Examining the Strategies and Outcomes of the Technological Competencies of Arabic Language Teachers in Schools of Babylon Province

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ABSTRACT

This study aimed to identify and analyze the strategies and outcomes associated with the development of technological competencies among Arabic language teachers in schools of Babylon Province. The study adopted a qualitative research design using the systematic grounded theory approach of Strauss and Corbin. The study population consisted of educational and technological experts, including university faculty members, policymakers, curriculum specialists, and experienced Arabic language teachers with a minimum of ten years of professional experience. Participants were selected through snowball sampling, and data collection continued until theoretical saturation was achieved. Data were gathered through 15 in-depth semi-structured interviews lasting between 20 and 60 minutes. Concurrent data collection and analysis were conducted using a three-stage coding process, including open coding, axial coding, and selective coding. To ensure the reliability of the qualitative analysis, the Holsti coefficient was calculated, yielding an acceptable reliability value. The extracted concepts and categories were organized into a paradigmatic model encompassing causal conditions, contextual conditions, intervening conditions, strategies, and outcomes. The findings revealed that the development of technological competencies among Arabic language teachers is a multidimensional and systemic process centered on a core phenomenon shaped by ten key categories. Causal conditions included the provision of technological infrastructure and the strengthening of technical and professional capabilities. Contextual conditions encompassed supportive governmental policies, school leadership, and a culture of technology acceptance. Intervening conditions such as continuity of professional development and professional networking played a mediating role. Strategic actions focused on innovation in Arabic language teaching and technology-oriented teacher empowerment, leading to outcomes including improved instructional quality, enhanced teacher competencies, increased student engagement, and sustainable professional development. The study concludes that effective development of technological competencies among Arabic language teachers requires an integrated and systemic approach that aligns infrastructure, policy support, professional learning, and pedagogical innovation to achieve sustainable educational improvement.

Keywords: teachers' technological competence, digital competence, individual development, Arabic language course, Babylon Province.

Introduction

In contemporary educational systems, teacher competence has increasingly been recognized as a central determinant of instructional quality, learner outcomes, and the overall effectiveness of schools. Among the various dimensions of teacher

competence, technological and digital competencies have gained particular prominence due to rapid technological advancements, the expansion of digital learning environments, and the growing expectations placed on teachers to integrate technology meaningfully into teaching and learning processes. International research consistently emphasizes that teachers' ability to employ technology is no longer a supplementary skill but a core professional requirement closely linked to pedagogical effectiveness, learner engagement, and sustainable professional development (1, 2). As educational systems worldwide move toward digital transformation, understanding the nature, strategies, and outcomes of teachers' technological competencies has become a critical research priority.

Technological competence in education is a multidimensional construct that encompasses not only technical skills in using digital tools but also cognitive, pedagogical, and professional capacities that enable teachers to design, implement, and evaluate technology-enhanced learning experiences. Scholars have argued that effective technological competence involves the integration of digital tools with subject-matter knowledge and pedagogical strategies, rather than the mere adoption of technological devices (3, 4). This perspective aligns with contemporary views of teacher professionalism, which conceptualize competence as a dynamic, context-sensitive, and continuously evolving process shaped by institutional, cultural, and policy environments (1).

Recent empirical studies have highlighted the growing importance of digital competence across different educational levels and disciplines. Research on pre-service and in-service teachers indicates that technological competence significantly influences instructional innovation, classroom management, assessment practices, and student motivation (5, 6). In particular, digital competencies have been shown to support teachers in adapting instruction to diverse learner needs, facilitating collaborative learning, and promoting higher-order thinking skills. These findings suggest that technological competence is closely intertwined with broader dimensions of professional competence and educational performance (7).

The integration of technology into teaching has been further accelerated by global disruptions such as the COVID-19 pandemic, which forced educational systems to adopt remote and hybrid learning modalities. Studies examining enforced remote work and online teaching environments have underscored the decisive role of teachers' technological competencies in maintaining instructional continuity and quality under crisis conditions (8). In language education, particularly in teaching Arabic, these challenges have been even more pronounced due to the specific linguistic, cultural, and pedagogical requirements of the subject. Research on virtual Arabic language instruction during the pandemic revealed significant gaps in teachers' preparedness, access to digital resources, and institutional support, highlighting the urgent need for systematic capacity building in technological competencies (9).

Within this broader context, the concept of technological competence has also been explored in other professional domains, offering valuable theoretical insights for educational research. For instance, Nakano et al. conceptualized technological competency as an integral component of professional care and responsibility, emphasizing the ethical and human-centered dimensions of technology use (10). Similarly, Soonthornchaiya et al. demonstrated that technological competence extends beyond functional skills to include reflective, contextual, and value-based dimensions that shape how professionals interact with technology in practice (11). These perspectives reinforce the notion that technological competence in teaching should be understood as a holistic professional capacity rather than a purely technical attribute.

In the Iranian and regional educational context, numerous studies have examined teacher competence from professional, pedagogical, and policy-oriented perspectives. Amin Beidokhti et al. identified professional competence as a composite of knowledge, skills, attitudes, and ethical commitments that collectively shape teachers' effectiveness in primary education (12). Similarly, Sotoudeh Moghadam et al. emphasized the role of in-service training and policy frameworks in empowering teachers' professionalism, arguing that sustainable competence development requires coherent institutional strategies and

continuous professional learning opportunities (13). These findings underscore the importance of aligning technological competence development with broader professionalization policies in education systems.

Research focusing specifically on digital competence has further revealed discrepancies between teachers' current and desired competency levels. Studies on student-teachers and practicing teachers indicate that while awareness of digital tools is increasing, effective pedagogical integration remains limited due to insufficient training, inadequate infrastructure, and weak support mechanisms (6, 14). Delghandi et al. highlighted the critical role of school administrators in facilitating the transition of newly trained teachers into professional practice, noting that supportive leadership and structured mentoring significantly influence teachers' ability to apply technological competencies in real classroom settings (15).

The challenges associated with technological competence development are particularly salient in contexts characterized by systemic constraints, such as limited resources, policy inconsistencies, and cultural resistance to change. Safi has documented structural issues within Iran's education system, including gaps in infrastructure, uneven access to technology, and insufficient coordination among educational institutions, all of which impede effective competence development (16). These systemic challenges highlight the need for context-sensitive research that accounts for local conditions, stakeholder perspectives, and institutional dynamics when examining technological competencies among teachers.

In the field of Arabic language education, professional competence has traditionally been framed around linguistic mastery, pedagogical knowledge, and cultural understanding. However, recent studies suggest that technological competence is becoming an increasingly integral component of effective Arabic language teaching. Alhchaimi et al. validated a professional competency model for Arabic language teachers, demonstrating that digital and technological dimensions are now essential elements of teacher effectiveness alongside traditional competencies (17). This shift reflects broader transformations in language education, where digital platforms, multimedia content, artificial intelligence, and interactive tools are reshaping how languages are taught and learned.

Empirical evidence from studies on Arabic language instruction indicates that technology-enhanced approaches can improve learner engagement, pronunciation accuracy, vocabulary acquisition, and communicative competence when teachers possess the requisite technological skills (9). However, the successful implementation of such approaches depends heavily on teachers' confidence, professional identity, and access to continuous professional development opportunities. Rezaei et al. have shown that teachers' educational performance is closely linked to their job engagement and professional competence, suggesting that technological competence development may have cascading effects on motivation, instructional quality, and organizational commitment (7).

Despite the growing body of literature on teacher competence and digital skills, there remains a notable gap in context-specific, qualitative research that explores how technological competencies are developed, enacted, and sustained among Arabic language teachers, particularly in regional settings. Much of the existing research relies on quantitative assessments of competency levels, offering limited insight into the underlying processes, strategies, and contextual conditions that shape competence development (5, 14). Grounded and qualitative approaches are therefore essential to capture the complex interactions among individual, organizational, and policy-level factors influencing technological competence.

Furthermore, international studies emphasize that competence development is not a linear process but a dynamic and iterative phenomenon shaped by professional experiences, institutional cultures, and external demands (2, 3). This perspective suggests that examining technological competence requires attention to causal conditions, contextual factors, intervening mechanisms, strategic actions, and outcomes within specific educational ecosystems. Such an approach aligns with contemporary theories of professional learning and organizational development, which stress the importance of systemic coherence and stakeholder collaboration.

In light of these considerations, there is a clear need for in-depth research that explores the strategies and outcomes of technological competence development among Arabic language teachers, particularly within under-researched regional contexts. By adopting a qualitative and grounded perspective, such research can contribute to theoretical advancement, inform policy design, and support evidence-based professional development initiatives. Understanding how teachers navigate technological demands, leverage available resources, and construct professional meaning around technology use is essential for fostering sustainable educational innovation (1, 13).

Accordingly, this study aims to identify and analyze the strategies and outcomes of developing technological competencies among Arabic language teachers in schools of Babylon Province.

Methods and Materials

The methodology of the present study was qualitative, and the systematic grounded theory approach of Strauss and Corbin was employed to examine the technological competencies of Arabic language teachers in schools of Babylon Province. The study population consisted of experts, and the snowball sampling method was used to select the participants. Accordingly, the experts in this study included university educational experts among policymakers, administrators, faculty members, curriculum specialists, and teachers who had a minimum of 10 years of professional experience. Their selection was carried out through snowball sampling. The sample size was determined based on the principle of theoretical saturation, and theoretical sampling continued until the categories reached theoretical saturation. In this study, theoretical saturation was achieved after conducting 15 in-depth semi-structured interviews.

Simultaneously with data collection, the coding of the data was also conducted. The data collection instrument was semi-structured interviews with a duration ranging from 20 to 60 minutes. The data were analyzed using the systematic coding method of Strauss and Corbin, and the components were extracted through a three-stage coding process consisting of open coding, axial coding, and selective coding. In this study, the Holsti coefficient was used to assess reliability. The obtained value in this study was 0.821, which is greater than 0.70; therefore, the reliability of the study is considered acceptable.

Findings and Results

The results of the interview analysis are presented in the table below.

Table 1. **Selective Coding of the Identified Components of the Technological Competencies of Arabic Language Teachers in Babylon Province**

Open Codes	Axial Codes	Selective Codes
Use of language learning platforms	Innovation in Arabic language teaching	Psychological
Design of interactive virtual classrooms		
Utilization of virtual and augmented reality		
Use of artificial intelligence in education		
Development of multimedia content		
Design of Arabic language educational games		
Conducting information technology training courses	Strengthening technical and professional capabilities	
Continuous assessment of technological competencies		
Collaboration between schools and educational technology centers	Organizational interaction and synergy	
Partnership with technology companies		
Communication with universities for specialized training		
Practical workshops on the use of digital tools	Training technologically competent teachers	Educational and developmental
Training in technology-based lesson design		

Enhancement of teachers' technological skills	Improvement of the quality of Arabic language education	
Improvement of students' language learning		
Conducting continuous educational technology courses	Continuity of development and updating	
Establishment of virtual learning communities		
Periodic evaluation of competencies		
Design of self-directed learning programs		
Encouragement to experiment with innovative tools		
Support for applied research		
Production of innovative educational resources	Enhancement of professional competencies	
Improvement of teaching methods		
Access to high-speed internet and digital equipment	Provision of technological infrastructure and resources	Technical and infrastructural
Allocation of budget for purchasing educational technologies		
Support from the Babylon Provincial Directorate of Education		
Provision of digital Arabic language resources		
Establishment of computer laboratories in schools		
Access to databases and digital libraries		
Conducting information technology training courses		
Continuous assessment of technological competencies		
Presence of supportive policies of the Government of Iraq	Creating appropriate platforms for technological development	
Readiness of schools' technical infrastructure		
Culture of technology acceptance in society		
Support from school principals		
National policies for technology integration in education		
Collaboration between schools and educational technology centers		
Partnership with technology companies		
Communication with universities for specialized training		
Formation of specialized groups of Arabic language teachers	Strengthening professional networking	
Use of professional social networks		

This study, through conducting interviews with 15 university technology experts and applying snowball sampling until reaching theoretical saturation, extracted 82 initial concepts through open coding. Data analysis led to the identification of 10 key categories in selective coding, with the core phenomenon labeled as "development of the technological competencies of Arabic language teachers." The distribution of concepts across different categories included 10 concepts related to the core phenomenon, causal conditions, contextual conditions, intervening conditions, strategies, and outcomes, indicating the comprehensiveness and depth of analysis in this study.

The findings indicate that the development of the technological competencies of Arabic language teachers in Babylon Province requires a systematic and multidimensional approach in which causal factors—such as the provision of technological infrastructure and the strengthening of professional capabilities—contextual conditions—such as supportive government policies and a culture of technology acceptance—and intervening conditions—including the continuity of development and professional networking—operate synergistically. The identified strategies included innovation in Arabic language teaching through the use of emerging technologies such as virtual reality and artificial intelligence, as well as technology-oriented empowerment of teachers through hands-on workshops and specialized training, which led to positive outcomes such as improved instructional quality, enhanced technological skills of teachers, and improved student learning. The findings are presented in the table below.

Table 2. **Findings of Open, Axial, and Selective Coding**

Selective Coding	Axial Coding	Open Coding
Development of technological competencies of Arabic teachers	Core phenomenon	Educational and linguistic needs of Babylon Province
		Technology training programs for Arabic teachers
		Technology integration workshops in language education
		Enhancement of teachers' digital skills
		Learning modern tools for teaching Arabic
		Use of e-learning platforms
		Development of digital Arabic language content
		Mastery of specialized educational software
Provision of technological infrastructure and resources	Causal conditions	Access to high-speed internet and digital equipment
		Allocation of budget for purchasing educational technologies
		Support from the Babylon Provincial Directorate of Education
		Provision of digital Arabic language resources
		Establishment of computer laboratories in schools
		Access to databases and digital libraries
Strengthening technical and professional capabilities		Conducting information technology training courses
		Continuous assessment of technological competencies
Creating appropriate platforms for technological development	Contextual conditions	Presence of supportive policies of the Government of Iraq
		Readiness of schools' technical infrastructure
		Culture of technology acceptance in society
		Support from school principals
		National policies for integrating technology in education
Organizational interaction and synergy		Collaboration between schools and educational technology centers
		Partnership with technology companies
		Communication with universities for specialized training
Continuity of development and updating	Intervening conditions	Conducting continuous educational technology courses
		Establishment of virtual learning communities
		Periodic evaluation of competencies
		Design of self-directed learning programs
		Encouragement to experiment with innovative tools
		Support for applied research
Strengthening professional networking		Formation of specialized groups of Arabic teachers
		Use of professional social networks
Innovation in Arabic language teaching	Strategies	Use of language learning applications
		Design of interactive virtual classrooms
		Utilization of virtual and augmented reality
		Use of artificial intelligence in education
		Development of multimedia content
		Design of Arabic language educational games
Technology-oriented empowerment of teachers		Practical workshops on the use of digital tools
		Training in technology-based lesson design
Improvement of the quality of Arabic language education	Outcomes	Enhancement of teachers' technological skills
		Improvement of students' language learning
		Increased classroom motivation and participation
		Sustainable professional development
		Personalized learning
		Improved academic achievement
Enhancement of professional competencies		Production of innovative educational resources
		Improvement of teaching methods

Based on the interviews, the core phenomenon—"development of the technological competencies of Arabic teachers"—was identified with 10 key concepts, including technology training programs, integration workshops, and mastery of specialized software. The causal conditions of this phenomenon were identified across two dimensions—"provision of technological infrastructure and resources" and "strengthening technical and professional capabilities"—with 12 concepts encompassing access to high-speed internet, budget allocation, support from the Babylon Provincial Directorate of Education, and the conduct of information technology training courses. The contextual conditions were defined across two axes—"creating appropriate platforms for technological development" and "organizational interaction and synergy"—with 10 concepts, including supportive policies of the Government of Iraq, a societal culture of technology acceptance, and collaboration between schools and educational technology centers.

The strategies were formulated across two domains—"innovation in Arabic language teaching" and "technology-oriented empowerment of teachers"—with 10 concepts such as the use of virtual and augmented reality, artificial intelligence, and hands-on workshops for digital tools, which are influenced by intervening conditions including "continuity of development and updating" and "strengthening professional networking," encompassing 10 concepts such as the establishment of virtual learning communities, the organization of specialized webinars, and the development of international collaboration networks. The outcomes, across two dimensions—"improvement of the quality of Arabic language education" and "enhancement of professional competencies"—with 10 concepts, lead to increased technological skills of teachers, improved student learning, development of 21st-century skills, and the creation of a culture of innovation, while inhibitory factors such as limited financial resources, weak technical infrastructure, resistance to change, and barriers including the digital divide, political–security instability, and lack of coordination among educational institutions necessitate special attention to implementation requirements such as sustainable funding, technical infrastructure development, comprehensive educational program design, and the establishment of incentive systems, so that through indicator-based evaluation mechanisms, continuous monitoring, and the issuance of specialized certifications, the objectives of sustainable professional development can be achieved.

Discussion and Conclusion

The findings of the present study demonstrate that the development of technological competencies among Arabic language teachers is a complex, multidimensional, and context-dependent process that cannot be reduced to isolated training initiatives or individual skill acquisition. The results clearly indicate that technological competence emerges through the interaction of causal, contextual, intervening, strategic, and outcome-related factors, a pattern that is strongly consistent with contemporary conceptualizations of teacher professionalism as a dynamic and systemic phenomenon. The identification of the core phenomenon as the "development of technological competencies of Arabic language teachers" confirms that technology-related competence is now embedded within the broader professional identity of teachers, rather than functioning as a peripheral or optional capability, a conclusion that aligns with long-standing theoretical perspectives on professional development in teaching (1, 2).

At the level of causal conditions, the study highlights the decisive role of technological infrastructure and resource availability, alongside the strengthening of technical and professional capacities. Access to high-speed internet, digital equipment, educational software, and stable funding emerged as foundational prerequisites for competence development. These findings are in line with previous research showing that teachers' digital competencies are significantly constrained or enabled by structural and infrastructural conditions within educational systems (4, 16). Moreover, the emphasis on continuous assessment and systematic training resonates with evidence from studies on digital and professional competencies indicating

that sustainable competence development requires ongoing feedback, skill monitoring, and institutional commitment rather than one-off training programs (6, 12).

The contextual conditions identified in this study—particularly supportive governmental policies, school-level leadership, and a culture of technology acceptance—underscore the importance of the broader educational ecosystem in shaping teachers' technological competencies. These results reinforce the argument that competence development is deeply embedded in organizational and policy contexts, a position strongly supported by research on teacher professionalization and educational reform (3, 13). The finding that national policies for technology integration and managerial support play a facilitative role echoes the work of Delghandi et al., who emphasized that administrative interaction and leadership practices significantly influence teachers' ability to translate training into effective classroom practice (15). In this regard, the present study adds empirical depth by illustrating how policy coherence and cultural readiness jointly shape the success of technological competence initiatives.

Intervening conditions such as continuity of development, systematic updating, and professional networking were found to mediate the relationship between infrastructure and outcomes. The prominence of professional learning communities, virtual networks, and peer collaboration suggests that technological competence is not merely an individual attribute but a socially constructed capacity reinforced through interaction and shared practice. This finding is consistent with research emphasizing collaborative and reflective professional learning as central to effective competence development (1, 2). It also parallels insights from studies outside the educational field, such as Nakano et al.'s conceptualization of technological competency as a relational and ethical practice embedded in professional communities rather than an isolated technical skill (10). The convergence of these findings supports the interpretation that professional networking acts as a catalyst that sustains motivation, innovation, and adaptive learning among teachers.

With respect to strategies, the study identified two principal domains: innovation in Arabic language teaching and technology-oriented empowerment of teachers. The extensive use of digital platforms, interactive virtual classrooms, multimedia resources, artificial intelligence, and virtual or augmented reality reflects a pedagogical shift toward learner-centered and technology-enhanced instruction. These results strongly align with studies demonstrating that digital tools, when pedagogically integrated, can enhance engagement, language acquisition, and instructional effectiveness (5, 9). The emphasis on practical workshops and technology-based lesson design further supports the argument that experiential and applied learning approaches are more effective than theoretical instruction in fostering technological competence, a conclusion also supported by research on digital competency development among student-teachers (14).

Importantly, the findings suggest that technological competence is closely intertwined with teachers' professional confidence and instructional creativity. The ability to design interactive lessons, experiment with new tools, and personalize learning experiences appears to reinforce teachers' sense of professional agency, a relationship that has been documented in studies linking competence, job engagement, and educational performance (7). This relationship was particularly evident in the Arabic language teaching context, where technology-enabled strategies helped address longstanding instructional challenges such as learner motivation, differentiated instruction, and access to authentic language resources. The results thus extend the findings of Alhchaimi et al., who validated digital competence as a core component of professional competency models for Arabic language teachers (17).

The outcomes identified in the study further underscore the transformative potential of technological competence development. Improvements in instructional quality, student learning, classroom participation, and professional growth indicate that technological competence functions as a leverage point for broader educational improvement. These outcomes are consistent with international evidence demonstrating that teachers' digital competencies contribute to enhanced learning

environments and sustainable professional development (1, 8). Notably, the emergence of personalized learning and the development of 21st-century skills among students reflect the broader educational value of technology integration beyond immediate instructional gains, reinforcing the strategic importance of competence development initiatives.

At the same time, the study identified significant inhibiting factors, including financial constraints, weak infrastructure, resistance to change, digital divides, and political–security instability. These barriers highlight the fragility of technological competence initiatives in contexts characterized by systemic uncertainty and resource limitations. Similar challenges have been reported in analyses of educational systems facing structural and policy-level constraints, where technological innovation is often undermined by inconsistent funding and institutional fragmentation (16). The presence of resistance to change also aligns with findings that teachers' attitudes and beliefs can significantly influence the adoption and sustainability of technological practices, particularly when professional support is insufficient (2).

Overall, the findings of this study contribute to the existing literature by offering a comprehensive, grounded understanding of how technological competencies among Arabic language teachers are developed, enacted, and sustained. By integrating infrastructural, organizational, professional, and pedagogical dimensions, the study supports a systemic view of competence development that moves beyond individual skill acquisition. This perspective is consistent with contemporary models of teacher professionalism and underscores the necessity of coherent policy design, sustained professional learning, and contextual sensitivity in advancing technological competence in education (3, 13).

Despite its contributions, this study has several limitations that should be acknowledged. First, the qualitative design and reliance on a relatively small group of expert participants limit the generalizability of the findings to other regions or educational contexts. Second, the study primarily reflects the perspectives of experts and may not fully capture the lived experiences of all Arabic language teachers in classroom settings. Third, contextual factors such as political and institutional dynamics may have influenced participants' responses, potentially shaping the findings in ways that are specific to the study setting.

Future research could build on the present findings by employing mixed-methods or longitudinal designs to examine the long-term impact of technological competence development on teaching practices and student outcomes. Comparative studies across regions or educational systems would also help identify context-specific and universal patterns in technological competence development. Additionally, future studies could explore students' perspectives on technology-enhanced Arabic language instruction to provide a more holistic understanding of educational effectiveness.

From a practical perspective, educational policymakers and administrators should prioritize sustainable investment in technological infrastructure and continuous professional development programs for teachers. Schools should foster collaborative learning cultures through professional networks and communities of practice that encourage experimentation and knowledge sharing. Designing incentive systems, certification pathways, and supportive leadership structures can further motivate teachers to engage in technology-oriented professional growth and ensure the long-term sustainability of competence development initiatives.

Declaration of Interest

The authors of this article declared no conflict of interest.

Ethical Considerations

All ethical principles were adhered in conducting and writing this article.

Transparency of Data

In accordance with the principles of transparency and open research, we declare that all data and materials used in this study are available upon request.

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