

## **Sustainable Development Education in Times of the Post Era: Challenges, Opportunities, and Strategies for Digital Transformation in Language Learning and Teaching**

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### **ABSTRACT**

*The COVID-19 pandemic abruptly shifted language education to online platforms, presenting challenges and opportunities for digital transformation. Over 1.5 years, digital education became essential, forcing millions of language educators and institutions to adapt to remote instruction. This article aims to understand and make known the consequences of the Post-COVID-19 pandemic specifically in digital transformation in language learning and teaching. This article examines the impact of the post-COVID-19 era on the digital transformation of language learning and teaching. The researcher systematically searched academic literature published between 2020 and 2022, using databases like Google Scholar, PubMed, and ScienceDirect, focusing on keywords related to COVID-19, language learning, teaching, and online education. By analyzing various documentary sources, the study explores how educators and learners have navigated online platforms, identifying difficulties and innovative strategies that emerged during the transition.*

### **Keywords:**

Sustainable Education; Digital Transformation; Language Learning.

### **ABSTRAK**

*Pandemi COVID-19 tiba-tiba mengalihkan pendidikan bahasa ke platform daring, menghadirkan tantangan sekaligus peluang untuk transformasi digital. Selama lebih dari 1,5 tahun, pendidikan digital menjadi penting, memaksa jutaan pendidik dan lembaga bahasa untuk beradaptasi dengan pembelajaran jarak jauh. Artikel ini bertujuan untuk memahami dan memberitahukan konsekuensi dari pandemi pasca-COVID-19 khususnya*

*dalam transformasi digital dalam pembelajaran dan pengajaran bahasa. Artikel ini mengkaji dampak era pasca-COVID-19 terhadap transformasi digital pembelajaran dan pengajaran bahasa. Peneliti melakukan pencarian sistematis literatur akademis yang diterbitkan antara tahun 2020 dan 2022, menggunakan basis data seperti Google Scholar, PubMed, dan ScienceDirect, dengan fokus pada kata kunci yang terkait dengan COVID-19, pembelajaran bahasa, pengajaran, dan pendidikan daring. Dengan menganalisis berbagai sumber dokumenter, penelitian ini mengeksplorasi bagaimana pendidik dan pelajar menavigasi platform daring, mengidentifikasi kesulitan dan strategi inovatif yang muncul selama transisi.*

**Kata kunci:**

Pendidikan Berkelanjutan; Transformasi Digital; Pembelajaran Bahasa.

## 1. Introduction

COVID-19 was recognized as a highly contagious disease, leading to protective measures (Trends, 2020; Amitabh, 2020). To monitor the virus's spread, governments globally had to shut down educational institutions during the pandemic (Bond, 2021). This virus triggered a fundamental shift in educational methodologies (Amitabh, 2020). The pandemic significantly disrupted global student learning and teaching practices, necessitating a massive overhaul of educational platforms. This led to a universal shift towards remote learning as educational institutions were forced to adopt virtual teaching methods due to pandemic lockdowns. This sudden move from the face-to-face (F2F) approach to online teaching created a sense of unease among educators, a phenomenon that could be termed "the fear of the unknown" (Larsari et al., 2023). Consequently, the educational process transitioned entirely online, impacting schools, colleges, and other academic entities (Cucinotta, 2020). Educational institutions faced immense pressure to close, making online teaching and learning the new standard almost instantly. Many countries had to shut down all their schools for learning and teaching language (UNESCO, 2020).

The pandemic and consequent lockdowns significantly impacted education across all levels. As the pandemic threat continues, understanding this transformation and its implications for the future is imperative. Over 1.6 billion learners across 190 countries faced school and university closures, representing over 90% of the world's student population (UNESCO, 2021). Practically overnight, technology-enabled teaching became indispensable for maintaining learning continuity. Consequently, the significance of digital education rose, compelling educators to conduct remote teaching through digital platforms, tools for synchronous and asynchronous collaboration, and engaging in authentic activities (Chattaraj & Vijayaraghavan, 2021). The adoption of digital technologies during the COVID-19 crisis may have had a more significant impact than all previous research combined. The shift from face-to-face to online education exposed various issues and challenges but also presented opportunities for exploration.

The aftermath of the COVID-19 pandemic has had profound, and lasting impacts on global education systems, particularly in language learning and teaching. While the pandemic initially forced an abrupt shift to online education, the post-COVID era presents unique challenges and opportunities for sustaining and further evolving digital transformation in education. As educational institutions gradually reopen and the world adapts to a new normal, there is a pressing need to evaluate the long-term implications of the pandemic-induced digital shift (Petrie, 2020).

In the post-COVID era, educators and institutions are tasked with rethinking and redesigning pedagogical approaches to integrate the lessons learned during the pandemic and address the ongoing need for flexibility, inclusiveness, and resilience in education. The widespread adoption of digital tools and online platforms during the pandemic has left a legacy that continues to influence language teaching methodologies. However, this transition has also highlighted persistent issues such as digital inequality, the need for enhanced digital literacy, and maintaining student engagement in virtual environments.

As we move forward, it is crucial to explore how digital technologies can be leveraged to enhance language learning, making it more accessible and adaptable to diverse learning contexts. This paper examines the strategies and opportunities for digital transformation in language education in the post-COVID era, aiming to provide insights into how institutions can build upon the advancements made during the pandemic to create more robust and sustainable educational models.

For language learning, the impact was especially acute. In-person conversational practice and immersive cultural experiences, long considered fundamental, were suddenly unattainable. The field was compelled to reinvent itself for remote environments (MacIntyre et al., 2020). This massive accidental experiment revealed digital capabilities and inequities in access and preparedness for online language instruction. As institutions navigate post-pandemic operations, difficult questions emerge regarding the role of technology. Can some pandemic-forced digital solutions enhance efficiency, flexibility, and inclusiveness? Or will the pendulum swing back towards conventional delivery modes? Exploring this tension specifically for language education can inform policies and investments to build back better. This urgent context motivates the need for studies like this one to systematically examine the challenges, opportunities, and strategies for digital transformation in language pedagogy. While technology cannot fully replace face-to-face learning, purposeful integration can strengthen access and resilience. Investigating pandemic impacts provides timely insights into innovations that may transform language teaching and learning (Zhang & Cristol, 2022). Rather than reactively responding to the next crisis, institutions can proactively build capacity for flexible, student-centered delivery supported by technology.

This paper examines the challenges, strategies, and opportunities associated with digital online education post-COVID-19 in language learning and teaching. It starts by discussing digital learning from a pedagogical perspective, then explores potential areas of interest in the post-COVID era, and concludes with key recommendations. The researchers clarified the objectives of this research as follows: (i) “Digital technology” and ICT are used synonymously, referring to educational processes

that utilize digital technology, like online courses or digital tools in classrooms; (ii) “*mobile learning*” denotes learning facilitated by mobile devices, allowing learning anytime and anywhere without time or location constraints (Shuler, Winters, & West, 2013); (iii) “*Online learning*” is commonly used, though it’s often interchangeable with “online education.” This differs from distance learning, which primarily depends on e-learning. While “virtual teaching” and “emergency remote teaching” (Hodges et al., 2020) have distinct definitions, they both involve the physical separation of students and teachers and the use of digital technology in education (Benson, 2019). Lastly, hybrid/blended education involves a mix of online and in-person sessions, sometimes with students attending in class and online or alternating between online and face-to-face meetings (Sullivan, 2022). Following the above, the following research questions were raised to guide this study:

1. What are the key challenges educators and learners face in the digital language learning environment post-COVID?
2. What strategies have proven effective in overcoming the barriers to digital language education post-COVID?
3. What are the long-term implications of the pandemic-induced digital shift on the future of language education?

## 2. Methods

### 2.1. Research Design

This study employs a qualitative research design, particularly focusing on document analysis. Document analysis was chosen due to its effectiveness in evaluating and interpreting written materials, which provide a deep understanding of a particular phenomenon—in this case, the digital transformation in language learning and teaching during the post-COVID-19 pandemic. The research explores and synthesizes existing knowledge, trends, and strategies relevant to the topic by examining various documents.

### 2.2 Population and Sample

The population for this research includes a broad spectrum of academic literature, including journal articles, conference papers, and books that focus on digital transformation in education during and after the COVID-19 pandemic. The sample is purposive, focusing on documents that specifically address the impact of the pandemic on language learning and teaching. Over 50 documents were selected for detailed analysis, representing diverse geographic perspectives with authors from Europe, Asia, and North America. The time frame for these documents ranges from 2020 to 2022, with some older works included to establish pre-pandemic trends.

### 2.3 Document Analysis Selection Criteria

This article aims to understand and highlight the consequences of the Post-COVID-19 pandemic specifically in relation to digital transformation in language learning and teaching. Document

collection and analysis was the technique **used** in this research, drawing on different types of documentary sources due to its potential to provide elucidative information on a given topic. This study employed a document analysis approach to explore the challenges, opportunities, and strategies for digital transformation in language learning and teaching in the post-COVID era. Document analysis is a qualitative research method involving systematically evaluating and interpreting documents to glean meaningful data and comprehend their context.

#### *2.4 Data Collection*

The data used in the analysis includes both primary data from the document itself as well as secondary data from the reference list:

- **Document data** - Information on pre-COVID trends, pandemic impacts, challenges, opportunities, strategies, conclusions, and recommendations were extracted directly from the text.
- **Reference data** - Additional insights were obtained from the academic references, including findings and perspectives to support the document analysis.

The data collection process involved systematic searches of academic databases such as PubMed, Google Scholar, and ResearchGate using keywords related to digital education, language learning, COVID-19, and sustainable education. The collected data included qualitative information on challenges faced by language institutions, opportunities presented by digital education, and strategies for effective digital transformation in language pedagogy.

#### *2.5 Data Analysis*

The data analysis followed a thematic approach, where the collected data were organized and analyzed based on key themes relevant to the research questions. The process involved:

1. **Coding:** The data was coded according to recurring themes such as challenges, opportunities, and strategies for digital transformation in language learning.
2. **Thematic Analysis:** The coded data was then analyzed to identify patterns and relationships among the themes, providing insights into digital transformation in language education.
3. **Synthesis:** Finally, the findings from various documents were synthesized to form a comprehensive understanding of the topic, highlighting the commonalities and differences in the perspectives and conclusions drawn by different authors.

The analysis aimed not only to summarize the findings from the literature but also to critically engage with them, providing a nuanced understanding of the impact of the post-COVID-19 pandemic on digital transformation in language learning and teaching.

### **3. Results and Discussion**

The results and findings of this research included the following: Challenges of Digital Transformation in Language Learning & Teaching, Opportunities for Digital Transformation, and Key Strategies.

#### **Challenges of Digital Transformation in Language Learning & Teaching**

- Educators lack sufficient digital skills and preparedness for online teaching (especially for younger students)
- Inadequate support from schools/institutions for technology integration
- Financial, infrastructure, and time constraints; issues with student engagement
- Worsening digital divide worsened - disadvantaged students accessed fewer online learning opportunities.

### Opportunities for Digital Transformation

- Developing and increasing access to online educational tools and resources.
- Enhance the digital literacy skills of both students and teachers.
- Create strategies to mitigate the widening digital divide.
- Integrate digital technologies into standard teaching/learning methods (degree varies by education level)
- Utilize mobile devices to enable flexible, adaptable learning opportunities.
- Revise policies to support the use of digital education technologies actively.
- Invest in educational infrastructure and tech resources.
- Evaluate and select appropriate online platforms and tools.

### Key Strategies

- Provide training to educators on virtual teaching methods and tools.
- Formulate guidelines for mobile learning implementation.
- Share effective digital education practices to support innovative online pedagogies.
- Supply devices/internet access to disadvantaged students
- Develop online collaboration/communication tools for teachers and students.
- Create websites with high-quality, age-appropriate educational resources.
- Assess digital platforms before adoption to ensure suitability.

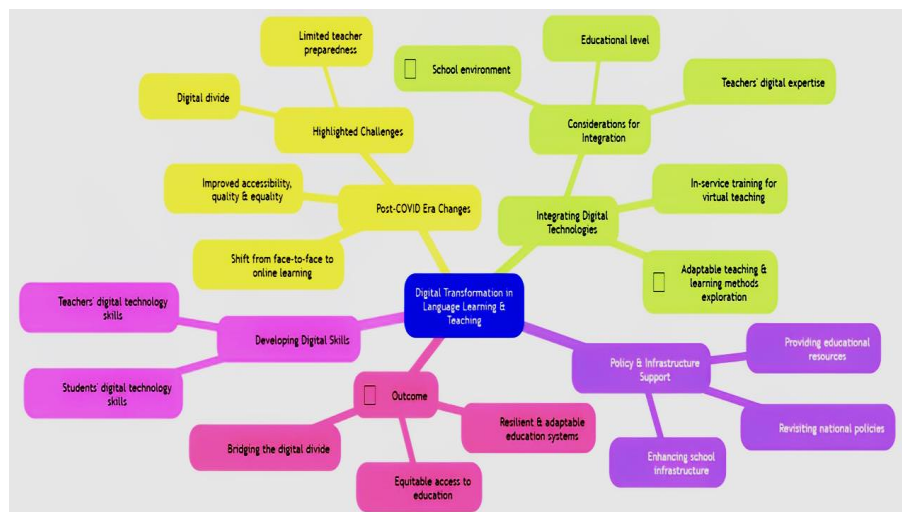


Figure 1. Mind Mapping of Findings

The mind map outlines the various aspects and consequences of digital transformation in language learning and teaching as influenced by the COVID-19 pandemic. It underscores the transition from traditional face-to-face learning to online platforms, highlighting the emerging challenges and opportunities. Challenges identified include limited teacher preparedness, a digital divide, and the need for teachers' digital skill development. The map also emphasizes the importance of adapting teaching methods and policies to support this shift, suggesting the need for a systemic approach to integrate digital technologies into education. In terms of outcomes, the map points towards the goal of creating resilient and adaptable education systems that provide equitable access to education. Developing digital skills for teachers and students is crucial to bridging the digital divide. Furthermore, the map suggests that policy and infrastructure support, such as revisiting national policies and enhancing school infrastructure, are necessary for sustaining these changes and ensuring that the educational resources provided are effective and accessible. Overall, the mind map analysis indicates a comprehensive understanding of the complexities involved in the digital transformation of language education, encapsulating the interplay between challenges, strategic responses, and the desired equitable and effective educational outcomes.

Overall, the results directly tied back to the study's original guiding research questions through evidence from documents analyzed on pre-pandemic trends, COVID-19 impacts, and post-pandemic outlook for digital education strategies and policies specifically focusing on implications for language teaching and learning. The findings provide insights to guide decisions for students, educators, institutions, and policymakers navigating this complex landscape. Please let me know if you need any clarification or have suggestions to strengthen these connections further.

### *3.1 Challenges, Opportunities, and Strategies for Digital Transformation in Language Learning and Teaching in the Post-COVID Outbreak*

Digital transformation in language learning and teaching is a dynamic process that offers challenges and opportunities. The adoption of digital technologies in education has accelerated rapidly, transforming how languages are taught and learned. While this digital transformation brings exciting new possibilities, it also poses significant challenges that require careful consideration. This literature review synthesizes key insights from research on the impacts, barriers, and best practices for leveraging technology to enhance language pedagogy.

#### *3.1.1 Challenges and Opportunities in Implementation*

The global outbreak of COVID-19 necessitated a rapid and profound transformation in language learning and teaching methodologies. Numerous challenges emerged as education transitioned to digital platforms, influencing the language education landscape. This comprehensive literature review delves into the multifaceted challenges faced during the post-COVID era. The shift from f2f to online learning has significantly improved educational accessibility, quality, and equality. However, the impact of this transition varied across different education sectors, influenced by factors like the age and individual learning

capacities of students, the nature of pedagogy at each educational level, and the extent of virtual learning's integration into standard teaching methods (Rapanta et al., 2020).

During the two waves of the pandemic, numerous challenges resulting from school closures and educational institutions came to light. Many educators expressed concerns about **younger students'** progress, noting their need for digital skills and preparedness for online teaching. These teachers often demonstrated limited enthusiasm for using mobile technology in their teaching. Support provided by schools and other institutions was frequently found to be informal, limited, or inadequate.

Other notable challenges included financial or infrastructural constraints, time constraints in preparing and organizing learning activities, and low levels of student engagement. Researchers pointed out the critical need for educational systems to sustain student learning during disruptions, highlighting the digital divide that became apparent during the pandemic. Longman & Younie (2021) observed that social inequality in the UK worsened during this period, with disadvantaged students benefiting less from online learning opportunities. Concurrently, a review of research trends identified areas for potential development in digital education, such as creating new online resources, providing free access to these resources, and improving the digital competencies of both teachers and students (Longman & Younie, 2021).

Looking forward to the post-COVID era, exploring potential opportunities in digital education is essential, given the challenges revealed during the pandemic. These opportunities include developing new online educational tools and providing access to them, enhancing the digital literacy of educators and learners, and creating strategies to mitigate the digital divide to ensure equitable educational access for all students.

### 3.1.2 *Integrating Digital Technologies into the Educational System*

When properly blended with effective teaching methods, digital education becomes an essential component of the educational process rather than merely an additional supplement (Karaköse & Demirkol, 2021). How digital education is woven into standard teaching and learning methods varies greatly. Factors influencing these methods include educational level, school environment and policies, teachers' digital expertise, subjects taught, and the learning objectives. Implementing digital tools across different student age groups presents challenges, especially for younger students who benefit more from experiential, hands-on learning methods.

Continued research into the effectiveness of technology-mediated activities and the overall impact of digital technologies on education is essential. An EU-wide survey revealed that in the spring of 2020 when schools were closed, 67% of teachers had to offer distance learning for the first time. This underscores that not all educators have the digital skills for online teaching. This situation suggests online learning strategies must be integrated into the educational framework. The degree and manner of integration will naturally differ across various educational sectors. For example, older students in higher education might be more suited to this approach than younger children, who benefit more from experiential learning. Pedagogical practices are vital in this context. These practices include creating educational



resources, presenting information, providing learning support, and employing inquiry-based learning techniques.

**3.1.3 *Exploring Opportunities for More Flexible and Digital Teaching and Learning Methods***

Exploring more flexible and adaptable teaching and learning methods presents a valuable opportunity. Leveraging the widespread and cost-effectiveness of mobile devices, such as tablets and smartphones, is crucial for providing access to high-quality educational resources. The adoption of technology, particularly mobile technologies, can lead to a more resilient and adaptable education system (Basilaia & Kvavadze, 2020).

Positive outcomes have been observed in schools that embrace mobile technology, as it allows learning to occur anytime and anywhere, encompassing various contexts like formal, semi-formal, and informal settings. The COVID-19 pandemic highlighted the role of mobile learning in enabling students to continue their education from any location (Pietro Giorgio et al., 2020). Therefore, facilitating access to online learning resources for students and teachers through mobile devices is recommended. Additionally, the effective use of mobile devices in education is closely tied to developing suitable applications that enhance user interaction.

**3.1.4 *Revisiting National Policies for Enhanced Digital Technology Use in Education***

In managing education crises, appropriate policy responses are crucial. This presents an opportunity for countries to reassess and refine their policies, to develop strategies that effectively handle future crises and strengthen public educational systems. These policies should actively support using digital mobile technologies in education, given their widespread use during the pandemic and students' familiarity with them in informal settings. Educational policymakers should create in-service training programs that promote virtual teaching methods, highlight the importance of mobile technologies, and focus on online education pedagogy, as previously discussed in the section on innovative mobile pedagogies.

School leaders, including principals, should formulate clear guidelines for mobile learning (m-learning) (Scully et al., 2021). The successful integration of digital mobile technology into the educational process will depend on collaborative efforts among all stakeholders, sharing effective digital educational practices, and support for teachers implementing innovative digital and mobile pedagogies, curriculum changes, and redesigns. For example, integrating online education into the strategic plans of schools or organizations can enhance curricula, contributing to their future sustainability and resilience (Scully et al., 2021).

**3.1.5 *Enhancing School Infrastructure and Creating Educational Resources***

The pandemic has highlighted the opportunity to improve educational infrastructure, including providing modern equipment and educational resources. Providing vouchers for tablets or laptops to socially disadvantaged students is particularly beneficial for adapting to the post-COVID educational landscape. The future of education relies on having reliable learning technologies and resources for digital citizenship that maintain a connection between parents and teachers (Nikolopoulou, 2021). Investing in technological infrastructure is crucial for closing the digital divide and ensuring equitable access to

education for all students, regardless of gender, age, or background. Securing funding is vital for supporting all learners through inclusive and progressive digital education and training programs, enhancing their internet usage for educational purposes.

Research by Saikat et al. (2021) has shown that some learning materials delivered via mobile learning (m-learning) were well-organized and beneficial to students during the pandemic. Therefore, developing tools for video collaboration, discussions, and communication (for instance, between teachers and students or among educators and students) is important. Developing websites with age-appropriate, high-quality educational materials is also essential. Open-access online educational technology resources, like virtual experiments and worksheets, can facilitate communication. Online laboratories, for example, allow students to conduct experiments remotely, offering benefits such as flexible access, cost reduction, and the ability to perform experiments that would otherwise be dangerous, difficult, or time-consuming. It is crucial to evaluate digital platforms and their features (Nikolopoulou, 2021) before teachers or students use them to ensure their effectiveness and appropriateness for educational purposes.

### *3.1.6 Developing Digital Technology Skills of Students and Teachers*

The transition from traditional face-to-face education to virtual learning during the COVID-19 pandemic revealed a gap in technological skills among many students and teachers for language learning and teaching. Despite this, as noted by Lee et al. (2021) there has been a notable improvement in the use of digital devices by numerous individuals. Therefore, enhancing the digital competencies of both students and teachers presents a significant opportunity in the post-pandemic landscape. These skills are crucial for students to access appropriate resources and effectively navigate online platforms. Reducing the digital divide among students involves providing access to digital technology and the internet and fostering their ability to contribute to knowledge creation. Research indicates that even seasoned teachers faced challenges transitioning to online education, particularly in effectively utilizing digital teaching tools.

For language teachers, technological proficiency is key to creating teaching materials, such as multimedia content, and becoming adept with synchronous and asynchronous teaching tools. Teacher training programs can empower educators to improve and sustain their presence in online teaching environments. Language teachers must clearly outline the course structure and design in these settings. Training can also enhance teachers' abilities to manage virtual classrooms, including accessing resources, monitoring student activities, designing interactive online content, and efficiently organizing the online learning environment. In preparation for future crises or lockdowns, people must possess advanced digital skills, such as digital communication competencies, to conduct online meetings and effectively engage in digital interactions.

### *3.2 Digital Learning and Teaching Are Essential Components of Effective Pedagogy*

Incorporating digital learning and teaching into effective pedagogical practices is essential. Rather than treating digital teaching and learning strategies as supplementary elements, they should

be fully integrated into instructional methods. Educational policymakers are encouraged to develop in-service training programs that bolster online language teaching and learning. These programs should focus heavily on online education pedagogy to enhance its effectiveness and presence. Furthermore, flexible online language learning and teaching should extend to include mobile learning. This approach suggests reevaluating current policies that ban smartphones in classrooms, proposing that these devices could be beneficially used under certain guidelines. Looking ahead, future research should examine how educators can refine their teaching approaches and utilize digital technology tools. The aim is to foster collaborative and socially inclusive online learning environments, making learning more accessible and engaging for all students (Rapanta et al., 2020).

### *3.3 Digital Teaching and Learning Language and Collaboration*

Digital teaching and learning, particularly in foreign language instruction, necessitate formal support and in-service training. Teacher professional development (TPD) programs equip language teachers with the skills to enhance their digital teaching methods, design lessons for diverse student groups, set clear learning objectives, provide feedback, and create age-appropriate online resources. Schools must offer language teachers opportunities to improve their digital competencies and online teaching skills (Li, 2022).

Language teachers face new challenges, such as adapting to blended and virtual learning environments where they often have less control over students' learning experiences. Addressing issues like the socio-emotional well-being of both teachers and students is crucial. This includes sharing effective practices and resources and fostering communication between schools and families, especially those from disadvantaged backgrounds. Additionally, equipping students with digital technology skills is essential for accessing learning materials outside the traditional classroom setting. Since online learning reduces face-to-face interactions, students require additional support to stay motivated and engaged in digital learning activities (Nørgård, 2021).

### *3.4 Stakeholders and Language Teachers in Creating Cooperation Relationship*

Considering similar crises, policymakers, curriculum developers, school/faculty administrators, and advisors should devise more effective strategies for adaptation. During the COVID-19 pandemic, the role of school administrators was highlighted as crucial in establishing virtual learning environments for language learning and teaching. For successful online language instruction, school administrators' endorsement and support of teachers are essential. Implementing collaborative tactics could be key to managing future challenges effectively. Collaboration and cooperation among various stakeholders are emphasized, as learning from peers is essential for adapting and thriving.

Sharing innovative teaching methodologies and phenomenology among teachers is recommended. Understanding how schools and organizations operate requires close collaboration between policymakers and teachers. Moreover, recognizing the importance of leadership and setting realistic expectations for teachers is fundamental. School leaders have a critical role in fostering digital education, ensuring staff and students' psychological and physical well-being, and aligning goals among stakeholders. The experiences of school administrators during the coronavirus pandemic

are expected to influence future school policies and practices significantly. Additionally, to foster collaboration and share experiences across different educational contexts, it is important to identify and support existing educational networks, encouraging exchange between various educational associations.

### 3.5 *Financial Support and The Transition to Digitalization in Language Learning and Teaching*

Adaptability is a crucial aspect of effective education and training. Education systems must be resilient and adapt to future crises, with digitalization playing a key role in transforming language learning and teaching. Digital learning encompasses a variety of approaches and tools, which can be applied differently across different educational levels and settings, both inside and outside the classroom. For instance, online tasks can supplement or fully replace traditional face-to-face learning. While online assessments are likely to complement conventional assessment methods and may be more appropriate for university students, the K-12 sector globally tends to be less digitized in the context of language learning and teaching. The creation of appropriate technological infrastructure and online educational tools depends on the presence of adequate funding. A systematic examination of K-12 research amid the pandemic proposes suggestions, including allocating funds for professional development and equipment, initiating collaborative activities, and establishing clear school policies and guidelines.

In examining how the COVID-19 crisis could accelerate the digital transformation of education in Latvia, Rubene, and colleagues advised policymakers to integrate digital transformation in education with broader digitalization efforts, implementing digital solutions at all educational levels. Features that enhance online learning should be prioritized when designing educational computer systems and programs, such as multifunctionality and diverse student assessment capabilities. Furthermore, designing online language learning and teaching tools and platforms with greater flexibility would offer teachers more options in their instructional approaches. Tools that foster connection, engagement, communication, and collaboration are particularly beneficial in online language learning and teaching.

### 3.6 *Hybrid/Blended Education in the Post-Covid Era*

After COVID-19 and the full and compulsory implementation of online language learning and teaching, the way has been paved for a combined and hybrid learning approach, especially in universities and schools (Leask & Younie, 2021). Blended learning approaches, which merge the convenience and flexibility of online courses with the essential component of face-to-face interaction, present a practical and viable solution for language teaching and learning, especially during crises where traditional in-person meetings are challenging. These methods offer benefits like flexible learning schedules and enhanced self-directed learning opportunities for students (Sullivan et al., 2019). Given that blended learning environments pose unique challenges and are relatively under-researched, it is recommended that future research focuses on investigating their potential and effectiveness in the context of language education (Sauro & Zourou, 2019).

### *3.7 Limitations*

The study on digital transformation in language learning post-COVID-19 acknowledges several limitations. Firstly, it relies on a document analysis approach, which, while comprehensive, may not capture the lived experiences of educators and learners transitioning to digital platforms. This method primarily synthesizes existing literature, potentially overlooking recent innovations or unreported challenges in digital education. Secondly, the research focuses on literature published within a specific timeframe (2020-2022), which may not reflect the ongoing evolution of digital pedagogy or the latest educational technologies emerging post-pandemic. The study's scope, centered on academic articles, conference papers, and book chapters, may limit its insight into practical, on-the-ground implementations of digital learning strategies. Lastly, as the digital transformation in language education is a rapidly evolving field, the study's findings might only encompass some emerging trends or future developments that could influence effective language teaching and learning in a post-COVID-19 world.

### *3.8 Pedagogical Implications for Further Research*

The COVID-19 crisis led to the unprecedented closure of academic institutions, a scenario that could recur under similar future circumstances. This situation underscores the importance of further research into the pedagogical implications across different educational sectors. The challenges and opportunities presented by online education vary significantly across different age groups, from elementary school to university levels. Particularly for young children, ongoing research is needed to address concerns about screen time, balancing the quality and quantity of activities such as watching movies, playing games, and socializing online. Additionally, there is a need for further investigation into recent advancements in educational technology, including artificial intelligence, in creating and delivering digital tools. These issues interest policymakers looking to leverage educational technologies to address national and international objectives. These include enhancing academic achievement, promoting inclusive education, and equipping the workforce with digital skills (Trends, 2020). While digital education can only partially replace the traditional, in-person classroom setting, it is an adequate alternative under certain conditions. The COVID-19 crisis has led scholars to argue that blended and distance learning environments are reshaping the global standard for education (Amitabh, 2020). In higher education institutions, where students typically exhibit more independence in their learning, blended courses or hybrid education integrate face-to-face teaching with digital tools, offering a balanced approach (Trends, 2020).

The rapid shift to online and hybrid language teaching models during the COVID-19 pandemic has significant implications for pedagogical practice and research. Teacher training programs should incorporate more robust development of digital literacies and online teaching competencies into their curricula (Johnson, Veletsianos & Seaman, 2020). Ongoing professional development for current language educators should also be prioritized to build capabilities like learning management systems, digital tools, and remote instructional design (Trust & Whalen, 2020). More research is needed to identify optimal hybrid learning designs that purposefully integrate physical and virtual language-

teaching interactions. Comparative studies assessing outcomes across fully online, blended, and traditional face-to-face modalities can provide insights into the affordances of each approach (MacIntyre, Gregersen & Mercer, 2020). Technology integration should align with and serve sound language pedagogy and established principles of second language acquisition (Gleason & Suvo-rov, 2020).

More research into the effectiveness of emerging tools like AI tutors, augmented reality games, and adaptive learning software could inform evidence-based adoption (Zhao, 2021). Language assessments may need to be reconceived to effectively evaluate proficiency and competencies in online environments. Further research into e-portfolios, performance-based tests, multimodal assessments, and other authentic for-mats could enhance digitally mediated evaluation. Exploring personalized, self-directed language learning models enabled by technology should be a priority. This can expand access and flexibility for diverse and non-traditional learners. All digital initiatives must be pursued with equity and inclusion as central considerations.

Research should specifically examine technology-enhanced solutions to overcome barriers faced by disadvantaged student populations face. Broader research into innovative and sustainable institution-wide strategies for online language education is needed, spanning everything from policy and infrastructure to faculty development and student support services. Although presenting challenges, the pandemic has opened possibilities for learner-centered, equitable, and resilient language teaching and learning innovations. Further research and pedagogical innovation should systematically seek to build upon these opportunities in the post-COVID era. Therefore, the continuous identification and examination of potential opportunities within digital education remains an active area of research. Key research questions in this field include: What is the effectiveness of hybrid instructional experiences across various educational sectors? How is the transition to the era of online teaching and learning also progressing? These inquiries are central to understanding and optimizing the evolving landscape of digital education.

#### **4. Conclusion**

This study examined the rapid digital transformation in language learning and teaching during the post-COVID-19 era. It identified key challenges, opportunities, and strategies that have emerged as education systems adapted to online platforms. The findings demonstrate that while digital learning offers significant advantages in accessibility and flexibility, it also presents challenges, such as digital skill gaps among educators and students as well as issues related to student engagement and equity. To address these challenges, educational policymakers and institutions must continue to invest in professional development programs that enhance digital teaching competencies. This includes not only training on the use of digital tools but also on the pedagogical approaches that best leverage these tools to create inclusive and effective learning environments.

Future research should focus on exploring the long-term impacts of this digital shift on language education, particularly in the context of evolving digital tools and platforms. Additionally, ongoing

studies could investigate the potential of emerging technologies, such as artificial intelligence and virtual reality, to further transforming language pedagogy. The ongoing efforts to refine digital educational strategies will provide valuable insights for future crises, ensuring that educational systems are better equipped to maintain continuity and quality in the face of disruptions.

The advantages, disadvantages, and challenges encountered during the pandemic can lead to valuable relationships. The primary recommendations for digital language learning and teaching presented in this section are based on the opportunities, problems, and techniques. Language teachers must learn from the crisis and adapt in the post-COVID period since educational institutions may use hybrid/combined solutions (in-person and online instruction) in the future.

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