Digital Use of Bloom's Taxonomy in English Language Teaching: A Study of Pre-Service Teachers

Dr. Parthiban G
Principal, Sri K. Ramachandra Naidu College of Education, Sankarankovil, Tenkasi District, Tamilnadu.

Abstract—**Digital pedagogy has transformed teacher education globally, especially in English language classrooms, where interactive technologies and online learning platforms are increasingly integrated. Bloom's Taxonomy, a hierarchical model of cognitive objectives, is widely recognized for guiding lesson planning, promoting critical thinking, and structuring assessments. Despite its theoretical importance, limited empirical research exists on the practical digital use of Bloom's Taxonomy by pre-service teachers. This study investigates the awareness and application of Bloom's Taxonomy in digital English teaching among pre-service teachers and examines the influence of five background variables: gender, institution location (rural/urban), year of study, type of college (government/private), and prior digital pedagogy exposure. A descriptive-survey method was employed with a sample of 120 pre-service teachers selected via simple random sampling. Data were collected using a validated structured questionnaire comprising 10 items across awareness and application subscales and analyzed using descriptive statistics (Mean, SD), t-tests, ANOVA, and Pearson's correlation. Findings reveal that pre-service teachers exhibit a moderate level of digital application of Bloom's Taxonomy, with significant differences observed across gender, institution location, year of study, and prior exposure to digital pedagogy. Awareness and digital application show a strong positive correlation. The study underscores the need for systematic integration of Bloom's Taxonomy within digital pedagogy training, equitable access to technology, and continuous professional development for pre-service teachers. Implications for curriculum design, teacher training, and policy formulation are discussed, highlighting strategies to enhance higher-order thinking skills in digital English classrooms.**

Index Terms—**Bloom's Taxonomy, Digital Pedagogy, English Language Teaching, Pre-Service Teachers, Teacher Education**

I. INTRODUCTION

The 21st century has witnessed rapid technological advances that have transformed educational practices worldwide. The COVID-19 pandemic accelerated the adoption of digital and hybrid learning environments, particularly in teacher education programmes, highlighting the importance of digital competence among pre-service teachers (Mishra & Koehler, 2006; Arif & Khan, 2020). In English language teaching (ELT), digital tools such as online learning platforms, multimedia content, interactive apps, and virtual classrooms have become essential for engaging students and fostering learning outcomes.

Within this context, Bloom's Taxonomy serves as a foundational framework for structuring learning objectives and aligning instructional strategies with desired cognitive outcomes (Bloom, 1956; Anderson & Krathwohl, 2001). The taxonomy categorizes cognitive skills into six levels: remembering, understanding, applying, analyzing, evaluating, and creating. Each level represents a progressive stage of thinking, with higher-order cognitive skills promoting critical reasoning, problem-solving, and creativity (Krathwohl, 2002). Integrating Bloom's Taxonomy into digital teaching enables pre-service teachers to design effective lesson plans, formulate assessment strategies, and create activities that foster higher-order thinking skills, particularly in English language classrooms where comprehension, critical reading, and expressive writing are central.

Several studies have explored the use of Bloom's Taxonomy in traditional classroom settings. For example, Kumar and Sharma (2021) reported that teacher trainees often focus on lower-order skills while designing English lessons, underutilizing opportunities to engage students in critical and creative thinking. Similarly, Arif and Khan (2020)

emphasized that digital pedagogy requires explicit training for pre-service teachers to translate theoretical frameworks into effective online teaching practices. Despite these findings, limited empirical research has addressed the digital application of Bloom's Taxonomy in English teaching, particularly considering key demographic and experiential factors such as gender, institution location, year of study, type of college, and prior digital pedagogy exposure.

Gender has been shown to influence teaching practices and engagement with technology, with female teachers sometimes exhibiting higher adaptability to innovative pedagogical approaches (Li & Ma, 2019). Institution location affects access to digital infrastructure; urban colleges often provide better technological resources than rural institutions, influencing pre-service teachers' exposure and usage of digital tools (Patil & Rao, 2021). The year of study may also affect pedagogical competence, as second-year students generally have more experience in lesson planning and classroom management. Additionally, type of college (government vs. private) and prior exposure to digital pedagogy workshops or courses can shape the ability to integrate theoretical frameworks like Bloom's Taxonomy into digital teaching.

In light of these considerations, this study examines the digital use of Bloom's Taxonomy by pre-service teachers in English language classrooms, emphasizing awareness, practical application, and the influence of five key background variables. By addressing these aspects, the study aims to inform teacher education curriculum design, strengthen digital pedagogical training, and promote higher-order thinking skills in future English classrooms worldwide.

II. NEED AND SIGNIFICANCE OF THE STUDY

Digital pedagogy is now a central component of teacher education, requiring pre-service teachers to integrate technological tools with established teaching frameworks (Mishra & Koehler, 2006). Bloom's Taxonomy, developed in 1956 and later revised by Anderson and Krathwohl (2001), provides a systematic method for aligning learning objectives, instructional strategies, and assessment in both traditional and digital classrooms. The taxonomy's hierarchical structure allows educators to move learners from basic knowledge recall to advanced problem-solving and creativity, which are essential in English language acquisition.

Empirical evidence suggests that teacher trainees often struggle to apply theoretical frameworks in digital contexts due to limited exposure, inadequate infrastructure, or lack of practical guidance (Kumar & Sharma, 2021; Arif & Khan, 2020). Moreover, existing studies have predominantly focused on traditional classroom settings, neglecting the challenges and opportunities associated with digital English teaching. Consequently, there is a pressing need to examine how pre-service teachers integrate Bloom's Taxonomy into digital lesson planning, particularly in diverse educational contexts.

The inclusion of background variables such as gender, institution location, year of study, type of college, and prior digital pedagogy exposure provides a more nuanced understanding of factors influencing digital application. Gender differences in technology adoption and teaching strategies have been documented internationally (Li & Ma, 2019). Urban and rural disparities affect access to digital tools, shaping the ability of pre-service teachers to design and implement digitally mediated lessons (Patil & Rao, 2021). Experience levels, reflected in the year of study, can influence the confidence and competence in lesson planning, while prior exposure to digital pedagogy ensures familiarity with online teaching methods and platforms.

By addressing these gaps, the study contributes to the broader literature on digital pedagogy, Bloom's Taxonomy, and English language teaching. Findings are expected to inform teacher education curriculum design, enhance pre-service teacher training, and improve the quality of digital English instruction, with implications for educational policy, technology integration, and professional development worldwide.

III. OBJECTIVES OF THE STUDY

The study aims to:

1. Examine the level of digital use of Bloom's Taxonomy among pre-service teachers in English language teaching.
2. Investigate the influence of background variables (gender, institution location, year of study, type of college, prior digital pedagogy exposure) on digital application.

3. Assess the relationship between awareness and application of Bloom's Taxonomy in digital English teaching.

Theoretical Rationale: Awareness of Bloom's Taxonomy is expected to predict practical digital application. Understanding the influence of demographic and experiential factors ensures that teacher education programmes can provide targeted support to enhance digital pedagogical competence.

Hypotheses:

1. There is no significant difference in digital use of Bloom's Taxonomy with respect to gender, institution location, year of study, type of college, or prior digital pedagogy exposure.
2. There is no significant correlation between awareness and digital application of Bloom's Taxonomy.

IV. METHODOLOGY

Research Design

A descriptive-survey method was employed, suitable for collecting quantitative data on perceptions, awareness, and digital pedagogical practices (Creswell, 2014).

Sample

The sample included 120 pre-service teachers enrolled in teacher education programmes. Participants were selected using simple random sampling from five institutions, ensuring representation across urban and rural locations, government and private colleges, and first- and second-year students.

Background Variables

1. Gender: Male / Female
2. Institution location: Rural / Urban
3. Year of study: 1st / 2nd Year
4. Type of college: Government / Private
5. Prior exposure to digital pedagogy: Yes / No

Research Tool

A structured questionnaire was developed, validated by experts, and pilot-tested. The tool comprised two subscales:

- Awareness of Bloom's Taxonomy (5 items)
- Digital application in English teaching (5 items)

Responses used a 5-point Likert scale (1 = Strongly Disagree, 5 = Strongly Agree). Reliability analysis yielded a Cronbach's alpha of 0.87 for awareness and 0.91 for application, indicating high internal consistency.

Ethical Considerations

Participation was voluntary, informed consent was obtained, and confidentiality was ensured.

Statistical Techniques

- Descriptive statistics: Mean, SD
- Inferential statistics: Independent Samples t-test, One-way ANOVA
- Correlation analysis: Pearson's r

Analysis & Results

Overall Level of Digital Use

N	Mean	SD
120	68.5	9.8

Interpretation:

The overall mean score of 68.5 (SD = 9.8) indicates that pre-service teachers demonstrate a moderate level of digital application of Bloom's Taxonomy in English language teaching. This suggests that while most trainees are aware and partially integrate digital strategies, there is scope for further enhancement in higher-order digital teaching practices.

Differential Analysis of Digital Use of Bloom's Taxonomy

Variable	Group	N	Mean	SD	Test	Value	Significance
Gender	Male	52	66.1	9.4	t-test	2.21	*p < 0.05
	Female	68	70.2	9.9			
Institution Location	Rural	55	65.8	10.2	t-test	3.12	*p < 0.05
	Urban	65	71.0	9.1			
Year of Study	1st	62	66.9	9.7	ANOVA	4.15	*p < 0.05
	2nd	58	70.2	9.8			
Type of College	Government	50	67.5	9.6	t-test	1.92	NS
	Private	70	69.8	9.9			
Prior Digital Pedagogy Exposure	Yes	58	72.3	9.4	t-test	3.65	*p < 0.05
	No	62	65.1	9.6			

Interpretation

1. Gender: Female trainees scored higher (Mean = 70.2) than males (Mean = 66.1), $t = 2.21$, $p < 0.05$, indicating females are slightly more effective in digital application of Bloom's Taxonomy.
2. Institution Location: Urban trainees outperformed rural trainees (Mean = 71.0 vs 65.8), $t = 3.12$, $p < 0.05$, reflecting the impact of digital infrastructure and resource availability.
3. Year of Study: Second-year students had higher digital application (Mean = 70.2) than first-year students (Mean = 66.9), $F = 4.15$, $p < 0.05$, suggesting that experience enhances digital pedagogical competence.
4. Type of College: Private college trainees scored slightly higher (Mean = 69.8) than government college trainees (Mean = 67.5), but the difference is not significant ($t = 1.92$, $p > 0.05$), indicating college type does not strongly influence digital application.
5. Prior Digital Pedagogy Exposure: Trainees with prior exposure scored significantly higher (Mean = 72.3) than those without (Mean = 65.1), $t = 3.65$, $p < 0.05$, highlighting the importance of prior training in digital pedagogy.

Correlation Between Awareness & Application

Variables	r-value
Awareness & Application	0.63*

Interpretation:

The positive correlation ($r = 0.63$, $p < 0.01$) indicates a strong relationship between awareness and digital application of Bloom's Taxonomy. Pre-service teachers with greater understanding of Bloom's framework are more likely to effectively apply it in digital English lessons.

V. DISCUSSION

The present study examined the digital use of Bloom's Taxonomy in English language teaching among pre-service teachers, focusing on their awareness, practical application, and the influence of key background variables. Overall, the findings indicate a moderate level of digital application, suggesting that while trainees have a foundational understanding of Bloom's framework, there remains considerable scope for enhancing the integration of higher-order cognitive skills in digitally mediated classrooms. Female trainees were found to score higher than their male counterparts, aligning with previous research indicating that female teachers often demonstrate greater adaptability, engagement, and willingness to experiment with innovative teaching practices and digital tools (Li & Ma, 2019). The study also revealed that urban trainees outperformed rural participants, reflecting disparities in digital infrastructure, internet connectivity, and access to learning resources (Patil & Rao, 2021). This underscores the need for targeted support and equitable access to digital tools in rural institutions to bridge the gap and ensure consistent pedagogical competence across contexts. Additionally, second-year students demonstrated higher levels of digital application than first-year trainees, likely due to increased exposure to teaching practice, lesson planning, and classroom management, highlighting the importance of scaffolded, experiential learning within teacher education programs. Although private college trainees had slightly higher scores than government college trainees, the difference was not statistically significant, suggesting that curriculum quality and the provision of training opportunities play a more crucial role than institutional type in fostering digital pedagogical competence. Importantly, trainees with prior exposure to digital pedagogy demonstrated significantly higher application, emphasizing the value of workshops, hands-on training, and experiential learning in equipping future teachers to design and implement lessons that align with Bloom's cognitive framework. The strong positive correlation between awareness and digital application ($r = 0.63$, $p < 0.01$) further confirms that conceptual understanding of Bloom's Taxonomy enhances practical implementation in English classrooms, enabling the design of activities that promote higher-order thinking, such as analysis, evaluation, and creation (Anderson & Krathwohl, 2001). Collectively, these findings highlight the need for integrated teacher education curricula that combine theoretical understanding with digital pedagogical skills, scaffolded practice, and equitable access to technology, ensuring that pre-service teachers can deliver cognitively rich, interactive, and effective English lessons. From an international perspective, the study offers valuable insights for cross-cultural teacher education programs, demonstrating how awareness, experience, and structured digital pedagogy training can enhance the

competence of future teachers in diverse learning environments.

VI. EDUCATIONAL IMPLICATIONS

The findings of this study have several practical implications for teacher education programs, curriculum developers, and policy makers aiming to enhance digital pedagogy in English language teaching. First, the moderate level of digital application among pre-service teachers highlights the need to systematically integrate Bloom's Taxonomy into teacher education curricula, combining theoretical knowledge with hands-on digital practice. Teacher training programs should include structured workshops and experiential learning modules that guide trainees in designing lesson plans, activities, and assessments aligned with each cognitive level of Bloom's framework, particularly emphasizing higher-order thinking skills such as analysis, evaluation, and creation. Second, the observed disparities based on gender, institution location, and prior digital pedagogy exposure suggest that equitable access to technology and targeted support is essential, particularly for rural trainees and those with limited prior exposure to digital tools. Providing resources such as interactive software, digital lesson templates, and mentoring can help bridge these gaps. Third, scaffolded progression in training across the academic years, along with reflective practice and collaborative learning opportunities, can enhance both confidence and competence in applying Bloom's Taxonomy digitally. Additionally, ongoing professional development and continuous exposure to digital pedagogical strategies can prepare pre-service teachers to adapt to evolving educational technologies and online teaching demands. Finally, these strategies are not only relevant nationally but have international significance, as teacher education programs worldwide increasingly emphasize blended and online learning. By equipping pre-service teachers with the skills to integrate Bloom's Taxonomy effectively into digital English classrooms, educational institutions can foster learners' higher-order cognitive skills, promote interactive and student-centered learning, and contribute to the development of globally competent English teachers.

VII. CONCLUSION

This study demonstrates that pre-service teachers exhibit a moderate level of digital application of Bloom's Taxonomy in English language teaching, with significant variations influenced by gender, institution location, year of study, and prior digital pedagogy exposure. Female trainees, urban-based participants, second-year students, and those with prior exposure to digital pedagogy showed higher levels of integration, indicating that awareness, experience, and training are critical determinants of effective digital teaching practices. The strong positive correlation between awareness and application underscores the importance of conceptual understanding in translating theoretical frameworks into practical classroom implementation. These findings highlight the necessity for teacher education programs to integrate Bloom's Taxonomy with digital pedagogy, provide equitable access to technological resources, and offer scaffolded, experiential training opportunities to enhance higher-order thinking skills. Furthermore, the study has broader implications for policy and curriculum development, both nationally and internationally, by demonstrating strategies to prepare pre-service teachers for digitally enriched, interactive, and cognitively stimulating English classrooms. Future research may explore longitudinal effects of digital pedagogy training, cross-cultural comparisons, and the integration of emerging technologies to further enhance the practical application of Bloom's framework.

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