and Alghamdi and Smith (2020), who found females demonstrating higher e-learning readiness due to better self-regulation and organizational skills in online learning environments.

Hypothesis 2:There will be no significant difference in teacher effectiveness between male and female teacher trainees.

Table 1, presents the comparative analysis of teacher effectiveness between male and female teacher trainees. The mean scores reveal that male teacher trainees obtained 179.02 while female teacher trainees scored 182.68, indicating a slightly higher mean for females. The calculated t-value is 1.19, which falls below the critical table value of 1.96 at 0.05 level of significance. Since the obtained t-value (1.19) is less than the table value (1.96), it is not statistically significant. This indicates that no significant difference exists in teacher effectiveness between male and female teacher trainees. Consequently, the null hypothesis-"There will be no significant difference in teacher effectiveness between male and female teacher trainees"-is accepted. This finding suggests that gender does not play a determining role in shaping teacher effectiveness among teacher trainees, and both male and female trainees demonstrate comparable levels of effectiveness in their pedagogical competencies.

The absence of significant gender differences in teacher effectiveness may be attributed to contemporary teacher education programs that provide equal opportunities and standardized training to all trainees regardless of gender (Kaur & Kaur, 2018). Modern pedagogical approaches emphasize competency-based education that focuses on skill development rather than gender-specific capabilities, creating an equitable learning environment for all trainees. Additionally, changing societal attitudes toward gender roles in education have diminished traditional stereotypes, allowing both male and female

trainees to develop similar professional competencies (Toprak & Karakus, 2018). The standardized curriculum and assessment methods in teacher training institutions ensure uniform development of teaching skills across genders. This finding aligns with Goe and Stickler (2008) who reported no significant gender differences in teaching effectiveness measures. Similarly, Stronge et al. (2011) found that effective teaching characteristics transcended gender boundaries in their comprehensive study. However, contradicting this finding, Aaronson et al. (2007) observed that female teachers demonstrated higher effectiveness in elementary literacy instruction. Likewise, Dee (2007) reported gender-specific advantages wherein students benefited from same-gender teachers in certain contexts.

Hypothesis 3:There will be no significant difference in E-learning Readiness between urban and rural teacher trainees.

To test this hypothesis, mean, S.D., S. E_M and t-value of E-Learning readiness and Teacher Effectiveness between urban and rural teacher trainees was calculated and has been presented in the table 2.

Table 2:Showing Mean, S.D., S. $E_M$and t-value of E-Learning Readiness and Teacher Effectiveness between urban and rural teacher trainees

Variables	Locale	N	Mean	S. D	S. E_M	t-Value
E-learning Readiness	Urban	100	132.01	10.354	1.035	**5.12**
	Rural	100	120.74	19.424	1.942	
Teacher Effectiveness	Urban	100	186.77	14.930	1.493	**4.05**
	Rural	100	177.09	18.656	1.866	

(Critical value 1.96 at 0.05 level and 2.58 at 0.01 level, df = 198)

Table 2, reveals that the mean scores of e-learning readiness for urban and rural teacher trainees were 132.01 and 120.74 respectively, indicating a notable difference of 11.27 points in favour of urban trainees. The standard deviation for rural teacher trainees (19.424) is considerably higher than urban trainees (10.354), suggesting greater variability in e-learning readiness among rural participants. The calculated t-value is 5.12, which exceeds the critical table value of 1.96 at 0.05 level of significance for a two-tailed test with 198 degrees of freedom. Since the obtained t-value (5.12) is substantially greater than

the table value (1.96), the difference between urban and rural teacher trainees' e-learning readiness is statistically significant at 0.05 level. Consequently, the null hypothesis stating "There will be no significant difference in e-learning readiness between urban and rural teacher trainees" is rejected. This finding establishes that urban teacher trainees demonstrate significantly higher e-learning readiness compared to their rural counterparts.

The superior e-learning readiness among urban teacher trainees can be attributed to enhanced access to digital infrastructure, consistent internet connectivity, and greater exposure to technology-integrated learning environments prevalent in urban educational institutions. Urban trainees typically possess more advanced digital literacy skills developed through frequent interaction with computers, smartphones, and online resources from their formative years. Additionally, urban areas offer better training opportunities, technical support systems, and peer collaboration networks that foster technological competence. The digital divide between urban and rural regions significantly impacts trainees' familiarity and comfort with e-learning platforms, affecting their confidence and preparedness to engage with online educational tools (Inan & Lowther, 2010). Supportive studies by Alqurashi (2016) and Joosten and Cusatis (2020) corroborate these findings, demonstrating that geographical location and technological access significantly influence e-learning readiness among prospective educators. Conversely, contradictory research by Keengwe et al. (2009) and Paraskeva et al. (2008) suggests that with adequate institutional support and training interventions, rural teacher trainees can achieve comparable e-learning readiness levels, indicating that geographical disparities can be mitigated through targeted professional development programs.

HYPOTHESIS 4: There will be no significant difference in Teacher Effectiveness of urban and rural teacher trainees.

Table 2, reveals that the mean scores of teacher effectiveness among urban and rural teacher trainees were 186.77 and 177.09 respectively. The calculated t-value is 4.05, which exceeds the table value of 1.96 at 0.05 level of significance, indicating a statistically significant difference between the two groups. The higher mean score of urban teacher trainees suggests superior teacher effectiveness compared to their rural counterparts. The standard deviations of 14.930 and 18.656 for urban and rural trainees respectively indicate greater variability in teacher effectiveness scores among rural participants. Based on these findings, the null hypothesis stating "There will be no significant difference in Teacher Effectiveness of urban and rural teacher trainees" is rejected. This significant difference demonstrates that locality plays a crucial role in determining the level of teacher effectiveness among teacher trainees, with urban trainees exhibiting notably higher effectiveness.

The superior teacher effectiveness among urban teacher trainees can be attributed to enhanced access to quality educational resources, modern infrastructure, and exposure to diverse teaching methodologies available in urban training institutions. Urban trainees benefit from better-equipped libraries, technological facilities, and opportunities for professional development through workshops and seminars (Darling-Hammond, 2010). Additionally, urban environments provide greater exposure to experienced mentor teachers and contemporary pedagogical practices, fostering higher competency levels. Stronge et al. (2011) support these findings, reporting that urban teacher trainees demonstrated significantly higher teaching competence due to better training facilities and resources. Conversely, Rao and Joshi (2017) reported no significant difference in teacher effectiveness between urban and rural trainees, attributing effectiveness primarily to individual motivation rather than location.

HYPOTHESIS 5: There will be no significant relationship between E-learning Readiness and Techer Effectiveness among teacher trainees.

To test this hypothesis, coefficient of correlation between e-learning readiness and teacher effectiveness among teacher trainees was calculated. The score of co-efficient of correlation of e-learning readiness and teacher effectiveness among teacher trainees have been shown in the table 3.

Table 3: Co-efficient of correlation of E-learning readiness and Teacher effectiveness among teacher trainees

Variable	E-Learning Readiness	Teacher Effectiveness
E-Learning Readiness	1	0.66
Teacher Effectiveness	0.66	1

The table reveals that the correlation coefficient between e-learning readiness and teacher effectiveness among teacher trainees is 0.66. This positive correlation indicates a substantial relationship between the two variables. At 0.05 level of significance, the table value for correlation coefficient is 0.195 (for a large sample). Since the calculated r-value of 0.66 is considerably higher than the table value of 0.195, it is statistically significant at 0.05 level of significance. This demonstrates that teacher trainees with higher E-learning readiness tend to exhibit greater teacher effectiveness.

Consequently, the hypothesis - "There will be no significant relationship between E-learning readiness and Teacher effectiveness among teacher trainees" - is rejected. The strong positive correlation suggests that as E-learning readiness increases, teacher effectiveness also increases proportionately among teacher trainees.

The significant positive relationship between E-learning readiness and teacher effectiveness can be attributed to several factors. Teacher trainees with enhanced E-learning readiness possess superior technological competencies, enabling them to design engaging digital learning experiences and adapt instructional strategies effectively (Hung et al., 2010). Their confidence in navigating online platforms translates into improved pedagogical delivery and classroom management skills. Furthermore, e-learning readiness fosters self-directed learning behaviors and reflective practices, which are fundamental characteristics of effective teachers (Martin et al., 2020). This finding aligns with studies by Paraskeva et al. (2008) and Yurdugül and Demir (2017), who reported positive associations between technology readiness and teaching competence. However, contrasting results were observed by Keramati et al. (2011) and Cigdem and Topcu (2015), who found weak or non-significant relationships, suggesting contextual and infrastructural variables may moderate this association.

FINDINGS OF THE STUDY

1. There is no significant difference in E-learning readiness between male and female teacher trainees. The calculated t-value of 1.85 is lower than the critical table value of 1.96 at 0.05 level of significance, indicating that gender does not significantly influence E-learning readiness among teacher trainees. Both male and female teacher trainees possess comparable levels of preparedness to engage with digital learning environments.

2. There is no significant difference in teacher effectiveness between male and female teacher trainees. The obtained t-value of 1.19 is less than the table value of 1.96 at 0.05 level of significance, demonstrating that gender does not play a determining role in shaping teacher effectiveness. Male and female trainees exhibit similar pedagogical competencies and instructional capabilities.

3. There is a significant difference in E-learning readiness between urban and rural teacher trainees. The calculated t-value of 5.12 exceeds the critical table value of 1.96 at 0.05 level of significance, revealing that urban teacher trainees demonstrate significantly higher E-learning readiness compared to rural trainees. The mean scores of 132.01 for urban and 120.74 for rural trainees indicate substantial disparity favoring urban participants.

4. There is a significant difference in teacher effectiveness between urban and rural teacher trainees. The t-value of 4.05 is greater than the table value of 1.96 at 0.05 level of significance, establishing that urban teacher trainees exhibit significantly superior teacher effectiveness compared to their rural counterparts. Urban trainees' mean score of 186.77 substantially exceeds the rural trainees' mean score of 177.09.

5. There is a significant positive relationship between E-learning readiness and teacher effectiveness among teacher trainees. The correlation coefficient of 0.66 substantially exceeds the table value of 0.195 at 0.05 level of significance, indicating a strong positive association. Teacher trainees with higher E-learning readiness demonstrate greater teacher effectiveness, suggesting that digital preparedness significantly contributes to pedagogical competence.

EDUCATIONAL IMPLICATIONS

1. Since gender does not significantly influence E-learning readiness among teacher trainees, teacher education institutions should design gender-neutral digital training programs that focus on universal technological competencies rather than gender-specific interventions. Educational policymakers must ensure equal access to digital resources and e-learning platforms for all trainees, eliminating any gender-based biases in technology integration initiatives. This finding encourages institutions to adopt inclusive approaches that recognize both male and female trainees as equally capable of mastering digital pedagogical tools, thereby optimizing resource allocation and training effectiveness.

2. The absence of gender differences in teacher effectiveness suggests that teacher training curricula should emphasize competency-based pedagogical development that transcends gender considerations. Educational institutions must continue promoting equitable learning environments where teaching effectiveness is evaluated based on professional skills rather than demographic characteristics. This finding reinforces the need for standardized assessment frameworks that measure pedagogical competencies objectively, ensuring that both male and female trainees receive equal mentorship, professional development opportunities, and recognition for their teaching abilities.

3. The significant disparity in E-learning readiness between urban and rural teacher trainees necessitates targeted interventions to bridge the digital divide in rural areas. Educational authorities must prioritize infrastructure development, including reliable internet connectivity, computer laboratories, and digital learning resources in rural teacher training institutions. Specialized professional development programs focusing on digital literacy, e-learning platform navigation, and

technology-integrated pedagogy should be implemented specifically for rural trainees to enhance their technological competencies and confidence in utilizing online educational tools.

4. The significant difference in teacher effectiveness between urban and rural trainees highlights the urgent need for quality enhancement measures in rural teacher education institutions. Educational policymakers should establish resource-sharing mechanisms, virtual mentoring programs, and collaborative learning networks that connect rural trainees with experienced educators and contemporary pedagogical practices. Rural institutions require substantial investment in modern teaching-learning materials, library resources, and exposure opportunities through workshops and seminars to elevate the overall effectiveness of rural teacher trainees to standards comparable with their urban counterparts.

5. The strong positive correlation between E-learning readiness and teacher effectiveness underscores the critical importance of integrating comprehensive digital competency training throughout teacher education curricula. Teacher training institutions must incorporate systematic e-learning modules, technology integration workshops, and hands-on experience with digital pedagogical tools as essential components of their programs. This finding suggests that enhancing teacher trainees' E-learning readiness through structured technological training, continuous professional development, and supportive institutional infrastructure will directly contribute to improving their overall teaching effectiveness, ultimately benefiting the quality of education delivered to future students.

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