From emergency to opportunity: Greek primary school teachers' journey in digital assessment before, during, and after COVID-19

Leonidas Chalkiadakis
Autonomous University of Barcelona

Abstract

This article examines how Greek primary school teachers adapted to digital assessment practices before, during, and after the COVID-19 pandemic. Drawing on a mixed-methods approach (questionnaire surveys and focus groups) with 417 teachers, the study traces the shift from limited technology use to a more engaged deployment of digital tools. Results highlight the rapid learning curve imposed by school closures, revealing both persistent challenges - such as infrastructure gaps and academic dishonesty concerns - and clear opportunities for more responsive, student-centered pedagogy. Teacher reflections emphasize the need for stronger professional development in digital competence, especially in training for online formative and summative assessments. Despite the undeniable strain placed on educators, many welcomed the potential for tailored feedback, enhanced collaboration, and robust learner engagement made possible by digital assessment tools. Ultimately, these experiences signal a transformative resilience in Greek primary education, paving the way for sustained innovation in assessment practices.

Questo articolo esamina l'adattamento degli insegnanti di scuola primaria greci alle pratiche di valutazione digitale prima, durante e dopo la pandemia di COVID-19. Lo studio, basato su questionari e focus group con 417 insegnanti, traccia l'evoluzione da un uso limitato a un impiego più profondo degli strumenti digitali. I risultati evidenziano una rapida curva di apprendimento dovuta alle chiusure scolastiche, rivelando sfide persistenti come lacune infrastrutturali e preoccupazioni per la disonestà accademica. Emergono anche chiare opportunità per una pedagogia più reattiva e centrata sullo studente. Gli insegnanti sottolineano la necessità di maggiore formazione digitale, specialmente per le valutazioni formative e sommative online. Nonostante le difficoltà, molti hanno apprezzato il potenziale degli strumenti digitali per feedback personalizzato, maggiore collaborazione e un più forte coinvolgimento degli studenti. Queste esperienze dimostrano una resilienza trasformativa nell'istruzione primaria greca, aprendo la strada a un'innovazione duratura nelle pratiche di valutazione.

Keywords: digital pedagogy; formative assessment; summative assessment; emergency remote teaching; primary education

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Parole chiave: pedagogia digitale; valutazione formativa; valutazione sommativa; teledidattica d'emergenza; istruzione primaria

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1. Introduction

The COVID-19 pandemic marked a turning point in education worldwide, acting as a stress test for the adaptability and resilience of educational systems. The abrupt shift to remote learning forced educators, administrators, and policymakers to grapple with an array of challenges, from technological barriers to pedagogical reconfigurations. Central to this upheaval was the integration of digital tools in both teaching and assessment, a process that varied widely depending on context, resources, and existing levels of technological adoption (Di Pietro et al., 2020). While some systems flourished in leveraging digital tools to enhance education, others were left exposed, struggling to meet the demands of a digitally dependent environment (Hodges et al., 2020).

In Greece, the pandemic-induced closure of schools revealed both the strengths and shortcomings of the country's educational infrastructure. Traditionally reliant on face-to-face instruction and paper-based assessments, the Greek primary education system had to pivot rapidly to a digital framework, with little preparatory groundwork. This shift illuminated systemic disparities in digital access and literacy, alongside gaps in teacher training and support. For Greek primary school teachers, this was not merely a logistical challenge but also a fundamental reimagining of their professional roles. They became digital facilitators almost overnight, expected to assess student performance in an online environment fraught with technical and ethical complexities (Karakaya et al., 2021).

The significance of focusing on Greek primary school teachers lies in their unique position as mediators between policy directives and student outcomes. As frontline implementers of digital education strategies, their experiences provide critical insights into the successes and failures of pandemic-driven digital transformation. While the global discourse often highlights the resilience of educators in advanced technological settings, the experiences of teachers in resource-constrained contexts, such as Greece, are underrepresented. This study addresses this gap by exploring how Greek primary school teachers navigated the challenges of digital assessment, from initial resistance to gradual adaptation and resilience.

A critical barrier to the successful implementation of digital education globally has been the digital divide - a term encompassing disparities in access to technology, internet connectivity, and digital literacy (Niemi & Kousa, 2020). In Greece, these inequities were starkly evident during the pandemic. Rural and economically disadvantaged regions faced significant challenges in ensuring students had access to the necessary devices and stable internet connections (Petek, 2021; Tomczyk & Walker, 2021). Moreover, many teachers themselves lacked adequate technological resources, relying on outdated hardware or shared family devices to conduct online classes. These conditions created a dual burden for educators: not only were they required to master unfamiliar digital tools, but they also had to navigate the frustration and inequities stemming from technological inadequacies (Müller et al., 2021).

The rapid shift to digital platforms also exposed disparities in digital literacy among teachers. While some had prior exposure to online teaching tools, the majority were unprepared for the demands of remote instruction and assessment. Teachers in Greece frequently cited insufficient training as a primary obstacle during the transition, a sentiment echoed in broader European studies on emergency remote teaching (Goman et al., 2021). The lack of systematic professional development programs to address these gaps exacerbated the difficulties, leaving educators to rely on informal networks and self-directed learning (Schleicher, 2020).

Digital assessment posed a particularly complex challenge during the pandemic. Traditional assessment methods, deeply ingrained in the Greek educational system, were rendered impractical in a remote setting. Teachers had to adapt to digital platforms for administering and grading assignments, often without clear guidelines or

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technical support. The transition raised concerns about the validity, reliability, and fairness of assessments conducted online. For example, issues such as students' access to technology, the potential for academic dishonesty, and the limitations of digital tools in capturing nuanced learning outcomes were frequently reported (Bao, 2020; Niemi & Kousa, 2020).

Moreover, the psychological toll on both teachers and students added another layer of complexity. Teachers reported heightened stress levels due to increased workloads, constant connectivity demands, and the need to maintain engagement in a virtual classroom. The emotional burden of managing these challenges, coupled with the need to ensure equitable assessment practices, often led to burnout (Kniffin et al., 2021). This dynamic underscores the need for a more robust support system for educators, one that addresses both technical and emotional well-being (Doucet et al., 2020).

Despite these barriers, the pandemic also acted as a catalyst for innovation and professional growth among Greek primary school teachers. Many educators demonstrated remarkable adaptability, experimenting with new tools and methodologies to engage students and ensure continuity in learning (Dhawan, 2020). Platforms such as Google Classroom, Microsoft Teams, and Moodle became central to their efforts, enabling collaborative and interactive approaches to teaching and assessment (Rannastu-Avalos & Siiman, 2020).

This period also saw a redefinition of teacher roles, aligning with broader trends in educational transformation. Teachers moved beyond their traditional roles as knowledge transmitters to become facilitators of a more learner-centered, technology-driven environment. For some, this transition was an opportunity to develop digital competencies and explore innovative pedagogical strategies that could be sustained beyond the pandemic (Jurs & Kulberga, 2021; Prieto-Ballester et al., 2021).

The experiences of Greek primary school teachers during the pandemic highlight the critical role of policy and professional development in enabling effective digital transformation. While national initiatives such as the Digital Skills for All program aimed to enhance technological adoption in education, their impact was uneven, with significant gaps in implementation and outreach (Caena & Redecker, 2019). This underscores the importance of targeted, context-sensitive interventions that address the unique challenges faced by educators in diverse settings.

Professional development emerged as a recurring theme in discussions about resilience. Teachers consistently emphasized the need for structured training programs that go beyond basic technical skills to encompass pedagogical strategies for digital teaching and assessment (Beardsley et al., 2021). Such programs should also address the emotional and psychological dimensions of teaching in a digital age, equipping educators to manage stress and build supportive peer networks.

The pandemic underscored the transformative potential of digital tools in education, even as it revealed the fragilities of existing systems. For Greek primary school teachers, the journey from resistance to resilience offers valuable lessons for the future. By leveraging their experiences, policymakers and stakeholders can design interventions that address systemic inequities, provide comprehensive support, and foster a culture of continuous professional growth.

In conclusion, this study situates the experiences of Greek primary school teachers within the broader discourse on digital transformation in education. By examining their navigation of pandemic-induced challenges, it contributes to a deeper understanding of how educators in resource-constrained settings can adapt to and thrive in a digital-first educational landscape. These insights have implications not only for Greece but also for other contexts grappling with similar challenges, paving the way for more inclusive and resilient education systems.

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2. Literature review

The COVID-19 pandemic has significantly accelerated the integration of digital technologies in education, particularly in the realm of assessment. This literature review examines recent studies from the past three years, focusing on the challenges and opportunities associated with digital assessment in primary education.

The sudden shift to remote learning during the pandemic necessitated the rapid adoption of digital assessment tools. Pozo et al. (2024) highlighted that, three years post-lockdown, there has been a decline in the frequency of digital resource usage among primary and secondary teachers, particularly in assessment-related activities. This suggests that while digital tools were initially embraced out of necessity, their sustained integration into assessment practices remains inconsistent.

Teachers faced challenges in adapting traditional assessments to digital formats. Niemi and Kousa (2020) noted that many educators lacked the necessary skills to conduct assessments online effectively, which often led to concerns about the reliability and validity of these methods. Furthermore, disparities in access to technology and connectivity exacerbated the difficulties of equitable assessment implementation during the pandemic.

Teachers have encountered numerous challenges in conducting online assessments. A study by Hsia and Nasri (2022) reported that primary school teachers struggled due to unclear policies and insufficient training, which resulted in confusion over appropriate assessment methods. Similarly, Coleman (2021) emphasized the impact of the digital divide, noting that students from socio-economically disadvantaged backgrounds experienced greater obstacles in accessing online assessment platforms.

In addition to technical issues, the increased workload for teachers in managing digital tools and ensuring fair assessments added to the stress of remote learning (Kniffin et al., 2021). These challenges highlight the need for systematic approaches to support educators in the transition to digital assessments.

The readiness of teachers to implement online classroom-based assessments (CBA) has been a critical factor influencing their success. According to Hsia and Nasri (2022), many primary school teachers reported a lack of digital assessment training, emphasizing the importance of professional development programs. UNICEF (2021) echoed this sentiment, advocating for teacher training that combines technical skills with pedagogical strategies tailored to digital environments. Su et al. (2023) expand this concern to early education, where a lack of age-appropriate Artificial Intelligence (AI) curricula and limited digital literacy among teachers pose additional challenges in implementing effective digital assessment.

The role of professional development in fostering resilience and adaptability among teachers has been widely acknowledged. Beardsley et al. (2021) found that structured training programs not only enhanced teachers' digital competencies but also improved their confidence in using innovative assessment methods. A European scoping review by Chalkiadakis & Noguera (2024) found that teachers across EU countries who received professional development or engaged in peer-led digital communities were more likely to sustain digital assessment practices after the pandemic.

Despite these challenges, the pandemic has also spurred innovation in digital assessment. The integration of AI into formative assessments has emerged as a promising trend. Alasgarova & Rzayev (2024) argue that effective integration of AI-enhanced assessments requires not just familiarity with the tools themselves, but a pedagogical grounding in the TPACK model that aligns technology with content and instructional purpose. Hopfenbeck et al. (2023) explored how AI technologies can personalize assessments by providing real-time feedback, enabling adaptive learning pathways. However, the study emphasized that successful implementation requires significant investments in teacher training and data accessibility.

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UNESCO (2019) advocated for the broader adoption of digital formative assessments as a tool to monitor student learning more effectively. These assessments allow for continuous feedback and can be integrated with AI-driven analytics to identify learning gaps and adjust teaching strategies accordingly.

Ensuring equity and inclusivity in digital assessments remains a pressing concern. UNICEF (2021) highlighted the importance of designing assessment strategies that accommodate diverse learning needs. This includes addressing technological disparities and creating accessible assessment tools for students with disabilities or those in remote areas.

Tomczyk & Walker (2021) underscored the challenges posed by the digital divide, arguing that inequities in access to technology and internet connectivity have widened the educational gap. They suggested targeted interventions to bridge these disparities, such as government-subsidized technology programs and community-based digital literacy initiatives.

The experiences gained during the pandemic highlight the need to rethink traditional assessment strategies. Mariadi et al. (2022) suggested that the challenges encountered in online assessments offer an opportunity to develop more resilient and flexible models. These should emphasize formative and adaptive assessments, leveraging technology to support personalized learning.

In conclusion, the literature from the past three years reflects a complex landscape of challenges and opportunities in digital assessment in primary education. While the pandemic has accelerated the adoption of digital tools, it has also exposed significant gaps in infrastructure, teacher readiness, and policy guidance. Addressing these issues through targeted professional development, equitable access to technology, and innovative assessment strategies will be crucial in shaping the future of education in a post-pandemic world.

Recent literature underscores the need for systemic reform in digital assessment practices. Emerging evidence suggests that effective digital assessment requires more than technology adoption - it demands ethical digital literacy, inclusive access, and robust teacher training. Chauncey and McKenna (2023) advocate for embedding AI literacy into teacher development programs to help both educators and students understand the implications of algorithmic feedback systems. These efforts should address disparities in technological infrastructure and foster equitable practices in digital pedagogy.

Beyond infrastructure, institutional support plays a critical role. For instance, Noguera Fructuoso et al. (2024) report that vocational education environments implemented flexible, digitally mediated assessments - alongside targeted educator training - recorded significantly higher student engagement and satisfaction. This trend reaffirms that professional development and systemic adaptation must co-evolve for sustainable digital transformation in schools.

These perspectives not only update but also expand the discourse on digital assessment, showing that the conversation has moved toward equity, personalization, and long-term strategic planning.

3. Methodology

3.1 Research design

This study employed a sequential explanatory mixed-methods design (Creswell & Plano-Clark, 2007), integrating quantitative and qualitative approaches to examine the impact of the COVID-19 pandemic on digital assessment practices among Greek primary school teachers. In the first phase, a large-scale quantitative survey was administered to capture trends in teachers' use of digital technologies for formative and summative assessment across three time periods: pre-pandemic, during Emergency Remote Teaching (ERT) and Intermittent Face-

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to-Face Teaching (IFFT), and the post-pandemic school year. This broad dataset provided a representative overview of teachers' practices, perceived barriers, and evolving levels of digital competence. In the second phase, qualitative focus groups were conducted with a purposive subsample of teachers to explain and enrich the statistical findings. These discussions offered deeper insights into the contextual factors shaping teachers' experiences, including professional development, digital inequities, and perceived pedagogical opportunities. This approach allowed for a comprehensive understanding of the shifts in digital assessment practices over time.

3.2 Participants and sampling

The study included 417 primary school teachers from across Greece, representing urban, semi-urban, and rural regions. This nationwide coverage ensured diversity and enhanced the representativeness of the findings. A non-probabilistic convenience sampling approach was applied, using professional networks within schools to distribute the survey and to recruit participants for the focus groups.

3.3 Data collection instruments

Questionnaire. A structured online questionnaire was developed to explore teachers' use of digital assessment tools before, during, and after the pandemic. It consisted of four sections: (a) demographic information, (b) digital assessment practices across the three periods, (c) perceived barriers and opportunities in adopting digital tools, and (d) changes in attitudes, competence, and confidence in using digital assessment. The instrument included both closed-ended questions (mainly Likert-scale items) to capture measurable trends and open-ended questions to allow teachers to elaborate on their experiences. On average, it required about 15 minutes to complete. The survey was distributed nationwide through professional networks, regional education offices, and online teacher communities.

Focus Groups. To complement the survey findings, five focus groups were organized with a total of 30 teachers representing different regions and school contexts. Each group included 5–7 participants and followed a semi-structured protocol covering three main themes: (a) the long-term impact of the pandemic on digital assessment strategies, (b) teachers' reflections on their evolving digital competence across the three periods, and (c) recommendations for future policy and professional development. Sessions lasted about 60–75 minutes, were conducted online between March and May 2022, and were recorded, transcribed, and thematically analyzed to identify recurring patterns that enriched and contextualized the quantitative results.

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3.4 Validation and ethical considerations

The questionnaire was piloted with 20 educators to ensure clarity and alignment with the study's objectives. Feedback from the pilot informed minor revisions. Ethical approval was secured from the Autonomous University of Barcelona's Ethics Committee (reference number CEEAH 6258), with informed consent obtained from all participants. Confidentiality and anonymity were upheld throughout the research process.

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3.5 Data analysis

For the quantitative data, responses from the questionnaire were processed with Jamovi statistical software. Descriptive statistics summarized teachers' practices across the three time periods, while inferential tests, including ANOVA and regression models, examined how factors such as teaching experience, school location, and digital competence related to the adoption of digital assessment tools.
For the qualitative data, focus group transcripts were analyzed thematically using Atlas.ti. A hybrid coding approach was applied: initial deductive codes were derived from the research questions (e.g., barriers, opportunities, professional development), while inductive codes emerged from participants' narratives. This process enabled the identification of recurring themes that explained and deepened the survey results, ensuring meaningful integration of the two data strands.

3.6 Research limitations

The study focused exclusively on Greek primary school teachers, which may limit the generalizability of findings to other educational levels, such as secondary or early childhood education. Furthermore, reliance on retrospective self-reported data may have introduced recall bias, particularly regarding experiences from the pre-pandemic and pandemic periods.

4. Results

4.1 Use of digital technologies for assessment

The results indicate a significant evolution in the use of digital technologies (DT) for formative and summative assessment among Greek primary school teachers across three time periods: pre-pandemic, during Emergency Remote Teaching (ERT) and Intermittent Face-to-Face Teaching (IFFT), and the post-pandemic school year (2021-2022).

4.2 Formative Assessment

Examining teachers' use of digital technologies (DT) for formative assessment, the findings suggest a notable increase during the pandemic. On a five-point Likert scale (1 = never, 5 = very often), mean scores rose from 2.33 (SD = 0.89) pre-pandemic to 3.21 (SD = 0.95) during ERT/IFFT. Although the mean slightly decreased to 2.80 (SD = 0.91) in the post-pandemic period, these levels remained significantly higher than pre-pandemic usage ($\chi^2 = 93.03$, $p < .001$). This indicates that while the use of DT in formative assessment peaked during the pandemic, its adoption has remained more frequent than before.

4.3 Summative Assessment

Similarly, the results show an increase in DT use for summative assessment, from a pre-pandemic mean of 2.30 (SD = 0.91) to 3.11 (SD = 0.94) during ERT/IFFT, with a slight decline to 2.81 (SD = 0.88) post-pandemic ($\chi^2 = 114.17$, $p < .001$). This pattern reflects a pandemic-driven adoption of digital tools for summative purposes, with sustained though slightly reduced levels in the post-pandemic period.

4.4 Correlations and teacher feedback

The findings suggest a positive correlation between the use of DT for assessment and the knowledge gained during the ERT/IFFT period. Spearman's rho revealed:

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- A moderate correlation between knowledge gained and formative assessment during ERT/IFFT ($r = 0.33$) and post-pandemic ($r = 0.35$, $p < .001$).
- A stronger correlation for summative assessment during ERT/IFFT ($r = 0.38$) and post-pandemic ($r = 0.44$, $p < .001$).

4.5 Focus group discussions emphasized challenges and opportunities

Challenges: Teachers consistently reported inequities in students' access to devices and reliable internet, particularly in rural areas, confirming the quantitative finding that infrastructure was a major barrier. Concerns about fairness in online assessments were frequent. As one teacher noted: "It would be very unfair to conduct assessments using digital technologies without ensuring all students have equal access to the required resources." Other themes included the stress of adapting to unfamiliar tools and the lack of institutional support.

Opportunities: At the same time, participants highlighted that digital tools enabled real-time feedback, self-paced learning, and more interactive activities, reflecting the quantitative trend of increased DT use for both formative and summative assessment during ERT/IFFT. Some teachers reported that these practices fostered greater student engagement and shaped new habits they intended to sustain post-pandemic.

By triangulating with the survey data, the focus group analysis confirmed that while adoption levels of DT decreased slightly after schools reopened, teachers who experienced clear pedagogical benefits were more likely to continue integrating digital assessment into their everyday practice.

4.6 Barriers to effective digital assessment

Despite these advances, both the survey and the focus groups revealed persistent barriers to the effective use of DT for assessment:

- Infrastructure limitations (survey + focus groups): Many teachers reported that unreliable internet connections and outdated hardware, particularly in rural schools, hindered the implementation of digital assessments.
- Training deficiencies (focus groups): Teachers emphasized the lack of systematic professional development. As one focus group participant admitted: "I didn't even know such tools existed until we were already using them." This lack of preparedness restricted the effective use of advanced tools.
- Digital inequity (survey + open-ended responses): Unequal student access to devices and stable internet was frequently mentioned in open-ended survey responses and focus group discussions. Some teachers indicated that these inequities led them to return to traditional paper-based assessments after schools reopened, citing concerns about fairness.

4.7 Satisfaction and usage patterns

Teachers' satisfaction with DT for assessment remained moderate, reflecting a mix of enthusiasm and apprehension. On a five-point Likert scale (1 = very dissatisfied, 5 = very satisfied):

- Formative assessments: Satisfaction was higher during ERT/IFFT ($M = 3.40$, $SD = 0.85$) compared to the post-pandemic period ($M = 2.90$, $SD = 0.81$).
- Summative assessments: A similar trend was observed, with satisfaction peaking during ERT/IFFT ($M = 3.30$, $SD = 0.90$) before declining slightly post-pandemic ($M = 2.85$, $SD = 0.88$).

The focus groups helped explain these shifts. Teachers noted that during remote teaching, digital tools allowed them to provide quicker feedback, use interactive quizzes, and manage assessments more flexibly, which raised satisfaction. However, after returning to face-to-face schooling, some participants expressed doubts about the

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fairness and reliability of digital assessments, especially in summative contexts, leading to a partial return to traditional paper-based methods. As one teacher explained: "I found online quizzes engaging, but in the classroom, I still prefer paper tests to make sure every student is treated equally."

This combination of quantitative and qualitative findings suggests that while digital assessments were appreciated during the pandemic, sustaining high satisfaction levels post-pandemic requires addressing issues of equity, validity, and institutional support.

4.8 Teachers' perspectives on pedagogical shifts

The focus group discussions highlighted that digital tools encouraged more active and autonomous learning methods during the pandemic. However, only 26% of teachers reported successfully implementing these methods to their full potential during ERT/IFFT. This indicates a need for further professional support to maximize the benefits of DT.

5. Discussion

Disparities in student access to reliable internet and devices undermined the fairness of digital assessments, especially in rural and economically disadvantaged regions, exacerbating existing educational inequalities. (OECD, 2021) and (UNESCO, 2023) reports similarly emphasized that the digital divide was one of the most pressing global barriers to equitable learning during the pandemic.

Despite gains in digital competence, many educators felt inadequately trained to implement advanced digital assessment methods. The absence of clear guidelines and institutional support during the early stages of emergency remote teaching further intensified these challenges. International evaluations confirm that teachers worldwide often relied on self-directed learning or peer networks to adapt to new tools, highlighting the need for systematic professional development (González et al., 2023; OECD, 2020).

Concerns also persisted around the reliability of digital summative assessments. Teachers were skeptical about issues such as the lack of standardized protocols and academic dishonesty, defined in this primary education context as unauthorized parental assistance and the unmonitored use of external online resources, concerns that are widely echoed in international literature (Pearce & Chiavaroli, 2023). Nevertheless, the findings indicate a significant shift in pedagogical practices driven by the adoption of digital tools. Teachers experimented with strategies such as gamification and interactive quizzes to boost engagement, aligning with Garcez et al. (2022) findings that technology can foster more student-centered learning. However, many innovations were not sustained post-pandemic, largely due to insufficient institutional support.

Focus group discussions reflected these tensions: while some teachers saw digital assessment as an opportunity to modernize education, others continued to prefer face-to-face methods for their perceived reliability. This mirrors a wider international debate about how best to balance digital innovation with traditional practices.

Addressing the challenges identified in this study requires targeted interventions at multiple levels:

- Infrastructure Investments: policymakers must prioritize bridging the digital divide by improving access to reliable internet and devices for all students. This is crucial for ensuring equity in digital assessment practices (Eugster et al., 2022).
- Comprehensive Training Programs: teachers need ongoing professional development to build their competence and confidence in using DT for assessments. Training should focus on both technical skills and pedagogical strategies to maximize the effectiveness of digital tools (Jurāne-Brēmane, 2021).

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- Development of Secure Assessment Platforms: Ensuring the validity and reliability of digital assessments requires robust and secure platforms that address concerns about academic dishonesty and standardization. Collaborative efforts between educators and technology developers can help achieve this goal (Pearce & Chiavaroli, 2023).

By addressing these challenges, educational institutions can better integrate digital technologies into their assessment practices, ensuring they are fair, reliable, and effective in enhancing student learning outcomes.

6. Conclusion

This study sheds light on the evolution of digital assessment practices among Greek primary school teachers, particularly in the context of the COVID-19 pandemic. The findings reveal a significant increase in the adoption of digital technologies (DT) for both formative and summative assessments during periods of Emergency Remote Teaching (ERT) and Intermittent Face-to-Face Teaching (IFFT). This shift underscores the potential of digital tools to enhance educational practices by providing real-time feedback and continuous monitoring of student progress (Wilkinson et al., 2023).

However, the study also highlights persistent challenges that impede the effective integration of DT in assessments. Notably, digital inequity remains a significant concern, with disparities in student access to reliable internet and devices undermining the fairness and inclusivity of digital assessments. Additionally, many educators reported feeling inadequately prepared to implement advanced digital assessment methods, citing a lack of comprehensive training and clear guidelines during the initial phases of ERT (González et al., 2023). These challenges align with findings that emphasize the need for targeted professional development and infrastructure investments to support the long-term adoption of digital tools in education (Myyry et al., 2022).

Furthermore, concerns regarding the validity and reliability of digital summative assessments persist. Issues such as academic dishonesty and the lack of standardized protocols for remote assessments have led to skepticism among educators about the effectiveness of these methods. This sentiment aligns with international research highlighting the limitations of online assessment methods and the need for robust and secure digital platforms to ensure assessment integrity (Pearce & Chiavaroli, 2023).

The mixed perceptions of digital assessments among teachers reflect a broader debate within the educational community. While there is recognition of the potential for digital tools to modernize education, there remains a preference for traditional face-to-face assessments due to their perceived reliability and alignment with established pedagogical values. This highlights the importance of developing a balanced approach that integrates the strengths of both digital and traditional assessment methods to meet diverse educational needs.

In conclusion, while the COVID-19 pandemic has acted as a catalyst for the adoption of digital assessment practices, sustaining and enhancing these advancements requires a coordinated effort. To translate the 'transformative resilience' identified herein into enduring pedagogical innovation, this study proposes a tripartite framework for the post-pandemic era. The first recommendation entails the formal adoption of hybrid assessment models that utilize digital instruments for continuous, low-stakes formative monitoring, while retaining in-person modalities for summative assessment to ensure academic integrity. Secondly, the curriculum should transition from isolated testing events toward the use of digital portfolios, enabling a longitudinal demonstration of student competence that reduces reliance on high-pressure examinations. Finally, teacher training programs must be recalibrated to include competencies in learning analytics, thereby enabling educators to utilize data-driven diagnostics to tailor instruction to individual learner needs. Addressing persistent barriers such as digital inequity, inadequate teacher preparedness, and concerns about assessment validity is essential. Future

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research should focus on exploring the long-term impact of digital assessments on student outcomes and identifying effective strategies for integrating digital tools into assessment practices to create an equitable and effective educational landscape.

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Leonidas Chalkiadakis is an educator and researcher who earned his PhD from the Autonomous University of Barcelona, focusing on teachers' digital culture. Since 2009, he has served in primary and higher education and currently advises on educational policy for the Region of Crete. A specialist in digital transformation, he has organized and participated in numerous international conferences, bridging evidence-based research with real-world needs to drive innovation in modern pedagogical practices.
Contact: leo@xal.gr

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