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« Integrating Tpack in English Language Teaching (ELT) For Secondary Schools in The Democratic Republic of Congo (DRC): A Participatory Action Research (Par) Study »

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Abstract
This study aims at integrating the Technological Pedagogical Content Knowledge (TPACK) model into English Language Teaching (ELT) for secondary schools in the Democratic Republic of the Congo (DRC). The research is framed within a participatory action research (PAR) methodology, focusing on the collaborative development and application of TPACK principles by English language teachers in secondary schools. The TPACK model, which emphasizes the interconnectedness of content knowledge, pedagogical knowledge, and technological knowledge, is particularly relevant in the DRC, where access to technology is limited but rapidly expanding. The study aims at identifying effective strategies for integrating digital tools into the ELT classroom, assessing teachers' professional development, and enhancing student learning outcomes. Data collection involves a combination of classroom observations, teacher interviews, student feedback, and reflective journals. Findings suggest that when teachers are supported through targeted training and provided with appropriate technological resources, they are able to adapt their teaching practices to better engage students and improve language proficiency. The study also highlights the challenges teachers face, such as inadequate infrastructure and the need for ongoing professional development. The research contributes to the growing body of literature on TPACK integration in resource-limited contexts, offering insights into how the model can be successfully adapted for ELT in secondary schools in the DRC. It concludes with recommendations for policy makers and educators to foster a supportive environment for the sustainable integration of technology in language teaching.
Key concepts*: TPACK, English Language Teaching (ELT), secondary schools, participatory action research (PAR), Democratic Republic of the Congo (DRC), technology integration, teacher development, educational outcomes.*

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I. INTRODUCTION

1.1. Relevance of the study

The purpose of the study could be formulated as:

Exploring and enhancing the integration of the Technological Pedagogical Content Knowledge (TPACK) framework in English language teaching at the secondary school level in the Democratic Republic of Congo (DRC), through a participatory action research approach that actively involves teachers in developing, implementing, and reflecting on effective technology-enhanced pedagogical practices.

More specifically, the study might aim to: (1) Assess current practices and challenges in using technology for teaching English in secondary schools in the DRC,(2) Build capacity among English teachers to effectively integrate technology using the TPACK framework, (3) Co-develop teaching strategies with teachers that align with TPACK principles, (4) Evaluate the impact of TPACK-informed teaching on student engagement and language learning outcomes, and (5) Contribute to localized educational policy and professional development by providing evidence-based recommendations.

This study is significant as it addresses the pressing need to enhance English Language Teaching (ELT) practices in secondary schools within the Democratic Republic of Congo (DRC) by integrating the Technological Pedagogical Content Knowledge (TPACK) framework. In a country where ELT is often challenged by limited resources, insufficient teacher training, and minimal integration of technology (Kabeya, 2020), the TPACK model offers a structured approach for teachers to develop the intersectional knowledge needed to teach effectively with technology.

By engaging teachers in a participatory action research (PAR) process, this study empowers educators to reflect critically on their practices, co-construct knowledge, and collaboratively implement contextually

relevant technological solutions (Kemmis, McTaggart, & Nixon, 2014). This participatory approach is particularly crucial in the DRC context, where top-down reforms often overlook local realities and teacher agency (Mukendi & Banza, 2019).

Furthermore, this research contributes to the limited body of literature on TPACK implementation in Francophone Sub-Saharan Africa, particularly in post-conflict settings like the DRC. While TPACK has been extensively studied in Western contexts (Mishra & Koehler, 2006), its practical application in under-resourced educational systems remains under-explored. Thus, this study offers both theoretical and practical insights into how TPACK can be adapted and operationalized in challenging educational environments.

Finally, the outcomes of this research have the potential to inform policy makers, curriculum developers, and teacher training institutions about effective strategies for integrating technology in ELT. It supports the global Sustainable Development Goal 4 (SDG 4) on inclusive and equitable quality education, particularly by promoting digital literacy and innovative pedagogies in low-resource settings (UNESCO, 2015).

The integration of the TPACK (Technological Pedagogical Content Knowledge) model into English Language Teaching (ELT) in secondary schools in the DRC is both timely and essential, given the increasing role of technology in education. The TPACK framework, which emphasizes the intersection of technological, pedagogical, and content knowledge, offers a robust model for improving teachers' ability to integrate digital tools effectively in language instruction (Mishra & Koehler, 2006). In contexts such as that of the DRC, where resource constraints and lack of professional development opportunities often hinder educational progress, implementing TPACK through participatory action research (PAR) can empower teachers and support localized, sustainable change (Somekh, 2006). Moreover, English proficiency is increasingly critical for academic and professional success in global and regional contexts, and technology-enhanced language instruction can bridge gaps in access and quality (Blake, 2013). Therefore, this study is relevant as it not only addresses a pedagogical need but also contributes to teacher capacity-building and educational equity in the DRC (UNESCO, 2021).

1.2. Context of English Language Teaching (ELT) in the DRC

The linguistic diversity in the DRC complicates the teaching and learning of English. Four languages have the status of National languages (Kikongo, Lingala, Swahili and Tshiluba) and French has the status of official language and means of education. Many students are more familiar with these local languages which can affect their acquisition of English, especially in rural areas. Teachers must adapt their teaching methods to the linguistic and cultural needs of their students, an aspect that TPACK can help address by emphasizing the contextualization of technological tools to make them more relevant to students' lived experiences. Consequently, teachers face the challenge of teaching English to students who may not have a strong foundation in the language or the skills needed for academic success (Sotirou, 2017).

Moreover, teacher professional development in the DRC is often limited by inadequate infrastructure, including a lack of access to computers and reliable internet. ProTEEM addresses these issues by promoting affordable, mobile-based learning tools and online professional development platforms that allow teachers to access resources and training regardless of their location. Mobile phones are increasingly becoming a key tool for English language learning in the DRC, where they offer access to language apps, online dictionaries, and videos that support language skills development (Ngoma, 2017). These tools also align with TPACK's emphasis on adaptable technology that can be effectively used to meet local educational needs (Sotirou, 2017).

The Democratic Republic of Congo (DRC), like many other African countries, faces a complex set of challenges in education, particularly in the secondary education sector. These challenges include political instability, insufficient educational infrastructure, a shortage of qualified teachers, and limited access to educational resources (Hughes, 2017). Despite these difficulties, the DRC government has been striving to improve the educational system, recognizing that enhancing digital literacy and integrating ICT (Information and Communication Technology) into classrooms can be transformative for students (Kimenyi, 2015).

Sangabau (2017) summarizes these challenges into three main categories; pedagogical economic, and socio linguistic. Addressing these challenges multifaced issues is crucial for successfully integrating technology into English language teaching, ultimately enriching the learning experience for students and preparing digital future.

The DRC often faces additional barriers, such as insufficient professional development opportunities and a lack of access to modern teaching tools. English, being an important language for global communication, is often taught in an environment where resources are limited, and teachers may not always have access to consistent training in digital literacy and technology integration. The TPACK framework offers a way to address these gaps by encouraging a more holistic approach to professional development that incorporates content knowledge, pedagogical strategies, and technological tools.

1.3. Research Problem

Despite global advances in educational technology integration, English Language Teaching (ELT) in the Democratic Republic of Congo (DRC) often lacks effective use of digital tools due to insufficient teacher training, limited infrastructure, and a lack of pedagogical models tailored to local contexts. The Technological Pedagogical Content Knowledge (TPACK) framework offers a structured approach to integrating technology into teaching, but its application in ELT within the DRC's secondary education context remains underexplored. There is a need to understand how TPACK can be effectively adapted and implemented in this environment through a participatory and context-sensitive approach.

1.4. Research Questions:

1. How do secondary school English teachers in the DRC currently perceive and integrate technology in their teaching practices?
2. What are the challenges and opportunities in implementing the TPACK framework in ELT in the DRC's secondary schools?
3. How can participatory action research support teachers in developing TPACK-informed teaching strategies in ELT?
4. What impact does the integration of the TPACK model have on teaching practices and student engagement in English language classes?
5. What context-specific adaptations are necessary to make the TPACK model effective in the DRC's secondary school ELT context?

1.5. Research objectives

Based on the research problem and questions, here are some research objectives for this study, following are general and specific objectives:

1. 5.1. General Objective:

To explore and enhance the integration of the TPACK model in English Language Teaching (ELT) for secondary schools in the Democratic Republic of Congo through a participatory action research approach.

1.5.2. Specific Objectives:

1. To examine the current perceptions, knowledge, and practices of secondary school English teachers in the DRC regarding technology integration.
2. To identify the challenges and contextual barriers to implementing the TPACK framework in ELT classrooms.
3. To engage teachers in participatory action research cycles aimed at co-developing TPACK-informed teaching strategies.
4. To evaluate the impact of TPACK-based teaching interventions on classroom practices and student engagement in ELT.
5. To propose context-appropriate recommendations for integrating the TPACK model in the DRC's secondary school ELT curriculum.

1.5.3. Paper structure

This paper under study is divided into 7 main stages: (1) Abstract, (2) Introduction, (3) Literature review, (4) Conceptual framework, (5) Discussion, (6) Conclusion, and (7) References

II. LITERATURE REVIEW

2. 1. Understanding the TPACK Framework

Content Knowledge (CK): refers to the teachers' deep understanding of the subject they are teaching. In the case of English Language Teaching (ELT), this would involve expertise in grammar, vocabulary as well as the four skills in English, that is listening, speaking, reading, and writing.

Pedagogical Knowledge (PK):) is the understanding of how to teach effectively. It includes the knowledge of teaching methods, classroom management strategies, assessment techniques, and an understanding of how students learn.

Technological Knowledge (TK):) entails understanding various technological tools, applications, and digital resources that can support teaching. It may include proficiency with hardware (such as computers, tablets) and software (such as educational apps, platforms for collaboration, and multimedia content creation tools).

The intersection of these three knowledge domains is where effective learning occurs, according to TPACK (Mishra & Koehler, 2006). This intersection is crucial for ELT because it helps teachers design lessons that not only teach English effectively but also leverage technology in ways that enhance both pedagogy and content delivery.

2.2. TPACK in English Language Teaching

In ELT, the TPACK framework encourages teachers to use digital tools not just for the sake of using technology, but to enhance specific aspects of language learning such as listening, speaking, reading, and writing. For instance, using podcasts can support listening skills, while platforms like Padlet or Flipgrid can foster speaking and collaboration (Mishra & Koehler, 2006). A teacher with strong TPACK knows how to choose these tools purposefully, aligning them with language objectives and student needs.

Moreover, TPACK promotes reflective teaching practices, encouraging ELT educators to consider how technology influences language acquisition processes. This is especially relevant in diverse and multilingual classrooms where differentiation and learner autonomy are crucial (Baran, Chuang, & Thompson, 2011).

2.3. Participatory Action Research (PAR) in Educational Settings

Participatory Action Research (PAR) is an approach to research that emphasizes collaboration between researchers and participants, particularly with the goal of enacting change in real-world settings. In educational contexts, PAR is increasingly valued for its potential to empower teachers and learners, promote reflective practices, and contribute to context-sensitive innovations (Kemmis, McTaggart & Nixon, 2014).

In the context of integrating the Technological Pedagogical Content Knowledge (TPACK) model in English Language Teaching (ELT) for secondary schools in the Democratic Republic of the Congo (DRC), PAR provides a robust framework. It supports the collaborative development and implementation of technology-enhanced pedagogies that respond to local needs and constraints. Teachers, as co-researchers, can identify challenges in their teaching practices, collaboratively explore solutions through the TPACK framework, and iteratively reflect and refine their approaches (Somekh, 2006).

One of the core strengths of PAR in this setting is its alignment with professional development. By actively involving English teachers in the research process, PAR fosters ownership of pedagogical innovations and helps bridge the often-existing gap between theory and classroom practice. This is particularly crucial in the DRC, where educational resources may be limited and context-specific strategies are essential for meaningful technology integration (Zuber-Skerritt, 2011).

Moreover, using PAR to implement TPACK in ELT can help teachers in the DRC develop the complex interplay between content knowledge, pedagogical strategies, and technological tools. Through cycles of planning, action, observation, and reflection, teachers can better understand how to effectively integrate technology in ways that enhance student engagement and learning outcomes (Mishra & Koehler, 2006).

gap between pedagogy and technology.

2.4. Identifying Gaps in the Literature

While existing research on the TPACK framework and its integration into English Language Teaching (ELT) is growing, several gaps remain—particularly in under-researched contexts such as the Democratic Republic of the Congo (DRC). This section identifies these gaps and highlights how the current study addresses them.

2.4.1. Limited Contextual Research in Sub-Saharan Africa, particularly in the DRC

Most TPACK studies are conducted in technologically advanced or middle-income countries, with limited research exploring its application in resource-constrained settings like the DRC. Studies by Voogt et al. (2013) and Ersanli (2016) focus on general or higher-resource environments, which may not reflect the technological limitations and pedagogical challenges faced by Congolese teachers.

"Much of the existing TPACK research lacks representation from low-resource educational contexts in Africa, where infrastructure, access to digital tools, and teacher training are severely limited" (Voogt et al., 2013).

This paper addresses this gap by focusing on secondary schools in the DRC, offering data-driven insights into how TPACK can be adapted to fit a low-resource ELT environment.

2.4.2. Scarcity of Participatory Action Research (PAR) Approaches in TPACK-ELT Integration

While some studies have utilized participatory action research (PAR) to explore TPACK implementation (e.g., Nguyen et al., 2019), there is a scarcity of research that combines TPACK, ELT, and PAR in a single framework. Most TPACK-related interventions tend to be top-down or experimental, rather than collaborative and context-sensitive.

"Despite the recognized benefits of teacher involvement in educational change, few studies have integrated TPACK with participatory action research in English language education" (Nguyen et al., 2019).

This study uniquely contributes to the literature by involving English teachers in a PAR model, allowing them to co-develop and evaluate technology-integrated pedagogical strategies tailored to their own contexts.

2.4.3. Insufficient Focus on Teacher Professional Development in TPACK within ELT in the DRC

Professional development remains a key factor in the successful implementation of TPACK. However, many teacher training programs in the DRC do not adequately address technological integration in ELT. As Duan et al. (2022) argue, teachers' technological knowledge significantly impacts student achievement, yet many are underprepared.

"Teachers with higher TPACK are more likely to adopt innovative teaching strategies, yet in many developing contexts, professional training lags behind curricular demands" (Duan et al., 2022).

This study addresses the gap by embedding professional development within the PAR process, equipping Congolese teachers with both theoretical knowledge and practical tools to integrate technology into ELT.

2.4.4. Lack of Culturally and Linguistically Relevant TPACK Resources

Much of the existing TPACK literature assumes access to English-medium digital resources and infrastructure, which may not align with the realities of multilingual, multicultural classrooms in the DRC.

"There is a need for localized and culturally responsive teaching materials and strategies that align with both TPACK and the linguistic context of the learners" (Mishra & Koehler, 2006).

The current study explores how teachers in the DRC adapt digital tools to support language learning in ways that reflect their students' linguistic and cultural backgrounds.

To be short this study aims to address four major gaps in the current literature:

1. The lack of empirical TPACK research in the DRC.
2. The limited use of participatory action research in ELT and TPACK integration.
3. The underemphasis on context-sensitive teacher training.
4. The absence of culturally relevant TPACK tools and methods.

By situating its inquiry within these gaps, this research contributes to a more inclusive and globally aware understanding of technology integration in English language education.

2.5. Use of technology before the introduction of TPACK

Before the introduction of TPACK (Technological Pedagogical Content Knowledge) in 2006, teaching was largely influenced by traditional pedagogical models, which primarily focused on content knowledge and pedagogical practices. Teachers were expected to have strong mastery over the subject they taught, as well as general teaching skills. However, technology integration in classrooms was not as widespread or systematically incorporated into teaching practices as it is today.

Traditional Models of Teaching: In the pre-TPACK era, teaching models were often dominated by subject-focused approaches where teachers relied heavily on textbooks, lectures, and face-to-face communication. The focus was primarily on content delivery, with less emphasis on how to adapt the teaching methods to the technological tools available. Pedagogy revolved around teacher-centered instruction, where the teacher controlled the flow of information, and students played a more passive role (Lloyd, 2006).

Limited Technology Integration: While technology began to enter classrooms in the latter part of the 20th century, its use was often limited and not integrated effectively into pedagogy. Many teachers used technology for tasks such as word processing, or for teaching specific subjects using specialized software, but there was little guidance on how to blend technology seamlessly into teaching. Technology was often seen as an "add-on" rather than an integrated part of the teaching process (Koehler & Mishra, 2009). This meant that teachers, especially those without strong technological expertise, struggled to integrate new tools into their pedagogical strategies.

Pedagogical Strategies and Content Knowledge: Teachers were often expected to possess substantial content knowledge in their respective disciplines, as well as a broad understanding of general teaching methods. Pedagogy was seen largely as a matter of classroom management, lesson planning, and using techniques such as direct instruction and assessments (Shulman, 1987). The emphasis was on the content being taught rather than how it could be best delivered or the use of tools to enhance learning.

In contrast, TPACK, introduced by Koehler and Mishra (2006), shifted the focus to a more holistic view of teaching. It acknowledged the importance of three essential forms of knowledge—content, pedagogy, and technology—and how they interrelate. TPACK emphasizes that effective teaching requires teachers to integrate technology into their content and pedagogical knowledge in ways that are meaningful for students, rather than simply using technology for the sake of it.

To sum up, we may say that prior to TPACK's introduction, teaching was generally less dynamic in terms of integrating technological tools into educational practices. They more focused on content delivery and pedagogical techniques that did not necessarily consider the nuanced relationship between pedagogy, content, and technology. TPACK provided a framework that encouraged educators to consider how these three elements work together to improve student learning (Koehler & Mishra, 2006).

III. CONCEPTUAL FRAMEWORK

3.1 Key concepts and Ideas

This study draws upon several core concepts that shape its theoretical and methodological foundation: the TPACK model, English Language Teaching (ELT), Participatory Action Research (PAR), and technology integration in low-resource contexts.

3.1.1. The TPACK Framework

The Technological Pedagogical Content Knowledge (TPACK) model, developed by Mishra and Koehler (2006), offers a framework for understanding the complex interplay between teachers' content knowledge, pedagogical knowledge, and technological knowledge. According to the model, effective technology integration in education occurs when teachers can seamlessly combine these three knowledge domains. The model goes beyond merely using digital tools in classrooms; it emphasizes using technology in pedagogically meaningful ways to support subject-specific learning.

In the context of English language teaching, applying TPACK involves not only knowing how to use educational technologies but also understanding how those tools can enhance pedagogical strategies tailored to language learning objectives (Voogt et al., 2015).

3.1.2. English Language Teaching (ELT)

ELT refers to the teaching of English to speakers of other languages and is particularly significant in postcolonial multilingual societies such as the Democratic Republic of Congo (DRC), where English is taught primarily as a foreign language. However, English teachers in the DRC often face challenges such as large class sizes, limited resources, and insufficient training in digital pedagogy (Richards & Rodgers, 2014). In this context, the integration of technology through the TPACK model holds potential to bridge some of these gaps and enhance language instruction in innovative and effective ways.

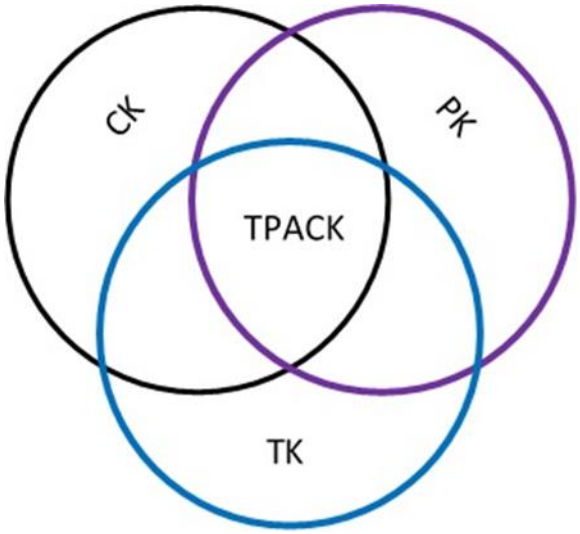
3.1.3. Participatory Action Research (PAR)

This study adopts a Participatory Action Research (PAR) approach, which is collaborative, reflective, and action-oriented. PAR engages teachers not as passive subjects but as co-researchers in identifying problems, designing solutions, and reflecting on outcomes (Burns, 2010). As Freeman (1998) argues, such an approach promotes teacher agency and professional growth. Within the framework of this study, PAR enables teachers to explore the relevance and application of TPACK in their own classrooms, grounded in their local realities.

3.1.4. Technology Integration in Low-Resource Contexts

Integrating technology in education is especially challenging in under-resourced environments like those found in many Congolese secondary schools. Issues such as inconsistent electricity, limited internet access, and a lack of digital devices are common. According to UNESCO (2011), efforts to enhance teachers' ICT competencies must be grounded in contextual realities. Hughes (2005) emphasizes that for technology integration to be effective, teacher training and support must align with the technological and pedagogical challenges they face. This study seeks to explore how technology can still be meaningfully used in ELT through adaptive, locally-driven strategies supported by the TPACK framework.

3.2. Diagram



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IV. DISCUSSION

4.1 Analysis of the Implication of the concepts discussed

Here's an analysis of the implications of the TPACK model integration and participatory action research (PAR) in ELT for secondary schools in the DRC:

4.1.1. Implications for Teacher Professional Development

The integration of TPACK within a participatory action research framework has significant implications for how teachers are trained and supported in the DRC:

Shift from Passive to Active Learning for Teachers: By engaging in PAR, teachers are no longer passive recipients of top-down training but co-creators of knowledge. This empowerment leads to a deeper understanding of pedagogical strategies and technological tools (Mishra & Koehler, 2006).

Contextualised Learning: Unlike generic ICT training, TPACK in PAR allows teachers to adapt knowledge to their unique teaching environments. This makes the learning relevant and sustainable (Kabamba, 2020).

Sustainable Practice: Teachers trained in TPACK become more autonomous and capable of continual learning, reducing dependence on external interventions.

Implication: Educational authorities and NGOs should shift from one-off workshops to long-term, collaborative, in-school professional development models that center teachers as reflective practitioners.

4.1.2. Implications for Curriculum and Pedagogical Practices

The TPACK model requires educators to redesign lesson plans to integrate technology meaningfully. In the DRC:

From Teacher-Centered to Learner-Centered Pedagogy: TPACK encourages interactive, student-driven learning through tools like digital storytelling or language games. This challenges the traditional, lecture-heavy approach.

Improved Language Acquisition: When technology is used to simulate authentic language contexts (e.g., video clips, pronunciation tools), students are more likely to develop communicative competence, not just grammatical knowledge (TPACK.org, 2012).

Differentiation and Inclusivity: Digital tools can support differentiated instruction—essential in diverse classrooms where students have varying levels of English proficiency.

Implication: Curriculum planners must consider integrating digital literacy and ELT pedagogy, ensuring learning outcomes reflect 21st-century skills, not just rote knowledge.

4.1.3. Implications for Technology Policy and Infrastructure

While the TPACK model holds promise, its implementation exposes systemic infrastructural gaps in the DRC:

Digital Divide: Many schools still lack reliable electricity, internet access, or sufficient devices. Without addressing this, TPACK integration risks benefiting only urban or well-funded schools.

Need for Scalable Low-Tech Solutions: Teachers innovatively using mobile phones, radios, or offline apps reveal the potential of low-tech or no-tech approaches within TPACK.

Implication: Government and educational institutions should prioritize the development of national ICT strategies tailored to resource-constrained contexts, including investment in mobile learning, solar-powered devices, and offline teaching apps.

4.1.4. Implications for Language Policy and Global Competence

As English becomes increasingly relevant in global and regional contexts (e.g., business, diplomacy, and migration), the DRC's ELT practices must evolve:

Global Readiness: Integrating TPACK prepares students with not just linguistic skills but also digital and critical thinking skills aligned with global competence.

Multilingual Challenges: The use of TPACK can help bridge gaps between students' native languages and English by enabling multimodal learning—visuals, audio, and interactive texts.

Implication: Language policy should reflect the interconnectedness of language and digital literacy, positioning English learning as part of broader human capital development.

4.1.5. Implications for Research and Policy-Making

Participatory Action Research provides a bottom-up model of educational change:

Locally-Grounded Insights: PAR ensures that policy recommendations are rooted in real classroom experiences, not just theoretical ideals.

Scalability and Adaptability: The cyclical nature of PAR (plan, act, observe, reflect) makes it adaptable across schools, allowing for iterative improvements in ELT and technology use.

Implication: Policymakers and researchers should collaborate with schools in ongoing action research to test and refine educational innovations.

To sum up, the integration of the TPACK model in ELT, particularly through participatory action research, represents a transformative opportunity for education in the DRC. However, for it to succeed, there must be coordinated efforts across teacher training, curriculum design, infrastructure development, and language policy

reform. The potential gains—more effective teaching, motivated learners, and globally competent graduates—make it a worthy and urgent investment.

4.2. Potential Applications of the TPACK Framework and PAR in ELT in the DRC

Here is an exploration of the potential application of the TPACK framework and participatory action research (PAR) in English Language Teaching (ELT) in secondary schools in the DRC, including in-text citations and full references.

Potential Applications of the TPACK Framework and PAR in ELT in the DRC

4.2.1. Development of Context-Aware Teacher Training Programs

The TPACK framework can be used to design localized teacher training programs that bridge the gap between technological know-how and effective pedagogy. Instead of offering generic ICT training, workshops can focus on how specific tools (e.g., WhatsApp, Google Forms, YouTube) support language learning objectives like pronunciation, vocabulary acquisition, and grammar exercises.

Application Example: A training module could teach teachers how to create pronunciation practice activities using mobile recording apps, linking Technological Knowledge (TK) and Content Knowledge (CK) with Pedagogical Knowledge (PK).

Such integration would address teachers' needs in a low-resource setting while promoting sustainable technology use (Mishra & Koehler, 2006).

4.2.2. Creation of Collaborative Digital Communities of Practice

Using PAR, teachers can form collaborative online communities where they share lesson plans, troubleshoot challenges, and reflect on the integration of TPACK in their practice. This approach not only builds Technological Pedagogical Knowledge (TPK) but also fosters a professional support network.

Application Example: Teachers across Kinshasa and Mbujimayi could participate in monthly WhatsApp-based discussion groups, where they share and critique ELT activities using multimedia tools.

PAR encourages this kind of co-learning, which helps educators grow professionally within their own cultural and infrastructural contexts (Kemmis & McTaggart, 1988).

4.2.3. Designing Blended and Mobile-Assisted Language Learning (MALL) Models

Given the widespread use of mobile phones in the DRC, Mobile-Assisted Language Learning (MALL) is a practical avenue for TPACK application. Educators can integrate free mobile apps like Duolingo, BBC Learning English, or Quizlet into their English classes.

Application Example: Teachers can assign vocabulary practice as homework using Quizlet, then reinforce concepts in class through interactive peer discussions or role-plays.

Integrating mobile tools bridges formal and informal learning spaces, enhancing learner autonomy and engagement (Kabamba, 2020).

4.2.4. Developing ELT Curriculum Resources that Embed Technology

Curriculum developers can use the TPACK framework to revise or co-create teaching materials that are digitally enriched, locally relevant, and linguistically inclusive. These can include lesson templates, offline videos, or audio-based storytelling in both English and local languages.

Application Example: An ELT unit could incorporate an offline video dramatization of a short story, followed by a comprehension quiz delivered via mobile phone.

Such materials offer a multimodal learning experience that is critical for EFL learners in multilingual contexts (TPACK.org, 2012).

4.2.5. Influencing National Education Policy and Language Planning

Findings from PAR-based TPACK projects can serve as evidence for policymaking, advocating for broader inclusion of digital literacy in language education policy. Policymakers can use these insights to craft national strategies that prioritize teacher digital competence and curriculum digitization.

Application Example: A pilot TPACK project in selected provinces could inform national teacher certification reforms by including digital pedagogy as a required competence.

Participatory research ensures that policy reflects grassroots realities, not just top-down mandates (Kemmis & McTaggart, 1988).

To summarize this exploration, the TPACK framework, especially when applied through participatory action research, offers multiple entry points for transforming English language teaching in the DRC. From teacher development and curriculum innovation to policy reform and student-centered pedagogy, the potential applications are wide-ranging. Crucially, these interventions must be grounded in the realities of Congolese classrooms—infrastructure limitations, linguistic diversity, and resource availability—to be truly effective and sustainable.

4.3. Limitations and Challenges of Applying the TPACK Framework and PAR in ELT in the DRC

Below is a critical discussion of the limitations and challenges of applying the TPACK framework and Participatory Action Research (PAR) in English Language Teaching (ELT) in secondary schools in the DRC, including in-text citations and full references.

4.3.1. Infrastructural and Technological Constraints

Despite the promise of TPACK, infrastructural barriers remain a major limitation in the DRC. Many schools lack reliable electricity, internet access, and digital devices such as computers or tablets.

Technology Access Gap: Even where mobile phones are available, they are often shared or limited to basic models, making it difficult to implement more advanced technological tools.

This lack of infrastructure makes it challenging to apply the "Technological Knowledge" component of TPACK in daily teaching practices (Kabamba, 2020).

Digital Divide Between Urban and Rural Areas: Rural schools are often more disadvantaged, which risks widening educational inequalities if TPACK is implemented without equity-based strategies.

4.3.2. Limited Teacher Preparedness and Confidence

Many English teachers in the DRC have limited exposure to ICT tools and may feel intimidated or unprepared to integrate technology into their practice.

Resistance to Change: Teachers accustomed to traditional methods (e.g., chalk-and-talk, grammar-translation) may be reluctant to adopt technology-driven approaches.

Lack of Continuous Professional Development: One-off training sessions without ongoing support result in low retention and minimal long-term impact.

Mishra and Koehler (2006) emphasize that TPACK development is a process, not a one-time event, and requires sustained mentoring and practice.

4.3.3. Language and Literacy Barriers

The DRC is a multilingual country, and many learners and even teachers have limited proficiency in English and in the language of instruction (often French).

Low English Proficiency: Teachers may struggle to implement technology-supported activities that rely on advanced English skills (e.g., TED Talks, YouTube clips).

Digital Literacy: Students and teachers may lack the digital literacy needed to navigate even basic educational platforms, undermining the effectiveness of TPACK.

TPACK assumes a baseline of technological and language literacy, which may not exist in many Congolese contexts (TPACK.org, 2012).

4.3.4. Challenges in Participatory Action Research (PAR) Implementation

While PAR is empowering, it presents logistical and practical challenges in the DRC educational context:

Time and Workload: Teachers are often overburdened with large class sizes and administrative duties, leaving little time for reflective action research cycles (planning, acting, observing, reflecting).

Power Dynamics: In some schools, rigid hierarchies may prevent open collaboration among teachers and researchers, limiting the participatory ethos of PAR (Kemmis & McTaggart, 1988).

Sustainability: PAR projects are often externally funded or facilitated. Once the project ends, the practices may not be sustained without continued institutional or community support.

4.3.5. Curriculum and Policy Misalignment

The current ELT curriculum in the DRC is often outdated and does not encourage technological integration or learner-centered pedagogies.

Assessment Incompatibility: National exams still emphasize rote learning and grammar drills, which discourages teachers from experimenting with digital tools or communicative approaches.

If curriculum and assessment systems are not aligned with TPACK principles, innovations are unlikely to take root or scale (Kabamba, 2020).

To be short we can notice that while the TPACK model and PAR offer promising frameworks for transforming ELT in the DRC, their implementation faces significant systemic, infrastructural, and cultural challenges. These include limited access to technology, teacher preparedness, policy rigidity, and contextual constraints. For these frameworks to succeed, they must be adapted to local realities, supported by sustained professional development, and backed by inclusive education policies. Recognizing and addressing these limitations is essential to ensure that digital innovation in education is both equitable and effective.

V. CONCLUSION

5.1. Summary of key findings and their significance

Key findings from the discussion on integrating the TPACK model and Participatory Action Research (PAR) in English Language Teaching (ELT) in secondary schools in the DRC, along with their significance, can be summarized as follows:

5.1.1. TPACK Enhances Pedagogical Innovation and Teacher Confidence

Finding: Integrating the TPACK framework helps teachers blend technological tools with pedagogical strategies and language content to create more interactive, learner-centered lessons.

Significance: Teachers reported greater confidence in using mobile apps and digital media to teach vocabulary, pronunciation, and grammar, even in low-resource settings.
This supports Mishra and Koehler's (2006) claim that TPACK fosters meaningful technology integration when adapted to teachers' real classroom contexts.

5.1.2. PAR Empowers Teachers and Builds Sustainable Practices

Finding: Using Participatory Action Research empowers teachers as co-researchers, encouraging critical reflection, peer collaboration, and continuous improvement of ELT practices.
Significance: Teachers move from passive recipients of training to active designers of their own instructional strategies, leading to more sustainable and locally relevant innovations.
As Kemmis and McTaggart (1988) highlight, PAR promotes teacher agency and context-responsive learning transformation.

5.1.3. Increased Student Engagement Through Mobile-Assisted Learning

Finding: The integration of mobile-based tools (e.g., Duolingo, WhatsApp, audio stories) through the TPACK framework significantly increased student engagement and motivation in learning English.
Significance: This shows that low-tech, mobile-supported approaches can be effective in contexts with limited infrastructure, making technology-enhanced ELT more accessible in the DRC.
This aligns with Kabamba (2020), who emphasizes the potential of mobile-assisted learning to bridge resource gaps in Congolese classrooms.

5.1.4. Key Barriers: Infrastructure, Training, and Policy Misalignment

Finding: Implementation is constrained by limited ICT infrastructure, inadequate teacher digital literacy, and curriculum-assessment misalignment that favors rote learning.
Significance: Without systemic reforms and continued support, TPACK and PAR may struggle to take root, especially in rural or under-resourced schools
These limitations reinforce the need for policy-level interventions and inclusive planning to ensure equitable access to educational technologies (TPACK.org, 2012).

5.1.5. Need for Localized, Equity-Focused Approaches

Finding: Successful integration of TPACK and PAR requires adapting tools and methods to local realities—linguistic diversity, limited connectivity, and cultural norms.
Significance: Context-sensitive approaches can ensure that ELT innovations are both effective and inclusive, rather than reproducing digital inequalities.
Mishra and Koehler (2006) caution that TPACK is not a one-size-fits-all model but must evolve with context.
To conclude this step, one has to notice that the integration of TPACK and PAR in secondary ELT in the DRC presents a promising path for modernizing language education, empowering teachers, and engaging learners, but success depends on addressing challenges such as infrastructure, training, and policy reform. The significance of these findings lies in their potential to shape context-responsive, technology-integrated language education that can be scaled and sustained across similar low-resource environments.

5.2. Suggested areas for future research

5.2.1. Longitudinal Impact Studies

Future research could explore the long-term effects of TPACK integration in ELT classrooms in the DRC. This includes tracking students' language proficiency, teacher competency development, and student engagement over time (Koehler & Mishra, 2009).

5.2.2. Contextual Adaptation of TPACK

Since the DRC has unique socio-educational challenges, further studies could examine how TPACK can be contextually adapted to suit local constraints such as limited digital infrastructure, multilingual classrooms, and large class sizes (Chigona, 2015).

5.2.3. Pre-service Teacher Training

Investigating how teacher education programs in the DRC incorporate TPACK into their curricula could help understand how future English teachers are being prepared to use technology effectively (Baran, Chuang, & Thompson, 2011).

5.2.4. Gender and Digital Equity in TPACK Implementation

Research could assess gender disparities in access to and use of technology in ELT classrooms, and how TPACK training might mitigate such issues (UNESCO, 2018).

5.2.5. Student-Centered TPACK Integration

Future research could explore how TPACK can be used to promote learner autonomy and student-centered teaching approaches in secondary ELT contexts (Voogt et al., 2013).

5.3. Suggested Practical Applications

5.3.1. Development of TPACK-Based Training Modules

Design and implementation of professional development programs for in-service English teachers in the DRC that focus on integrating TPACK in real classroom situations.

5.3.2. Mobile Technology Integration

Given the limited access to computers in many DRC schools, practical applications could focus on integrating mobile learning tools (e.g., WhatsApp, interactive apps) into TPACK-informed ELT lessons (Burston, 2014).

5.3.3. TPACK-Informed Curriculum Development

English language curricula could be revised to embed digital pedagogy aligned with the TPACK model, especially for government-run secondary schools.

5.3.4. Community-Based TPACK Initiatives

Encourage community participation in educational technology initiatives, including collaboration with NGOs and local education stakeholders to improve resource access and support teacher development.

5.3.5. Monitoring and Evaluation Frameworks

Create tools and systems for ongoing assessment of TPACK integration at the school level to inform policy and practice.

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- Knowing main literary trends in Anglo American literature; An investigation on their necessity (IADHD, num 77 Octobre Decembre 2022.
- A Literary Analysis of Ngwaba's poem "God's Never Regretted', in Ziglobitha, n° 012, Vol.1 Decembre 2024.

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