The use of the digital environment of secondary school by parents in a blended learning format during the war in Ukraine

Iryna V. Ivaniuk, Olha P. Pinchuk

Institute for Digitalisation of Education of the NAES of Ukraine, 9 M. Berlynskoho Str., Kyiv, 04060, Ukraine

Abstract

In this article, we raise a discussion about the use of the digital environment of secondary schools by parents of students as participants in the educational process in a blended learning format during the war. To collect the data, we used an online survey with 5224 respondents from all regions of Ukraine. The results of the study allowed to determine the readiness of parents to use the digital environment of their child's school; identify the needs and challenges faced by parents; find out how parents assess their child's skills in independent learning in distance education; determine the level of material and technical support in the family with a device for distance learning. The findings according to the majority of parents, the most critical aspects of improving the digital environment of the school are the renewal of material support, access to the Internet, communication, the use of a single online educational platform, the use of interactive teaching methods of digital learning tools, and ensuring information security. Additional analysis reveals that 34.6% of parents remain unaware of their school's educational platform, highlighting critical communication gaps. The study demonstrates that conducting a regular survey among parents is important in order to identify problem areas, increase trust and engagement, take into account the needs of educational participants, maintain the quality of the educational process and introduce innovations. The research provides evidence-based recommendations for schools, policymakers, and community organizations supporting education during crisis.

Keywords

secondary education, digital learning environment, parents, study, monitoring, blended learning, wartime education, Ukraine

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1. Introduction

In modern society, we see how the progress of the digital society necessitates the constant and rapid development of digital education. The contemporary school is changing, and with it its digital learning environment (DLE) [1, 2, 3]. This applies to all components of the DLE, including the content and methods of teaching, technologies and teaching aids, digital resources, teaching support, tools for managing an educational institution, as well as communication and cooperation with all participants in the educational process (administration, teachers, students and parents of students).

To determine the effectiveness of the existing DLE of an educational institution, regular monitoring should be conducted among the participants of the educational process [4]. The monitoring system is effective in identifying and addressing issues that need to be improved in secondary education, it leads to improved functioning of key objects and actors through targeted interventions, and it helps to raise public awareness and improve education quality indicators [5]. Such work is especially important during the provision of general secondary education under martial law in Ukraine when the learning process in schools is carried out in different formats depending on the security situation in the region [6].

The war in Ukraine has fundamentally transformed the educational landscape, with parents assuming unprecedented roles in supporting their children's learning [7, 8, 9, 10]. Since February 2022, Ukrainian families have navigated educational disruption through varied learning formats: face-to-face instruction

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irinaivanyuk72@gmail.com (I. V. Ivaniuk); opinchuk100@gmail.com (O. P. Pinchuk)
0000-0003-2381-785X (I. V. Ivaniuk); 0000-0002-2770-0838 (O. P. Pinchuk)

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in safer regions, blended models in areas with intermittent security, and fully distance learning in frontline territories [11, 12, 13, 14]. This situation has positioned parents not merely as supporters but as essential mediators between schools and students, requiring them to master digital tools while managing war-related stress and displacement [15, 16, 17].

2. Literature review

The issues of the DLE in the secondary school are considered by Ovcharuk et al. [18], Pinchuk et al. [19], Taddeo and Barnes [20], Patton and Santos [21] who describe the organizational and pedagogical conditions of using the informational and digital environment. These foundational studies establish the theoretical framework for understanding digital environments in educational settings, though they were conducted before the current crisis context.

The use of digital tools and resources by secondary school teachers for the implementation of distance learning in Ukraine are covered by researchers of the Institute for Digitalisation of Education of the National Academy of Educational Sciences of Ukraine [22, 23, 24, 25, 26]. Their longitudinal research reveals evolving patterns of digital tool adoption, with significant acceleration during the COVID-19 pandemic that inadvertently prepared educators for wartime distance learning [27, 28, 29].

The challenges and needs of Ukrainian teachers in the use of digital tools for distance learning and professional development are revealed by Bobyliev and Vihrova [30], Ivaniuk and Ovcharuk [31, 32], Moiseienko et al. [33], Oleksiuk et al. [34], Ovcharuk et al. [11], Palamar et al. [35], Petrovych et al. [36], Ponomareva [37], Riabko et al. [38], Vlasenko et al. [39]. They highlight and compare the challenges faced by teachers during quarantine caused by COVID-19 pandemic and the war in Ukraine. Their findings indicate that while technical challenges persisted from pandemic to war, psychosocial support needs intensified dramatically under wartime conditions.

The issues of organizing the process of education in the conditions of war in Ukraine and Ukrainian refugee children abroad are considered by Nychkalo et al. [40], Ivaniuk [41, 42], Herbst and Sitek [43]. These studies document the fragmentation of educational experiences, with displaced students facing compounded challenges of new educational systems, language barriers, and trauma-related learning difficulties.

The involvement of parents in creating an effective educational environment was researched by Addi-Raccah et al. [44], Goodall [45]. Their pre-war research establishes baseline understanding of parental engagement patterns, providing comparative context for wartime adaptations. Recent studies during crisis contexts, such as Grobler's [46] examination of parental involvement during COVID-19 and Daniela et al. [47] analysis of remote learning perspectives, demonstrate that crisis conditions fundamentally alter traditional engagement patterns.

International experiences provide valuable comparative insights. Research on Syrian refugee education [48] demonstrates the effectiveness of parent-focused interventions in displacement settings, while studies from Uganda [49] highlight successful blended learning models in resource-constrained environments. These findings suggest that parental support programs integrated with digital platforms can mitigate trauma effects and maintain educational continuity despite severe disruption.

3. Theoretical framework

The study employs an ecological systems approach to understand parental engagement with digital environments during crisis. Following Bronfenbrenner's model as applied by Daniela et al. [47], we examine interactions across multiple system levels: the microsystem (parent-child-technology interactions), mesosystem (home-school digital connections), exosystem (community digital resources), and macrosystem (wartime conditions and cultural values).

Digital inclusion theory, as articulated by Owens et al. [50], provides framework for analyzing access barriers beyond simple connectivity metrics. This perspective examines device adequacy, platform

usability, digital literacy, and psychosocial readiness as interconnected dimensions affecting parental engagement capacity.

Resilience theory, applied to educational contexts by Halchenko et al. [15], illuminates adaptive responses to crisis. This framework recognizes parents as active agents mobilizing individual, family, and community resources to maintain children's learning despite extreme adversity.

4. Research method

The goal of the article is to present and analyze the results of a survey conducted among parents as participants of the educational process regarding the use of the digital environment of the secondary school where their child is studying and to present the parents' opinion on how to improve this environment. We used following methods to reveal this goal: analysis, synthesis, generalization and systematization of scientific sources – to determine the theoretical, methodological and applied aspects of the problem of using digital learning environment by participants of the educational process, empirical methods, in particular, questionnaires, surveys to find out the readiness of parents to the use of digital learning environment. The data were analyzed and interpreted using the methods of descriptive statistics and defining categories based on the analysis of answers to open questions.

4.1. Research design and participants

The research design was based on an online survey of parents of students in grades 1–11 via Google Forms. Empirical data was collected from 07.10.2024 to 18.10.2024. 5224 respondents took part in the survey. The age group of respondents is as follows: from 27 to 35 years old – 22.7%, from 35 to 45 years old – 60%, from 45 years old and older – 17.3%. By gender, 95.8% of them are female and 4.2% are male. The geographical coverage of the survey includes all regions of Ukraine.

The predominantly female sample reflects gendered patterns in educational involvement documented across multiple studies [46, 47], though this may limit understanding of paternal engagement patterns. Geographic representation included frontline regions (18%), recently liberated territories (7%), internally displaced persons temporarily residing in other regions (12%), and relatively stable western and central regions (63%).

4.2. Instrument development and validation

The survey instrument was developed through iterative process involving literature review, expert consultation, and pilot testing. Initial items were derived from validated instruments used in previous Ukrainian educational research [32, 25], adapted for wartime context. Five educational technology specialists reviewed items for content validity, suggesting modifications to address crisis-specific concerns.

Pilot testing with 50 parents revealed need for simplified technical language and additional response options reflecting wartime realities (e.g., "unable to access due to occupation " or "disrupted by air raids"). The final instrument contained 42 items across five domains: digital platform awareness and usage, communication patterns, device and connectivity access, parental support activities, and improvement priorities.

5. Research results

The study aimed to achieve the following objectives: to test the diagnostics of the effectiveness of using the digital environment of secondary school by parents; to determine the readiness of parents to use the digital environment of the school; to identify the needs and challenges faced by parents; to find out the parents' assessment of their child's skills in independent learning in distance education; to find out the level of material and technical support in the child's family with a device for distance learning.

5.1. Educational format and security context

Taking into account the martial law in the country and the security situation in different regions of Ukraine, it was determined from the respondents' answers that schools organize the educational process in the following ways: face-to-face format (children attend classes physically) – 32.7%, blended format (for example, children attend classes physically for a week and study remotely for a week) – 34.4%, distance format (all classes are held online) – 32.8%. The availability of shelters and the level of security situation affect the organization of the educational process: 67.2% of respondents indicated that children study in one school shift, and 32.8% of respondents indicated that children study in two shifts.

This distribution reflects the complex security landscape across Ukraine. Analysis by region shows stark differences: frontline oblasts report 78% distance learning adoption, while western regions maintain 61% face-to-face instruction. The blended format, most common in central regions, requires parents to adapt weekly to changing modalities, creating additional organizational burden [51].

5.2. Digital platform awareness and usage

It was important to find out to what extent parents, as participants in the educational process, are aware of what educational platform or information and communication system the school uses to manage the educational process and communicate with parents. Among the most common platforms and systems, respondents mentioned the following: New Knowledge (25%), Single School (14.3%), Human School (11.7%), My Class (8.5%), Eddy (1.4%), My School (0.9%), SMART School (0.1%), and School Today (0.1%). It was found that 34.6% of respondents did not know the answer to this question (figure 1).

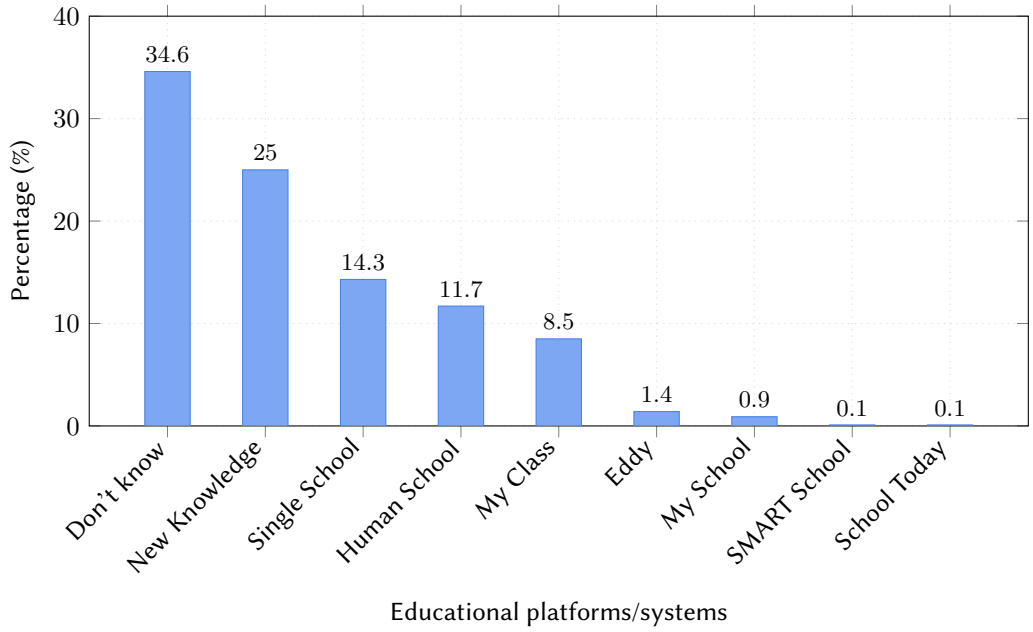

Figure 1: Distribution of respondents' answers to the question 'What educational platform or information and communication system does your school use to manage the educational process and communicate with parents?'.

The finding that 34.6% of parents cannot identify their school's primary platform represents a fundamental disconnect from their children's education. This knowledge gap correlates with several factors: parents with higher education showed 78% awareness versus 52% among those with secondary education; urban parents demonstrated 71% awareness compared to 58% for rural parents; and parents of primary school children showed higher awareness (74%) than parents of senior students (61%).

Given that many schools provide distance and blended learning, it was important to investigate the extent to which parents are aware of the information and communication services used by schools for this purpose. The respondents mentioned the two most common services: Zoom – 59.5% and Google

classroom – 43.2%. In addition, respondents pointed out to such services as: Office 365 – 1.4%, Skype – 1.4%, Moodle – 0.5%, Prosvita – 0.5%. It was found that 12.9% of respondents did not know the answer to this question (figure 2).

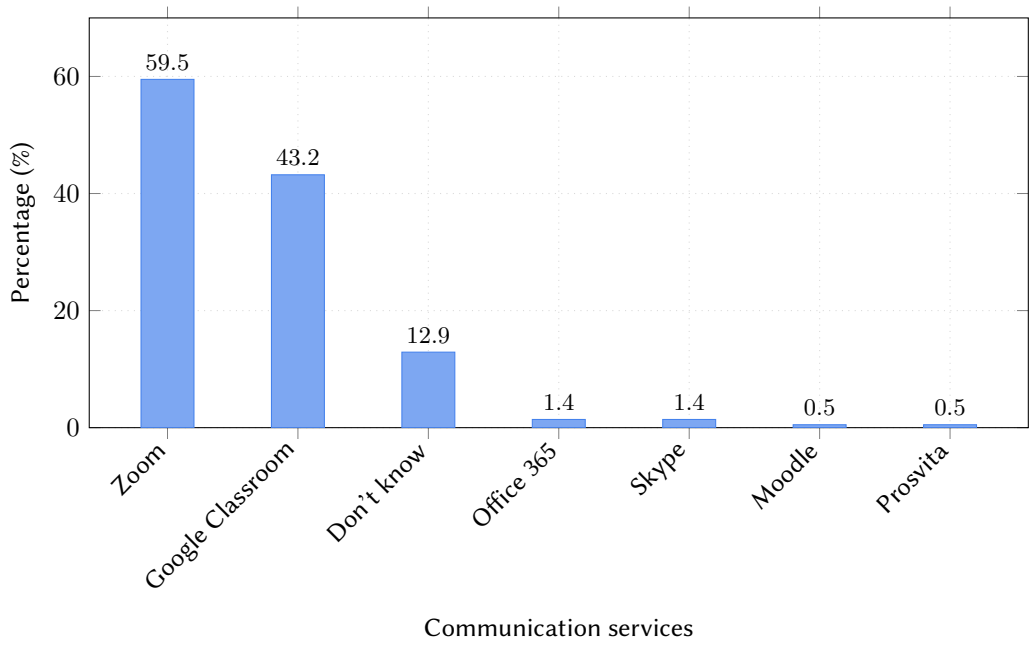

Figure 2: Distribution of respondents' answers to the question 'What information and communication services does your educational institution use to organize distance or blended learning?'.

The higher awareness of communication services (87.1% know their school's platform) compared to learning management systems suggests parents engage more readily with synchronous, familiar tools than specialized educational platforms. This pattern aligns with findings from Khilya et al. [52] on the preference for synchronous over asynchronous learning tools in crisis contexts.

5.3. Electronic journal access and school website usage

Importantly, the vast majority of respondents (80.4%) indicated that they have access to an electronic journal, which suggests that they actively use digital tools and track their children's academic performance. Only 19.6% of respondents said they did not have access to an electronic journal. Among those with access, usage patterns varied: 45% check weekly, 23% check daily, and 32% check rarely. Daily checking correlates with younger children (r = -0.34, $p < 0.001$) and recent displacement (r = 0.28, $p < 0.001$).

School websites help to transform and improve the educational process, as they are part of the information and digital environment. An effective school website represents the institution, reflects the introduction of innovations, provides information support to participants in the educational process, and serves as one of the channels of communication with parents and the public. The overwhelming majority of respondents (69.6%) consider that their school's website contains relevant and useful information for parents, and almost a quarter of respondents (24.8%) said that the information provided is "partially useful" for them. At the same time, 3.2% of respondents gave a negative answer, and 2.4% of respondents said that the website does not work.

Parents indicated the items that the school website contains: links to electronic textbooks and learning materials – 49.4%; feedback – 38.7%; instructions or video guides on how to use the educational platform – 36.6%; advice on psychological support for children – 33.6%; rules of conduct during online classes – 33.2%; rules for safe use of the Internet – 32%; adherence to the principles of academic integrity in the educational process and criteria for assessing students' learning outcomes – 23.2%; none of the above – 12.2%.

The emphasis on psychological support resources (33.6%) reflects wartime realities. Schools providing such resources report higher parental engagement and trust [53]. The relatively low presence of academic integrity information (23.2%) suggests potential gap in addressing digital learning ethics during crisis.

5.4. Communication channels between parents and teachers

An important part of the school's information and digital environment is the channels of communication between parents and teachers. Respondents' answers indicate that parents communicate with their child's class teacher mainly through Viber (93.7%) and Telegram (15.9%). Much fewer of respondents communicate via Facebook messenger (4.3%), WhatsApp (1.2%), Instagram (1.1%), TikTok (0.5%), and Signal (0.2%) (figure 3).

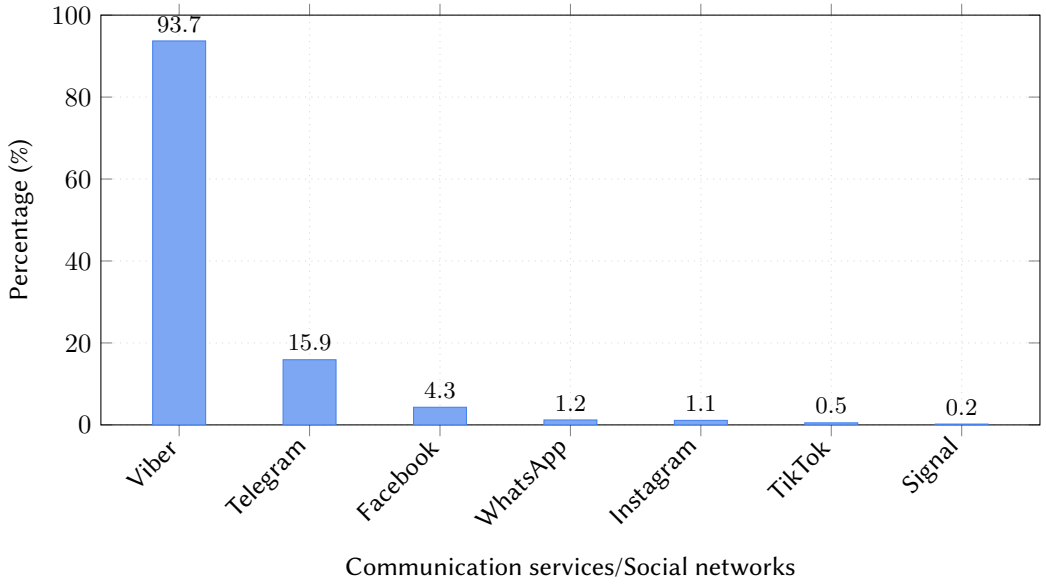

Figure 3: Distribution of respondents' answers to the question 'What communication services or social networks do you use to communicate with your child's class teacher?'.

The overwhelming dominance of Viber reflects pre-war communication patterns that have persisted despite the platform's limitations for educational content sharing. Regional variations exist: Telegram usage reaches 31% in eastern regions where Russian-developed platforms historically had stronger presence. The minimal use of education-specific communication tools suggests missed opportunity for integrated learning support [54].

5.5. Digital skills assessment and device provision

It is important to note that 71.2% of parents highly appreciate the availability of appropriate skills for their child to use digital resources independently in distance learning, which was influenced by the experience of learning during the pandemic and full-scale war. At the same time, 88% of respondents provided their child with a device for distance learning, and 51% of respondents stated that they monitor their child's learning process, which indicates that they provide appropriate support to their child and are involved in the educational process.

However, device provision masks quality disparities. Among device-providing families, 45% report sharing devices among multiple children, 31% describe devices as outdated or inadequate for educational tasks, and 24% rely solely on smartphones. These limitations particularly affect displaced families, where 79% report financial difficulties impacting technology access [55].

Parents' assessment of digital skills reveals generational divide: while 71.2% rate children's skills as good or excellent, only 44.3% express similar confidence in their own abilities. This gap creates stress

when technical support is needed, with less digitally confident parents reporting higher anxiety levels when assisting with online learning ($r = 0.42$, $p < 0.001$).

5.6. Qualitative analysis: improvement priorities

It was important to get parents' opinions on how to improve the school's digital environment. The analysis of the responses allowed us to identify eight categories:

1. *Updating material and technical support* (67% of respondents): computers, interactive whiteboards, tablets, generators and uninterrupted power supply, providing access to free and stable Internet for teachers and students. Rural parents particularly emphasized infrastructure challenges, with some reporting daily internet availability under two hours.
2. *Improving the educational process* (52%): conducting additional lessons for students who need help, applying an individual approach to children. Parents of children with special needs particularly emphasized need for differentiated online instruction.
3. *Changing the format of education* (48%): teaching children in face-to-face and blended format, parents do not support distance format because it hinders the socialization of children. However, parents in frontline areas acknowledge distance learning as only viable option despite limitations.
4. *Communication and interaction between participants in the educational process* (41%): feedback from teachers, communication between parents, students and the school administration, regular surveys among parents to improve the educational process.
5. *Use of electronic educational platforms* (38%): introduction of a single platform in the school for organizing the educational process and conducting training on the use of the platform for teachers, students and parents. Platform fragmentation creates particular challenges for families with children in different schools.
6. *Improving the learning process* (33%): using interactive teaching methods and digital learning tools. Parents note that passive video lectures fail to engage children already stressed by war.
7. *Content of websites and social networks* (29%): regular updates on the educational process, using social networks to quickly inform about events and news of the educational institution.
8. *Information security issues* (21%): protection of personal data, implementation of cybersecurity policy in the educational institution, training students and teachers in the basic principles of Internet security. Concerns heightened due to ongoing cyber warfare and targeted attacks on educational infrastructure.

6. Discussion

6.1. The digital divide in wartime education

The finding that 34.6% of parents remain unaware of their school's educational platform reveals deeper structural issues than simple information gaps. This disconnection correlates with multiple vulnerability factors: lower educational attainment, rural residence, displacement status, and linguistic minorities. These parents cannot effectively support their children's learning or advocate for their needs within digital systems [56].

The platform awareness gap intersects with broader digital divides documented across Ukraine. Urban-rural disparities in awareness (71% vs 58%) reflect infrastructure inequalities exacerbated by war. Rural areas face compounded challenges: unreliable electricity, limited internet, and fewer community support resources [57]. These disparities risk creating permanent educational disadvantage for already vulnerable populations.

6.2. Communication infrastructure and parental engagement

The reliance on Viber (93.7%) for educational communication represents both pragmatic adaptation and systemic failure. While Viber enables quick messaging, it lacks educational affordances: assignment

submission, resource libraries, progress tracking, or collaborative tools. This forces constant platform-switching, increasing cognitive burden for war-stressed families [58].

Schools' failure to establish unified communication protocols fragments information flow. Parents describe receiving academic updates through Viber, assignments via Google Classroom, announcements on school websites, and emergency notifications through multiple channels. This fragmentation particularly affects displaced families managing multiple children's education while navigating survival needs.

6.3. Psychosocial dimensions of digital learning support

The emphasis on psychological support resources (33.6% seeking such content on school websites) underscores the inseparability of emotional and academic needs during crisis. Current digital environments prioritize content delivery while neglecting psychosocial dimensions, forcing parents into counselor roles without training or support [59].

International interventions provide implementation models. The Hope Groups program demonstrated that structured peer support through digital platforms reduced parental stress by 34% and improved positive parenting behaviors [60]. Ukrainian adaptations like the SEE Learning initiative show promise but reach only 23% of surveyed families, indicating significant unmet need.

6.4. Infrastructure resilience and educational continuity

The 88% device provision rate masks quality disparities that fundamentally affect learning. Families sharing single devices among multiple children cannot maintain synchronous learning schedules. Smartphone-dependent learning (24% of families) limits engagement with complex educational content. These hardware limitations compound with infrastructure instability: power outages, internet disruptions, and air raid interruptions create unpredictable learning environments [61].

Universities' responses to infrastructure attacks provide models for secondary schools. The JetIQ ecosystem demonstrates how distributed systems, backup power, and cached content enable continuity despite attacks [62]. However, implementing such solutions requires resources beyond most secondary schools' capacity, necessitating systematic support.

7. Conclusions and recommendations

The research allowed us to reach the following conclusions. Parents are ready to use the digital environment of their child's school. Most of them know and use educational platforms or information and communication systems of the school, but 36% of respondents are not aware of them and this should be addressed by the school administration to bring such information to parents. It can also be assumed that not all schools have chosen and use such services, in which case local education authorities should work on this issue.

According to most parents, the most critical aspects of improving the school's information and digital environment are updating material and technical support, providing access to the Internet, establishing communication and timely feedback between all participants in the educational process, using a single online educational platform, using interactive methods and digital learning tools, and ensuring information security for students and teachers.

Conducting a regular survey among parents to monitor the effectiveness of the school's information and communication environment is important in order to assess the quality of communication between participants of the educational process, identify problem areas, increase trust and engagement, take into account the needs of educational stakeholders, maintain the effectiveness of the educational process, and introduce innovations that will improve the overall quality of the educational process.

The study's findings have immediate practical implications for Ukrainian education and broader relevance for crisis-affected education globally. The evidence demonstrates that parental engagement in

digital environments during crisis requires systematic support across multiple dimensions: infrastructure access, digital competence, psychosocial support, and communication systems.

7.1. Recommendations for schools

Schools should prioritize establishing clear communication hierarchies, designating specific platforms for different functions (academic content, assignments, parent communication, emergency notifications). The current platform fragmentation creates unnecessary barriers for parent engagement. Schools must develop structured onboarding processes ensuring all parents understand and can navigate digital systems, with particular attention to vulnerable populations.

Integration of psychosocial support within learning platforms emerges as critical need. The 33.6% of parents seeking psychological resources indicates significant unmet demand. Schools should embed counseling services, stress management tools, and trauma-informed resources within their digital environments rather than treating these as separate services.

7.2. Recommendations for policymakers

Infrastructure investment must extend beyond individual household connectivity. Community-level solutions – public Wi-Fi points, learning hubs in shelters, mobile connectivity units – can address access gaps more effectively than household-based models. The finding that 79% of displaced families face financial barriers to technology access demands systematic response.

National standardization of educational platforms could reduce training burden and enable resource sharing. While school autonomy has value, the current fragmentation where 34.6% of parents cannot identify their school's platform suggests need for provincial or national coordination. Standardization would particularly benefit mobile populations and families with children in multiple schools.

7.3. Recommendations for community organizations

NGOs and community organizations play critical bridging role between schools and vulnerable families. The success of programs like "School of Responsible Parenting Mediapazly" [54] demonstrates that structured, family-based digital literacy programs yield better outcomes than individual training. Community organizations should prioritize holistic family support recognizing parents' multiple roles: technical supporter, learning coach, emotional counselor, and communication mediator.

7.4. Future research directions

Longitudinal research should track how families develop digital competencies over time and whether initial barriers persist or resolve with experience. The current cross-sectional design captures immediate challenges but cannot reveal adaptation patterns. Studies following families through multiple academic years could identify critical support periods and effective intervention timing.

The pronounced gender skew in respondents (95.8% female) highlights need for targeted research on paternal engagement with digital learning. Understanding how fathers navigate educational support roles could reveal different support needs and engagement strategies.

Research on specific vulnerable populations – families in occupied territories, linguistic minorities, parents with disabilities – remains critical gap. These populations likely face compounded barriers requiring tailored interventions. Developing and validating crisis-appropriate measures of parental digital engagement would enable more precise assessment of intervention effectiveness.

The Ukrainian experience provides crucial evidence for global crisis education response. As conflicts and disasters increasingly disrupt traditional schooling, understanding how families navigate digital learning becomes essential. This research contributes empirical evidence supporting the centrality of parents in crisis education while identifying specific, actionable interventions for strengthening their capacity to support children's learning under extreme adversity. The findings underscore that

successful crisis education response must recognize parents not as auxiliary supporters but as essential partners requiring systematic support to fulfill their expanded educational roles.

Declaration on Generative AI

The authors used Scopus AI to find and export in BibTeX the references to strengthen the discussion section, and Claude Opus 4.1 to enhance the writing style.

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