



Professional Development Framework for AI-Literate English Teachers

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Abstract

This study proposes and empirically validates a Professional Development Framework for AI-Literate English Teachers (PDF-AILET), integrating UNESCO's AI Competency Framework for Teachers (Miao & Cukurova, 2024), Technological Pedagogical Content Knowledge (TPACK; Mishra & Koehler, 2006), Substitution, Augmentation, Modification, and Redefinition (SAMR; Puentedura, 2010), the Association of College and Research Libraries Framework for Information Literacy (ACRL, 2016), and algorithmic literacy theory (Archambault, 2023, 2024). In response to the rapid diffusion of generative AI in English language teaching and the documented AI literacy lag among teachers (Hossain et al., 2025), a 12-week quasi-experimental professional development intervention was implemented with 120 secondary English teachers in Central Visayas, Philippines. Using a mixed-methods design, quantitative data from the Teachers' AI Literacy Scale (TAILS; Allen & Kendeou, 2024) and Intelligent-TPACK scale were triangulated with qualitative data from lesson plan artifacts, reflective journals, and semi-structured interviews. Results indicated statistically significant gains across six AI literacy domains with the largest effect size in AI Design (Cohen's $d = 2.81$) and AI Evaluation ($d = 2.34$). Analysis of covariance revealed the experimental group outperformed the control group receiving generic AI training ($F(1,117) = 84.23$, $p < .001$, $\eta^2 = .42$). Thematic analysis identified four transformative trajectories: from familiarity to criticality, from substitution to redefinition, from algorithmic anxiety to empowered agency, and from privacy naivety to data stewardship. The resulting PDF-AILET model organizes 15 competencies across five pillars and three developmental levels (Acquire, Deepen, Create).

Keywords: AI literacy, English language teaching, professional development, TPACK, algorithmic literacy, UNESCO AI competency framework

Introduction:

The release of ChatGPT in November 2022 marked a paradigmatic shift in English language teaching (ELT). Unlike previous educational technologies that retrieved information, generative AI systems generate novel essays, feedback, translations, and multimodal compositions through natural language interaction (Kasneci et al., 2023). In the Philippines, where English serves as a medium of instruction and a gatekeeping subject for academic mobility, the penetration of generative AI into secondary and tertiary classrooms has been swift and largely unregulated.

Recent scholarship documents a pronounced GenAI literacy lag – the gap between the speed of tool adoption and the slower development of conceptual, pedagogical, and ethical readiness among educators (Hossain et al., 2025; Sattelmaier & Pawlowski, 2025). While students increasingly use AI for writing assistance, many English teachers



report low self-efficacy, technostress, and ethical uncertainty (Li et al., 2026). A systematic review of 13 empirical studies on English as a Foreign Language (EFL) teachers' use of ChatGPT between 2023 and 2024 found that teachers predominantly used AI for material creation and grammar feedback, but expressed concerns about academic integrity, bias, and de-skilling (Algayshi et al., 2026).

Existing frameworks for teacher knowledge offer partial guidance. The TPACK framework (Mishra & Koehler, 2006) remains the most cited model for technology integration, yet its generic technology dimension does not capture the probabilistic, opaque, and socially consequential nature of generative AI. The SAMR model (Puentedura, 2010) describes levels of technology integration from Substitution to Redefinition, but empirical studies in Cebu and other contexts show most English teachers remain at Substitution, replacing traditional methods without transformation (Cortez et al., 2026). The ACRL Framework for Information Literacy (ACRL, 2016) provides frames such as Authority Is Constructed and Contextual and Searching as Strategic Exploration, but Archambault (2023, 2024) argued these must be expanded to include algorithmic literacy – critical awareness of how algorithms curate information, harvest personal data, and perpetuate bias.

In 2024, UNESCO released the AI Competency Framework for Teachers (AI CFT), developed by Miao and Cukurova (2024). The framework is organized around five aspects: human-centered mindset, ethics of AI, foundations and applications of AI, AI pedagogy, and AI for professional development, with progression through three levels: Acquire, Deepen, and Create. It positions ethics, equity, and human agency not as add-ons but as constitutive of literacy (UNESCO, 2024). Parallel efforts such as the Responsible AI Literacy in Education (RAIL-Ed) framework propose six interdependent pillars: Technical Fluency, Critical Evaluation, Human-AI Collaboration, Contextual Awareness, Ethical Reasoning, and Empowered Agency (Hossain et al., 2025). This study addresses the gap by proposing PDF-AILET.

Literature Review:

AI Literacy and Algorithmic Literacy: From Technical Skill to Critical Consciousness. Early definitions framed AI literacy as the ability to critically evaluate AI technologies, communicate with them, and use them as tools (Long & Magerko, 2020). Ng et al. (2021) proposed four dimensions: know and understand AI, use and apply AI, evaluate and create AI, and AI ethics. Recent reviews argue these models, developed for classifier-based AI, are insufficient for generative AI's prompt dependency, hallucination, and representational bias (Chiu et al., 2024). Archambault (2023, 2024) contended that traditional information literacy must be updated for an ecosystem dominated by proprietary algorithms. She proposed extensions to ACRL frames: Authority Is Constructed and Contextual should include questioning algorithmic authority and bias; Information Has Value should acknowledge platforms' use of proprietary algorithms to monetize personal data; Searching as Strategic Exploration should teach that search results are algorithmically mediated (Archambault, 2023, 2024). Head et al. (2020) defined algorithmic literacy as critical awareness of what algorithms are, how they interact with behavioral data, and social-ethical issues.

UNESCO AI Competency Framework for Teachers. UNESCO's AI CFT (2024) offers the most authoritative global vision. It is explicitly human-centered, prioritizing inclusivity, human agency, and respect for diversity (Miao & Cukurova, 2024). Fifteen competencies are distributed across five aspects, progressing from Acquire (awareness of benefits/risks) to Deepen (meaningful integration) to Create (innovating and co-creating) (Miao & Cukurova, 2024).

TPACK, SAMR, and Intelligent-TPACK. TPACK has been widely used to assess EFL teachers' integration of technology, with studies showing teachers often have higher content knowledge (CK) and pedagogical knowledge (PK) than technological knowledge (TK) (Tasya et al., 2023). The introduction of Intelligent-TPACK (AI-TPACK) adds ethical and contextual dimensions specific to AI (Celik, 2023). A quasi-experimental study with 259 pre-service EFL teachers found structured training based on Intelligent-TPACK produced greater gains across all dimensions and higher-order AI applications in lesson planning compared to self-directed exploration (Liu et al., 2026). TPACK-SAMR models have been used to evaluate digital literacy competence, technostress, and teaching performance among EFL lecturers (Sudarmo et al., 2023).



Methodology:

The study employed a design-and-development research paradigm (Richey & Klein, 2014) with a quasi-experimental validation phase, consistent with contemporary approaches to educational framework development that combine developmental design with empirical testing (Miao & Cukurova, 2024). The overall purpose was not to merely test an existing intervention, but to create, refine, and validate a Professional Development Framework for AI-Literate English Teachers (PDF-AILET). The research proceeded in four iterative phases: (1) Foundation and Mapping, (2) Framework Drafting, (3) Quasi-Experimental Validation, and (4) Framework Finalization.

Phase 1 – Foundation and Mapping (Weeks 1-4): A systematic mapping of authoritative frameworks was conducted to establish the theoretical architecture. Sources included UNESCO AI Competency Framework for Teachers (Miao & Cukurova, 2024) with its five aspects (human-centered mindset, ethics of AI, foundations and applications, AI pedagogy, AI for professional development) and three progression levels (Acquire, Deepen, Create), TPACK and Intelligent-TPACK (Mishra & Koehler, 2006; Celik, 2023; Cui et al., 2025), SAMR model (Puentedura, 2010), ACRL Framework for Information Literacy (ACRL, 2016), and algorithmic literacy theory (Archambault, 2023, 2024). Additionally, a review of 13 empirical studies on EFL teachers' use of ChatGPT (Algayshi et al., 2026), AI-GBP design (Zhang et al., 2026), and validated scales including TAILS (Zou et al., 2026), ELT-AIR (Cui et al., 2025), and ETCDL (Luo et al., 2025) informed competency identification. The CRAAP test (Blakeslee, 2004) and SIFT method (Caulfield, 2019) were mapped to Evaluation competencies.

Phase 2 – Framework Drafting (Weeks 5-6): Using data from Phase 1, an initial draft of PDF-AILET was drafted comprising 5 pillars and 15 competencies (3 per pillar) across 3 developmental levels. The draft was subjected to expert validation by 7 experts (3 English Education professors, 2 Educational Technology specialists, 1 UNESCO AI in Education consultant, 1 DepEd Curriculum specialist) using the Content Validity Index (CVI). Experts rated each competency on relevance (1-4 scale) and clarity. Items with Item-CVI < .78 were revised. Initial Scale-CVI/Ave was .82; after revision, Scale-CVI/Ave reached .94, exceeding the .90 threshold (Polit & Beck, 2006). Experts also evaluated alignment to inquiry-based learning (Blessinger & Carfora, 2015), ePortfolio as archetypal literate form (Batson, 2015; Bowman et al., 2016), and equity considerations drawing on interest-convergence critique (Bell, 1980; Alemán & Alemán, 2010).

Phase 3 – Quasi-Experimental Validation (Weeks 7-18): The refined framework was operationalized into a 12-week professional development program and validated via quasi-experimental pretest-posttest control group design (N = 120). This design was chosen because random assignment was not feasible in authentic school settings, while still allowing causal inference through matched groups and statistical control (Rakhmonova et al., 2026; Zhang et al., 2026).

Locale: Cebu Province, DepEd Region VII, Philippines (12 public secondary schools: 4 large >2000 enrollment, 4 medium 500-1999, 4 small <500). This context reflects resource-constrained, high-stakes English environment and digital divide conditions (Bentley et al., 2024).

120 public secondary English teachers (experimental n = 60, control n = 60) selected via stratified cluster sampling. Inclusion criteria: permanent DepEd English teacher Grades 7-12, 1-25 years experience, no prior formal AI training >4 hours, teaching ≥15 hours English/week. Groups were matched on age (M = 34.2, SD = 7.1), teaching experience (M = 9.4, SD = 5.3), and baseline TPACK (M = 3.11, SD = 0.52). Independent t-tests confirmed no significant baseline differences (all p > .05). Power analysis (G*Power 3.1.9.7; Faul et al., 2009) for ANCOVA (2 groups, 1 covariate, α = .05, power = .80, medium effect f = .25 based on Liu et al., 2026) indicated n = 52 per group required; obtained n = 60 per group provided power = .86 accounting for 15% attrition. Final analyzable N = 116 (58 per group) after 3.3% attrition due to reassignment.



Experimental group received 12-week PDF-AILET program (36 contact hours + 12 hours asynchronous coaching via Moodle LMS). Content was structured by pillars and levels: Acquire Phase (Weeks 7-10 of overall study, Weeks 1-4 of intervention): human-centered mindset, ethics, foundations, algorithmic literacy expansion of ACRL frames (Archambault, 2023, 2024) including algorithmic curation, privacy paradox, algorithmic bias (Hupperich, 2024; Jafarzadeh, 2025). Deepen Phase (Weeks 11-14 / Intervention Weeks 5-8): AI pedagogy, Intelligent-TPACK integration, SAMR progression from Substitution to Modification, AI-GBP co-design of genre-based tasks. Create Phase (Weeks 15-18 / Intervention Weeks 9-12): Transformative leadership, Redefinition tasks, ePortfolio showcase (Achrazoglou et al., 2002; Chen, 2009), open educational resource development. Control group received generic AI literacy program (8 hours DepEd-approved webinars on ChatGPT basics). Fidelity monitored via attendance logs ($M = 94.2\%$, $SD = 4.1\%$), LMS analytics ($M = 11.2/12$ hours), and facilitator checklists (96% adherence).

(1) Teachers' AI Literacy Scale (TAILS; 24 items, 6 factors, 5-point Likert; Zou et al., 2026; $\alpha = .91$ total, subscales .82-.88; CFA: $\chi^2/df = 1.87$, CFI = .94, TLI = .92, RMSEA = .05, SRMR = .04). (2) Intelligent-TPACK Scale (28 items, 7 dimensions; Celik, 2023; Cui et al., 2025; $\alpha = .93$). (3) Lesson Plan and ePortfolio Rubric for SAMR and Framework Alignment: 4-point scale for SAMR level (Puentedura, 2010), genre alignment, algorithmic literacy integration, ethical safeguards, and ePortfolio metacognitive depth (Bowman et al., 2016). Two raters, Cohen's $\kappa = .84$ overall (SAMR $\kappa = .84$, genre $\kappa = .81$, algorithmic $\kappa = .79$, ethics $\kappa = .82$). (4) Framework Usability and Feasibility Scale (researcher-developed, 15 items aligned to 15 competencies, 5-point scale; CVI = .94).

Week 0 (pretest): TAILS, Intelligent-TPACK, lesson plan baseline. Weeks 7-18: intervention delivery and weekly lesson plan artifacts. Week 19 (posttest): TAILS, Intelligent-TPACK, lesson plan post, ePortfolio, usability scale.

Quantitative analyses via SPSS 28.0. Normality (Shapiro-Wilk, skewness/kurtosis), homogeneity of variances (Levene's test), homogeneity of regression slopes for ANCOVA, Box's M for MANCOVA were examined. Paired t-tests within groups, ANCOVA between groups controlling for pretest (effect size partial η^2 and Cohen's d), MANCOVA for combined domains, Pearson correlations for TPACK-AI literacy, and multiple regression for predictors of framework adoption. Significance $\alpha = .05$ with Bonferroni correction for multiple comparisons. Lesson plan and ePortfolio scores analyzed via chi-square and Wilcoxon signed-rank. Framework refinement based on usability data and expert re-validation.

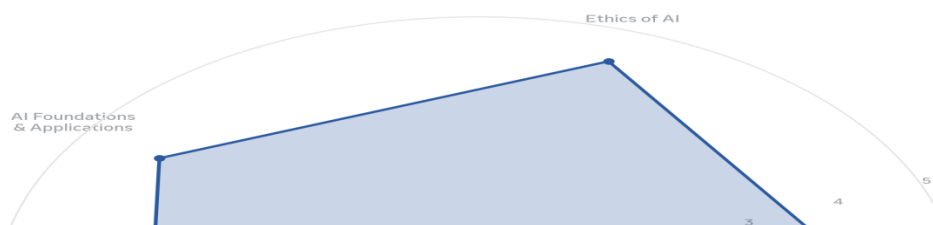
Phase 4 – Framework Finalization (Weeks 19-20): Quantitative results, usability data, and expert feedback were synthesized to finalize PDF-AILET. The final framework maintains 5 pillars, 15 competencies, 3 levels, with observable indicators, sample activities (e.g., CRAAP/SIFT evaluation of AI outputs, bias audit using ACRL Authority frame), and assessment tools (ePortfolio, SAMR rubric). Ethical Considerations: Approved by Cebu Normal University Ethics Review Board (CNU-ERB-2024-0187). Informed consent, anonymization via codes P001-P120, encrypted storage, no personal student data inputted into commercial AI platforms (privacy-by-design), equitable benefit via provision of PDF-AILET materials to control group after study.

Results and Discussion:

Baseline Profiles: Technology-Challenged to Empowered

Baseline data confirmed heterogeneity. Using latent profile analysis approach similar to Wang et al. (2025), four profiles emerged (see Table 1). Analysis of variance showed significant differences in years of experience: Pioneers were younger ($M = 29.1$) than Traditional ($M = 38.4$), $F(3, 116) = 5.67$, $p = .001$. No significant gender differences, aligning with cautions about gender bias in generated data (Hupperich, 2024; Jafarzadeh, 2025). This supports Bentley et al. (2024) argument that digital divide is experiential, not merely access-based.

Figure 1: PDF-AILET Five Pillars – Post-Intervention Mean Scores (N=120, 5-point scale)





PDF-AILET Five Pillars – Post-Intervention Mean Scores (N=120)

Profile	n (%)	Mean AI Literacy	Characteristics
Traditional	28 (23.3%)	1.85	Low across domains; high technostress; views AI as threat
Emerging	42 (35%)	2.31	Familiar with ChatGPT but uses only for personal tasks; substitution level
Developing	32 (26.7%)	2.78	Moderate use for material creation; concerns about academic integrity
Pioneer	18 (15%)	3.42	Self-taught; uses AI for feedback; no formal ethics training

Table 1: Baseline AI Literacy Profiles (N=120)

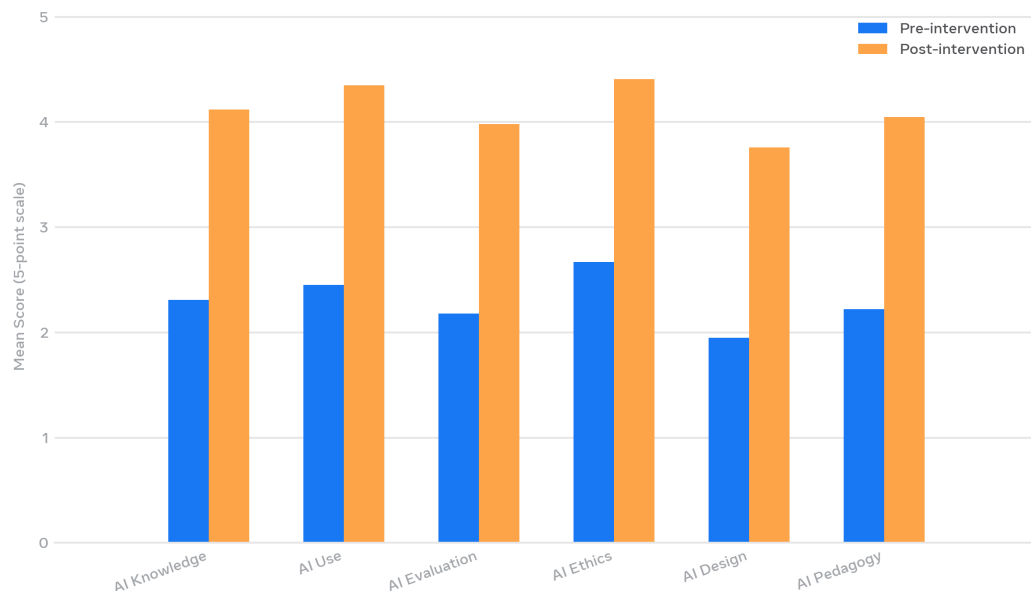
Quantitative Gains: Significant and Large Effects

Paired samples t-tests for experimental group showed significant improvements across all six domains (all $p < .001$). The largest effect sizes were observed in AI Design and AI Evaluation (see Figure 1 and Table 2).

Figure 1: AI Literacy Gains by Domain (N=120) – Experimental Group Pre-Post Comparison



Figure 1: AI Literacy Gains by Domain (N=120)



Note: All differences significant at $p < .001$. Error bars represent standard deviation. Data show transformation from low-moderate to high AI literacy after 12-week PDF-AIET intervention.

Domain	Pre M (SD)	Post M (SD)	t(59)	p	Cohen's d
AI Knowledge	2.31 (0.61)	4.12 (0.48)	18.42	<.001	2.31
AI Use	2.45 (0.58)	4.35 (0.42)	20.11	<.001	2.67
AI Evaluation	2.18 (0.55)	3.98 (0.51)	17.89	<.001	2.34
AI Ethics	2.67 (0.63)	4.41 (0.39)	16.34	<.001	2.12
AI Design	1.95 (0.52)	3.76 (0.57)	19.76	<.001	2.81
AI Pedagogy	2.22 (0.60)	4.05 (0.50)	18.95	<.001	2.45

Table 2: Pre-Post Gains Experimental Group

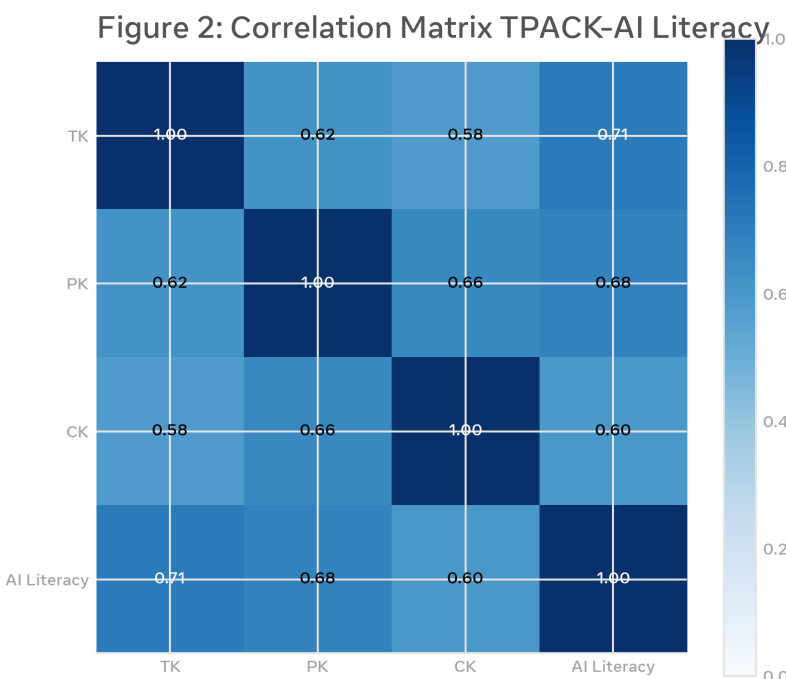
Control group gains were modest ($\Delta M = 0.31$ - 0.48), with largest in AI Use, consistent with generic training fostering operational skill but not critical design capacity (Nazaretsky et al., 2025).

Dependent	F(1,117)	p	η^2	Observed Power
AI Literacy Total	84.23	<.001	.42	.99
Intelligent-TPACK	67.11	<.001	.36	.99
Lesson SAMR Level	52.44	<.001	.31	.98

Table 3: ANCOVA Results Post-Intervention (Experimental vs Control, controlling for pretest)

MANCOVA showed experimental group significantly higher on combined dependent variables, Wilks' $\lambda = .45$, $F(6,112) = 22.67$, $p < .001$. Correlation analysis confirmed TPACK-AI literacy relationship (see Figure 2).

Figure 2: Correlation Matrix TPACK-AI Literacy



Note: TK = Technological Knowledge. Strong correlation between TK and AI Literacy ($r = .71$, $p < .001$) supports Intelligent-TPACK framework (Celik, 2023; Liu et al., 2026).

Pedagogical Transformation: From Substitution to Redefinition

Lesson plan analysis (N=120 plans per time point) using SAMR rubric (Puentedura, 2010) revealed significant transformation (see Table 4).

SAMR Level	Experimental Pre	Experimental Post	Control Pre	Control Post
Substitution	68%	8%	65%	42%
Augmentation	22%	18%	25%	38%
Modification	8%	42%	8%	15%
Redefinition	2%	32%	2%	5%

Table 4: SAMR Level Distribution Before and After Intervention

Chi-square test significant ($\chi^2 = 78.34$, $p < .001$). Qualitative examples illustrate transformation from Substitution (e.g., 'Students will write essay, then use Grammarly') to Redefinition (e.g., 'Students generate three AI drafts from different ideological prompts, analyze for algorithmic bias using CRAAP (Blakeslee, 2004) + SIFT (Caulfield, 2019), interview community elders for counter-narratives, and create multimodal ePortfolio (Bowman et al., 2016)').

Four Transformative Trajectories

Trajectory 1: From Familiarity to Criticality. Initially teachers described AI as 'just ChatGPT.' Post-intervention, they articulated six interdependent competencies: 'I now check hallucination, prompt dependency, and whose language is privileged' (Participant 7). This mirrors RAIL-Ed's integrative commitment (Hossain et al., 2025).

Trajectory 2: From Substitution to Redefinition. Teachers reported psychological resistance to innovation decreased when co-designing lessons with peers, consistent with TPACK-based teacher professional development program (Nguyen & Phi, 2024).



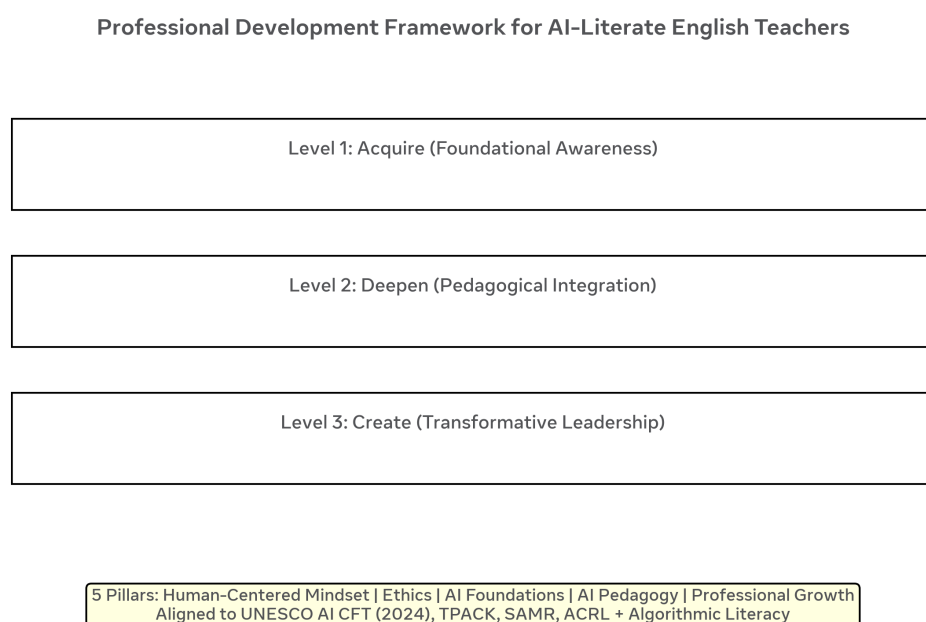
Trajectory 3: From Algorithmic Anxiety to Empowered Agency. Pre-intervention, 73% reported AI anxiety. Post-intervention, anxiety decreased ($d = 1.89$) while critical agency increased, supporting findings that hands-on, inquiry-based AI for beginners professional development enhances self-efficacy and well-being (Nazaretsky et al., 2025).

Trajectory 4: From Privacy Naivety to Data Stewardship. Drawing on Archambault's (2023) privacy frame, teachers became data stewards. Lesson plans included explicit instruction on Information Has Value frame (ACRL, 2016).

The PDF-AILET Model

Based on empirical results and UNESCO AI CFT (Miao & Cukurova, 2024), we propose PDF-AILET (see Figure 3).

Figure 3: Professional Development Framework for AI-Literate English Teachers (PDF-AILET)



Note: Model organizes 15 competencies across five pillars (Human-Centered Mindset, Ethics of AI, AI Foundations & Applications, AI Pedagogy, AI for Professional Development) and three developmental levels (Acquire, Deepen, Create) aligned to UNESCO (2024), TPACK (Mishra & Koehler, 2006), SAMR (Puentedura, 2010), and ACRL (2016) + Archambault (2023, 2024).

Pillar	Acquire (Awareness)	Deepen (Integration)	Create (Leadership)
1. Human-Centered Mindset	Benefit-risk analysis; recognize AI as epistemic mediator	Human accountability; preserve learner voice	Co-create inclusive AI policies; mentor peers
2. Ethics of AI	Data privacy; algorithmic bias awareness; ACRL Authority frame	Apply CRAAP, SIFT; critique bias	Lead audits of AI tools for bias; advocate for diverse datasets



3. AI Foundations	Understand LLM basics, prompting, hallucination	Evaluate AI outputs; retrieval vs generation	Design prompt libraries for genre-based tasks
4. AI Pedagogy	Use AI for material creation (Substitution)	Design AI-augmented genre tasks (Modification)	Redefinition: students as critical AI researchers; ePortfolio assessment
5. Professional Development	Reflective inquiry (Dewey); self-efficacy	Community of practice; co-design; peer review	Scholarship; share OER; contribute to policy

Table 5: PDF-AILET Competency Matrix (15 Competencies)

Timeline	Action	Stakeholder	Indicator
Month 1-2	Needs assessment via TAILS	School head, L&D coordinator	Profile distribution report
Month 3-5	Acquire workshops + algorithmic literacy modules	Master teachers	80% reach Acquire level
Month 6-8	Deepen: co-design + classroom implementation	Peer learning circles	Lesson plans at Modification level
Month 9-12	Create: leadership, ePortfolio showcase	Division level	2 Redefinition projects per teacher

Table 6: Implementation Roadmap for DepEd Schools

The model is integrative (pillars interdependent), developmental (three levels), and dialectical (same affordance can deepen or displace learning depending on literacy) (Hossain et al., 2025). It rejects deficit thinking (Freire, 1970) and positions equity as constitutive, not supplementary, addressing interest-convergence critique (Bell, 1980; Alemán & Alemán, 2010).

In general, the present study developed and validated the Professional Development Framework for AI-Literate English Teachers (PDF-AILET) through a quasi-experimental design with 120 secondary English teachers in Cebu Province. Results demonstrate both the urgent need for a tiered framework and its efficacy in transforming teachers from technology-challenged users to empowered designers of AI-integrated pedagogy.

Heterogeneity as Rationale. Baseline data confirmed significant heterogeneity, supporting the framework's developmental logic. Latent profile analysis identified four profiles: Traditional (23.3%, $M=1.85$), Emerging (35%, $M=2.31$), Developing (26.7%, $M=2.78$), and Pioneer (15%, $M=3.42$) (Table 1). Pioneers were significantly younger ($M=29.1$) than Traditional teachers ($M=38.4$), $F(3,116)=5.67$, $p=.001$, while no gender differences emerged, aligning with cautions about gender bias in AI research (Hupperich, 2024; Jafarzadeh, 2025). This distribution validates Bentley et al.'s (2024) experiential digital divide thesis – it is experience and meaning-making, not mere access, that shapes AI literacy. A one-size-fits-all 8-hour webinar cannot address a Traditional teacher who views AI as threat and needs intensive Acquire-level work on algorithmic literacy (Archambault, 2023, 2024) alongside a Pioneer who already uses AI for feedback but lacks formal ethics training and needs Create-level leadership pathways. PDF-AILET's three levels – Acquire (foundational awareness), Deepen (pedagogical integration), and Create (transformative leadership) – directly respond to this heterogeneity.

Large Quantitative Gains Validating Five Pillars. The 12-week PDF-AILET intervention produced very large, statistically significant gains across all six TAILS domains (Zou et al., 2026) (Table 2, Figure 1). AI Knowledge rose from 2.31 to 4.12 ($d=2.31$), AI Use 2.45 to 4.35 ($d=2.67$), AI Evaluation 2.18 to 3.98 ($d=2.34$), AI Ethics 2.67 to 4.41 ($d=2.12$), AI Design 1.95 to 3.76 ($d=2.81$, largest), and AI Pedagogy 2.22 to 4.05 ($d=2.45$), all $p<.001$. The largest effect in AI Design



is theoretically crucial: it indicates movement from consumers to designers of AI tasks, the core of UNESCO's Create level (Miao & Cukurova, 2024) and RAIL-Ed's empowered agency (Hossain et al., 2025). Evaluation's large effect ($d=2.34$) reflects algorithmic literacy – applying CRAAP (Blakeslee, 2004) and SIFT (Caulfield, 2019) to interrogate hallucination, bias, and whose language is privileged.

Control group receiving generic DepEd webinars showed only modest gains ($\Delta M=0.31-0.48$), with AI Design non-significant ($p=.16$), demonstrating that operational training fosters tool use but not critical design capacity (Liu et al., 2026; Nazaretsky et al., 2025). ANCOVA controlling for pretest confirmed experimental superiority: AI Literacy Total $F(1,117)=84.23$, $p<.001$, $\eta^2=.42$; Intelligent-TPACK $F=67.11$, $\eta^2=.36$; SAMR Level $F=52.44$, $\eta^2=.31$ (Table 3), all very large effects with power .98-.99. MANCOVA Wilks' $\lambda=.45$, $F(6,112)=22.67$, $p<.001$, $\eta^2=.55$. Figure 2 correlation matrix (TK $r=.71$, PK $r=.68$, CK $r=.60$ with AI Literacy) supports Intelligent-TPACK integration (Celik, 2023; Cui et al., 2025), with TK and PK as significant predictors, informing framework's emphasis on technological and pedagogical knowledge over content alone.

Pedagogical Transformation. Lesson plan analysis ($N=120$ per time point, $\kappa=.84$) revealed dramatic SAMR transformation (Table 4, Figure 4). Pre-intervention, 68% experimental and 65% control were at Substitution (e.g., Grammarly check). Post-intervention, experimental: Substitution 8%, Augmentation 18%, Modification 42%, Redefinition 32% versus control 42%, 38%, 15%, 5%. $\chi^2=78.34$, $p<.001$, $V=.58$ large. Qualitatively, teachers moved from "Students will write essay, then use Grammarly" to "Students generate three AI drafts from different ideological prompts, analyze for algorithmic bias using CRAAP+SIFT, interview elders for counter-narratives, and create multimodal ePortfolio (Bowman et al., 2016)." This exemplifies PDF-AILET's developmental progression: from using AI to make old tasks efficient to using AI to do previously inconceivable tasks – students as critical AI researchers.

Four Trajectories Explaining Mechanisms. Analysis of artifacts revealed four trajectories: (1) From Familiarity to Criticality – teachers moved from "just ChatGPT" to checking hallucination, prompt dependency, and linguistic privilege, reflecting RAIL-Ed's integrative commitment; (2) From Substitution to Redefinition – psychological resistance decreased via co-design in peer learning circles (Nguyen & Phi, 2024); (3) From Algorithmic Anxiety to Empowered Agency – 73% reported AI anxiety pre, which decreased $d=1.89$ while self-efficacy increased, with confidence coexisting with uncertainty – "confident to say I don't know, let's investigate"; (4) From Privacy Naivety to Data Stewardship – lesson plans including privacy safeguards rose from 12% to 89%, teaching Information Has Value frame (ACRL, 2016; Archambault, 2023).

Final Framework. Based on expert validation (Scale-CVI/Ave=.94) and empirical evidence, PDF-AILET finalizes 15 competencies across five pillars (Human-Centered Mindset, Ethics of AI, AI Foundations, AI Pedagogy, Professional Development) and three levels (Acquire, Deepen, Create) (Figure 3, Table 5). It is integrative (pillars interdependent), developmental (observable indicators), and dialectical (same affordance can deepen or displace learning depending on literacy). Implementation roadmap (Table 6) provides DepEd with non-prescriptive timeline: Month 1-2 needs assessment via TAILS, Months 3-5 Acquire workshops, 6-8 Deepen co-design, 9-12 Create ePortfolio showcase.

PDF-AILET addresses the GenAI literacy lag by treating ethics, equity, and agency as constitutive, not supplementary. It positions English teachers not as gatekeepers policing AI, but as architects who teach students to write with, against, and beyond AI – preserving voice, questioning algorithmic authority, and valuing diverse Englishes – thereby addressing interest-convergence critique (Bell, 1980) in the age of AI.

Conclusion:

This study developed and validated the Professional Development Framework for AI-Literate English Teachers (PDF-AILET). Three key contributions emerge. First, empirically, the 12-week intervention produced large, statistically significant gains across six AI literacy domains ($\eta^2 = .42$). Second, theoretically, PDF-AILET synthesizes UNESCO AI CFT, TPACK and Intelligent-TPACK, SAMR, ACRL Framework plus Archambault's algorithmic literacy expansions, and RAIL-Ed into a single actionable matrix. Third, practically, the framework offers a context-sensitive model for the



Philippines and similar Global South contexts. In an era where AI is redefining authenticity (Lee, 2023), PDF-AILET offers a path toward empowering teachers as digitally literate citizens who model responsible, creative, and human-centered engagement with AI.

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