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Research Paper

Action Research as a Catalyst for Empowering EFL Teachers' Pedagogical Content Knowledge

Abolfazl Ghasemzadeh [1*] **Ehsan Rezvani** [2] **Fatemeh Karimi** [3]

Abstract

As teachers' professional development is pivotal to enhancing educational outcomes, the role of action research (AR) in advancing Iranian EFL teachers' pedagogical content knowledge (PCK) has yet to be fully realized, particularly within a social constructivist framework. In light of this gap, this study aims to explore the impact of socially constructed AR on the PCK of eight in-service Iranian EFL teachers, with a particular focus on the transformative power of reflective practice and collaborative learning. To achieve this, a sequential explanatory mixed-methods design was employed. Data were collected through pre- and post-intervention questionnaires, alongside semi-structured interviews and observational field notes that offered a perspective on teacher experiences. The results indicated statistically significant improvements in teachers' PCK, though with modest effect sizes. Qualitative insights revealed heightened instructional confidence, increased student-centered approaches, and enriched collaborative learning experiences. However, institutional barriers such as limited time and support hindered the full realization of AR's potential. No significant gender-based differences in knowledge gains were observed. This study underscores AR's perceived potential to foster reflective teaching and enhance PCK among Iranian EFL teachers. The study concludes that institutional support, including professional learning communities, is needed to sustain AR initiatives. It recommends longitudinal research to assess AR's long-term impact and urges integrating AR into teacher development frameworks for sustainable growth.

Keywords: action research, pedagogical content knowledge, social constructivism, teacher development, Iranian EFL teachers, reflective practice

In EFL teaching, teacher professional development is widely recognized as a cornerstone for improving instructional practices and fostering student success (Richards & Farrell, 2005). Central to this development is the concept of PCK (Shulman, 1986), which bridges the domains of content knowledge and pedagogical expertise. PCK enables teachers to transform subject matter into accessible and meaningful learning experiences, particularly in linguistically and

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1. PhD candidate, Department of English, Isf. C., Islamic Azad University, Isfahan, Iran. abolfazl.ghasmzadeh@iau.ac.ir
2. Assistant Professor, Department of English, Isf. C., Islamic Azad University, Isfahan, Iran (Corresponding Author) e.rezvani@iau.ac.ir
3. Department of English, Isf. C., Islamic Azad University, Isfahan, Iran. fkarimi@khuisf.ac.ir

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culturally diverse EFL contexts (Clarke & Hollingsworth, 2002). Remarkably, over the past few decades, AR has emerged as a pivotal tool for advancing teacher professional development across both educational and academic spheres (Burns, 2019; Edwards, 2020). Originating from Lewin's (1946) work, AR provides a structured, cyclical process of planning, acting, observing, and reflecting, allowing teachers to critically evaluate and refine their practices (Burns, 2006; Carr & Kemmis, 2003).

Relatedly, the growing body of research has consistently demonstrated that AR fosters reflective practices, improves instructional strategies and practices (Ali, 2020), and bridges the gap between theoretical knowledge and classroom application with the ultimate goal of exercising praxis (Burns, 2006; Hei & David, 2017). Thus, the integration of AR into EFL teaching has been widely acknowledged as a transformative approach to teacher development, the design of context-based materials, the integration of technology, and the exploration of innovative teaching strategies (Abdallah, 2017; Cochrane, 2014). Additionally, AR has proven effective in identifying learning problems and fostering collaboration among teachers and professionals (Ainscow et al., 2004).

Over time, both PCK and AR have undergone significant evolution, transitioning from static constructs to dynamic, context-dependent frameworks. Initially conceptualized as fixed entities, they are now recognized as fluid and adaptive, shaped by teachers' experiences, collaborative efforts, and reflective practices (Burns, 2006; Tuithof et al., 2019). In the same vein, PCK has been refined to include additional dimensions, such as contextual knowledge and cultural sensitivity, underscoring its multifaceted and evolving nature (Loughran et al., 2012). This evolution highlights the growing recognition of the complex, situated nature of teaching and professional development, where adaptability and responsiveness are paramount.

However, despite AR's established potential, its adoption and implementation in certain contexts, particularly in Iranian EFL education, remain underexplored. The extant literature (Mehrani, 2017; Tavakoli & Howard, 2012) highlights significant barriers, including limited institutional support, insufficient training, and heavy workloads, that hinder teachers' ability to engage in systematic inquiry and reflective practices. Moreover, while studies in other contexts emphasize the role of collaborative inquiry and reflective dialogue in enhancing PCK, there is a paucity of research investigating how Iranian EFL teachers navigate these processes within the constraints of their educational environment. This gap is particularly pronounced concerning the integration of AR into teacher education programs underpinned by social constructivism (Vygotsky, 1978), which emphasizes learning through interaction and shared meaning-making. Banegas and Consoli (2020) further elaborate on the ecological dimension of AR, highlighting its ability to capture the complex and dynamic patterns of human behavior within educational contexts. They argue that AR is not merely about solving problems but about transforming practices through meaningful interactions between agents and their environment. This perspective aligns with the principles of social constructivism, which view learning as a situated, context-responsive process. Furthermore, the iterative nature of AR

ensures progressive optimization and adaptation to specific educational needs (Edwards & Burns, 2016).

Adding to this complexity, the dynamic and multifaceted nature of PCK development remains under-researched, particularly regarding how collaborative learning environments support reflective processes essential for teachers' professional development. In the Iranian EFL context, these gaps are especially significant, as early-career teachers often face unique challenges in transitioning from theoretical knowledge to practical expertise. In light of these gaps, this study aims to investigate the impact of action research on improving Iranian EFL teachers' PCK through a social constructivist lens. Teachers are empowered to critically reflect on and revise ineffective teaching practices, leveraging innovative ideas to craft concrete instructional approaches that drive enhanced educational outcomes. Besides, it endeavors to identify the challenges and opportunities associated with implementing AR in Iranian EFL contexts. By filling these voids, this study contributes to the global discourse on teacher professional development, offering empirical insights into the transformative potential of AR in fostering sustainable betterments in teaching practices.

Literature Review

The Role of PCK and Action Research in EFL Teacher Growth

At the heart of effective teaching lies the concept of PCK, which is redefined as the art of transforming subject matter into digestible, learner-friendly content (Richards & Farrell, 2005). Within the realm of EFL education, PCK encompasses three interdependent dimensions: linguistic knowledge, which involves mastery of grammar, vocabulary, and discourse systems; cultural sensitivity, which entails understanding sociolinguistic norms and intercultural communication; and instructional strategies, which include employing methods such as scaffolding, task-based learning, and communicative approaches (Richards & Rodgers, 2014). These dimensions collectively equip teachers to navigate the complexities of language instruction while addressing learners' diverse needs.

In parallel, AR has emerged as a transformative methodology for fostering PCK. The iterative process of AR positions educators as active agents of inquiry, empowering them to diagnose pedagogical challenges and implement evidence-based solutions (Carr & Kemmis, 2003; McNiff, 2013). The alignment between AR and social constructivism offers a robust framework for enhancing teacher development. According to Burns (2019), AR enables teachers to reflect on their pedagogical practices and become more self-aware, thereby increasing their self-efficacy. Teachers who engage in this reflective process are more likely to adapt their methods, leading to improved instructional outcomes and greater student engagement.

Ali (2020) highlights that AR is often used to equip teachers with the skills to improve performance, identify learners' needs, and raise awareness of innovative teaching strategies. A case study in Saudi Arabia underscores how entrenched reliance on rote learning, form-focused

instruction, and memorization constrains students' autonomy and critical thinking challenges, issues that, while not uniform, have been observed in certain Iranian EFL settings. AR is positioned as a pivotal mechanism for fostering reflective pedagogical practices, equipping educators with the tools to systematically and collaboratively address these instructional deficiencies. Recent research further underscores AR's transformative potential in EFL education. Talandis Jr. and Stout (2015) found that a year-long AR project at a Japanese university significantly improved student engagement and language proficiency, enriching teachers' PCK in communicative language teaching.

In a similar vein, AR studies investigate the integration of technology and online learning (Singh & Hardaker, 2014), explore teaching strategies, and identify learning problems (Kostandy, 2013). These applications demonstrate the versatility of AR in addressing diverse educational challenges, particularly in EFL/ESL contexts. Complementing these frameworks was the theory of Social Constructivism, which emphasized the role of social interaction in learning. At its heart lie three core tenets: the Zone of Proximal Development (ZPD), which describes the gap between independent performance and potential achievement with guidance; mediation, which highlights the use of cultural tools, including language, to facilitate cognitive growth; and scaffolding, which involves the gradual withdrawal of support as learners gain competence. Together, these principles underscore the importance of collaborative and interactive learning environments, where knowledge is co-constructed through dialogue and shared reflection.

Empirical studies underscore AR's potential as a catalyst for professional growth in EFL contexts. Burns (2010) demonstrated that AR fosters reflective practice, enabling teachers to evaluate and refine their instructional strategies critically. Similarly, Reynolds et al. (2021) highlighted diverse trajectories of PCK development, including surge-stabilized and zigzag-progressed patterns influenced by contextual, emotional, and collaborative factors. The role of collaborative learning environments in advancing PCK is particularly well-documented. Donato's (1994) study on peer scaffolding revealed that collaborative interactions create a "collective zone of proximal development (ZPD)," enhancing both linguistic and pedagogical growth. Likewise, it was found that professional learning communities foster mutual learning, reflective dialogues, and innovative teaching practices, thereby bridging theoretical knowledge with practical application (Hord, 2004; Vescio et al., 2008).

Models and Theoretical Frameworks

Kemmis and McTaggart's Action Research Model

In parallel with the evolution of AR, several models have emerged, among which Kemmis and McTaggart's (1988) model stands as one of the 'best known' frameworks (Burns, 2010, p. 8). This model presents an ongoing, dynamic process that cycles through planning (innovating), acting (enacting), observing (documenting), and reflecting (contemplating). It invites educators to adopt the dual role of teacher-researcher and to engage in a systematic,

iterative cycle of inquiry. Through this process, teachers not only reflect on their practices but also analyze outcomes at each stage, critically assessing whether their actions effectively address the challenges at hand. In this way, the model fosters a reflective, context-responsive approach to professional development, ensuring that teachers' practices remain adaptable and sustainably aligned with evolving educational needs (Burns, 2016).

The Interconnected Model of Professional Growth (IMPG)

Central to understanding teacher development is Clarke and Hollingsworth's (2002) Interconnected Model of Professional Growth (IMPG), which offers a dynamic framework for examining how teachers evolve professionally. This model identifies four interconnected domains: the external domain, encompassing resources and institutional support; the personal domain, including teachers' beliefs and knowledge; the practice domain, focusing on classroom strategies and interventions; and the consequence domain, evaluating student outcomes and teacher reflections. Through iterative cycles of reflection and enactment, the IMPG mirrors the cyclical nature of AR, emphasizing the interconnectedness of these domains in fostering holistic professional growth.

Collaborative Learning Models

Building on the IMPG's emphasis on interconnectedness (Jiang, 2022), collaborative learning models such as professional learning communities (PLCs) and task-based learning (TBL) further reinforce AR's social constructivist underpinnings. These models prioritize peer collaboration, mutual feedback, and shared problem-solving, creating fertile ground for sustained professional growth (Ellis, 2003). By fostering a culture of collective inquiry and reflection, these approaches enable teachers to bridge the gap between theoretical knowledge and practical application, ultimately enhancing both their pedagogical and content knowledge.

Notably, the role of social constructivism in AR has been a subject of debate. While some studies, such as Donato's (1994), emphasize the benefits of collaborative learning environments in fostering PCK growth, others argue that the social constructivist approach may not be universally applicable. For example, in contexts where hierarchical structures dominate, collaborative inquiry may face resistance, limiting its effectiveness (Borg, 2013). These contrasting findings highlight the need for a better grasp of how social constructivism can be adapted to different cultural and institutional settings.

Another contentious issue in the literature is the extent to which AR can be effectively integrated into teacher education programs, particularly in resource-constrained environments. While some researchers argued that AR offers a flexible and empowering approach to professional development (McNiff, 2013), others caution that its success depends heavily on institutional support and teacher motivation (Borg, 2006). Significantly, the dynamic nature of PCK growth has sparked debates over the most effective strategies for fostering it. Some studies emphasize the importance of reflective dialogue and collaborative scaffolding (Schön, 1983;

Donato, 1994), while others highlight the need to adapt to the unique challenges of diverse classrooms (Richards & Farrell, 2005).

Despite significant progress in understanding AR and PCK, several gaps remain. First, the contextual intricacies of AR's implementation in EFL teaching, particularly in the Iranian context, are underdeveloped. Second, there is a lack of research investigating how AR can enhance the PCK of early-career Iranian teachers within a social constructivist framework. Third, the dynamic and multifaceted nature of PCK development remains poorly understood, particularly in collaborative learning environments. In this regard, the study offers implications for: a) EFL teachers on how the integration of AR, underpinned by social constructivism, can foster significant enhancements in their PCK, thereby advancing their professional growth. b) Teacher educators need to know how to strategically design and implement AR-based initiatives to further empower early-career teachers, particularly within the Iranian context, to develop robust PCK through collaborative and socially enriched learning environments. To achieve this goal, the study is guided by the following research questions:

Research Questions

1. Does socially constructed action research have a significant effect on EFL teachers' Content Knowledge?
2. Does socially constructed action research have a significant effect on EFL teachers' pedagogical knowledge?
3. Is there a significant difference between male and female EFL teachers' content and pedagogical knowledge achievement in socially constructed action research practices?
4. What is the attitude of EFL teachers toward socially constructed action research?
5. What are the benefits of using social constructivism as a framework for EFL teachers' action research?
6. What are the challenges of using social constructivism as a framework for EFL teachers' action research?

Research Hypotheses

In the quantitative phase, the following hypotheses were formulated to address the research questions:

H01: Socially constructed action research does not have a significant effect on EFL teachers' content knowledge.

H02: Socially constructed action research does not significantly affect EFL teachers' pedagogical knowledge.

H03: There is no significant difference between male and female EFL teachers' achievement in content and pedagogical knowledge within the context of socially constructed action research.

Method

Study Design

The study adopted a sequential explanatory mixed-methods design (Creswell & Plano Clark, 2018; Ivankova et al., 2006), which is particularly well-suited to the iterative and participatory nature of action research. This design unfolds in two distinct but complementary phases: a quantitative phase followed by a qualitative phase. The quantitative phase employed pre- and post-intervention measurements to assess the impact of action research on teachers' PCK. At this level, a researcher-modified questionnaire was used to measure changes in participants' PCK. The qualitative phase adopted a case study approach, focusing on the lived experiences of participants with shared concerns and experiences (Merriam, 2009) as they engaged in AR. This phase involved semi-structured interviews to explore participants' perceptions, attitudes, and reflections on the action research process. The case study approach enabled an in-depth exploration of the contextual factors that influenced action research outcomes, providing profound insights that complemented the quantitative findings. This dual-phase design aligns with the pragmatic philosophy underpinning mixed methods research, which emphasizes practical outcomes and the integration of diverse perspectives to address complex research phenomena (Johnson & Onwuegbuzie, 2004).

Participants and Setting

The study involved eight early-career Iranian EFL teachers (four males and four females) from Shirvan, North Khorasan Province, Iran. The selected school served as an information-rich site for this study for several reasons. First, as a public school under the Ministry of Education's supervision, it represents a mainstream instructional context in which systemic curricular expectations, assessment practices, and professional development structures shape teachers' pedagogical work. Second, the school had limited access to sustained, collaborative professional development initiatives, making it a suitable setting for examining the potential of AR as an alternative, context-responsive approach to teacher learning. Access to the school was granted through formal permission obtained from the school administration. Following school approval, the researcher introduced the study to eligible teachers and invited them to participate voluntarily. Data collection activities, including collaborative meetings and reflective sessions, were conducted on the school site during non-instructional hours throughout the spring academic term.

The participating female teachers were aged between 23 and 30 years (M = 25.75, SD = 2.28), and male teachers were aged between 31 and 40 years (M = 36.5, SD = 2.18) and had teaching experience ranging from 1 to 5 years. They were all TEFL-degreed, ensuring a relatively homogeneous professional cohort. The balanced gender distribution (four males and four females) enabled exploration of potential gender differences in the outcomes of action research. Participants were selected using a purposive criterion sampling strategy, which aligns with the qualitative case study approach. The sample size, though modest, was deemed

appropriate for the intensive demands of action research, which relies on deep participant engagement, iterative collaboration, and reflective practice (Creswell & Plano Clark, 2018). They assumed dual roles as both data contributors and co-creators of pedagogical interventions and attended professional development workshops led by the researcher, emphasizing reflective dialogue, collaborative problem-solving, and pedagogical innovation. This participatory approach aligned with the core tenets of action research, which underscored the active involvement of stakeholders in the research process (Kemmis et al., 2014). The inclusion criteria were carefully designed to investigate novice teachers' experiences and address challenges relevant to their early career trajectories. Participants were selected based on their teaching experience, academic background, and willingness to engage in reflective and collaborative practices.

The researcher, a local of the city where the study was conducted, possessed a deep, intimate familiarity with both the teaching context and the teachers themselves. This unique positionality was pivotal in fostering a relationship of trust, which was essential for the success of AR. The teachers in this context were actively engaged in professional development, underscoring the importance of these workshops and research for their growth. The primary motivation for conducting the study was to address this very need. With this in mind, AR represents a potential alternative for supporting teachers' professional development. The researcher's established ties with the teachers allowed for a more organic, open exchange of ideas and reflections. This familiarity fostered a collaborative atmosphere in which teachers felt comfortable sharing their experiences and challenges, knowing they were working alongside someone who genuinely understood their local context.

Furthermore, the researcher's insider status played a crucial role in bridging potential gaps between the study's objectives and the teachers' lived realities, ensuring that the interventions and reflections were not only contextually relevant but also practically applicable. This emic perspective, rooted in the researcher's local knowledge and direct involvement, was further enriched by the etic perspectives of two additional researchers. Their contributions in developing and refining codes and themes, as well as in drafting the paper, brought a valuable external lens that strengthened the overall study and promoted meaningful pedagogical change.

The study was conducted within a robust ethical framework that prioritized voluntary participation, informed consent, and strict confidentiality. Participants were briefed on the study's objectives, methodologies, and potential risks, and assured of their unequivocal right to withdraw at any time. To safeguard participant confidentiality, all data were anonymized and securely stored. The research process was conducted with utmost sensitivity, emphasizing participant comfort and respect in alignment with the ethical principles of beneficence and nonmaleficence (Beauchamp & Childress, 1994). For a detailed demographic breakdown of teacher participants (see Table 1).

Table 1

Demographic features of teacher participants

Frequencies (N), Percentages (%) of Participants' Characteristics

		Total (N=8)	
		n	%
Age		23-30	50
		31-40	50
Gender	Male	4	50
	Female	4	50
Licensure	BA	8	100
Place of teaching	School	8	100
Teaching experience	1–2 years	3	37.5
	3-4 years	4	50
	5+ years	1	12.5

Instruments and Materials

A Researcher-Developed Checklist

A professional development checklist was used to guide participants in identifying areas for growth throughout the intervention. The checklist, informed by Brown's (2014) framework on language acquisition theories and pedagogical principles, served as both a reflective tool and a mechanism for tracking participants' progress. The checklist was structured to address key dimensions of EFL teaching, including lesson planning, classroom management, and student engagement. To ensure the reliability and validity of the study, the checklists were both pilot-tested and reviewed closely by experts. Triangulation of quantitative and qualitative data strengthened the credibility of the findings, while the researcher maintained detailed field notes to document observations and reflections throughout the process.

Semi-Structured Interviews

The interviews were conducted at strategic intervals throughout the process to capture the evolution of teachers' perceptions and practices. The interview questions were theory-driven, informed by the study's conceptual framework and relevant literature on action research and pedagogical content knowledge. The questions were reviewed and piloted with two EFL teachers outside the main sample, resulting in minor refinements for clarity. The first round of interviews, lasting approximately 30 minutes, was conducted before the AR cycle began and focused on exploring teachers' motivations for engaging with AR, their views on research, and their expectations. Follow-up interviews, each lasting around 20-40 minutes, were conducted after key stages of the AR cycle acting, observing, and reflecting at intervals that allowed for reflection on their interventions, addressing contextual and pedagogical challenges, and assessing the benefits and obstacles encountered.

Besides, to explore the long-term impact, interviews were held six months and one year after the completion of the process. These interviews, typically lasting 30-40 minutes, examined the teachers' recollections of their AR experiences, their sustained involvement in reflective

practices, and any lasting shifts in their pedagogical approaches or professional outlook. This multi-round interview strategy allowed us to track the evolving nature of their engagement with and capture any enduring transformations in their PCK and teaching methodologies.

Questionnaires

The primary quantitative instrument was a researcher-modified questionnaire adapted from the Technological Pedagogical Content Knowledge (TPACK) framework (Koehler et al., 2014). Given the study's focus on pedagogical content knowledge rather than technology integration, technology-related items were removed, resulting in a PACK-oriented instrument aligned with the study's conceptual framework. Item wording was reviewed to ensure it was contextually relevant to EFL teaching and action research practices.

The first questionnaire comprised eight sections addressing pedagogical knowledge, personality factors, teaching styles, and sociocultural dimensions of teaching. The second questionnaire was a teachers' attitudes toward socially constructed action research, crafted to gauge teachers' perceptions and attitudes regarding socially constructed action research within the EFL context. It was adapted from Rainey's (2000) work, drawing on an exhaustive review of the literature, including the works of Borg (2006), Gould (2008), Rahimi and Weisi (2018), and Zeichner (2003). As this adapted PACK instrument was used in an exploratory manner within a small-scale case study, the quantitative findings are interpreted as indicative rather than confirmatory. It was administered at both pre- and post-intervention stages to measure changes in participants' knowledge levels. The questionnaire underwent a rigorous validation process, including expert review and pilot testing, to ensure its reliability and validity. Internal consistency reliability was high (Cronbach's $\alpha = .91$), indicating the items' internal coherence.

The reliability of the PCK questionnaires was assessed using Cronbach's Alpha coefficients. The pedagogical knowledge questionnaire yielded a Cronbach's Alpha of 0.917, while the content knowledge questionnaire had a Cronbach's Alpha of 0.843. Both values exceed the recommended threshold of 0.70, indicating high internal consistency and reliability (Dörnyei & Taguchi, 2009; Fryer et al., 2018; Harrison et al., 2021). These results confirm that the instruments provided consistent, stable measurements of participants' content and pedagogical knowledge (George & Mallery, 2019).

Table 2

Cronbach's Alpha Reliability Indices for Pedagogical and Content Knowledge

	Cronbach's Alpha	N of Items
Pedagogical Knowledge	.917	11
Content knowledge	.843	6

Data Collection Procedure

During the six-month *act* stage, participants participated in biweekly collaborative workshops structured around socially constructed action research cycles. Workshops involved hands-on, task-based activities rather than abstract discussion. Teachers collaboratively identified authentic classroom challenges (e.g., low student participation in speaking tasks, difficulties with lesson pacing, grammar instruction, or homework completion) and jointly designed AR cycles to address them. These cycles included planning and implementing concrete classroom interventions such as structured speaking activities using sentence starters, differentiated grammar tasks, gamified review activities, peer-assisted learning strategies, and revised feedback practices. Workshop sessions further incorporated guided reflection tasks, peer feedback discussions, and group analysis of questionnaire findings to inform subsequent instructional decisions. Teachers shared implementation experiences, evaluated student responses, and refined strategies across successive AR cycles, thereby operationalizing a socially constructed approach to professional learning. An overview of the cycles, focal areas, and collaborative workshop activities is presented in Table 3.

Table 3

Overview of the Socially Constructed Action Research Intervention

AR Stage	Focus	Collaborative Activities
Diagnose	Identifying classroom challenges	Group discussions on speaking reluctance, lesson pacing, grammar difficulties, and homework completion
Plan	Designing AR cycles	Collaborative planning of interventions (e.g., sentence starters, differentiated tasks, gamified quizzes)
Act	Classroom implementation	Teachers implemented planned strategies in their own classrooms
Observe	Monitoring outcomes	Reflective notes, discussion of student engagement, participation, and responses
Reflect	Collective reflection	Guided reflection tasks; peer feedback; questionnaire-informed discussions
Revise	Refinement of practice	Adjustment of strategies and planning of subsequent AR cycles

Data Analysis Procedure

Quantitative Data Analysis

The data analysis adhered to the mixed-methods framework, ensuring a comprehensive exploration of the research questions. Given the small sample size and case study design, the quantitative analyses were conducted in an exploratory and indicative manner rather than for confirmatory inference**.** Quantitative data were analyzed using SPSS (version 24), incorporating both descriptive and inferential statistical techniques. Initially, descriptive statistics were computed to encompass the pre- and post-intervention levels of participants' content and pedagogical knowledge, with means and standard deviations offering a clear picture of trends across the data. To assess the influence of the action research intervention, the Wilcoxon Signed Rank Test was employed, chosen for its robustness in handling small sample

sizes and non-parametric distributions. This test enabled the identification of statistically significant changes in knowledge levels. To explore potential gender-based disparities, the Mann-Whitney U test was used, as it is appropriate for comparing independent groups when assumptions for parametric tests are not met.

Qualitative Data Analysis

Upon completing the data collection, we proceeded with the qualitative analysis to explore in depth how participants engaged with the AR process and the transformations in their PCK. The analysis aimed to contextualize the changes observed in the pre- and post-intervention quantitative findings, offering an understanding of the underlying dynamics. This phase focused on capturing the evolving instructional practices, professional development, and adaptive teaching methodologies of EFL educators as they navigated the AR framework. Observational field notes were used to contextualize participants' reflections and to support the interpretation of emerging themes; however, they were not subjected to independent systematic coding due to the study's primary focus on teachers' reflective meaning-making.

As previously mentioned, semi-structured interviews were conducted to complement the quantitative data and offer participants the opportunity to reflect on their experiences. The interview protocol was carefully designed to draw out detailed insights into participants' instructional challenges, the adaptation of their strategies within specific classroom settings, and the factors influencing their involvement in the AR process. Additionally, the interviews examined shifts in teaching methodologies, collaborative learning experiences, and changes in perspectives on student engagement, thereby shedding light on the broader evolution of their PCK.

Thematic analysis (Braun & Clarke, 2006) was employed to interpret the interview data. This approach was selected for its suitability for applied educational research aimed at identifying patterned meanings across participants' accounts. A hybrid inductive–deductive coding strategy was employed. Deductive codes were initially informed by key concepts associated with action research, such as reflective practice, collaboration, and pedagogical adaptability, while inductive coding allowed new insights to emerge directly from the data. The next stage involved constant comparative analysis (Tisdell et al., 2025), in which data across researchers and study stages were continually compared to identify emerging patterns and relationships. This process allowed for a dynamic synthesis of codes and themes, facilitating the identification of key narratives that illustrated the teachers' evolving PCK. At this stage, codes for each teacher, data source, and study phase were developed and subsequently compared across the dataset to refine and consolidate the overarching themes. Inter-coder discussions were also held to mitigate potential biases and ensure a reliable analysis. To enhance analytical rigor, emerging themes were discussed among the researchers, and differences in interpretation were addressed through reflexive dialogue. The final phase involved reviewing, defining, and naming themes to ensure that they accurately represented

participants' experiences and provided a clear account of how engagement in AR contributed to teachers' professional development and pedagogical transformation.

Results

AR and Content Knowledge

The first research question examined whether socially constructed action research had a significant effect on teachers' content knowledge. Given the small sample size (n = 8) and the ordinal nature of the measurement scale, a Wilcoxon Signed-Rank Test was employed as a non-parametric alternative to the paired-samples t-test. The Wilcoxon-Signed Rank Test revealed a significant improvement in median scores from 2.67 (pretest) to 4.25 (posttest) ($Z = -2.38$, $p < .05$). However, the effect size ($r = .051$) was weak, suggesting that while the intervention had a statistically significant impact, its practical significance was modest (Gray & Kinnear, 2012).

Table 4

Mean Ranks on First and Second Content Knowledge

		N	Mean Rank	Sum of Ranks
First (Median = 2.67) Second (Median =4.25)	Negative Ranks	7[a]	5.00	35.00
	Positive Ranks	1[b]	1.00	1.00
	Ties	0[c]		
	Total	8		

a. First < Second
b. First > Second
c. first = Second

AR and Pedagogical Knowledge

The second research question explored the impact of socially constructed action research on teachers' pedagogical knowledge. The Wilcoxon-Signed Rank Test showed a significant increase in median scores from 2.27 (pretest) to 4.38 (posttest) ($Z = -2.52$, $p < .05$). Similar to content knowledge, the effect size ($r = .054$) was weak, indicating that while the intervention was statistically significant, its practical impact was limited.

Table 5

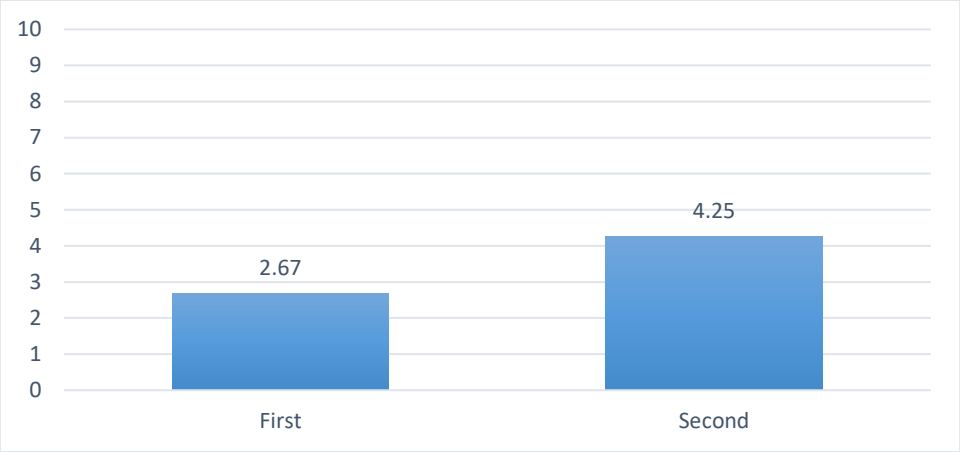
Wilcoxon-Signed Rank Test for First and Second Pedagogical Knowledge

Group		**Pretest - Posttest**
Experimental	Z	-2.383[b]
	Asymp. Sig. (2-tailed)	.017

b. Based on positive ranks.

Figure 1

Median Scores First and Second Content Knowledge



Gender Differences

The third research question investigated gender differences in content and pedagogical knowledge following the intervention. The Mann-Whitney U test revealed no statistically significant differences between male and female teachers in either content knowledge (z = -0.899, p = 0.369) or pedagogical knowledge (z = -0.296, p = 0.767). Although female teachers had slightly higher mean ranks in both domains, these differences were not statistically significant.

Table 6

Mean Ranks on First and Second Pedagogical Knowledge

		N	Mean Rank	Sum of Ranks
First (Median = 2.27) Second (Median =4.38)	Negative Ranks	8[a]	4.50	36.00
	Positive Ranks	0[b]	.00	.00
	Ties	0[c]		
	Total	8		

a. First < Second
b. First > Second
c. first = Second

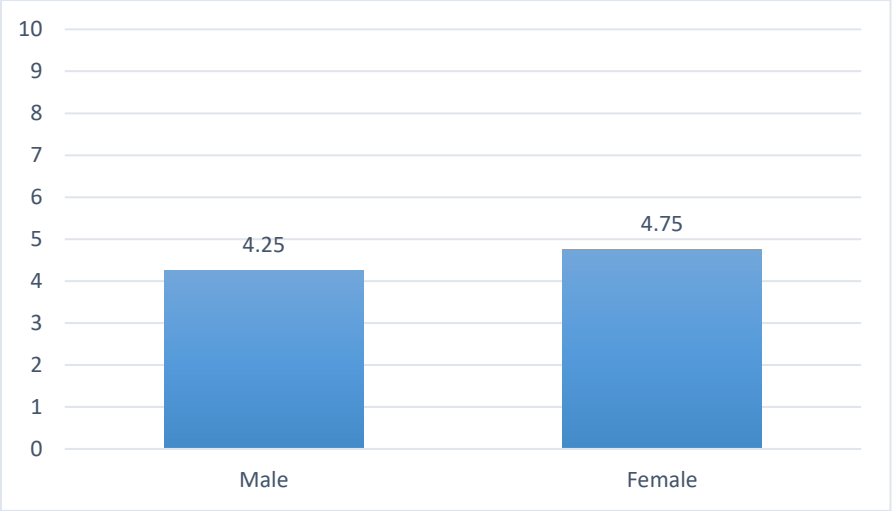
Table 7

Mann-Whitney U Test for EFL Teachers' Second Pedagogical Knowledge by Gender

	Pedagogical Knowledge
Mann-Whitney U	7.000
Wilcoxon W	17.000
Z	-.296
Asymp. Sig. (2-tailed)	.767
Exact Sig. [2*(1-tailed Sig.)]	.886[b]

Figure 2

Mean Ranks on Second Pedagogical Knowledge by Gender



Qualitative Insights

The qualitative phase provided more profound insights into the mechanisms driving the observed changes. Overall, three themes emerged to portray the teachers' PCK in the context of the AR program, including the evolution of pedagogical and content knowledge, the impact of collaborative learning, transformations in teaching methodologies, and challenges encountered during the intervention.

Evolution of Pedagogical and Content Knowledge

A key objective of this study was to explore EFL teachers' attitudes toward socially constructed action research. For the teachers in this study, AR was more than an academic exercise; it was a journey of self-discovery and professional reinvention. Initially, the majority of teachers viewed their teaching as a static process, delivering content in a structured yet conventional manner. However, as they engaged in AR cycles, they experienced a profound shift, reshaping both their pedagogical and content knowledge.

Fatemeh K., reflecting on her early experience, admitted:

"Before participating in this project, I had only a superficial understanding of content knowledge and was entirely unfamiliar with the concept of pedagogical knowledge."

For Fatemeh M., the transformation was equally striking:

"Now, it has really influenced my way of thinking. I realize that to be an ideal teacher, I must actively develop both pedagogical and content knowledge."

Teachers moved from passively delivering lessons to actively interrogating and refining their instructional approaches. This shift underscored the power of AR in fostering more profound engagement with teaching methodologies, a strategy that is not static but continuously evolving.

Impact of Collaborative Learning

In exploring the benefits of using social constructivism as a framework for EFL teachers' action research, a defining feature of this transformation was the role of collaboration as a cornerstone of growth. The power of professional dialogue became evident as teachers engaged in discussions with colleagues, challenging assumptions, exchanging strategies, and refining their methods through collective reflection.

Adele captured the essence of this experience:

"Engaging with colleagues in action research has been eye-opening. Their insights pushed me to rethink long-standing beliefs about teaching."

Esmail shared a similar sentiment:

"It was so helpful. I learned valuable techniques from my colleagues, which led me to refine my teaching methods."

Ali emphasized the depth of these peer exchanges:

"Without collaboration, I wouldn't have recognized the blind spots in my teaching. Peer discussions provided alternative strategies I hadn't considered."

This highlights the importance of professional learning communities in shaping effective educators. The most profound growth often occurs in collective spaces where teachers share and build knowledge together.

Transformations in Teaching Methodologies

One of the most tangible shifts observed was the transformation in classroom practices. Teachers who once relied heavily on lecture-based instruction found themselves experimenting with more interactive, student-centered approaches.

Fatemeh T. reflected on her evolution:

"Previously, my classes were heavily lecture-based. Action research prompted me to integrate more student-led discussions, significantly improving engagement."

Adele emphasized the role of peer observation in driving her instructional changes:

"Seeing different methods work in my colleagues' classrooms gave me the confidence to experiment with new approaches."

Esmail provided concrete evidence of this shift:

"Now I understand the effectiveness of action research. For example, my students struggled with reading, and I was able to address their issues more effectively."

By embracing student-led discussions and differentiated instruction, teachers cultivated environments where learning became a shared, participatory process rather than a one-way transmission of knowledge.

The Ripple Effect: Student Engagement and Learning Outcomes

The impact of AR extended beyond the teachers themselves. It was deeply felt in their classrooms. As teachers refined their methods, students became more engaged, more confident, and more proactive in their learning.

Ali observed:

"Since implementing what I learned through action research, my students have become more engaged and confident in expressing their ideas."

Esmail shared a similar shift:

"When I applied action research in my class, previously disengaged students became more active the following week."

Mohammad described an increase in interactive learning:

"Classroom discussions have become much more interactive, with students taking greater responsibility for their own learning."

When teachers refine their instructional strategies, the classroom dynamic shifts, fostering a space where students feel empowered to contribute and take ownership of their learning.

The Roadblocks: Challenges and Institutional Barriers

Despite the overwhelmingly positive outcomes, the journey was not without challenges. Participants frequently cited time constraints and limited institutional support as significant barriers to sustaining AR practices.

Saeed articulated this struggle:

"The biggest challenge was managing action research alongside my teaching load. Finding time to reflect and implement changes was difficult."

Esmail noted additional logistical challenges:

"Obstacles included time, equipment, and book shortages."

Fatemeh M. highlighted the institutional hurdles:

"While I appreciated the collaborative aspect, I sometimes felt that my school didn't fully support the extra workload required for action research."

Without structured time allocation and administrative support, teachers struggle to integrate AR into their professional routines, limiting its long-term sustainability.

Overall, the qualitative findings of this study paint a compelling picture of how socially constructed action research can serve as a powerful tool for teacher development. When embedded within a collaborative, inquiry-driven framework, AR fosters professional growth, enhances pedagogical effectiveness, and improves student engagement. The findings suggest that while AR has immense potential, its sustainability depends on systemic support and school recognition.

This study underscores the argument that educational reform cannot be driven solely by teachers; it requires structural adjustments at the institutional level to facilitate continuous professional learning. By creating opportunities for structured reflection, fostering professional

learning communities, and providing institutional backing, AR can evolve from an individual practice into a collective movement that transforms not only teachers but the educational landscape as a whole.

Discussion

The primary objective of this study was to examine the impact of AR on improving Iranian EFL teachers' PCK through the lens of social constructivism. The findings reported in this study primarily reflect teachers' self-reported perceptions and reflections on their pedagogical development, as elicited through questionnaires, interviews, and reflective discussions. The results indicated that AR had a statistically significant yet modest impact on both content and pedagogical knowledge development (CK: $Z = -2.38$, $p < .05$; PK: $Z = -2.52$, $p < .05$). While the intervention led to measurable improvements, the effect sizes (CK: $r = .051$; PK: $r = .054$), suggest that the magnitude of these changes warrants further exploration. Additionally, no significant gender differences were found in either CK or PK despite slightly higher mean ranks among female participants. The qualitative findings further illuminated the mechanisms behind these changes, highlighting themes such as the evolution of PCK, the impact of collaborative learning, and the challenges of implementing AR in resource-constrained environments. Participants reported heightened awareness of instructional strategies and increased confidence in applying pedagogical concepts in classroom settings. These findings align with Schön's (1983) reflective practitioner model, which underscores the role of self-evaluation and iterative learning in professional growth. Additionally, collaborative learning emerged as a key facilitator of PCK enhancement, corroborating prior research emphasizing the collective ZPD as a catalyst for teacher development (Donato, 1994; Vygotsky, 1978).

This study contributed to the growing body of literature advocating for AR as a viable mechanism for teacher development, particularly in contexts where reflective practice and collaborative inquiry remain underutilized (Burns, 2006; McNiff, 2013). The findings support Schön's (1983) model of the reflective practitioner, which posits that sustained engagement in reflective inquiry enables teachers to move beyond passive knowledge transmission to active knowledge co-construction. Despite these gains, the modest effect sizes suggest that the intervention's impact may be constrained by contextual factors, such as limited institutional support and heavy workloads, which are consistent with barriers identified in other studies (Mehrani, 2017; Tavakoli & Howard, 2012). This raises questions about the scalability and sustainability of AR in similar contexts, notably where systemic support is lacking, which echoes findings from Fullan (1993) and Cochran-Smith & Lytle (1999). While the results affirm the theoretical benefits of AR, they also highlight the need for structural adjustments, such as dedicated time for reflection and institutional backing, to maximize its potential.

The qualitative insights revealed that collaborative learning played a pivotal role in enhancing teachers' PCK, a finding consistent with the principles of social constructivism (Lave & Wenger, 1991; Vygotsky, 1978). Participants reported that peer interactions provided

opportunities to challenge assumptions, exchange strategies, and refine methodologies, reinforcing the notion that professional learning is inherently dialogic (Timperley et al., 2008). The shift from content-centered to student-centered teaching methodologies, as reported by the teacher participants, aligns with Bruner's (1997) constructivist theory, which advocates active engagement over passive absorption. This transformation is particularly significant in EFL contexts, where student engagement is a key predictor of academic success (Hattie, 2009). The findings also resonate with Freire's (1970) emphasis on participatory learning, which fosters critical thinking and deeper understanding. However, the study's modest effect sizes suggest that while AR can catalyze pedagogical innovation, its impact may be limited by contextual factors such as time constraints and institutional barriers. This underscores the need for further research into how AR can be adapted to diverse cultural and institutional settings, particularly in resource-constrained environments such as Iran.

Moreover, the study found no significant gender differences in PCK development following the intervention. While female teachers exhibited slightly higher mean ranks, the differences were not statistically meaningful. This suggests that AR's impact is largely independent of gender and instead mediated by factors such as prior experience, engagement levels, and contextual constraints. Further research is needed to explore how individual teacher characteristics interact with AR methodologies to shape professional growth trajectories. Overall, this study provides empirical evidence supporting AR as a perceived, incremental shift for teacher development. By bridging the gap between theoretical knowledge and practical application, AR fosters a dynamic and participatory learning environment that enhances instructional effectiveness. However, its successful implementation requires sustained institutional support and a conducive professional culture that encourages reflective practice and peer collaboration (Nasi, 2024).

Conclusion

This study offers a significant contribution to the expanding scholarship on action research by demonstrating its potential to enhance PCK among Iranian EFL teachers. The findings illustrate that AR not only facilitates knowledge acquisition but also cultivates reflective teaching practices and collaborative learning. These insights advance current understandings of teacher professional development by reinforcing the efficacy of social constructivism as a guiding framework for pedagogical enhancement.

The study's implications extend beyond theoretical contributions, offering practical insights for teacher educators, policymakers, and institutional stakeholders. Given the documented benefits of AR, it is recommended that teacher training programs incorporate structured AR cycles to promote continuous professional development. Additionally, institutions should establish professional learning communities (PLCs) that support peer mentoring and reflective inquiry, fostering a sustainable AR culture in educational settings.

However, several limitations must be acknowledged. The small sample size, while appropriate for an in-depth qualitative analysis, limits the generalizability of the findings. The gender-based analyses reported in this study should be interpreted with caution due to the very small sample sizes in each group (n = 4). Such a limited sample reduces statistical power and precludes generalizable conclusions about gender differences. Accordingly, these findings are presented as exploratory and descriptive rather than inferential, and future research with larger and more balanced samples is needed to examine gender-related patterns more robustly. Additionally, the adapted PACK questionnaire was employed as an exploratory instrument within a small sample; therefore, the quantitative findings should be interpreted cautiously and not generalized beyond the study context. The small effect sizes observed indicate that the intervention's impact should be interpreted cautiously, and claims of transformation are understood here in a qualitative, developmental sense rather than as large statistical effects.

Besides, future studies should consider larger participant cohorts and longitudinal designs to examine the long-term impact of AR on teacher development. Furthermore, the study primarily focused on early-career teachers; expanding the scope to include mid-career and veteran educators may yield additional insights into the adaptability of AR across different experience levels. Furthermore, the study was conducted in a specific cultural and institutional context of Iran, which may affect the transferability of the results to other settings. The reliance on self-reported data in the qualitative phase may also introduce bias, as participants' reflections could be influenced by social desirability.

To enhance the effectiveness of AR in EFL contexts, future research should explore hybrid AR models that integrate digital tools and online collaborative platforms. Leveraging technology in AR initiatives can facilitate broader participation and mitigate some of the logistical constraints identified in this study. Additionally, policy reforms that embed AR into national teacher certification and evaluation systems can institutionalize its practice, ensuring sustained professional growth and instructional innovation.

Last but not least, this study underscores the incremental shift of action research in advancing EFL teacher development. Situating AR within a social constructivist paradigm highlights the importance of collaborative learning, reflective practice, and institutional support in fostering pedagogical excellence. Moving forward, a concerted effort among educators, researchers, and policymakers is needed to institutionalize AR as a standard practice in teacher education, thereby ensuring its long-term impact on instructional quality and student learning outcomes. Furthermore, institutional policies should be revised to recognize and reward teachers' engagement in AR, ensuring that it is seen as a valuable tool for professional growth rather than an added burden.

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