

Online Teaching in Successive Crisis Contexts: Arab Teachers' Perceptions in Two Emergency Periods

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Abstract

This qualitative study explored 41 Arab-Israeli teachers' perceptions of the transition to online learning during two crises: the COVID-19 pandemic and the Iron Swords War in Israel. Using the Technology Acceptance Model (TAM) as a conceptual framework, the study examined three central dimensions of teachers' use of digital tools: perceived usefulness, perceived ease of use, and intention to integrate digital tools into future teaching. The findings revealed a marked shift in teachers' attitudes and practices, from reactive and constrained adoption during the COVID-19 pandemic to more confident and pedagogically grounded use of digital tools during the subsequent crisis. During the pandemic, teachers experienced significant technological and pedagogical challenges, which limited their perceptions of both effectiveness and usability. In contrast, during the war, accumulated experience enabled more confident and effective implementation of digital tools. While initial adoption during COVID-19 was often reactive and fragmented, the subsequent crisis was characterized by greater pedagogical alignment, increased student engagement, and broader willingness among teachers to embed digital tools into their routine teaching. The study highlights the importance of contextual readiness, sustained professional development, and institutional support in fostering long-term technology acceptance in education.

Keywords: Arab teachers; online learning; educational technology; Technology Acceptance Model (TAM); crisis-based education

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The global outbreak of the COVID-19 pandemic in 2020 and the severe restrictions it imposed triggered an unprecedented transformation in education systems worldwide. Schools were required to shift rapidly to remote learning, delivered through synchronous and asynchronous modalities, including online chat, hybrid models, and video-conferencing platforms (Lestiyanawati & Widyantoro, 2020). In this context, digital technology emerged as an indispensable tool for ensuring the continuity of learning and mitigating educational disruptions (Maatuk et al., 2022; Rasmitadila et al., 2020).

Research has consistently highlighted the pedagogical advantages of integrating digital technologies into education, including the enhancement of teaching quality (Bray & Tangney, 2016; Vassel & Ragonis, 2024), adaptation of instruction to individual student needs, expanded access to learning resources (Pourhossein Gilakjani & Sabouri, 2017), and increased student engagement (Lee et al., 2021; Orlando & Attard, 2016; Schacter & Jo, 2017; Shamir et al., 2017). Technology has also been shown to reshape the teacher's role into that of a facilitator of innovative, student-centered learning (Mishra & Koehler, 2006). Despite these benefits, numerous studies emphasize the difficulties associated with technology integration, variously attributed to teachers' lack of technological proficiency (Simons et al., 2017), inexperience with digital tools (Wood et al., 2005), and most significantly, their perceptions of technology (Adov et al., 2020; Fitzgerald et al., 2023; Scherer & Teo, 2019).

The present study examined how Arab-Israeli teachers perceived the use of digital tools during two distinct periods of emergency remote teaching—the COVID-19 pandemic and the Iron Swords War. Drawing on the Technology Acceptance Model (TAM; Davis, 1989), it explored teachers' perceptions of the usefulness and ease of use of digital tools, as well as their reported willingness to integrate these tools into future teaching practices. By comparatively analyzing retrospective accounts of each crisis period, the study sought to illuminate similarities and differences in technology-related perceptions across successive emergency contexts.

The analysis drew on the Technology Acceptance Model (TAM; Davis, 1989), a well-established and widely used model for explaining individuals' acceptance and use of technological systems in diverse contexts, including among teachers. The model posits that technology adoption is shaped by two central perceptions: perceived usefulness, defined as the extent to which users believe a technology enhances their performance, and perceived ease of use, referring to the degree to which the technology is perceived as requiring minimal effort. These perceptions influence users' attitudes and behavioral intentions to use technology, and these intentions shape their actual integration practices.

In crisis contexts, the conditions under which technology is introduced in education differ from routine educational settings. Emergency remote teaching is often characterized by rapid implementation, limited preparation, and constrained alternatives, rather than by gradual pedagogical planning (Hodges et al., 2020). Under such conditions, teachers' perceptions of usefulness and ease of use become particularly salient for understanding both their immediate engagement with digital tools and their willingness to integrate these tools into future teaching practices. The use of TAM enables a systematic examination of how teachers interpret and evaluate digital technologies when teaching in emergency conditions and how these perceptions evolve across successive crises.

The study sample comprised Arab teachers teaching in Arab schools in the Israeli national education system. The sample was deliberately chosen. Educational structures and

professional conditions in Arab schools are shaped by historical, social, and political factors (e.g., Arar, 2012; Haddad Haj-Yahya & Rudnitzky, 2018; Reingold & Baratz, 2020), causing Arab schools to lag behind their Jewish counterparts in those areas. A crisis is likely to exacerbate existing inequalities, as it will affect teachers' access to resources, institutional support, and capacity to adapt pedagogical practices (Vasel, 2023, 2025b), making the reflections of Arab teachers of particular interest.

Many studies have examined teachers' responses to technology during the COVID-19 crisis (e.g., Orhan & Beyhan, 2020; Rasmitadila et al., 2020). Far fewer have explored how teachers' technology-related perceptions evolve across successive emergency contexts, and to the best of our knowledge, no research has focused on a minority population. This study adds to the literature by examining Arab-Israeli teachers' perceptions at two distinct points, conceptualizing the COVID-19 pandemic and the subsequent war-related disruption as stages within an ongoing process of pedagogical and technological adaptation.

Literature Review

Online learning and emergency learning.

Online learning, defined as “the process of teaching and learning using digital devices designed for this purpose” (Clark & Mayer, 2016), is a pedagogical approach that can take place anytime and anywhere, is adaptable to the learner's pace, and is implemented using technological tools. Access to educational tools via Internet connectivity (Cojocariu et al., 2014) enables convenient, short-term learning (Aithal & Aithal, 2016), and there can be a physical distance between teacher and students (Fallatah, 2021).

This pedagogical paradigm became a crucial tool for learning during COVID-19, applied through three primary methods: synchronous learning, asynchronous learning, and a blended approach (Mahoney & Hall, 2020; Richardson et al., 2020). In the synchronous approach, teaching and learning processes occur in real time through the use of online digital tools. In the asynchronous approach, students learn independently without the teacher's presence and are sometimes required to submit assignments (Sturm & Quaynor, 2020; Tarman, 2020). The blended approach combines synchronous and asynchronous methods and aims to increase the flexibility of learning processes.

Online learning is a planned process conducted continuously, utilizing advanced digital platforms and tools (Fuchs, 2022). In contrast, emergency learning is an educational approach that operates suddenly and without prior planning, using available technological tools, especially online ones. COVID-19 was one such emergency. Studies conducted during the pandemic noted challenges in online implementation, including lack of knowledge in the field, lack of collaboration among educational staff, and unpreparedness of students, teachers, and parents (Lase et al., 2022). Other factors, such as the lack of resources and insufficient infrastructure, also hindered the implementation of teaching and learning processes using an online approach (Klapproth et al., 2020; Ramij & Sultana, 2020).

Online learning in the Arab education system in Israel.

Although the Arab education system in Israel is part of the general national education system, local policies and politics often impact it. For example, school principals' autonomy is often limited (Arar, 2012). They navigate significant pressure from inspectors and local authorities, and their leadership styles are shaped by clan-based political dynamics (Reingold

& Baratz, 2020). Economic factors play a crucial role as well, and Arab schools are under-resourced compared to Jewish schools (Haddad Haj-Yahya & Rudnitzky, 2018). This creates significant disparities between the Arab and Jewish sectors in terms of academic achievements, pedagogical quality, educational services (Abu Asba, 2008), the use of technology in teaching, and teacher motivation (Arar & Massry-Herzllah, 2016).

Dahan et al. (2020) argued this context significantly impacted the preparedness of the Arab education system for emergency remote learning during COVID-19. The number of students (and some teachers) who participated in online learning was limited. Approximately 50% of Arab students were not consistently engaged in online learning. In some areas, there was no online learning at all due to a lack of infrastructure, limited resources, and parental inability to support children in online education. Furthermore, the central technological platform for online learning was not linguistically adapted; it was based on Hebrew and lacked Arabic-language content. Nor was the platform culturally adapted. Arab schools tend to adopt a traditional and authoritarian culture (Vasel et al., 2025), emphasizing rote memorization and imitation and focusing on knowledge transmission. Meanwhile, contemporary educational policies in Israel and globally emphasize creativity, knowledge construction, inquiry, hypothesis testing, and critical thinking (Asbah, 2007).

In Arab-Israeli schools, students are often viewed as passive and lacking the right to express independent opinions or positions (Vasel et al., 2025), while the teacher is an authoritative figure who makes the decisions (Vasel et al., 2025). Many teachers adhere to traditional teaching methods and do not implement innovative learning strategies (Vasel, 2025a; Vasel et al., 2025). Research examining hybrid learning (a combination of online and face-to-face learning) during COVID-19 pointed to the reflection of the patriarchal and authoritative nature of Arab society in the adoption of traditional teaching methods, limited autonomy granted by school principals, and the underdevelopment of digital skills among teachers (Habiballah et al., 2021).

Teachers' pedagogical beliefs and attitudes towards technology.

The pedagogical approach teachers adopt in the classroom is derived from their pedagogical beliefs (Fives & Gill, 2014; Vasel, 2025a; Vasel et al., 2025). Accordingly, to assess the success of pedagogical innovation in teaching, particularly innovation based on a constructivist approach, it is essential to understand teachers' beliefs and perceptions (Liu, 2011; Sang et al., 2010; Vasel, 2025c; Vasel et al., 2025). For example, teachers who embrace a constructivist pedagogical approach, focusing on student-centered learning and the integration of technology in teaching, tend to use digital tools more than those who adopt a traditional pedagogical approach, where the student is viewed as passive and the teacher is the central figure in the classroom (Tondeur et al., 2017).

Teachers' attitudes towards technology significantly influence the success of its integration into teaching (Greer et al., 2016; Hsu, 2016; Tondeur et al., 2017). Studies show that teachers with a positive attitude towards technology are more likely to use digital tools in teaching (Demirci, 2009), believe in the importance of integrating technology into teaching, and can cope with the technical challenges (Ertmer et al., 2012).

TAM (Davis, 1989) seeks to understand why some users perceive certain information systems positively while others resist using them. The model suggests users' attitudes and subjective norms influence their intentions, and these intentions, in turn, predict their behavior. According to TAM theory, understanding the acceptance or rejection of an

information system requires focusing on two main perceptions: perceived usefulness and perceived ease of use. Perceived usefulness refers to the extent to which users believe using a particular information system will enhance their performance, while perceived ease of use refers to the expectation that using the system will require minimal effort.

The Present Study

Research objective.

The objective of this qualitative study was to investigate Arab-Israeli teachers' perceptions of the transition to online learning during two distinct crisis periods—the COVID-19 pandemic and the Iron Swords War—using TAM as a theoretical framework. More specifically, it examined teachers' perceptions of usefulness and ease of use of digital tools at two crisis points and their willingness to integrate them into their teaching practices.

Research questions.

1. How did Arab teachers perceive the usefulness and ease of use of digital tools during the COVID-19 pandemic and the Iron Swords War?
2. In what ways did these two crisis periods influence Arab teachers' willingness to integrate digital tools into their future teaching practices?

Methodology

Participants

The study involved 41 Arab teachers and two distinct crises. First, in 2023, 23 teachers were asked to reflect on their use of technology during COVID-19. They taught in 20 schools within the Arab community, located in the Haifa and Northern districts; 15 were women and eight were men. Eleven taught in elementary schools, eight in middle schools, and four in high schools. All taught core subjects, including languages, mathematics, and sciences. Second, in 2025, 18 teachers from the Northern District were asked about their use of technology during the 2024 Iron Swords War. This group consisted entirely of women. Ten elementary school teachers were from five schools, with two teachers representing each school. The remaining eight teachers were from three secondary schools; two teachers from one school and three teachers from each of the other two schools.

The Northern District was selected because of the researcher's residence in the region and her professional access to teachers in the Arab education system. In addition, in 2024, the Northern region experienced sustained security-related problems leading to the closure of schools and a full transition to online learning. This context was therefore relevant for examining teachers' experiences of emergency remote teaching in two crisis period.

Participants were recruited using a convenience sampling method based on accessibility (Richards & Morse, 2012). For the second period, the researcher also employed a snowball sampling method. Each teacher who agreed to be interviewed was asked to recommend at least one colleague from the same school who might be willing to participate. This approach ensured that at least two teachers from each school were involved, enriching the perspectives collected from each institution.

To be included, teachers had to be working in the Arab education system in Israel and to have taught during both periods of interest. Teaching experience and levels of digital literacy were not used as inclusion or exclusion criteria.

A recruitment call was published and disseminated through school administrators and pedagogical instructors in both periods. Teachers who agreed to participate filled out an online questionnaire that included their details and three suitable times for an interview.

Research Tools and Data Collection

Data were collected in semi-structured interviews to facilitate comprehensive information gathering. While a list of questions was prepared in advance, the order of questions was adaptable, allowing flexibility based on the dynamics of the interview, the characteristics of the interviewee, and the depth of responses. This approach enabled the introduction of additional questions as needed, eliciting thorough and rich insights (Wimmer & Dominick, 2013).

To ensure trustworthiness in the data collection and analysis phases (Holstein & Gubrium, 2021; Kornbluh, 2015; Thornberg & Charmaz, 2014; Willig, 2014), the level of detail in the interview questions was scrutinized by an independent expert specializing in the study's subject matter. The questions were subsequently translated from Arabic, the participants' native language, into Hebrew and evaluated by external researchers with expertise in relevant issues in Arab society, thereby ensuring their reliability and accuracy.

The interview questions were designed to explore teachers' attitudes towards online remote learning, focusing on the perceived usefulness and ease of use of technological tools during the two crisis periods. Participants interviewed after the COVID-19 period and those interviewed after the war constituted two distinct groups. The interviews were conducted shortly after the relevant crisis period. Each participant was interviewed once. Participants were invited to reflect on their experiences during the crisis. Participants at the second time point were also asked to reflect on how their experiences during COVID-19 affected their wartime experiences.

All interviews were conducted in the participant's native language, fostering a personal and direct interaction between interviewer and interviewee. Each interview lasted a minimum of 45 minutes. To accommodate crisis-related restrictions and minimize participant burden, most interviews were conducted via video conferencing (using Zoom) in the afternoon or evening. Notably, while the majority of teachers expressed a preference for online interviews, two participants requested face-to-face meetings; these were arranged at a community center that graciously hosted them. All interviews were recorded and transcribed for subsequent analysis.

Data Analysis

The interview questions were not structured explicitly around TAM, but the model was used as an analytical lens to interpret teachers' accounts. Themes emerged inductively from the interview data and were mapped onto the three TAM dimensions—perceived usefulness, perceived ease of use, and intention to integrate digital tools—in relation to the study's research questions. Questions addressing perceptions of effectiveness, motivation, and perceived drawbacks were analytically associated with perceived usefulness; questions focusing on challenges, skills, and manageability were linked to perceived ease of use;

questions concerning future integration and school-level preparedness were interpreted in relation to teachers' intention to integrate digital tools into their future teaching practices. Appendix A presents the interview questions and illustrates their alignment with the research questions and TAM framework.

Data were analyzed using inductive qualitative content analysis (Cho & Lee, 2014), following the six phases of thematic analysis outlined by Braun and Clarke (2006): familiarization with the data, generation of initial codes, identification of potential themes, review of themes, definition and naming of themes, and development of the final thematic structure. The coding process was conducted by the researcher through an iterative cycle of open coding and constant comparison across interview transcripts. Initial codes were derived inductively from the data and continuously refined through repeated engagement with the transcripts. Themes that emerged inductively from the data were mapped onto the TAM constructs to support theoretically grounded interpretation while preserving the integrity of participants' accounts.

A multiple-case study design was employed (Yin, 2014), treating each period (COVID-19 and the war) as a distinct case. Within-case analyses were conducted separately for each period, followed by a cross-case comparison aimed at identifying similarities and differences between the two crisis contexts. This cross-case comparison was conducted by systematically examining patterns across themes in relation to the three TAM dimensions.

Established qualitative research practices were applied to enhance the trustworthiness of the findings, including repeated and careful reading of transcripts and systematic analysis of the data (Alshenqeeti, 2014). Credibility was supported through sustained engagement with the data, dependability through consistent application of the analytical framework and documentation of analytic decisions, confirmability through reflexive analysis and data-grounded interpretations, and transferability through detailed contextual description.

Although coding was conducted by a single researcher, analytic rigor was supported through systematic documentation of coding decisions, iterative re-examination of codes and themes, and consistent application of the analytical framework across cases. Formal member checking, peer debriefing, and triangulation were not employed.

Ongoing reflexivity was maintained throughout the analytical process, with attention to the researcher's positionality and potential interpretive biases. The researcher's professional background and familiarity with the educational context were considered factors that might shape the research process. To address this, reflexive analysis was maintained, and interpretations were carefully grounded in participants' accounts rather than in prior assumptions.

As the interviews were conducted in Arabic and reported in English, particular attention was given to language validity. The researcher, fluent in Arabic and English, conducted the translations and systematically reviewed all translated excerpts against the original transcripts to ensure semantic accuracy and contextual equivalence. This cross-language verification process aimed to preserve the intended meanings of participants' statements and minimize the risk of interpretive distortion. At the end of each interview, participants were given the opportunity to clarify, refine, or expand their responses, thereby supporting the credibility of the data and their interpretation (Creswell & Creswell, 2017).

Data analysis continued until no new themes emerged within or across the two cases. In interpreting the findings, the reflective nature of the interviews was taken into account and data were interpreted with caution.

Ethical Considerations

The study received approval from the Chief Scientist of the Ministry of Education and ethical clearance from the institutional ethics committee prior to data collection. Participation was voluntary, and informed consent was obtained from all participants. Participants were informed about the purpose of the study and their right to withdraw at any stage without consequence. Confidentiality and anonymity were ensured by removing identifying information from the transcripts and using pseudonyms in all reports. All data were stored securely and were accessible only to the researcher.

Results

The findings are presented in two stages: first, findings for each of the two crisis periods (within-case analysis), and second, comparative findings (across-case analysis).

Within-Case Findings

Case 1: COVID-19 pandemic.

(1) Perceived Usefulness. Teachers described the transition to online learning during the COVID-19 pandemic as both disruptive and transformative. While the shift was sudden and unplanned, many saw significant benefits in using digital tools for instruction. Teacher Hassan stated, “The shift gave us a reason to rethink everything. We found ways to make lessons more interactive and relevant.” Similarly, Teacher Doaa emphasized, “Moving to online platforms improved the way I delivered content; it became easier to reach all students.”

Several teachers noted improvements in student engagement and autonomy. Teacher Leen shared, “Before the pandemic, my students were passive. Online learning made them more responsible and engaged.” Teacher Azl observed, “Digital tools helped students who were usually quiet to participate more. I saw them come to life during Zoom discussions.”

Others emphasized the pedagogical innovation it enabled. Teacher Mayan explained, “It allowed me to try things I never had time for before, like project-based learning and peer reviews.” According to Teacher Adam, “We finally entered the 21st century. I felt like I was teaching skills that actually matter.” Some teachers linked it to their students’ development of broader life skills. Teacher Sona said, “Students learned to manage their time, communicate better, and ask questions more clearly.” In this sense, digital tools were seen not only as instructional aids but as mechanisms for personal growth.

Still, teachers clarified that perceived usefulness was conditional. Teacher Sawsan noted, “It works, but only if there’s support. Without training, it’s overwhelming.” Teacher Ibrahim added, “There’s no point in having great platforms if the teacher doesn’t know how to use them effectively.” Importantly, while teachers saw potential in the tools, many emphasized that the initial transition was chaotic. Teacher Eden reflected, “It all happened too fast. We didn’t have time to explore or test anything; we were just thrown in.” Even so, some

viewed the disruption as a necessary catalyst. Teacher Areen concluded, “We wouldn’t have changed without the pandemic. It forced us to move forward, even if the process was messy.”

(2) Perceived Ease of Use. While some teachers adapted quickly to online teaching platforms, others found the experience difficult and stressful. Technological barriers were a common theme. Teacher Sime said, “Learning the systems while also teaching was exhausting. I felt like I was always behind.” Teacher Mervat added, “Every new app came with new problems. I spent more time troubleshooting than teaching.” Access inequality also played a significant role. Teacher Abed explained, “Many of my students didn’t have stable Internet. I couldn’t reach everyone.” For others, emotional and relational aspects of teaching were harder to replicate online. Teacher Soha said, “I missed the energy of the classroom, the smiles, the body language.” Teacher Rana noted, “I couldn’t tell who was following and who was lost. It felt like teaching in the dark.”

Despite the challenges, some teachers found ways to adapt and were positive about the experience. Teacher Amna said, “Teaching from home gave me flexibility. I could plan better and focus more without distractions.” Teacher Mahmud echoed this, saying: “Some of my students who struggled in class found it easier to engage from home.” Teacher Salma shared, “We created group work via shared documents, which helped restore a sense of collaboration.” Teacher Adam observed, “Recording lessons helped students review at their own pace, and it helped me reflect too.”

The main consensus was that ease of use improved over time, but only with support. Teacher Reem remarked, “Once we got training, things became manageable. But the start was too abrupt.”

(3) Intention to Integrate Digital Tools in Future Teaching. Teachers were divided in their long-term commitment to using digital tools after the pandemic. Those who had positive experiences expressed enthusiasm. Teacher Areen said, “I’m definitely going to keep using online platforms; it opened up new ways to connect with students.” Teacher Soha explained, “Technology won’t replace face-to-face teaching, but it adds value. I plan to use both.” Teacher Hassan offered a balanced view: “I’m not abandoning traditional methods, but I now have more options. I can mix and match.” Teacher Sawsan agreed: “I’ll keep what worked and leave what didn’t. Some tools really improved student engagement.”

Not all teachers shared this optimism. Teacher Leen admitted, “It didn’t work for me. It felt disconnected and ineffective. I’ll probably go back to the old ways.” Teacher Aml added, “If the tools don’t make teaching better, there’s no reason to keep them.” The variation in intention often depended on the teacher’s personal experience, access to resources, and perceived success. Teacher Ali commented, “Using platforms for homework and grading saved me time; I’ll definitely continue that.” But Teacher Seham said, “The learning curve was too steep. I’d rather not go through that again.” Teacher Morad raised concerns about student access: “It’s not fair if not all students have devices or internet. That has to be fixed before we make it permanent.”

Despite skepticism, many teachers expressed a newfound openness to pedagogical experimentation. Teacher Rana concluded, “Now that I’ve tried new methods, I’m not afraid to try more. That’s a big shift for me.”

Case 2: Iron Swords War.

(1) Perceived Usefulness. Teachers who engaged in online teaching during the wartime crisis had more favorable and confident perceptions of the usefulness of digital tools, shaped by their prior experiences during the COVID-19 pandemic. Teacher Roz explained, “This time, we knew what we were doing. We had strategies, tools, and confidence.” Teacher Eden stated, “During COVID, we were lost. Now we’re prepared. I adjusted my materials in a day and was ready to go.” Teacher Areej added, “I reused the digital content I developed earlier; it saved time and worked even better the second time.”

The usefulness of digital tools was especially evident in maintaining learning continuity under stress. Teacher Maha said, “The platform allowed me to keep my students focused despite the fear and uncertainty around them.” Teacher Nawal reflected, “My students said our sessions were a kind of escape. That made it feel worthwhile.” Teachers also emphasized how online learning supported differentiation and independent learning. Teacher Huda noted, “I tailored materials to different levels easily. Students worked at their own pace, and it worked well.” Teacher Dima added, “It helped students who usually stay behind to actually succeed. That was new for me.”

Some identified institutional benefits. Teacher Walaa shared, “Parents were impressed that we continued learning so smoothly. It strengthened their trust in the school.” Teacher Iman stated, “We felt more professional and capable this time. That changed how I see myself as a teacher.” Still, a few teachers emphasized that usefulness was conditional on experience and prior investment. Teacher Nour said, “Without what we learned during the pandemic, this would have been a disaster. It’s the same tools, but we’re better users now.”

(2) Perceived Ease of Use. In contrast to the pandemic experience, most teachers found the technological aspect of online learning during the war manageable. Teacher Samar explained, “I already knew the tools, so I focused on teaching, not figuring out how Zoom works.” Teacher Lina added, “Everything was smoother. We didn’t waste time on technical problems like before.” Digital literacy had clearly improved for both teachers and students. Teacher Asma commented, “Even students who struggled last time knew what to do. The learning curve was gone.” Teacher Dana reflected, “I didn’t have to explain everything again. They were independent. That saved me energy.”

Some challenges remained, particularly around emotional and social engagement. Teacher Walaa said, “It was easier technically, but emotionally harder. The war was scary. Sometimes I couldn’t get students to focus.” Teacher Hadel added, “There were days when the tension made teaching feel mechanical. But the platform helped us stay connected.”

Still, teachers were more confident in managing their classes online. Teacher Aseel shared, “I created routines. Students knew what to expect, and that gave them stability.” Teacher Siham said, “It wasn’t ideal, but it was workable, and that’s a big improvement from COVID.” The infrastructure was also stronger. Teacher Fatima noted, “This time, the school had backup plans. We had guidelines and tech support.”

(3) Intention to Integrate Digital Tools in Future Teaching. The experience of teaching during war positively influenced many teachers’ intentions to integrate digital tools into future classroom practices. Teacher Roz said, “Now I see technology as part of my toolbox. It’s not either/or; it’s both.” Teacher Lina added, “I already use online platforms for assignments and feedback. I plan to keep doing that.”

Several teachers described a shift in mindset, from viewing digital tools as a temporary solution to seeing them as a long-term asset. Teacher Dana said, “It’s not just about emergencies. I realized tech helps with everyday teaching too.” Some teachers said digital tools increased their instructional flexibility. Teacher Iman reflected, “I recorded short videos and used them even after we returned to school. Students love having material to review.”

Others acknowledged ongoing limitations but expressed a desire to use technology selectively. Teacher Samar explained, “I’ll keep what worked, especially for homework and communication. But I won’t rely on it for everything.” A few teachers remained cautious, however. Teacher Fatima stated, “I prefer face-to-face teaching. I’ll use technology to support, not replace it.” Teacher Siham added, “Not all content works well online. We need to be thoughtful in how we use it.”

Overall, the wartime crisis solidified the role of digital tools as part of teachers’ regular pedagogical repertoire. Teacher Hadel concluded, “We used to be afraid of technology. Now we see it as something we can control and use well.”

Cross-case Comparative Findings

Table 1 synthesizes the findings across the two cases.

Table 1

Comparison of the COVID-19 Pandemic and the Iron Shields Wartime Period Based on TAM

TAM Dimension	COVID-19 Pandemic (2020)	Wartime Period (2024)
Perceived Usefulness	Limited and inconsistent usefulness due to lack of preparation	High perceived usefulness supported by prior experience
Perceived Ease of Use	Low ease of use, many technical and emotional challenges	Improved ease of use, fewer technical barriers, better digital fluency
Intention to Integrate	Divided attitudes, dependent on personal experience and training	Broad willingness to integrate tools in future teaching

Over time, there was a growth in both positive perceptions and practice. During the COVID-19 pandemic, the transition to online learning was abrupt and unstructured, leading to mixed experiences. Teachers struggled with unfamiliar platforms, unequal access to devices, and a lack of pedagogical models. Although many acknowledged the potential of digital tools, their perceived usefulness was often overshadowed by logistical and emotional barriers. In the wartime context, teachers entered remote learning with prior experience, increased confidence, and refined digital strategies. Their perceptions of usefulness and ease

of use were more stable and positive. Importantly, their willingness to integrate digital tools in future teaching was significantly higher, with many viewing technology as a permanent enhancement of their pedagogy. Findings suggest familiarity, support, and accumulated experience are key enablers of technology acceptance. Teachers' attitudes evolved from initial compliance in 2020 to confident and proactive integration in 2024. This evolution reinforces the core assertion of TAM: acceptance is not only about the tool's features, but also about the context, competence, and confidence surrounding its use.

Discussion

This study explored Arab-Israeli teachers' perceptions of online learning in two crisis contexts, the COVID-19 pandemic and the Iron Shields War, using TAM as an analytical framework to understand how attitudes towards digital tools evolved. Findings showed a clear progression, reflecting a shift from forced adoption under pressure to confident and intentional integration of technology. Importantly, this progression cannot be explained by technological exposure alone; rather, it reflects a cumulative process shaped by contextual, cultural, and institutional conditions that reconfigured teachers' professional agency over time.

Perceived Usefulness

During the pandemic, many teachers identified the potential of digital tools to enhance instructional practices, increase student engagement, and develop 21st-century skills (Rafiq et al., 2024; Vasel, 2023). However, this perceived usefulness was tempered by limited preparedness, lack of pedagogical models, and the emotional strain of crisis-driven adaptation (Panadero et al., 2022). As reflected in the cross-case comparison, teachers' assessments of usefulness during this period were often tentative and situational, shaped by the immediate demands of emergency remote teaching rather than by established pedagogical experience.

Teachers had a more consistent and confident perception of the benefits of digital platforms during the wartime crisis. Drawing on prior experience, they were able to implement tools more effectively, personalize instruction, and use technology to maintain a sense of continuity and emotional stability for students, a finding echoed in research conducted in wartime educational contexts elsewhere (Ovcharuk, 2023; Sytnykova et al., 2023). In contrast to the pandemic period, perceived usefulness was grounded in familiarity; teachers relied on previously developed digital routines, not improvised solutions.

The evolution underscores a key principle in TAM: perceived usefulness increases not only with exposure to the technology itself, but also with accumulated experience and successful application. The cross-case comparison indicates that the pandemic functioned as an initial point of exposure to online teaching, while the wartime context enabled a consolidation of digital practices, contributing to more stable and confident perceptions of pedagogical value. Previous research has similarly shown digital tools are more likely to be seen as useful when integrated within a familiar pedagogical framework (Abdulrahman et al., 2020; Bray & Tangney, 2016; Shamir et al., 2017). Building on this literature, the present findings suggest that differences in perceived usefulness across the two crises were primarily related to changes in teachers' accumulated experience and preparedness, rather than to the technological tools themselves.

Perceived Ease of Use

The contrast between the two periods was stark for perceived ease of use. During the pandemic, teachers experienced significant difficulties navigating new platforms, managing technical breakdowns, and addressing the digital divide among students. Many expressed frustration with the need to teach and troubleshoot simultaneously, often without adequate training or support (Norman et al., 2022). In this initial crisis period, ease of use was frequently described as limited and burdensome, constraining teachers' ability to focus on instructional decision-making.

By the time the war broke out, however, the majority of teachers had become more digitally literate. They reported smoother implementation, greater familiarity with tools, and a stronger infrastructure within their schools. The students themselves had gained experience, reducing the overall technological burden. While emotional stress persisted due to the wartime context, the technical and instructional processes were described as far more manageable (Lytvyn et al., 2024; Sytnykova et al., 2023). In contrast to the pandemic period, teachers saw online teaching as technically manageable, allowing more attention to pedagogy and less to technological problem-solving.

It is important to situate these findings within the access conditions under which online learning took place during each crisis period. During both the pandemic and the war, instruction combined synchronous Zoom-based teaching with asynchronous self-directed learning, and learning occurred primarily in students' homes rather than school facilities. Internet access and connectivity were generally more stable during the pandemic. The wartime period was characterized by more frequent disruptions; some students participated from shelters, and this occasionally affected signal quality and continuity of connection. These contextual conditions help explain why, despite overall improvement in perceived ease of use due to accumulated experience, infrastructural constraints remained a limiting factor in the second crisis.

Previous work has found that continuous exposure, hands-on practice, and professional development are crucial for overcoming initial barriers (Francom, 2020; Kopcha, 2012). The findings affirm TAM's emphasis on the role of perceived ease of use in shaping technology acceptance. They add to the literature by suggesting perceived ease of use is not static; it evolves with time and training. Viewed through a cross-case lens, the findings indicate the perceived ease of use shifted gradually across the two crises, in parallel with teachers' growing familiarity with online teaching practices.

Intention to Integrate Digital Tools in Future Teaching

Teachers' willingness to continue using digital tools post-crisis differed markedly for the two periods. During the pandemic, intentions were fragmented: some educators embraced the flexibility and innovation made possible by digital platforms, but others remained skeptical, citing fatigue, disengagement, and pedagogical goals (Bajaj et al., 2021; Herawati et al., 2022). These fragmented intentions reflect the emergency-driven nature of technology use during the pandemic; adoption was situational and shaped by immediate constraints, not by sustained pedagogical planning. Teachers reflecting on the wartime period expressed clear and confident intentions to integrate digital tools into their future classroom practices. They viewed technology not as a temporary solution, but as a lasting enhancement that could support differentiated instruction, formative assessment, and student autonomy. Their intentions were articulated with greater clarity and selectivity, drawing on prior experience with online teaching and a clearer understanding of which tools were pedagogically valuable.

This shift aligns with recent literature suggesting behavioral intention increases when both perceived usefulness and ease of use are present (Venkatesh & Davis, 2000). From a cross-case perspective, the findings suggest that strengthened perceptions of usefulness and ease of use contributed to more stable and coherent intentions to integrate digital tools. The wartime experience, building on lessons from the pandemic, created a stronger foundation for intentional and strategic adoption. Teachers moved from reactive to proactive use of technology—a key indicator of meaningful integration. Rather than reflecting a simple continuation of emergency practices, this transition indicates a shift toward more deliberate consideration of technology as part of teachers' regular instructional repertoire. Moreover, changes in intention were not only individual but also institutional. Teachers said school leadership, infrastructure, and professional cultures were more supportive in 2023–2024, reinforcing their motivation to continue using digital tools.

Together, these cross-case findings suggest that teachers' intentions evolved over time in parallel with their accumulated experience and growing confidence in using digital tools under crisis conditions.

Interaction of TAM Dimensions Across Successive Crisis Contexts

Findings for the two crisis periods indicate that perceived usefulness, perceived ease of use, and intention to integrate digital tools were not experienced as independent dimensions but as interrelated perceptions that evolved together. During the COVID-19 pandemic, difficulties related to ease of use often limited how usefulness was evaluated, contributing to unstable intentions regarding future integration. In contrast, during the wartime period, accumulated experience enabled greater ease of use, supporting more consistent perceptions of usefulness and clearer intentions to integrate digital tools.

Situated within the Arab-Israeli educational context, this interaction reflects how technology acceptance developed under conditions of limited preparedness and structural constraint, and how repeated crisis exposure enabled a gradual re-alignment of these perceptions. TAM thus serves to interpret not isolated attitudes but the evolving relationships among perceptions across successive emergency contexts.

Limitations and Future Research

A limitation of this study was its reliance on teachers' self-reported perceptions, which reflect subjective experiences rather than direct classroom observations or student learning outcomes. Accordingly, the findings are based on teachers' self-reported interpretations of their online teaching experiences, not on objective measures of instructional quality or learning outcomes. Another limitation was the study design; data were collected at the end of each crisis period with two different groups of teachers, enabling comparison of collective patterns rather than individual longitudinal change. The participant groups were unbalanced in size (23 vs. 18), and the second group consisted exclusively of female teachers, limiting cross-period comparability. Finally, the relatively small sample size and the context-specific focus on Arab teachers in Israel may limit the generalizability of the findings to other educational systems or crisis settings.

Future research could complement the present findings with longitudinal or mixed-methods studies that incorporate classroom observations or performance data to capture how teachers' evolving technology acceptance translates into measurable

instructional impact. Studies should also explore students' and school administrators' perspectives on online teaching during a crisis.

Conclusion

The findings suggest a process of maturation in teachers' engagement with educational technology. The COVID-19 pandemic served as an abrupt initiation into digital teaching, marked by struggle and improvisation. During the wartime period, increased experience, infrastructure, and confidence converged to produce more sustainable and positive perceptions.

The study contributes to the online learning literature by showing that teachers' engagement with online teaching is shaped cumulatively rather than episodically. Rather than responding to each emergency in isolation, in the second crisis, teachers drew on prior experience to re-evaluate the usefulness, ease of use, and future integration of online teaching practices. Importantly, these shifts were not driven by technological familiarity alone, but by differences in the nature of the crisis contexts, including levels of institutional preparedness, stability of learning conditions, and the emotional and structural demands on teachers and students.

The study underscores the dynamic nature of technology acceptance and highlights the importance of longitudinal support—pedagogical, technical, and emotional—for fostering deep and lasting integration of digital tools in educational contexts. From a practical perspective, the findings point to the need for sustained, experience-based professional development that moves beyond emergency training toward pedagogically grounded integration of digital tools. At the policy level, investment in continuous teacher training, school-level technological infrastructure, and clear guidelines for online teaching in crisis situations may strengthen system readiness and support more effective and resilient online learning practices.

Availability of Data

The dataset used in this study is accessible upon reasonable request, subject to the author's approval.

Declaration of Competing Interest

The author declares no competing interests.

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Appendix A

Interview Questions and Their Analytical Alignment with the Research Questions and the TAM Framework

Table A1

Alignment Between Research Questions, TAM Dimensions, and Interview Questions

Research Question	TAM Dimension Guiding Analytical Interpretation	Interview Questions (examples)
RQ1	Perceived usefulness	How did each crisis period influence your perception of the effectiveness of online teaching compared to traditional methods?
RQ1	Perceived usefulness	What factors motivated you to adopt technological tools in each context, and why were they significant?
RQ1	Perceived usefulness	While we acknowledge the benefits of technology in education, did you experience any drawbacks during either crisis period? If so, what were they?
RQ1	Perceived ease of use	What specific challenges did you encounter during each transition to remote learning?
RQ1	Perceived ease of use	Do you feel adequately skilled in using technological tools to effectively teach your students, and did this change between the two crises?
RQ2	Intention to integrate digital tools	What is your stance on the integration of technology in your teaching practices during each of the two periods?
RQ2	Intention to integrate digital tools	In your opinion, are schools better prepared today for the integration of technology, given their experiences during both the pandemic and the wartime period?
RQ2	Intention to integrate digital tools	Do you believe that your school environment fosters an atmosphere that encourages teachers to adopt technology in times of crisis and beyond?