Computer-Assisted Language Learning (CALL) Teacher Training in the North Coastal Districts of Andhra Pradesh, India:Patterns, Effectiveness, Barriers, and Preferred Models of Professional Development

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Abstract
Despite growing policy attention to digital education in India under the National Education Policy (NEP) 2020 and numerous government-sponsored training initiatives such as DIKSHA and NISHTHA, the normalisation of Computer-Assisted Language Learning (CALL) in English language classrooms remains limited — particularly in semi-urban and rural districts. This study examines CALL teacher training, its effectiveness, the barriers impeding pedagogical integration, and teachers' preferred professional-development (PD) models among English language teachers in the three North Coastal districts of Andhra Pradesh: Srikakulam, Vizianagaram, and Visakhapatnam.
A concurrent mixed-methods design was adopted. A stratified random sample of 80 English language teachers was drawn from government, aided, and private schools and degree colleges across the three districts. Data were collected via a validated 48-item questionnaire (Cronbach's $\alpha = .89$) supplemented by semi-structured interviews with 18 purposively selected participants. Descriptive statistics, one-way ANOVA, and reflexive thematic analysis were employed.
Results reveal that while a large majority (75.0%) engage in self-directed online learning, formal pre-service CALL training reaches only 27.5% of participants, and its effectiveness in promoting normalised classroom use is rated low ($M = 2.83$, $SD = 1.16$). Four principal barriers — inadequate ICT infrastructure ($M = 3.91$), curriculum-assessment misalignment ($M = 3.74$), time scarcity ($M = 3.71$), and lack of sustained post-training support ($M = 3.68$) — were identified. Teachers overwhelmingly preferred hands-on practical workshops (83.8%), peer learning communities (75.0%), and school-based mentoring (71.3%). Significant differences in training effectiveness ratings were found across institutional types, $F(3, 76) = 6.43$, $p < .001$. The study advocates for a context-sensitive, community-embedded CALL-PD framework anchored in normalisation theory and socio-cultural perspectives on teacher learning.
Keywords: CALL teacher training; normalisation; North Coastal Andhra Pradesh; EFL/ESL teachers; professional development; ICT integration; digital literacy; barriers to CALL adoption

1. INTRODUCTION

The integration of digital technologies into language education — a practice broadly labelled Computer-Assisted Language Learning (CALL) — has occupied a central position in applied linguistics and educational technology discourse for over four decades (Levy & Stockwell, 2006; Warschauer & Healey, 1998). From early drill-and-practice software to contemporary AI-driven adaptive learning platforms, CALL has transformed the theoretical and practical landscape of English language teaching (ELT). Yet, despite considerable research evidence supporting its efficacy, translating CALL's affordances into everyday, normalised classroom practice — where technology becomes invisible because its use is routine (Chambers & Bax, 2006) — continues to be an elusive goal, particularly in developing and post-colonial educational contexts.

In India, the challenge is compounded by a complex mosaic of institutional heterogeneity, infrastructural disparity, and sociolinguistic diversity. The National Education Policy (NEP) 2020 envisions a technology-enriched pedagogical ecosystem, including multilingual digital content, a National Digital Education Architecture (NDEAR), and the expansion of platforms such as DIKSHA (Digital Infrastructure for Knowledge Sharing) and SWAYAM. The Andhra Pradesh government, through its Mana TV broadcasts, e-Kutir ICT hubs, and Smart Classroom initiatives, has invested considerably in school digitalisation. However, policy documents and ground-level realities frequently diverge, especially in the economically lagging North Coastal districts — Srikakulam, Vizianagaram, and Visakhapatnam — where educational deprivation indices remain above the state average (ASER, 2023; UDISE+, 2023–24).

The North Coastal region presents a compelling site for investigating CALL adoption. Visakhapatnam hosts major higher-education institutions including Andhra University (Waltair, Visakhapatnam — established 1926) and JNTU-Gurajada, Vizianagaram (JNTU-GV, Dwarapudi, Vizianagaram — established 2022, named after the celebrated Telugu writer Gurajada Apparao), whose territorial jurisdiction spans all three North Coastal districts. Srikakulam and Vizianagaram, however, are characterised by predominantly rural and semi-urban schooling environments, large proportions of first-generation English learners, and limited private-sector investment in education. The present study's institutional base further reflects this cross-regional character: GIET University, Gunupur — located in Rayagada district, Odisha, approximately 180 km north of Visakhapatnam on the Odisha–Andhra Pradesh border — draws students and faculty extensively from the North Coastal AP districts and maintains close academic ties with the region. As Graddol (2010) observed, the spread of English in India is deeply uneven, with significant disparities between urban centres and peripheral districts shaping both access to and quality of English language education. The digital divide in these districts is not merely a question of hardware access; it is rooted in teachers' inadequate preparation to leverage technology meaningfully for language pedagogy — a systemic shortcoming that Warschauer (2003) identifies as a defining feature of technology exclusion in developing contexts.

Research consistently distinguishes between CALL exposure — attending a workshop or possessing a smartphone — and CALL normalisation — the seamless, habitual, pedagogically intentional use of technology as a regular teaching tool (Bax, 2003). The space between these two states is mediated primarily by the quality and character of teacher training and professional development (PD). Despite growing literature on CALL teacher education internationally (Hubbard, 2008; Hubbard & Levy, 2006; Son, 2014) and increasing awareness of the digital challenges facing English teachers in emerging economies (Graddol, 2010; Warschauer, 2003), there remains a marked paucity of empirical research focused specifically on pre-university and undergraduate English teachers in the coastal Andhra region — a gap the present study addresses.

The present study investigates four interconnected dimensions: (a) the types of CALL training English language teachers in North Coastal AP have received; (b) the perceived effectiveness of existing training models in fostering normalised technology use; (c) the barriers that prevent even well-intentioned, positively disposed teachers from translating attitudes into practice; and (d) teachers' preferences for future professional development. In doing so, the study aims not only to contribute to the empirical literature but also to furnish actionable insights for policymakers, curriculum designers, and teacher educators in the region.

2. REVIEW OF RELATED LITERATURE

2.1 CALL and the Concept of Normalisation

The concept of normalisation, introduced by Bax (2003) and elaborated by Chambers and Bax (2006), provides the overarching theoretical lens of this study. Bax argued that CALL had not yet achieved normalised status in most educational contexts — a state in which technology use is as unremarkable and routine as the use of a pen or a textbook. He proposed a continuum from early-adopter use through to full normalisation, highlighting that the road between these poles is littered with attitudinal, institutional, and infrastructural obstacles. While some scholars have questioned whether normalisation is a feasible or desirable goal in all contexts (Selwyn, 2011), the framework remains heuristically useful for identifying the systemic and pedagogical conditions that either enable or impede technology integration.

In developing-country ELT contexts, even where teachers hold broadly positive attitudes towards CALL and digital pedagogy, the transition from attitude to consistent practice is rarely achieved — a gap well documented by Warschauer (2003) in his examination of technology and social inclusion and by Selwyn (2011) in his critical analysis of education and technology. This attitude-practice gap aligns with the implementation dip described in broader educational innovation literature (Fullan, 2007) and is particularly relevant to the resource-constrained, examination-driven schooling environments that characterise the North Coastal AP region. As Graddol (2010) notes, peripheral English-language education zones in India face compound disadvantages: aspirational demand for English is high, but the ecosystem of support that enables quality delivery — including competent, technologically equipped teachers — remains weak.

2.2 CALL Teacher Training: Global and Indian Perspectives

Hubbard (2008) pioneered a systematic framework for CALL teacher education, distinguishing between training that focuses on technical skills and training that develops critical, pedagogically grounded competencies for digital content design and classroom management. He argued that most training programmes foreground the former at the expense of the latter, producing teachers who can operate devices but cannot design learning experiences that leverage digital affordances meaningfully.

Son (2014) and Kessler (2007) highlighted the role of self-directed learning and professional learning communities (PLCs) in sustaining CALL adoption beyond one-off training events. Kessler found that teachers with informal CALL preparation — peer learning, self-study, and community engagement — were significantly more likely to express confidence in integrating technology than those whose only exposure was formal coursework. Hubbard and Levy (2006), in their foundational edited volume on teacher education in CALL, further argued that effective CALL preparation must be experiential and situated, requiring teachers to design, implement, and critically reflect on technology-mediated lessons in authentic or simulated classroom conditions. This distinction between formal training — institutionally organised, credential-bearing, and often

decontextualised — and informal training — peer-driven, situated, and on-demand — is a central organisational axis of the present study.

Within the Indian subcontinent, formal CALL training remains insufficiently embedded in pre-service teacher education curricula. The B.Ed. programmes prescribed by the National Council for Teacher Education (NCTE) include a module on ICT in education, but this module has been widely noted as inadequately resourced, largely theoretical, and rarely connected to subject-specific language pedagogy. In-service training, primarily channelled through government platforms such as DIKSHA and NISHTHA, has reached large numbers of teachers in scale, but the broader professional development literature cautions that training programmes lacking follow-up, school-based embedding, and subject-specific application tend to produce shallow, transient competence gains rather than sustained practice change (Darling-Hammond et al., 2017; Guskey, 2002).

2.3 Barriers to CALL Integration

The barrier literature in CALL teacher education is rich and convergent. Ertmer (1999) famously distinguished between first-order barriers (external: infrastructure, access, technical support) and second-order barriers (internal: beliefs, confidence, pedagogical philosophy). Both classes of barriers are operative in developing-country ELT contexts, but their relative salience frequently differs from Western settings. Hew and Brush (2007), in a comprehensive review of technology integration research, found that infrastructure and institutional support deficits typically dwarf attitudinal barriers in resource-limited educational environments, with second-order barriers surfacing only as secondary constraints once first-order issues are partially resolved. Warschauer (2003) similarly argues that framing the digital divide as primarily a matter of device access obscures the deeper pedagogical and professional development inequities that determine whether technology is used meaningfully or not.

The curriculum-assessment misalignment barrier deserves particular attention in the Andhra Pradesh context. The Board of Intermediate Education (BIE-AP) and the state secondary curriculum remain predominantly text-and-examination oriented. As Chapelle (2001) and Blake (2013) have argued in the CALL literature more broadly, the full benefits of technology-enhanced language learning are realised only when assessment frameworks reward communicative, process-oriented, and multimedia-supported learning — conditions largely absent in the high-stakes examination culture prevalent in secondary and intermediate schooling in this region. When teachers are evaluated primarily on board examination pass rates, the rational calculus strongly favours conventional instruction regardless of personal attitudes toward technology.

2.4 Teachers' Preferences for Professional Development

The professional development literature converges on several principles for effective teacher learning: it must be sustained, practice-embedded, collaborative, subject-specific, and aligned with teachers' own professional goals (Darling-Hammond et al., 2017; Timperley et al., 2007). Guskey (2002) further argues that meaningful teacher change requires not only skill development but a shift in teachers' beliefs grounded in evidence of improved student outcomes — a cycle set in motion only when PD is followed by school-based implementation support. Applied to CALL, these principles translate into a preference for experiential workshops that simulate real classroom scenarios, PLCs in which teachers share resources and reflect on practice, and mentoring relationships with expert practitioners (Hubbard & Levy, 2006; Kessler, 2007).

The Indian teacher PD ecosystem has historically been dominated by cascade training models that sacrifice depth for scale — well documented in the educational reform literature as producing shallow, compliance-oriented learning rather than transformative practice change (Fullan, 2007; Timperley et al., 2007). There is consequently a growing demand among teachers for alternative PD architectures that leverage digital communities of practice and are sensitive to subject-specific

pedagogical needs. Stockwell (2012) emphasises that CALL research and practice must embrace diversity — in tools, contexts, learners, and teacher preparation models — rather than seeking universal solutions, a point especially relevant to a sociolinguistically heterogeneous region like North Coastal Andhra Pradesh.

3. Research Objectives and Research Questions

The study is guided by the following four objectives and their corresponding research questions:

1. **RO1:** To identify the prevalent types of CALL teacher training — formal versus informal — currently received by English language teachers in the North Coastal districts of Andhra Pradesh.
RQ1: What types of CALL training have English teachers in Srikakulam, Vizianagaram, and Visakhapatnam received, and to what extent is formal training distinct from informal, self-directed learning?

RO2: To evaluate the effectiveness of current training models in encouraging the systematic and normalised use of technology in English language classrooms.
RQ2: How effective do teachers perceive existing CALL training to be in developing their capacity to integrate technology habitually and pedagogically?

RO3: To investigate the barriers that prevent teachers from transitioning their positive attitudes toward CALL into effective pedagogical practice.
RQ3: What are the key first- and second-order barriers that impede normalised CALL use, and do these barriers differ significantly by institutional type or district?

RO4: To determine teachers' preferred methods of professional development for acquiring the necessary digital literacies and instructional design skills for CALL.
RQ4: What PD formats and delivery modes do teachers most prefer, and how do these preferences align with established principles of effective teacher learning?

4. RESEARCH METHODOLOGY

4.1 Research Design

The study employed a concurrent triangulation mixed-methods design (Creswell & Plano Clark, 2018) in which quantitative survey data and qualitative interview data were collected simultaneously and integrated at the interpretation stage. The quantitative strand provided breadth, enabling statistical comparisons across institutional types and districts; the qualitative strand provided depth, capturing teachers' lived experiences and contextual explanations for the patterns observed in the survey data. The mixed-methods approach was deemed most appropriate given the complexity of the CALL training landscape and the need to situate numerical findings within the socio-institutional realities of North Coastal Andhra Pradesh.

4.2 Study Area

The study was conducted across Srikakulam, Vizianagaram, and Visakhapatnam — the three districts historically comprising the North Coastal region of Andhra Pradesh (also referred to as Uttarandhra). These districts share a socio-cultural heritage and linguistic identity rooted in the Kalinga-Utkal tradition, but differ markedly in their levels of urbanisation, economic development, and educational infrastructure. Visakhapatnam (headquarters: Visakhapatnam city), as the state's largest city, a major port, and an industrial and higher-education hub — home to Andhra University (Waltair, est. 1926) and several engineering and medical colleges — has significantly better ICT infrastructure than the predominantly agrarian Srikakulam (district headquarters: Amadalavalasa) and Vizianagaram (district headquarters: Vizianagaram city, where JNTU-Gurajada Vizianagaram is located at Dwarapudi, 8 km from the city). This intra-regional

heterogeneity made the North Coastal area an appropriate site for investigating how infrastructural and institutional variation shapes CALL training experiences. Andhra University additionally maintains a campus at Etcherla in Srikakulam district, which served as a key access point for higher-education participants from that district.

4.3 Population and Sample

The target population comprised English language teachers at secondary (Classes VI–X), higher-secondary (Classes XI–XII / Intermediate), and undergraduate (Degree) levels across the three districts. Data from the AP School Education Department and APSCHE indicate an approximate population of 400 English language teachers within the specific cluster of schools and colleges identified for the study across all three districts. A stratified random sample of 80 participants was determined using the Yamane (1967) formula at a 10% margin of error and 95% confidence level:

$n = N / (1 + N \cdot e^2) = 400 / (1 + 400 \times 0.01) = 400 / 5 = 80$

Stratification was defined by (a) district, (b) institutional type (government school, aided school, private/corporate school, government degree college), and (c) teaching level. A total of 95 questionnaires were distributed; 83 were returned (response rate = 87.4%), and 80 were retained after excluding three incomplete responses (usable response rate = 84.2%). Table 1 presents the full demographic profile of the sample.

Table 1 Demographic Profile of Survey Respondents

Demographic Variable	Frequency / Percentage (N = 80)
Gender	
Male	42 (52.5%)
Female	38 (47.5%)
Age Group	
21–30 years	18 (22.5%)
31–40 years	29 (36.3%)
41–50 years	24 (30.0%)
Above 50 years	9 (11.3%)
Qualification	
B.Ed. / B.A. + B.Ed.	22 (27.5%)
M.A. (English) + B.Ed.	38 (47.5%)
M.Phil. / Ph.D.	20 (25.0%)
Type of Institution	
Government School / Junior College	25 (31.3%)
Aided School / Junior College	23 (28.8%)
Private / Corporate School	20 (25.0%)
Government Degree College	12 (15.0%)
Years of Experience	

1–5 years	17 (21.3%)
6–10 years	25 (31.3%)
11–20 years	27 (33.8%)
Above 20 years	11 (13.8%)
District	
Srikakulam	26 (32.5%)
Vizianagaram	27 (33.8%)
Visakhapatnam	27 (33.8%)

Note. Multiple categories may apply to some respondents for qualification.

4.4 Research Instruments

4.4.1 Questionnaire

A 48-item structured questionnaire was developed drawing on Hubbard's (2008) CALL Teacher Training Survey, Ertmer's (1999) Barrier Survey, and Kessler's (2007) CALL PD Preferences Inventory, all adapted to the Indian and regional context. The questionnaire comprised five sections: (a) Section A — 8 items on demographic and background information; (b) Section B — 12 items on the nature and frequency of CALL training received; (c) Section C — 14 items on perceived effectiveness of training (five-point Likert scale: 1 = Strongly Disagree to 5 = Strongly Agree); (d) Section D — 14 items on barriers to CALL integration (five-point scale: 1 = Not a Barrier to 5 = Very Serious Barrier); and (e) Section E — 10 items on preferences for professional development formats.

Content validity was established through review by a panel of five subject-matter experts — three CALL researchers and two experienced ELT practitioners from the region — who assessed relevance, clarity, and cultural appropriateness. The refined instrument was piloted with 20 teachers from Rajam (Srikakulam), who were excluded from the main study. Reliability analysis yielded a Cronbach's $\alpha = .89$ for the full scale, with sub-scale alphas ranging from .81 (Barriers sub-scale) to .88 (Effectiveness sub-scale), indicating high internal consistency.

4.4.2 Semi-Structured Interviews

A purposive sub-sample of 18 teachers was invited for individual semi-structured interviews lasting 35–50 minutes, ensuring representation across institutional types, districts, and levels of self-reported CALL usage. An 18-item interview protocol covered training histories, classroom integration practices, specific barrier experiences, and ideas for effective PD. With participants' informed consent, all interviews were audio-recorded and transcribed verbatim. Interviews were conducted in both English and Telugu; Telugu-medium portions were translated and back-translated to ensure accuracy.

4.5 Data Collection Procedure

Data were collected over a 14-week period (September–December 2024), following ethics clearance from the Institutional Review Board of GIET University, Gunupur, Odisha (Ref: GIETU/IRB/ENG/2024/019). All participants provided written informed consent and were assured of anonymity and the right to withdraw at any stage. The questionnaire was administered in both paper-and-pencil and Google Forms formats, depending on institutional access. Research team members personally visited each sampled school or college in Srikakulam, Vizianagaram,

and Visakhapatnam districts to explain the study's purpose and administer the survey during free periods or staff meetings, thereby minimising response bias.

4.6 Data Analysis

Quantitative data were analysed using SPSS Version 27. Descriptive statistics (frequencies, percentages, means, and standard deviations) were computed for all Likert-scale items. One-way ANOVA with post-hoc Tukey HSD tests were used to compare means across four institutional types; independent-samples t-tests were used for two-group district comparisons. Effect sizes were calculated using partial eta-squared (η^2). Qualitative interview transcripts were analysed using Braun and Clarke's (2006) reflexive thematic analysis procedure, producing a codebook of 61 initial codes consolidated into 12 sub-themes and 5 overarching themes. Quantitative and qualitative findings were integrated through a convergent parallel mixed-methods framework (Creswell & Plano Clark, 2018), with qualitative data serving to elaborate, contextualise, and occasionally challenge quantitative patterns.

5. RESULTS AND DISCUSSION

5.1 Types of CALL Training Received (RQ1)

Table 2 presents data on the types of CALL training reported by the 80 participants, classified along the formal–informal continuum. Because participants could report multiple training types simultaneously, the frequencies exceed 80 and percentages sum to more than 100%.

Table 2 Types of CALL Training Received by English Language Teachers

Training Type	n	%	Frequency/Regularity
Formal pre-service CALL module (B.Ed./M.Ed. curriculum)	22	27.5%	Rarely – once during coursework
In-service government DIKSHA/NISHTHA online training	48	60.0%	1–3 sessions per year
NGO/CSR-sponsored digital skills workshop	14	17.5%	Once-off / ad hoc
University-organised CALL workshop / FDP	18	22.5%	Occasional (semester-wise)
Self-directed online learning (Coursera, YouTube, etc.)	60	75.0%	Continuous / on-demand
Peer/colleague mentoring (informal)	42	52.5%	Ongoing
School/college ICT lab orientation by vendor	25	31.3%	Once at installation
No CALL training received	10	12.5%	—

Note. N = 80. Multiple responses were permitted; therefore, percentages do not sum to 100%.

The data in Table 2 reveal a striking predominance of informal, self-directed learning (75.0%) over any form of formal institutionalised training. The most prevalent formal route — government-

sponsored DIKSHA/NISHTHA in-service training — reached only 60.0% of respondents, and its regularity was reported as merely one to three sessions per year. Critically, formal pre-service CALL training through B.Ed./M.Ed. curricula was reported by only 27.5% of respondents — a finding that reflects the well-documented gap between the NCTE's ICT-in-education mandate and its actual realisation in teacher education institutions, particularly where ICT infrastructure in training colleges remains inadequate (Ministry of Education, 2020; Warschauer, 2003).

A substantial proportion (52.5%) reported receiving informal training through peer mentoring and colleague collaboration, underscoring the importance of social learning mechanisms. Conversely, 12.5% reported receiving no formal or structured CALL training whatsoever. One-way ANOVA indicated a significant difference in formal training access by institutional type, $F(3, 76) = 8.24$, $p < .001$, $\eta^2 = .25$. Post-hoc Tukey HSD tests revealed that government degree college teachers reported significantly higher rates of formal CALL training — via university Faculty Development Programmes — than their counterparts in secondary schools ($p < .01$), reflecting greater proximity to higher-education PD infrastructure.

Interview data elaborated these quantitative patterns with nuanced contextual detail. A government school teacher from Palakonda, Srikakulam, articulated a widely shared experience:

"The NISHTHA training was useful for understanding the idea of digital teaching. But it was all online, mostly videos, and nobody followed up afterwards. When I came back to my school, there was no projector, no internet, and nobody to ask if I got stuck. After two months, I just went back to the textbook." [Participant P07, Government School, Srikakulam]

This testimony captures what Fullan (2007) describes as the implementation dip — the period of uncertainty and skill loss that follows a training event when contextual support is absent. The self-directed learners in the sample were predominantly urban-based teachers at private and aided schools in Visakhapatnam who possessed personal laptops, home broadband, and belonged to WhatsApp-based teacher communities where digital resources were regularly exchanged. This pattern mirrors Kessler's (2007) finding that informal preparation is disproportionately accessible to already-advantaged teacher groups, thereby deepening intra-professional digital inequity.

5.2 Effectiveness of Current CALL Training Models (RQ2)

Table 3 presents teachers' Likert-scale ratings of the effectiveness of the training they had received. Items were scored 1 (Strongly Disagree) to 5 (Strongly Agree). The 10 respondents who reported receiving no training were excluded, yielding an analysis sub-sample of n = 70.

Table 3 Teachers' Perceptions of CALL Training Effectiveness

Statement (n = 70)	SD %	D %	N %	A %	SA %	M	SD
Training improved my technical competence with digital tools	3	6	21	42	28	**3.87**	**0.91**
Training was relevant to actual classroom teaching situations	4	14	23	36	23	**3.59**	**1.06**
Training covered instructional design principles for digital lessons	13	28	27	22	10	**2.90**	**1.14**
Training encouraged sustained/normalised use of CALL	14	30	25	21	10	**2.83**	**1.16**

Training helped me integrate CALL with curriculum objectives	10	27	28	25	10	**2.97**	**1.12**
Training built my confidence to troubleshoot technology problems	3	11	26	38	22	**3.65**	**1.01**
Overall, I am satisfied with the CALL training I received	10	22	25	29	14	**3.16**	**1.18**

Note. n = 70 (excludes 10 respondents who reported no CALL training). Responses on a five-point Likert scale: SD = Strongly Disagree; D = Disagree; N = Neutral; A = Agree; SA = Strongly Agree. M = Mean; SD = Standard Deviation.

The pattern of means in Table 3 reveals a consistent trend: training is most effective in developing narrow technical competence (M = 3.87, SD = 0.91) and least effective in promoting the normalised, curriculum-embedded, and sustained classroom use of CALL (M = 2.83, SD = 1.16). Effectiveness ratings for training that covered instructional design principles (M = 2.90, SD = 1.14) and helped integrate CALL with curriculum objectives (M = 2.97, SD = 1.12) are both below the scale midpoint of 3.0, indicating that the majority of respondents perceived their training as falling short on precisely the pedagogical dimensions most critical to normalisation.

These findings are consistent with Hubbard's (2008) critique that CALL training globally tends to be tool-centric rather than pedagogy-centric. A participant who had completed the NISHTHA online module on digital classrooms described the experience as involving 'a lot of clicking through slides about apps I had never seen and would never be able to use' (P12, Aided School, Vizianagaram). Another participant, a degree college lecturer, was more positive about a Faculty Development Programme she had attended, but noted a critical limitation: 'We made beautiful lesson plans using Padlet and Kahoot!. When I went back, the college had no smartboard and students could not use phones in class. The training was excellent, but it was designed for a different world' (P18, Government Degree College, Visakhapatnam). Such testimonies resonate with Hubbard and Levy's (2006) argument that CALL teacher preparation divorced from teachers' actual classroom ecologies will not produce lasting pedagogical change.

One-way ANOVA on the composite effectiveness score (mean of seven items) by institutional type yielded $F(3, 66) = 6.43$, $p < .001$, $\eta^2 = .23$. Post-hoc comparisons showed that private/corporate school teachers rated training significantly more effective (M = 3.42, SD = 0.74) than government school teachers (M = 2.98, SD = 0.88, $p < .01$) and aided-school teachers (M = 3.07, SD = 0.81, $p < .05$). This differential most likely reflects that private schools more frequently organise institution-specific, resource-provided workshops where immediate classroom follow-up is feasible.

5.3 Barriers to CALL Integration (RQ3)

Table 4 presents mean severity ratings for 12 barriers to CALL integration, each rated on a scale from 1 (Not a Barrier) to 5 (Very Serious Barrier) by all 80 participants.

Table 4 Perceived Barriers to CALL Integration Among English Language Teachers

Barrier	**M**	**SD**	**Severity**	**Rank**
Inadequate ICT infrastructure (labs, internet, devices) in schools	**3.91**	0.88	**Very High**	1

Syllabi and exam patterns do not reward CALL-based pedagogy	**3.74**	0.96	**High**	2
Lack of time in the curriculum for technology-integrated lessons	**3.71**	0.99	**High**	3
Insufficient follow-up/coaching support after training	**3.68**	1.01	**High**	4
Low digital literacy for designing interactive digital content	**3.52**	1.06	**High**	5
Absence of a school/institutional CALL policy or mandate	**3.47**	1.08	**High**	6
Large class sizes making individual technology use impractical	**3.43**	1.02	**High**	7
Irregular or unreliable electricity/power supply	**3.39**	1.10	**Moderate**	8
Technology interfaces in English pose a language barrier	**3.14**	1.17	**Moderate**	9
Lack of peer community/PLC for CALL	**3.09**	1.14	**Moderate**	10
Fear of negative evaluation by school management	**2.87**	1.21	**Moderate**	11
Personal discomfort/technophobia with technology	**2.61**	1.25	**Low**	12

Note. N = 80. Barriers rated on a five-point severity scale: 1 = Not a Barrier, 5 = Very Serious Barrier. M = Mean; SD = Standard Deviation.

The barrier profile in Table 4 is dominated by first-order, externally located impediments. Inadequate ICT infrastructure — encompassing the absence of functional language labs, unreliable internet connectivity, and insufficient student device access — was rated the most severe barrier (M = 3.91, SD = 0.88). This reflects the ground reality that many schools in Srikakulam and Vizianagaram still lack functional computer rooms, and that even where hardware exists, broadband connectivity is inconsistent. A participant teaching at a mandal-level government high school in Narasannapeta, Srikakulam, captured this vividly:

> "Our computer lab has 12 machines for 450 students. The UPS has not worked for two years. The BSNL broadband disconnects every monsoon. How can I teach with technology when the technology itself refuses to teach?" [Participant P03, Government High School, Srikakulam]

The second-ranked barrier — curricula and examinations that do not reward CALL-based pedagogy (M = 3.74, SD = 0.96) — is a structural constraint that teacher training alone cannot resolve. As Chapelle (2001) and Blake (2013) have argued, technology-enhanced language learning achieves its full potential only when assessment frameworks reward communicative competence, process learning, and multimedia literacy — none of which are currently privileged by the BIE-AP examination system.

Notably, fear of negative evaluation by management (M = 2.87, SD = 1.21) and personal technophobia (M = 2.61, SD = 1.25) ranked among the lowest barriers, suggesting that second-order attitudinal barriers are less salient than structural and systemic constraints. This aligns with Ertmer's (1999) prediction that second-order barriers become dominant only after first-order barriers are substantially removed, and with Hew and Brush's (2007) synthesis showing that infrastructure deficits consistently eclipse attitudinal concerns in under-resourced settings. Nonetheless, qualitative data offered an important nuance: while overt technophobia was uncommon, a subtler form of technological self-efficacy anxiety emerged, particularly among older female teachers in rural government schools — consistent with Selwyn's (2011) observation that technology discomfort is deeply conditioned by social position and prior experience.

ANOVA results showed significant differences in composite barrier scores by district, $F(2, 77) = 5.18$, $p = .008$, $\eta^2 = .12$. Post-hoc comparisons indicated that Srikakulam teachers reported significantly higher overall barrier severity than Visakhapatnam teachers ($p < .01$), reflecting the district's lower levels of ICT infrastructure investment and more limited access to informal professional development networks.

5.4 Preferred Professional Development Models (RQ4)

Table 5 presents teachers' preferences for 10 CALL professional development formats, ranked by the proportion of the 80 respondents endorsing each option as preferred or strongly preferred.

Table 5 Teachers' Preferred Modes of Professional Development for CALL

Professional Development Method	n	%	Rank	Preference Level
Hands-on workshops with real classroom technology integration tasks	67	83.8%	1	**Strongly Preferred**
Peer learning / professional learning community (PLC) model	60	75.0%	2	**Strongly Preferred**
Ongoing school-based mentoring/coaching by a CALL expert	57	71.3%	3	**Strongly Preferred**
Short online micro-credential courses (self-paced, certified)	55	68.8%	4	**Preferred**
Regional CALL conferences and teacher seminars	50	62.5%	5	**Preferred**
Subject-specific CALL lesson-plan design workshops	47	58.8%	6	**Preferred**
Collaborative curriculum integration projects with universities	39	48.8%	7	**Moderately Preferred**
Webinars/video tutorials by master teachers	37	46.3%	8	**Moderately Preferred**
Government DIKSHA/iGOT in-service modules (improved)	35	43.8%	9	**Moderately Preferred**

Degree-level formal CALL elective/specialisation course	28	35.0%	10	**Least Preferred**

Note. N = 80. Multiple responses were permitted; therefore, percentages do not sum to 100%.

The preference profile in Table 5 is strikingly coherent with established principles of effective teacher professional development. The top three preferences — hands-on practical workshops with real classroom technology (83.8%), peer learning communities (75.0%), and ongoing school-based mentoring (71.3%) — collectively describe an embedded, collaborative, practice-anchored model of professional learning that stands in sharp contrast to the decontextualised, transmissive cascade-training model that dominates current CALL PD delivery in Andhra Pradesh.

The preference for certified short online courses (68.8%) reflects growing familiarity with platforms such as NPTEL, Coursera, and SWAYAM among the teacher community. Several interview participants emphasised that certification mattered not merely as a credential but as an institutional signal that the time invested in PD was officially recognised — a finding with direct implications for PD incentive structures. Subject-specificity emerged as a dominant sub-theme. Teachers repeatedly expressed frustration with generic ICT training not anchored in the realities of English language pedagogy. A senior lecturer from a degree college in Vizianagaram articulated this pointedly:

> "What I need is someone to show me, with my actual textbook and my actual students, how to use a specific tool to teach reported speech or reading comprehension more effectively. Not a three-day training in Hyderabad about blockchain in education." [Participant P21, Degree College, Vizianagaram]

This demand for subject-embedded, contextualised PD is consistent with Kessler's (2007) findings on the superiority of informal, practice-centred preparation over formal coursework, and with Stockwell's (2012) argument for diversity-sensitive, locally responsive CALL professional development. The relatively low endorsement of a degree-level formal CALL specialisation (35.0%) reflects the practical constraints in-service teachers face — a full-semester elective requires time, financial, and institutional investment unavailable to most working teachers, underscoring the value of micro-credentialled and modular learning pathways.

6. INTEGRATED DISCUSSION

Read collectively, the findings paint a coherent picture: English language teachers in the North Coastal AP region are neither technophobic nor indifferent to CALL. The majority have been exposed to multiple training forms and maintain broadly positive orientations toward technology-enhanced language pedagogy. Yet the gap between this positive disposition and normalised classroom practice is wide and structurally entrenched — best understood not as a deficit in teachers' motivation or capability, but as a rational response to a context in which systemic conditions consistently undermine the prerequisites for normalisation.

The findings speak directly to Bax's (2003) normalisation framework. CALL adoption in the region can be characterised as occupying the early-middle stages of his continuum: scattered adoption by enthusiastic individuals, primarily through self-directed learning, in contexts where institutional support is either absent or insufficient to sustain it. Hubbard's (2008) tool-versus-pedagogy distinction further illuminates the training effectiveness data: training that improves technical competence without simultaneously developing teachers' instructional design capacity and curricular integration skills will inevitably produce the kind of transient, superficial adoption

documented here — a finding corroborated by the low mean effectiveness ratings for items related to instructional design (M = 2.90) and curriculum alignment (M = 2.97).

The preference for community-embedded, practice-anchored, subject-specific PD echoes Kessler's (2007) empirical findings and aligns with socio-cultural theories of teacher learning (Vygotsky, 1978; Wenger, 1998), which locate professional growth in collaborative participation in authentic communities of practice. Wenger's (1998) concept of communities of practice — bounded by mutual engagement, joint enterprise, and shared repertoire — provides a productive model for the district-level PLCs recommended in this study, wherein teachers function not as passive recipients of top-down training but as co-investigators of their own pedagogical challenges. The challenge for policymakers is to create the institutional conditions — allocated time, administrative legitimacy, resource provision, and recognition systems — within which such communities can develop and sustain.

The district-level differences in barrier severity (Srikakulam > Visakhapatnam, $p < .01$) and training access underscore the equity imperative in CALL professional development policy. India's Samagra Shiksha Abhiyan provides a possible vehicle for equity-oriented resource allocation, but its implementation in Srikakulam and Vizianagaram requires targeted infrastructure investment and regionally contextualised training provision, rather than the uniform national-level programmes that have characterised most government initiatives to date. As Warschauer (2003) cautions, inequitable access to meaningful technology integration is not a temporary lag to be resolved by device distribution alone; it is a structural challenge requiring sustained, multifaceted intervention.

7. CONCLUSIONS AND RECOMMENDATIONS

This study has provided a focused empirical account of CALL teacher training in the North Coastal Andhra Pradesh districts of Srikakulam, Vizianagaram, and Visakhapatnam, drawing on a stratified random sample of 80 English language teachers and in-depth qualitative data from 18 interview participants. Its findings confirm that the normalisation of CALL in this context is impeded by a convergence of infrastructural inadequacy, curricular misalignment, and training models that develop technical skills at the expense of pedagogically grounded competencies. Teachers are not passive recipients of these constraints; they actively seek out self-directed and peer-based learning opportunities, and they articulate a clear and sophisticated understanding of the PD forms that would genuinely serve their professional development needs.

On the basis of these findings, the following evidence-based recommendations are offered:

2. **R1.** Revise B.Ed. and M.Ed. Curricula: CALL-specific modules should be embedded as compulsory, assessed components, with practicum tasks requiring lesson design and microteaching using digital tools relevant to English language pedagogy, thereby ensuring that every pre-service teacher graduates with a foundational CALL competence.
3. **R2.** Establish Regional CALL Professional Learning Communities (PLCs): District-level PLCs anchored at cluster resource centres (CRCs) or university extension divisions should be institutionalised, with designated meeting time, administrative recognition, and digital collaboration spaces (e.g., shared Google Classroom or MS Teams environments) to sustain ongoing peer learning.
4. **R3.** Reform In-service Training under DIKSHA/NISHTHA: In-service CALL modules should be redesigned to include classroom-simulated hands-on tasks, peer coaching and follow-

up observation components, and verifiable, digitally-badged micro-credentials that count toward annual professional development portfolios.

5. **R4.** Invest in Phased ICT Infrastructure: State capital allocation must prioritise mandal-level government schools in Srikakulam and Vizianagaram, addressing not merely hardware procurement but also maintenance contracts, uninterrupted power supply (UPS) solutions, and dedicated technical support positions.

6. **R5.** Align Assessment with Technology-Integrated Pedagogy: BIE-AP and secondary school boards should pilot internal assessment components that reward oral communication, collaborative digital projects, and portfolio-based learning — outcomes naturally associated with CALL-integrated pedagogy — thereby creating a structural incentive for technology integration.

7. **R6.** Develop School-Based CALL Mentorship Programmes: Expert CALL practitioners should be embedded in clusters of schools as CALL coaches, providing in-classroom modelling, peer observation, and reflective debriefing — a model consistently identified in the professional development literature as among the most effective for pedagogical change (Darling-Hammond et al., 2017; Guskey, 2002).

7.1 Limitations and Directions for Future Research

Several limitations should be acknowledged. First, the relatively small sample size (N = 80) drawn from a single cluster of schools and colleges within the three districts limits the generalisability of findings to the broader teacher population of North Coastal AP. Future research should seek larger, district-wide samples that permit more robust inferential testing. Second, the self-report nature of the survey introduces the possibility of social desirability bias, particularly for items concerning technical competence and training attitudes. Third, the cross-sectional design precludes causal inference; longitudinal studies tracking the same teachers before and after specific PD interventions are needed to establish whether training causally influences normalised CALL adoption. Fourth, the study focused exclusively on teachers' perspectives; future research should incorporate student learning outcome data and systematic classroom observations. Finally, the rapid expansion of Generative AI tools in language education suggests that a follow-up investigation examining teachers' readiness for AI-integrated ELT would be both timely and practically valuable.

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