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Dilxumor ISRAILOVA,
O‘zbekiston davlat jahon tillari universiteti tayanch doktoranti
E-mail:isradil90@gmail.com

O‘zMU dotsenti M.Abdullayeva taqrizi asosida

TIL TA’LIMIDA O‘QITUVCHILARNING KASBIY RAQAMLI KOMPETENSIYASI: DASTURLAR ASOSIDAGI TAHLILIY SINTEZ

Annotatsiya

Ta’limning raqamli transformatsiyasi o‘qituvchilardan keng qamrovli kasbiy raqamli kompetensiyani (KRK) namoyon etishni talab etmoqda. Ushbu tahliliy sharh KRK tushunchasini til ta’limi kontekstida aniqlash va amaliyotga tatbiq etish maqsadida yigirmadan ortiq ilmiy va siyosiy manbalarni umumlashtiradi. Tadqiqot DigCompEdu, TPACK, ISTE, digi.kompP hamda DC4LT, Cambridge va EAQUALS kabi maxsus dasturlarni nazariy asoslari, empirik dalillari va siyosiy ahamiyati bo‘yicha taqqosladi. Natijalar raqamli resurslar, pedagogik integratsiya va baholash kabi umumiy kompetensiyalarni ko‘rsatdi, biroq amaliy qo‘llashda kontekstual tafovutlarni aniqladi. Tadqiqot SI savodxonligi, ma’lumotlar xavfsizligi va tanqidiy raqamli pedagogikani integratsiyalashni taklif etadi.

Kalit so‘zlar: kasbiy raqamli kompetensiya, til ta’limi, DigCompEdu, TPACK, ISTE standartlari, DC4LT, o‘qituvchilarni tayyorlash, raqamli kompetensiya dasturlari.

ПРОФЕССИОНАЛЬНАЯ ЦИФРОВАЯ КОМПЕТЕНТНОСТЬ ПРЕПОДАВАТЕЛЕЙ В ЯЗЫКОВОМ ОБРАЗОВАНИИ: ФРЕЙМВОРКОВЫЙ СИНТЕЗ

Аннотация

Цифровая трансформация образования усиливает потребность преподавателей в развитии комплексной профессиональной цифровой компетентности (ПЦК). Данный обзор обобщает результаты более двадцати ведущих эмпирических и нормативных исследований, направленных на концептуализацию и операционализацию ПЦК в сфере языкового образования. Рассмотрены ключевые модели — DigCompEdu, TPACK, ISTE, digi.kompP, а также специализированные фреймворки DC4LT, Cambridge и EAQUALS — с точки зрения их теоретической основы, эмпирической проверки и политической значимости. Анализ выявил совпадение компетенций в области цифровых ресурсов, педагогики и оценивания, но также контекстуальные разрывы в реализации. В заключение предлагается создание гибридных рамок, учитывающих ИИ-грамотность, этику данных и критическую цифровую педагогику.

Ключевые слова: профессиональная цифровая компетентность, языковое образование, DigCompEdu,TPACK,стандарты ISTE, DC4LT, подготовка преподавателей, цифровые фреймворки.

TEACHERS’ PROFESSIONAL DIGITAL COMPETENCE IN LANGUAGE EDUCATION: A FRAMEWORK-BASED SYNTHESIS.

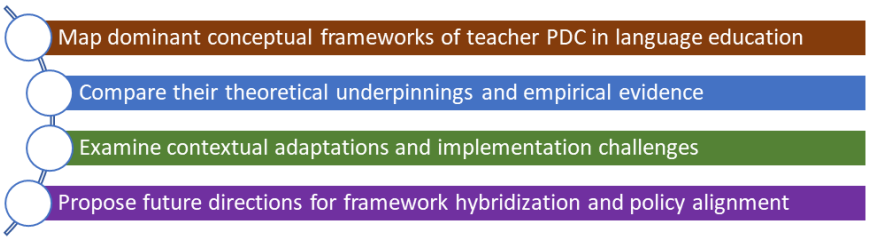
Abstract

The ongoing digital transformation in education intensifies the need for teachers to exhibit comprehensive professional digital competence (PDC). This review synthesizes over twenty influential empirical studies and policy frameworks to examine how PDC is conceptualized and operationalized in language education. Core models such as DigCompEdu, TPACK, ISTE, digi.kompP, and domain-specific frameworks (DC4LT, Cambridge, EAQUALS) are critically compared in terms of theoretical orientation, empirical grounding, and policy relevance. The analysis reveals convergent competence domains—digital resources, pedagogy, and assessment—while exposing contextual limitations in practice. The study recommends developing hybrid, context-responsive frameworks incorporating AI literacy, data ethics, and critical digital pedagogy.

Keywords: professional digital competence, language education, DigCompEdu, TPACK, ISTE Standards, DC4LT, teacher education, digital frameworks.

Introduction. The rapid digital transformation of global education systems, driven by ubiquitous technologies, pedagogical innovation, and disruptions such as the COVID-19 pandemic, has profoundly reshaped expectations of teacher professionalism [5]. Within this transformation, Professional Digital Competence (PDC) has emerged, especially in language education, where digital mediation intersects with communication, culture, and literacy [13].

While PDC is widely acknowledged as essential, it remains conceptually fragmented and context-dependent.Diverse frameworks – ranging from the European DigCompEdu to context-specific adaptations like digi.kompP and DC4LT – attempt to codify digital teaching knowledge, skills, and attitudes. However, discrepancies persist between policy rhetoric and classroom enactment, particularly regarding language-specific competences such as digital feedback, multimodal writing, and intercultural communication[14].



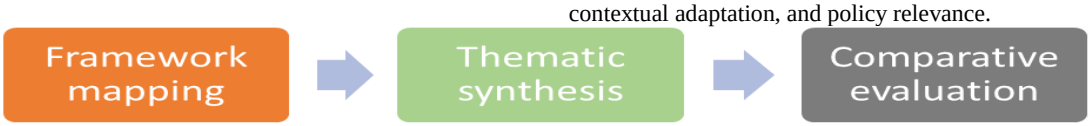
1.1. Four key actions of critical synthesis of empirical and policy research.

Literature review. Professional digital competence frameworks provide structured models for integrating technology in education. The DigCompEdu framework outlines six competence areas for educators, while ISTE Standards (2025) emphasize educator roles in digital learning[17-8;9,4-6].TPACK contextualizes technological, pedagogical, and content knowledge in EFL settings [1;10]. National adaptations include Austria’s Digi.kompP and Spain’s SFDCT [2;8]. Specialized tools like DC4LT target language teachers [15,17; 16,14]. Meta-analyses confirm TPACK-based development enhances efficacy, supported by OECD’s digital outlook [4;13,7].

Research methodology. This study adopts a systematic analytical literature review design focusing on peer-reviewed empirical and policy-based sources published between 2017 and 2025. The study includes 20+ high-impact studies from Q1–Q3 journals, institutional frameworks such as OECD, INTEF, ISTE, and language education-specific reports in the form of DC4LT and Cambridge English Digital Frameworks.

The inclusion criteria for this study were as follows. First, the selected works had to focus explicitly on teachers’ professional digital competence (PDC). Second, they were required to present either empirical findings or policy-based applications within the field of language education. Third, the studies needed to incorporate frameworks that included clearly defined competence models or assessment scales. Finally, only peer-reviewed publications written in English were considered for inclusion.

Analysis. The analysis was conducted in three main stages. In the first stage, a framework mapping process was carried out to identify and categorize the core models, including DigCompEdu, TPACK, ISTE, digi.kompP, and DC4LT. The second stage involved a thematic synthesis, which examined the key conceptual constructs, operational domains, and assessment structures presented within these frameworks. In the final stage, a comparative evaluation was performed to integrate cross-framework similarities and differences, as well as to analyze empirical insights related to progression models, contextual adaptation, and policy relevance.



1.2. Analytical approach of the analysis.

Results. The conceptual evolution of PDC stems from digital literacy and digital citizenship, progressing toward profession-specific digital competence models[6]. In language education, PDC integrates technological knowledge with pedagogical strategies that enhance language learning, intercultural competence, and learner autonomy[15].Frameworks translate these demands into structured competence domains, proficiency scales, and developmental trajectories [13].

The European DigCompEdu Framework is the most influential global reference, encompassing six domains and 22 competencies, structured along A1–C2 proficiency levels [16,4]. Its empirical validation in Spain and Austria confirms its adaptability across educational systems. National versions, such as SFDCT in Spain, contextualize DigCompEdu by emphasizing professional engagement and national digital policies[8;2].

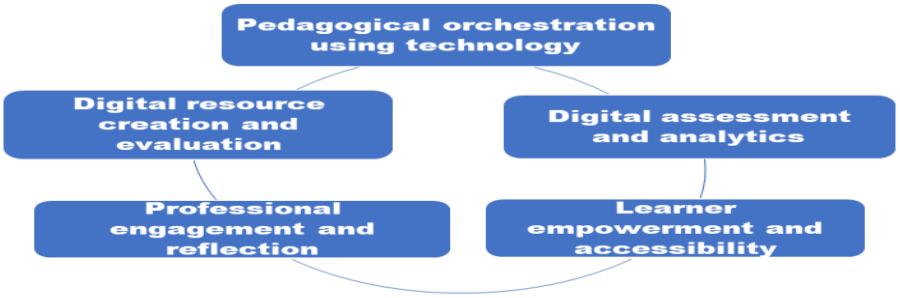
The Technological Pedagogical Content Knowledge (TPACK) model conceptualizes teacher knowledge as an intersection of technology, pedagogy, and content[4]. In language education, TPACK operationalizes how teachers integrate technological tools to enhance communicative tasks and linguistic outcomes [10]. Meta-analyses reveal moderate-to-strong effects on teaching integration and student performance, though its generic structure requires adaptation to EFL/ESL-specific contexts [1].

The ISTE Standards articulate seven roles—Learner, Leader, Citizen, Collaborator, Designer, Facilitator, and Analyst—defining teacher engagement with technology [9]. Studies demonstrate their utility in in-service professional development and blended language teaching, enhancing self-efficacy and data-informed pedagogy [3]. However, empirical evidence shows selective implementation, with “Designer” and “Facilitator” roles more easily activated [11].

Austria’s digi.kompP merges DigCompEdu with national priorities, outlining eight domains across three professional phases [2]. It emphasizes self-assessment and lifelong professional progression, demonstrating significant correlations between formal ICT training and higher self-rated competence levels.

The DC4LT and related frameworks adapt general PDC models to language-specific pedagogy, including digital mediation of communicative, corpus-based, and intercultural learning [16]. The DC4LT Assessment Framework introduces a six-level progression model tied to empirical classroom evidence and reflective toolkits [15].

All major frameworks demonstrate a clear convergence across five core competence areas. These include the creation and evaluation of digital resources, the pedagogical integration and orchestration of technology in teaching, the use of digital tools for assessment and learning analytics, the promotion of learner empowerment and accessibility, and the enhancement of professional engagement and reflective practice.Together, these areas represent the essential dimensions of teachers’ professional digital competence in language education



1.3.Convergence of Major Frameworks across 5 competence areas by Redecker and Johannesen et al.

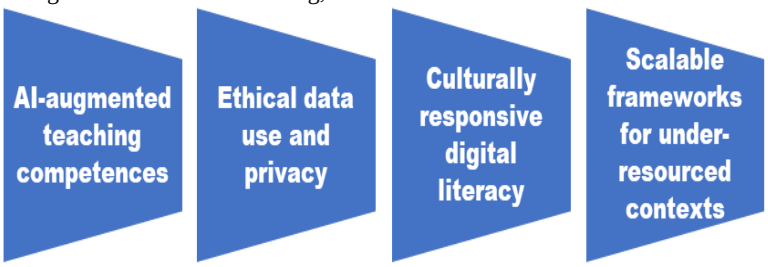
Across frameworks (DigCompEdu, INTEF, digi.kompP), proficiency is measured along six-level scales. Empirical studies show most language teachers self-assess at intermediate levels, with strengths in basic digital tasks but weaknesses in digital assessment and learner agency[6];15].Progression correlates strongly with formal training, continuous professional development, and institutional support [2].

Discussion. Recent studies advocate hybrid frameworks combining the progression logic of DigCompEdu, the pedagogical integration of TPACK, and the language-specific precision of DC4LT [1]. The Digital Competence Framework for Learners (DCFL) exemplifies this direction, incorporating AI literacy, data ethics, and self-regulated learning [7].

Effective national policy requires alignment with international frameworks while maintaining local adaptability[13]. Assessment tools now integrate self-evaluation rubrics, e-portfolios, and peer coaching, focusing on authentic digital artifacts rather than abstract skill lists [18; 15].

Teacher education should embed context-specific digital pedagogy, emphasizing collaborative learning, reflective practice, and ongoing mentoring. Evidence confirms that sustained competence development relies more on professional communities and mentorship than on isolated training [10].

Conclusion/Recommendations. Emerging research in the field should systematically address the development of teaching competencies that are enhanced by artificial intelligence, ensuring educators are equipped to effectively integrate AI technologies into their pedagogical practices. Furthermore, it is imperative to investigate the ethical dimensions of data use and privacy management within educational settings, as these concerns are increasingly central in digitally mediated instruction. Additionally, studies must prioritize the promotion of culturally responsive digital literacy, enabling educators and learners to navigate and critically engage with digital environments in diverse sociocultural contexts. Finally, research efforts should focus on designing and validating scalable frameworks that support the integration of digital resources and methodologies, particularly in under-resourced educational contexts where equitable access and sustainability are critical challenges.



1.4. Four essential directions for future research development

This analytical synthesis demonstrates that while diverse frameworks—DigCompEdu, TPACK, ISTE, digi.kompP, and DC4LT—provide solid conceptual ground for defining teachers’ professional digital competence, their real impact depends on contextual adaptation andcontinuous professional learning. The convergence of theoretical and practical insights signals a shift toward integrated, reflective, and AI-aware frameworks that empower language educators to navigate complex digital ecosystems. Sustained professional growth requires mentorship, institutional backing, and global-local policy coherence to translate digital competence into transformative pedagogy.

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