

Research Article**Digital Literacy and Readiness for Technology-Integrated Teaching Among B.Ed. Student-Teachers in Dakshina Kannada****Mr. Raghunandana K¹, Mrs. Deepashree S²**¹Assistant Professor, Alva's College of Education, Moodubidire²Assistant Professor, Mar Ivanios College of Education, Kunthoor**Corresponding Author: Mr. Raghunandana K****Abstract**

Digital literacy is an important part of teacher preparation because future teachers are expected to use digital resources to support teaching, learning and assessment. However, basic digital skills alone do not guarantee that teachers are ready to integrate technology meaningfully into classroom practice. This study examined digital literacy and readiness for technology-integrated teaching among B.Ed. student-teachers in Dakshina Kannada district, Karnataka. It investigated differences by gender, locality and year of study. A quantitative descriptive survey design was used. The sample consisted of 200 B.Ed. students selected from colleges in the district through random sampling. Data were collected using a 50-item tool developed and validated by the investigators, together with relevant demographic information. The mean, standard deviation and independent-samples t-test were used to analyse the data. The results showed statistically significant differences across all three comparisons. Female student-teachers had higher mean scores than male student-teachers, urban student-teachers scored higher than rural student-teachers and second-year student-teachers scored higher than first-year student-teachers. These findings may help teacher educators identify areas in which student-teachers need further support to develop digital competencies and prepare for technology-integrated teaching.

Keywords: Digital Literacy; Technology-Integrated Teaching; B.Ed. Student-Teachers; Teacher Education; Dakshina Kannada; Karnataka.

1.0.0 Introduction

Digital technologies have increasingly influenced the planning, delivery and assessment of education. Digital learning platforms, multimedia resources, online collaboration tools and technology-supported assessment can broaden teaching practices and respond to different learning needs. Teacher education institutions therefore have an important role in preparing future teachers to use digital technologies effectively and responsibly. Digital literacy involves more than operating computers or smartphones. It includes the ability to locate, evaluate, create and communicate information using digital technologies (Gilster, 1997). For teachers, it also involves selecting appropriate educational resources, assessing their credibility, protecting learners' privacy and using technology to support clear pedagogical goals.

Technology-integrated teaching requires teachers to connect digital resources with subject knowledge, instructional strategies and learning outcomes. A student-teacher may be comfortable using social media or general-purpose applications but have limited experience designing technology-supported lessons, conducting digital assessments or evaluating online learning resources. Digital literacy and readiness for technology-integrated teaching are therefore related but distinct concepts that merit examination (Mishra & Koehler, 2006; Koehler & Mishra, 2009). Pre-service teacher education offers an important opportunity to develop these competencies before student-teachers enter the profession. Teacher education programmes can support this development through practical technology activities, demonstrations, guided lesson planning, teaching practice and opportunities to evaluate digital instructional resources.

Tondeur et al. (2012), in a synthesis of qualitative evidence on preparing pre-service teachers to integrate technology, highlighted the importance of teacher-education experiences that connect technology use with pedagogical practice. This perspective suggests that digital competence involves more than learning to operate devices or applications. B.Ed. student-teachers in Dakshina Kannada district, Karnataka, provide a relevant group in which to examine these issues. Understanding their digital literacy and readiness may help teacher educators identify areas requiring additional support. The need for a district-specific study should, however, be established through a systematic review of existing research rather than assumed solely from the participants' location.

This study examined digital literacy and readiness for technology-integrated teaching among B.Ed. student-teachers in selected colleges in Dakshina Kannada district. Although technology is increasingly important in contemporary teaching, student-teachers may differ in their digital skills, confidence and preparedness to incorporate digital resources into instruction. Understanding these differences may help teacher education institutions plan appropriate learning experiences and professional development opportunities.

The problem addressed in this study was: What differences exist in digital literacy and readiness for technology-integrated teaching among B.Ed. student-teachers in Dakshina Kannada district when they are grouped by gender, locality and year of study?

1.1.0 Need and Significance of the Study

Rapid advances in digital technology have brought significant changes to education. Digital literacy and readiness for technology-integrated teaching are important competencies for teachers in the twenty-first century. The effective use of digital tools and resources can support student engagement, enrich learning experiences and encourage innovative teaching practices. Prospective teachers therefore need the digital knowledge, skills and confidence required to respond to the demands of contemporary education.

B.Ed. student-teachers are future educators who will help shape teaching and learning. Their ability to use digital technologies effectively can support interactive, inclusive and learner-centered classrooms. However, differences in technological exposure, access to digital resources, and opportunities for ICT-based learning may influence their digital literacy and readiness for technology-integrated teaching. This study assesses these competencies among B.Ed. student-teachers in Dakshina Kannada and examines differences by gender, locality and year of study. The findings may help identify student-teachers' learning needs and inform suitable training programmes. They may also be useful to teacher educators, curriculum planners and educational administrators working to strengthen ICT-based learning, improve digital infrastructure and provide professional development. In addition, the study may inform efforts to promote equitable access to digital-learning opportunities.

2.0.0 Theoretical Framework

2.1.0 Theoretical Framework Related to Digital Literacy

2.1.1 Digital Competence Framework for Educators (DigCompEdu)- Redecker (2017)

Christine Redecker (2017) developed the European Framework for the Digital Competence of Educators (DigCompEdu), which provides a model for understanding educators' use of digital technology in professional practice. The framework treats digital competence as more than basic device operation. It includes the knowledge, skills and attitudes required to select, create and manage digital tools effectively and responsibly in support of teaching and learning.

DigCompEdu identifies six areas of educator competence: **professional engagement**, including digital communication, collaboration and continuing professional development; **digital resources**, including the identification, adaptation and management of educational materials while respecting copyright and privacy; **teaching and learning**, involving the design and use of technology-supported instructional strategies; **assessment**, including digital assessment, feedback and analysis of learner progress; **empowering learners**, through accessibility, inclusion, differentiation and personalized instruction; and **facilitating learners' digital competence**, by

helping students develop digital problem-solving, media literacy, content-creation and responsible technology-use skills.

2.1.2 Digital Literacy Framework – Eshet-Alkalai (2004)

Eshet-Alkalai (2004) described digital literacy as a combination of cognitive, social, and technical skills needed to function effectively in digital environments. The framework extends beyond technical operation to include understanding, evaluating and communicating information across digital platforms. Its five components are **photo-visual literacy** or interpreting visual representations such as icons and images; **reproduction literacy** or adapting existing digital materials to create meaningful content while respecting intellectual property; **branching literacy** or navigating non-linear digital environments; **information literacy** or critically evaluating online information; and **socio-emotional literacy** or communicating and collaborating responsibly in online environments.

2.2.0 Theoretical Framework Related to Technology-Integrated Teaching

2.2.1 Technology Integration Matrix (TIM)- Florida Center for Instructional Technology

The Florida Center for Instructional Technology developed the Technology Integration Matrix (TIM) to describe and evaluate how technology is used in classroom instruction (Florida Center for Instructional Technology, n.d.).

The matrix combines five levels of technology integration with five characteristics of meaningful learning environments: **active learning**, in which students engage directly with digital tools; **collaborative learning**, in which technology supports teamwork and the exchange of ideas; **constructive learning**, in which students connect new concepts with prior knowledge; **authentic learning**, in which digital tools support meaningful, real-world tasks; and **goal-directed learning**, in which students use digital resources to plan, monitor, and reflect on their learning.

2.2.2 UNESCO ICT Competency Framework for Teachers (ICT-CFT)

The UNESCO ICT Competency Framework for Teachers (ICT-CFT) provides guidance on integrating information and communication technologies into teaching, learning, assessment, and professional development. Its six components address understanding ICT in education policy; curriculum and assessment; pedagogy; the application of digital skills; the organisation and administration of digital learning environments; and teacher professional learning. Together, these components emphasise the use of ICT to support educational goals, learner-centred teaching, effective classroom management and continuing professional development.

3.0.0 Literature Review

Praveen Kumar et al. (2025) conducted a study on *Digital Literacy, Pedagogical Readiness, and Technology Integration Among Pre-Service Teachers in Higher Education*. This study utilized a descriptive survey design across multiple teacher education institutions to assess the relationship between foundational digital competence and the practical readiness of B.Ed. student-teachers to implement technology-enhanced instruction. The study analyzes the impact of institutional infrastructure, digital self-efficacy, and training exposure to identify existing competency gaps, institutional challenges and best practices in preparing future educators for digital classrooms. This literature review concludes that bridging the gap between general digital literacy and classroom-ready pedagogical application requires B.Ed. curricula to shift away from theoretical computing and emphasize hands-on, subject-specific digital integration.

Suresh Poojary and Lakshmi Hegde (2025) conducted a study on *E-Content Creation and Digital Assessment Practices Among Pre-Service Teachers*. This study uses a literature review and survey design based on the DigCompEdu framework to evaluate B.Ed. trainees' ability to create original learning resources and use digital tools for formative and summative evaluations. The study analyzes the specific domains of digital assessment (e.g., Google Forms, online quizzes) and multimedia content design. This literature review concludes that digital assessment and

digital content creation remain the weakest dimensions of trainee readiness, requiring targeted practical modules within the B.Ed. curriculum.

Priya D'Souza and Rajesh Kumar (2025) conducted a study on *Affective Factors and Digital Self-Efficacy in Technology-Integrated Instruction Among Pre-Service Educators*. This study applies a correlation design to measure how teacher attitudes, digital anxiety, and computer self-efficacy influence the adoption of technology during teaching practice. The study assesses the psychological readiness of student-teachers and their apprehension toward potential technical failures during class delivery. This literature review concludes that positive teacher attitudes and high digital self-efficacy serve as stronger predictors of successful technology integration than basic technical skill alone.

Deepak Fernandes and Savitha Nayak (2024) conducted a study on *Infrastructure Availability and Digital Teaching Readiness in Government Aided and Unaided B.Ed. Colleges of Dakshina Kannada*. This study analyzes descriptive data collected from urban and rural teacher training colleges in the district to compare institutional access to smart classrooms, language labs, and digital repositories. The study highlights structural constraints, resource allocation gaps, and varying levels of hands-on exposure provided during the training program. This literature review concludes that disparities in institutional ICT infrastructure significantly impact pre-service teachers' practical readiness and willingness to adopt digital tools in live school environments.

K. V. Ananya and M. S. Bhat (2024) conducted a study on *Integrating Technological Pedagogical Content Knowledge (TPACK) in B.Ed. Curricula: Assessing Student-Teacher Readiness*. This study utilizes a mixed-methods approach to investigate how pre-service teachers in Mangaluru blend subject-matter expertise with digital teaching strategies during internship programs. The study examines lesson plans, self-efficacy scores, and classroom execution to assess the transition from theoretical ICT knowledge to active teaching. This literature review concludes that student-teachers exhibit strong content and general pedagogical knowledge but experience a significant drop in confidence when designing interactive, technology-enhanced instructional units.

4.0.0 Objectives of the Study

- To determine whether digital literacy and readiness for technology-integrated teaching differ significantly between male and female B.Ed. student-teachers in Dakshina Kannada district.
- To determine whether digital literacy and readiness for technology-integrated teaching differ significantly between urban and rural B.Ed. student-teachers in Dakshina Kannada district.
- To determine whether digital literacy and readiness for technology-integrated teaching differ significantly between first-year and second-year B.Ed. student-teachers in Dakshina Kannada district.

5.0.0 Hypotheses

- There is no significant difference in digital literacy and readiness for technology-integrated teaching between male and female B.Ed. student-teachers in Dakshina Kannada district.
- There is no significant difference in digital literacy and readiness for technology-integrated teaching between urban and rural B.Ed. student-teachers in Dakshina Kannada district.
- There is no significant difference in digital literacy and readiness for technology-integrated teaching between first-year and second-year B.Ed. student-teachers in Dakshina Kannada district.

6.0.0 Research Method

Research Design

The study used a Descriptive Survey Design.

Sample

The sample consisted of 200 B.Ed. students from Dakshina Kannada district, selected using random sampling technique.

Tools Used

Data were collected using a 50-item tool developed and validated by the investigator.

Statistical Techniques Used

The data were analyzed using the Mean, Standard Deviation and Independent-Samples t-test.

7.0.0 Analysis and Interpretation

Hypothesis 1:

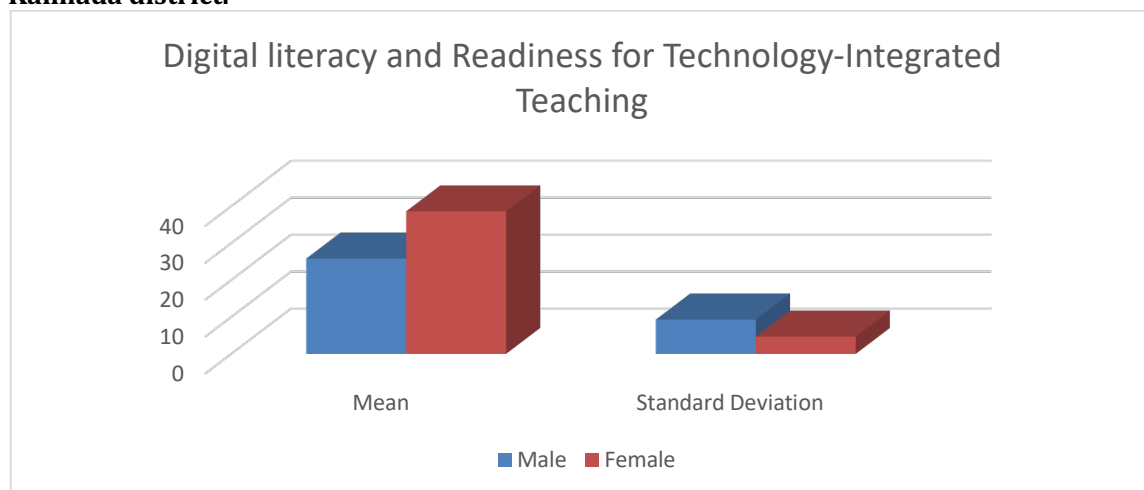
There is no significant difference in digital literacy and readiness for technology-integrated teaching between male and female B.Ed. student-teachers in Dakshina Kannada district.

Table 1: Gender-wise comparison of digital literacy and readiness for technology-integrated teaching

Variable	Gender	Mean	Standard deviation	t-value	p-value	Result
Digital literacy and readiness	Male	25.8	9.293008	5.39783	0.00000006	Significant
	Female	38.6	4.694678			

The independent-samples t-test indicated a statistically significant difference between male and female student-teachers. Female student-teachers had a higher mean score than male student-teachers. The reported p-value was 0.00000006, which is below the 0.05 significance level. Therefore, the null hypothesis was rejected.

Figure 1: Graph shows the comparison of digital literacy and readiness for technology-integrated teaching between male and female B.Ed. student-teachers in Dakshina Kannada district.



Hypothesis 2:

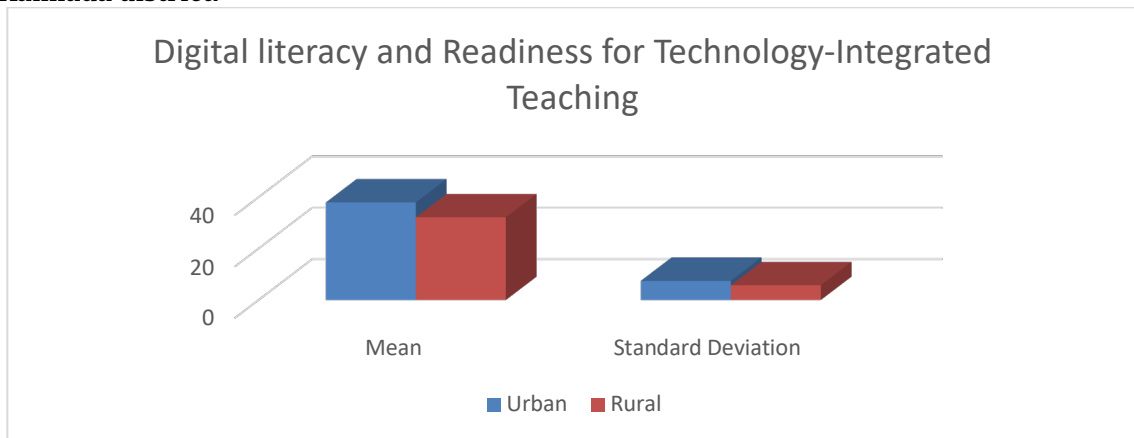
There is no significant difference in digital literacy and readiness for technology-integrated teaching between urban and rural B.Ed. student-teachers in Dakshina Kannada district.

Table 2: Locality-wise comparison of digital literacy and readiness for technology-integrated teaching

Variable	Locality	Mean	Standard deviation	t-value	p-value	Result
Digital literacy and readiness	Urban	38.0	7.483315	5.14739	0.0000012	Significant
	Rural	32.2	5.758472			

The independent-samples t-test indicated a statistically significant difference between urban and rural student-teachers. Urban student-teachers had a higher mean score than rural student-teachers. The reported p-value was 0.0000012, below the 0.05 significance level. Therefore, the null hypothesis was rejected.

Figure 2: Graph shows the comparison of digital literacy and readiness for technology-integrated teaching between urban and rural B.Ed. student-teachers in Dakshina Kannada district.

**Hypothesis 3:**

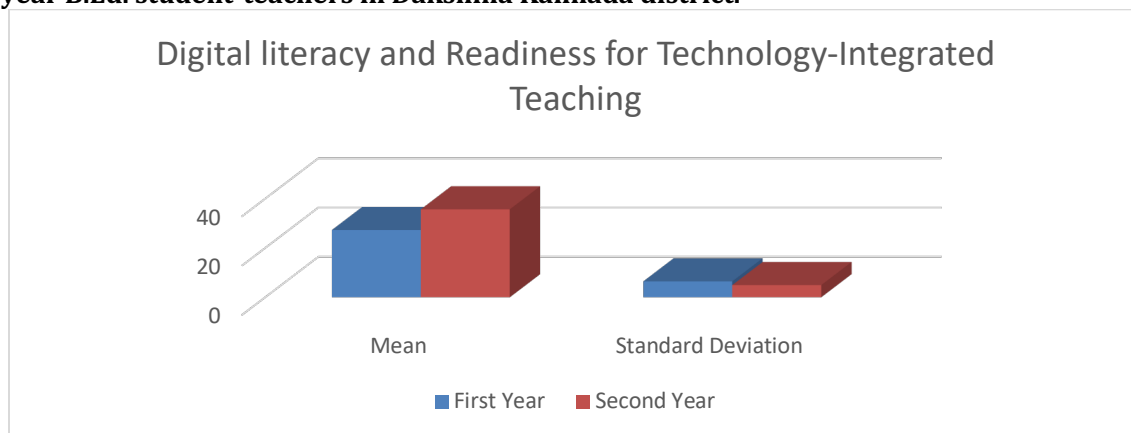
There is no significant difference in digital literacy and readiness for technology-integrated teaching between first-year and second-year B.Ed. student-teachers in Dakshina Kannada district.

Table 3: Year-wise comparison of digital literacy and readiness for technology-integrated teaching

Variable	Year study of	Mean	Standard deviation	t-value	p-value	Result
Digital literacy and readiness	First year	27.3	6.458328	4.13364	0.000037	Significant
	Second year	35.7	4.950758			

The independent-samples t-test indicated a statistically significant difference between first-year and second-year student-teachers. Second-year student-teachers had a higher mean score than

first-year student-teachers. The reported p-value was 0.000037, below the 0.05 significance level. Therefore, the null hypothesis was rejected. **Figure 3 shows the comparison of digital literacy and readiness for technology-integrated teaching between first-year and second-year B.Ed. student-teachers in Dakshina Kannada district.**



8.0.0 Findings of the Study

- A statistically significant difference was found between male and female student-teachers. Female student-teachers had a higher mean score than male student-teachers.
- A statistically significant difference was found between urban and rural student-teachers. Urban student-teachers had a higher mean score than rural student-teachers.
- A statistically significant difference was found between first-year and second-year student-teachers. Second-year student-teachers had a higher mean score than first-year student-teachers.

9.0.0 Discussion of the Findings

This study examined digital literacy and readiness for technology-integrated teaching among B.Ed. student-teachers in Dakshina Kannada district, with particular attention to gender, locality, and year of study. The results showed statistically significant differences across all three comparisons.

Gender-wise, female student-teachers had higher mean scores than male student-teachers. This difference may relate to variations in learning experiences, access to digital resources, technology use, or attitudes towards technology-based teaching. However, the study design does not establish the reasons for the difference. The finding highlights the importance of providing equitable opportunities for all student-teachers to develop digital competencies.

Locality-wise, urban student-teachers had higher mean scores than rural student-teachers. This difference may be associated with internet connectivity, digital infrastructure, access to technological resources, and opportunities for ICT-based learning. These factors were not directly tested in the study and should therefore be treated as possible explanations rather than established causes. Research on digital inequality also cautions that differences may involve skills and patterns of technology use, not only access (van Dijk, 2020).

Year-wise, second-year student-teachers had higher mean scores than first-year student-teachers. This difference may relate to greater exposure to pedagogical training, ICT-based activities, teaching practice, or technology-integrated classroom experiences during the B.Ed. programme, although the results do not establish a causal relationship. Overall, the findings highlight the value of systematic training, adequate digital resources, and practical opportunities to develop student-teachers' digital competencies.

10.0.0 Educational Implications

- Digital literacy should be incorporated systematically into the B.Ed. curriculum so that student-teachers can develop essential technological knowledge and skills.
- Teacher education institutions should provide equitable opportunities for all student-teachers to develop digital competencies through ICT-based activities and practical training.
- Institutions should assess whether student-teachers in rural areas have adequate internet connectivity, computer facilities, and access to digital learning resources, and address any gaps identified.
- Student-teachers should be encouraged to use digital tools, multimedia presentations, online resources, and educational applications when planning lessons and completing teaching practice.
- Workshops, seminars, and hands-on training should be organised to strengthen digital literacy and readiness for technology-integrated teaching.
- Teacher educators should give student-teachers opportunities to develop digital lesson plans, interactive learning materials, and technology-based assessment tools.
- Collaborative activities, online discussions, and digital projects should be used to build technological confidence and professional competence.
- Teacher education institutions should assess student-teachers' digital literacy and readiness periodically and provide appropriate guidance and support.

11.0.0 Suggestions for Further Research

- The study could be replicated among B.Ed. student-teachers in other districts of Karnataka to compare findings across locations.
- Future studies could compare digital literacy and readiness for technology-integrated teaching among student-teachers in government, aided, and private teacher education institutions.
- Further research could examine the relationship between digital literacy, teaching competence, and academic achievement among B.Ed. student-teachers.
- Experimental studies could investigate whether ICT-based training programmes improve digital literacy and readiness for technology-integrated teaching.
- Longitudinal research could examine how student-teachers' digital competencies develop throughout the B.Ed. programme.
- Future studies could explore how socioeconomic status, access to technology, digital-learning experiences, and attitudes towards technology relate to student-teachers' digital readiness.
- Qualitative research could investigate the challenges student-teachers face when integrating digital technologies into classroom teaching.
- Further research could examine digital literacy and readiness for technology-integrated teaching among in-service teachers.

12.0.0 Conclusion

Digital literacy and readiness for technology-integrated teaching are important competencies for prospective teachers. This study examined these competencies among B.Ed. student-teachers in Dakshina Kannada district and found statistically significant differences by gender, locality, and year of study. Female student-teachers had higher mean scores than male student-teachers, urban student-teachers scored higher than rural student-teachers, and second-year student-teachers scored higher than first-year student-teachers. These findings point to the need for equitable opportunities to develop digital competencies through teacher education. Adequate digital infrastructure, structured ICT training, and practical experience may support this development. Digital tools are most useful when selected to serve clear teaching

and learning goals. Teacher educators should therefore provide opportunities for student-teachers to practise using educational technologies and build confidence in their application. Continued efforts are also needed to address unequal access to digital resources and promote inclusive, technology-supported education.

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