New classrooms were inaugurated in the Railway Lyceum's bomb shelter in Kharkiv city in February 2025. PHOTO: TETIANA KURAS/ UNHCR

Resilience of school infrastructure

Children's right to education in wartime Ukraine

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abstract

This essay examines innovative educational adaptations implemented in Kharkiv to ensure children's right to education, considered as a manifestation of resilience in wartime. The research methodology employed a descriptive case study approach utilizing multiple data sources to ensure triangulation, including official reports from educational authorities; press releases; Ukrainian and foreign mass media platforms; documented observations of facilities and stakeholder testimonials; and personal notes, videos, and photos. The results indicate the interventions successfully provided safe learning environments for approximately 15,000 schoolchildren (30% of school-aged learners) by December 2025 The experience in Kharkiv offers transferable insights for educational continuity planning in conflict zones worldwide.
KEYWORDS: Armed conflict adaptation, educational resilience, children's right to education, underground schools.

Children's right to education has faced unprecedented challenges during the Russian-Ukrainian War as the conflict has led to a humanitarian crisis with severe implications for civilian infrastructure, particularly in urban centers proximate to combat zones. Kharkiv, Ukraine's second-largest city, located merely 30 kilometers from the Russian border, has experienced particularly devastating effects on its educational infrastructure. 316 schools in the Kharkiv region are damaged and 60 completely destroyed, according to the data for January 2026.[1] According to earlier data (May 9, 2025), almost 60% of the schools in Kharkiv city were either damaged or completely destroyed. As a consequence, according to the data for May 2025, only 8,800 schoolchildren studied offline; that represents slightly over 16% of all schoolchildren living in the Kharkiv region, while all the rest studied online.[2] By December 2025, 15,000 schoolchildren (30% of school-aged learners) in Kharkiv

The aftermath of a Russian bombing of a school in Kharkiv, Ukraine in February 2022. An estimated 1 700 schools have been damaged or destroyed in Ukraine since the war started, leaving one in every third child unable to attend schol at a full time basis. PHOTO: AMNESTY INTERNATIONAL

learned offline. The widespread destruction of schools has left thousands of school-aged children without access to traditional learning environments.

Educational challenges in Kharkiv must be contextualized within a prolonged period of disruption. Prior to the current conflict, schoolchildren had already experienced two years of remote learning during the COVID-19 pandemic, followed by an additional three years of online education necessitated by the war. However, continued online education is not merely a response to physical infrastructure damage but represents a critical safety measure given the persistent threat of missile attacks. With Russian missiles capable of reaching Kharkiv within approximately 30 seconds, conventional above-ground educational facilities present unacceptable security risks for schoolchildren and educational personnel.

EFFORTS BY EDUCATORS to fulfil children's right to education during the war in Kharkiv represent a powerful example of humanity in the post-digital era of education – a context where technological solutions for remote learning exist, even if they cannot fully replace the essential human elements of education. This tension between digital capability and human necessity forms a critical backdrop for understanding the significance of underground educational infrastructure development. While digital platforms provided immediate continuity during the initial stages of the conflict, the community's determination to establish face-to-face learning environments despite extraordinary challenges demonstrates a profound recognition of education's social and developmental dimensions.

The post-digital educational context in Ukraine is particularly complex, as it follows directly from pandemic-related disruptions that had already stretched the limits of digital learning modalities. Research prior to the conflict had already identified concerns about the psychosocial impacts of extended online learning, including decreased learner engagement, limited peer interaction, and challenges in maintaining educational quality. These existing concerns were magnified by the conflict's onset, creating an urgent need for solutions that could address both safety requirements and holistic educational needs.

"EDUCATIONAL RESILIENCE ENCOMPASSES BOTH INSTITUTIONAL ADAPTABILITY AND COMMUNITY DETERMINATION TO MAINTAIN EDUCATIONAL CONTINUITY."

EDUCATIONAL RESILIENCE provides a valuable theoretical framework for examining Kharkiv's response to the disruptions to education caused by the conflict. Educational resilience encompasses both institutional adaptability and community determination to maintain educational continuity. This framework helps contextualize Kharkiv's underground educational initiatives not merely as tactical responses to immediate safety concerns but as strategic manifestations of systemic resilience.

Several dimensions of educational resilience can be identified that are particularly relevant to the situation in Kharkiv:

- Adaptive capacity: the ability to modify structures and processes in response to changing circumstances

- Resource mobilization: effective utilization of available resources and infrastructure
- Community participation: engagement of multiple stakeholders in developing and implementing solutions
- Cultural relevance: ensuring adaptations respect and reinforce cultural identity and values
- These dimensions provide the analytical lenses for examining Kharkiv's educational adaptations, particularly the repurposing of underground infrastructure for educational use.

Literature review

The researchers Bezkrovniy[3] and Derkachova[4] have conducted in-depth analyses of the legal regulation of the right to education in Ukraine, with particular attention to its preservation and enforcement amid wartime conditions. Their work offers critical insights into the legislative framework governing education and its practical implementation during periods of armed conflict. Complementing these contributions, Romanova[5] examined the theoretical and juridical foundations of the right to education in times of war, focusing on key challenges affecting its realization under the constraints imposed by military aggression. Expanding upon this foundation, Tereshchenko[6] explored the exercise of educational rights under martial law in Ukraine, emphasizing the urgency of protecting access to education for all social groups and delineating the complex obstacles faced by the Ukrainian academic community in ensuring educational continuity.

Beyond the Ukrainian national legal context, scholarly inquiry has increasingly turned to the role of international actors in mitigating educational disruptions during crises. Iliichuk et al.[7] presented a detailed examination of policy frameworks and strategic recommendations issued by international organizations committed to safeguarding educational access, quality, and equity in emergency settings. Similarly, Zayachuk[8] analyzed the broader implications of international assistance in addressing Ukraine's educational challenges, situating this support within the paradigm of the Sustainable Development Goals.

FURTHERMORE, Nestulya et al.[9] highlighted international cooperation as an essential instrument for alleviating financial volatility in the educational sector, fostering scientific progress, stabilizing higher education institutions, and promoting the dissemination of best practices in university governance. Their research also underscored the significance of youth engagement through career-oriented programs and student-led initiatives, as a strategy for enhancing institutional resilience and adaptability.

In parallel, the systemic effects of the war on Ukraine's educational infrastructure have been rigorously assessed by Sibruk et al.,[10] who emphasized the pivotal role of educators in cultivating students' academic competencies amid crises. In particular, educators have emerged as both facilitators of learning and providers of psychological support, enabling students to maintain the development of essential skills despite the challenges posed by ongoing hostilities.

During the war in Ukraine, the right to education continues to be realized primarily through the expansion and adaptation of online learning.[11] Building upon the experience gained during the COVID-19 pandemic, Ukrainian universities have maintained access to education by integrating digital platforms such as *Moodle*, *Zoom*, *Microsoft Teams*, and institutional systems like the Educational Electronic Information Complex.[12] These tools enable skill development and provide flexibility in learning, particularly benefiting students with high motivation. Online education has proven effective in preserving instructional continuity, although researchers emphasize the importance of balancing online and offline elements to foster meaningful communication and engagement.[13]

PAPERS WRITTEN by researchers outside Ukraine[14] offer a comprehensive and multidimensional understanding of the legal, institutional, and international dimensions of the right to education during wartime elsewhere in the world. All studies collectively highlight the imperative for robust legal safeguards, sustained international cooperation, and adaptive educational strategies to uphold the right to education under conditions of armed conflict.

"DURING THE WAR IN UKRAINE, THE RIGHT TO EDUCATION CONTINUES TO BE REALIZED PRIMARILY THROUGH THE EXPANSION AND ADAPTATION OF ONLINE LEARNING."

Nonetheless, a critical gap remains in the existing literature concerning the emergence of underground educational institutions, particularly in Kharkiv, as an innovative response to wartime constraints. The research presented in this paper seeks to address this lacuna by examining the phenomenon of underground education as a novel mechanism for ensuring educational continuity in times of war.

This research aims to document and analyze the innovative educational infrastructure adaptations implemented in Kharkiv, Ukraine, during the Russian-Ukrainian War, with particular attention to their humanitarian dimensions. Specifically, the study seeks to:

1. document the establishment, operational framework, and physical organization of the Metroschool initiative and educational facilities of underground schools;
2. analyze the logistical, security, and pedagogical considerations that shaped these educational adaptations;
3. evaluate the effectiveness and limitations of these initiatives in providing educational continuity during armed conflict;
4. examine how these adaptations reflect broader humanistic values and commitments in post-digital education;
5. consider the broader implications of Kharkiv's experience for educational resilience planning in conflict-affected regions globally.

THIS RESEARCH CARRIES significance for multiple domains. For educational policy and practice in conflict zones, it offers documented evidence of innovative approaches to maintaining educational continuity under extreme or wartime conditions. For humanitarian response frameworks, it provides insights into how educational needs can be addressed alongside other emergency or war provisions. From a theoretical perspective, it contributes to scholarship on educational resilience by examining existing manifestations of adaptive capacity in a complex crisis or war context.

Methods and materials

This research employs a descriptive case study methodology to comprehensively examine Kharkiv's educational adaptations during wartime conditions. The case study approach is particularly appropriate when examining contemporary phenomena within real-life contexts. The unique nature of Kharkiv's underground educational adaptations, deeply embedded within specific geopolitical and cultural contexts, makes case study methodology an appropriate choice.

The research utilizes a single-case embedded design, with the Kharkiv educational system constituting the primary case and underground educational initiatives such as the *Metroschool* and purpose-built underground schools representing embedded units of analysis. This approach facilitates detailed examination of specific adaptations while maintaining attention to the broader systemic context.

The descriptive analysis method was also used. The study provides detailed descriptions of the challenges, solutions, and outcomes of educational adaptations during wartime. In addition, the qualitative research method was also used. The authors share their insights in the capacity of being researchers, university professors, and Kharkiv residents, incorporating their observations in doing firsthand interpretations.

DATA COLLECTION involved multiple sources to ensure methodological triangulation, such as: official reports and statistical data from Kharkiv City Council's Department of Education (2023–25); press releases and public statements from the municipal city authorities (2023–25); documented observations of Metroschool and underground school facilities (2023–25); mass media from Ukrainian platforms *UkrInform*, *Suspilne*, *DumkaMedia*, *Ukrainska Pravda*, *KharkivOsvita*, and *CurrentTime* and foreign platforms such as *Euronews*, *Deutsche Welle*, *CNN*, etc.; and testimonials from educational stakeholders (teachers, administrators, parents, students), collected through public statements and from personal recordings and videos.

The collected data underwent thematic analysis to identify key patterns related to infrastructure development, operational frameworks, security protocols, and pedagogical adaptations. This approach facilitated a comprehensive understanding of both the technical implementation of underground educational facilities and their socio-emotional impact on educational communities.

Analysis proceeded through several stages. A categorization

PHOTO: IHOR TEREKHOV/MAYOR OF KHARKIV

Metroschool classroom.

PHOTO: OLEG SINEGUBOV/KHARKIV OVA

PHOTO: IHOR TEREKHOV/MAYOR OF KHARKIV

The first totally underground school in Kharkiv.

of themes was carried out according to technical, operational, pedagogical, and humanitarian dimensions, after which a comprehensive framework was developed for understanding the multiple dimensions of underground educational initiatives.

A limitation of this methodology is its focus on descriptive documentation rather than longitudinal assessment of educational outcomes. Ethical considerations included ensuring appropriate attribution of the sources while maintaining confidentiality for individual stakeholders where appropriate. The researchers' position as both academic investigators and community members required ongoing reflexivity to balance insider knowledge with analytical objectivity.

Findings

After the war began, understanding that schoolchildren need socializing, parents, teachers, and city authorities came up with the unique idea of opening classes in the city's underground subway. In September 2023, the so-called *Metroschool* solution was launched as the response to the destruction of educational infrastructure. This program repurposed sections of the city's subway system to create safe learning environments while maintaining essential transportation functions. Key features of the Metroschool initiative include:

- 20 purpose-designed classrooms distributed across six metro stations
- classrooms averaging 40 square meters with capacity for 20 learners each
- strategic positioning in underground passages between stations
- implementation of ventilation systems, noise insulation, and educational technology including interactive whiteboards and projection equipment
- transformation of utilitarian spaces into child-friendly environments through decorative elements including educational materials, colorful multiplication tables, cartoon characters, and a prominent "Indestructible Kharkiv" banner
- dedicated play areas with Legos and toys for younger learners
- two-shift scheduling system operating from 09:00–12:00 and 13:00–16:00
- dedicated transportation network routes utilizing school buses
- varying attendance frequencies based on grade level (with primary school learners attending 2–3 days weekly)
- modified instructional periods (30 minutes for grades 1 and 2, 40 minutes for grade 3, 45 minutes for grades 5 and above)
- focused curriculum emphasizing core subjects (Mathematics, Ukrainian Language/Literature, History)
- on-site support personnel including medical staff, psychologists, and security officers
- daily commencement with the national anthem to maintain cultural continuity and national identity

The initiative demonstrated rapid growth, expanding from approximately 800 young learners in September 2023 to 2,200 learners by December 2025. Testimonial data from parents and teachers indicates a generally positive reception of the Metroschool initiative, despite its limitations. Parents particularly valued the safety provisions and socialization opportunities for younger students. The parents noted that there are colorful carpets and toys, and that children even have a place to go and just jump around, stating that offline learning is very necessary because it keeps a child engaged and less distracted.

Educational professionals observed improved engagement compared to online learning modalities. Teachers noted that learners are not distracted, and that a teacher can immediately see what learners do and do not understand when teaching in person. Some teachers also reported that the technological resources in the Metroschool classrooms often exceeded those available in pre-war conventional schools.

THE METROSCHOOL is a place where university students are involved in teaching practice. Pre-service teachers train to deliver lessons, while professors observe them and offer students their comments and advice. The students' teaching practice at the Metroschool was designed to provide pre-service teachers with practical classroom experience in secondary schools. The primary aim of this teaching practice is to bridge theoretical knowledge with practical teaching skills, allowing students working as pre-service teachers to observe experienced educators, analyze various teaching methodologies, and begin developing their own instructional approaches to delivering lessons.

"TESTIMONIAL DATA FROM PARENTS AND TEACHERS INDICATES A GENERALLY POSITIVE RECEPTION OF THE METROSCHOOL INITIATIVE, DESPITE ITS LIMITATIONS."

The students' teaching practice began with a location conference where pre-service teachers were provided with information regarding their placements, content expectations, and specific tasks to be completed during the practice period. Throughout the process, pre-service teachers participated in regular video conferences via the ZOOM platform, led by a head professor who reviewed daily tasks and addressed questions.

The practice took a multifaceted approach to professional development, including elements such as: classroom observations across different grade levels of young learners (particularly grades 1–2 and 3–4); analysis of experienced teachers' instructional methods; the development of lesson plans and teaching fragments; the implementation of teaching opportunities; the completion of supplementary professional development through an online course titled "School for All"; an exploration of inclusive education practices; and the preparation of a comprehensive practice report at the end of the practice.

PRE-SERVICE TEACHERS in 2025 were strategically placed in different classrooms, which provided opportunities to observe

diverse teaching approaches in the Metroschool. One notable experience involved observing a classroom operating as part of the exclusive "Intellect of Ukraine" project, offering insight into this specialized educational model. The varied placements allowed practice participants to compare and contrast different instructional methods and classroom management techniques employed by experienced educators.

Many students highlighted the value of witnessing how experienced teachers at the Metroschool balanced traditional pedagogical approaches with modern educational technologies. They observed creative tasks and game-based learning activities that effectively engaged young learners and facilitated better comprehension of academic material. An important component of the practice was the opportunity for students to deliver their own lessons, particularly in Mathematics, the Ukrainian language, and the English language. This hands-on teaching experience proved invaluable for applying previously acquired theoretical knowledge in an authentic classroom environment.

The supplementary online course "School for All" enhanced the practice experience by providing additional theoretical frameworks and practical ideas that complemented the in-classroom observations. This course appeared to focus on inclusive education practices, with participants noting that they had gained knowledge about inclusion approaches from various international contexts.

The practice generated significant professional development outcomes for the participants. Students reported:

- enhanced understanding of lesson structure and instructional design,
- practical application of theoretical knowledge previously acquired at the university,
- development of a methodological resource base through observation and analysis of different lessons,
- greater comprehension of diverse teaching techniques and approaches,
- experience in implementing various instructional methods
- improved ability to analyze Mathematics, Language, and Literature lessons,
- acquisition of a professional teaching certificate following completion of the "School for All" online course during their practice.

STUDENTS CONSISTENTLY noted the high academic achievement demonstrated by young learners at the Metroschool, suggesting that the observed teaching methods were effective in promoting learning. Beyond the professional development aspects, many students reported forming meaningful connections with the Metroschool learners. Despite the relatively short duration of the practice (several weeks), participants reported becoming "sincerely attached" to the learners and finding joy in observing their academic progress. The energy, curiosity, and enthusiasm of the young learners served as inspiration for the pre-service teachers.

Practice participants characterized the Metroschool as having a "special atmosphere" where students, teachers, and

PHOTO: MINISTRY OF INTERNAL AFFAIRS UKRAINE

School lesson in Kharkiv Metro during Russian invasion of Ukraine. 61 children of different ages study in five metro stations in Kharkiv.

young learners functioned as "one big family", characterized by mutual support. This positive school climate appears to have significantly enhanced the practice experience and provided a model for the type of learning environment a "student-teacher-learner" might aspire to create in their future classrooms. The Metroschool practice experience was consistently described as valuable, interesting, and beneficial for professional development. Pre-service teachers emphasized that the experience went beyond mere academic observation to become a real journey into the world of young learners full of indomitability and a thirst for knowledge.

The practice successfully achieved its aims by providing students with:

- exposure to diverse teaching methodologies
- opportunities for professional reflection and analysis
- practical teaching experience
- enhanced understanding of effective instructional design
- connections between educational theory and classroom practice

MANY PARTICIPANTS expressed an anticipation that future practice experiences would build upon this foundation and offer even more intensive opportunities for professional growth and discovery. The practice appears to have reinforced participants' commitment to the teaching profession while providing actual skills and experiences that will inform their future pedagogical practice.

Overall, the Metroschool practice represented a significant milestone in these pre-service teachers' professional development journey, combining structured learning experiences with authentic classroom engagement to prepare them for careers in education. Recognizing the capacity limitations of the Metroschool program, municipal authorities initiated a comprehensive underground school construction program. This unprecedented infrastructure development project included the establishment of the first dedicated underground schools in Pivnichna Saltivka and the Industrial District, areas experiencing severe shelling. Comprehensive safety provisions including reinforced construction were required in order to be able to meet the wartime protection parameters. The facilities' combined floorspace exceeds 1,000 square meters, including classrooms, dining facilities, and conference spaces, with a total capacity of approximately 900 schoolchildren, operating in two shifts. The first totally underground school in Kharkiv was opened in May 2024.

THE SECOND totally underground school in Kharkiv was built and opened in January 2025, with an initial enrollment of 750 schoolchildren. It features an enhanced design incorporating wider corridors, more spacious classrooms, and specialized inclusive education facilities, with a projected capacity of 1,000 schoolchildren upon completion of second-stage construction.

The necessity of underground schools is emphasized in many interviews. For example, nine-year-old S. says he feels safe from the bombs he's heard while studying at home:

> **[…] when it was very loud, I would either run into the corridor or hide underneath the table. Near the wall, away from the window.**

His father says:

> **The war greatly affected the development of children. The war had a great impact on education. There must be a society for children. And the children have dreamed of meeting their classmates.**

The teacher N. comments:

> **The anxiety is constant. It's always there. And as you see —constant air signals. We are constantly under stress, but we try to hold on. Of course, this is our choice. We are staying in Kharkiv, we have not gone abroad. This is our native home, our native school.**

Kharkiv Regional Prosecutor's Office S. B. states that:

> **More than one million civilians live in Kharkiv and they suffer from attacks every day. No one is safe from such strikes, as you can see that the time from the launch of the bombs to their arrival is very short and people do not have time to go to the shelter during the alarm.**[15]

Further underground schools are under construction in all city districts, with projected completion by December 2026. By October 2025, combined enrollment across all underground educational facilities including the Metroschool and five underground schools reached approximately 15,000 schoolchildren, representing approximately 30% of the estimated 50,000 school-aged children residing in Kharkiv. A consistent pattern emerged across all underground educational initiatives: the prioritization of young learners, particularly those in early primary grades. This priority allocation of limited resources reflects both pedagogical considerations regarding young learners' developmental needs and a pragmatic recognition of their greater vulnerability to educational disruption.

These opportunities for in-person education for young learners are important and valuable, as they offer them opportunities for socialization, communication, and team and pair work. Both parents and educators emphasize the particular importance of in-person learning for young learners' social and academic development. Underground educational facilities incorporate comprehensive security protocols beyond mere physical protection from missile strikes. These include the regular presence of National Police and emergency service personnel, controlled entry/exit procedures, and on-site medical and psychological support services.

The development of these protocols required collaboration between educational authorities, emergency services, and security personnel —representing a significant achievement in cross-sector coordination during crisis and war conditions.

Discussion

Kharkiv's development of underground educational infrastructure represents an unprecedented adaptation to ensure educational continuity during prolonged armed conflict. The rapid conceptualization and implementation of these facilities demonstrates remarkable organizational resilience within Kharkiv's educational system. By repurposing existing underground infrastructure while simultaneously developing purpose-built facilities, authorities have created a sustainable approach to educational continuity despite ongoing security threats.[16] This multi-tiered approach allowed for an immediate intervention with the Metroschool while also developing longer-term solutions with the dedicated underground schools. Such strategic planning reflects the key elements of systemic resilience: adaptation, transformation, and persistence in the face of war. The Kharkiv case exemplifies how educational systems can maintain their core functions while fundamentally transforming delivery mechanisms in response to external threats.

The underground educational initiatives in Kharkiv represent a profound statement about educational values in the post-digital era. Despite the available technological infrastructure for online learning –a modality necessitated during both the COVID-19 pandemic and the initial stages of the war – the community's determination to establish in-person learning environments reflects a recognition of education's irreducibly human dimensions. Several aspects of this humanistic orientation are particularly noteworthy. The consistent emphasis on socialization opportunities, particularly for young learners, demonstrates a recognition that education encompasses more than just the delivery of academic content.

"CHILDREN DESCRIBE THE UNDERGROUND SCHOOL AS BEING BETTER THAN HOME, INDICATING THAT THESE ENVIRONMENTS MAY OFFER PSYCHOLOGICAL SECURITY AMID ONGOING CONFLICT-RELATED STRESS."

WITHOUT DOUBT, offline learning keeps learners engaged and less distracted. This prioritization of interpersonal interaction represents a corrective to purely instrumental conceptions of education that can predominate during times of crisis or war. Symbolic elements incorporated into underground educational environments –including prominent "Indestructible Kharkiv" banners and the daily playing of the national anthem –reflect a commitment to maintaining cultural identity and national solidarity during the war. These elements transform underground spaces from mere safety shelters into sites of cultural preservation and transmission. The differentiated allocation of resources based on developmental needs –particularly the prioritization of young learners –reflects a humanistic attention to children's varied requirements, rather than a uniform application of technological solutions. This nuanced approach recognizes the particular vulnerability of young learners to educational disruption and prioritizes their needs accordingly.

The psychological impact of underground educational environments merits particular consideration. While primarily developed as physical safety measures, these spaces appear to provide significant psychological benefits for schoolchildren. Children describe the underground school as being better than home, indicating that these environments may offer psychological security amid ongoing conflict-related stress. Several psychological elements also appear significant. The establishment of regular schedules, consistent instructional patterns, and familiar educational rituals provide crucial elements of normalcy amid broader disruption. This routinization likely contributes to psychological stabilization for both schoolchildren and educators.

UNDERGROUND EDUCATIONAL environments provide respite from the hypervigilance required in above-ground settings, where air raid alerts and potential missile strikes create ongoing stress. By temporarily removing this stressor, underground facilities may enable more focused learning and reduced anxiety. The shared experience of underground education appears to foster community solidarity among participants. By transforming what could be experienced as degraded educational conditions into a symbol of collective resilience, the psychological framing of these facilities contributes to their effectiveness. Despite impressive adaptation efforts, significant limitations remain. Additional challenges include instructional constraints, with instructional time typically limited to 2–3 hours daily on alternating days, and a reduced curriculum scope focusing primarily on core subjects. Long-term uncertainties are the unknown psychological impacts of spending extended periods in underground educational environments and sustainability concerns regarding resource allocation for specialized infrastructure.

Kharkiv's experience offers valuable insights for educational resilience planning in other war-affected regions. Most significantly, it demonstrates how existing underground infrastructure can be rapidly repurposed for educational use –potentially a transferable approach for other urban centers with subway systems. Additionally, the phased approach to infrastructure development provides a model for progressive expansion of educational capacity despite ongoing security threats.

SEVERAL TRANSFERABLE principles emerge. The creative repurposing of existing infrastructure in the metro demonstrates how educational continuity can be maintained without requiring entirely new construction. This approach allows for rapid response while more permanent solutions are developed. The clear prioritization of young learners provides a model for allocating limited resources during war conditions, recognizing varying developmental vulnerability while maintaining some educational access across age groups.

The integration of educational, transportation, security, and health services demonstrates the importance of coordinated planning across multiple sectors when developing educational strategies for responding to war. The transformation of safety measures into symbols of resilience and cultural continuity illustrates how physical adaptations can serve psychological and social functions beyond immediate security. As researchers, university professors, and Kharkiv residents, it can be stated that the Metroschool and underground school initiative represents more than just an educational solution; it exemplifies the Ukrainian spirit of resilience and determination.

Variants of Kharkiv's Metroschool and underground schools have been established in different border cities, towns, and villages in the Zaporizhia, Dnipro, Kryvyi Rih, and Sumy regions in Ukraine. Despite the ongoing war, the community's commitment remains firm in maintaining educational standards and ensuring schoolchildren's socialization and development. This innovative approach has garnered international attention and could serve as a model for other war-affected regions. While the current situation presents significant challenges, Kharkiv's response demonstrates a clear priority: maintaining educational continuity and socialization, even in the face of fear and uncertainty.

THE CHALLENGES and potential negative consequences of underground schooling are varied. The limited capacity for accommodating schoolchildren who study face-to-face leads to reduced instructional time, typically just 2–3 hours daily on alternating days, and to a narrowed curriculum focused on core subjects. Furthermore, there are long-term uncertainties regarding the psychological impacts of prolonged periods spent in these underground environments; while they offer physical safety, the absence of natural light, fresh air, and outdoor play could affect schoolchildren's mental and physical well-being over time. The sustainability of such resource-intensive initiatives also remains a concern, particularly in the case of a prolonged conflict. These factors highlight that underground schooling, while an impressive demonstration of resilience, is only a temporary, partial solution.

A limitation of the study is its focus on descriptive documentation rather than longitudinal assessment of educational outcomes. Ethical considerations included ensuring appropriate attribution of the sources while maintaining confidentiality for individual stakeholders where appropriate. The researchers' position as both academic investigators and community members required ongoing reflexivity to balance insider knowledge with analytical objectivity. The limitations of relying on media reports, which can sometimes have positivity biases and especially during times of war, are also considered. Media may sometimes focus on the heroic aspects of resilience while downplaying the significant hardships and challenges faced by those involved.

Conclusions

Kharkiv's innovative adaptation of underground spaces for educational purposes in order to uphold the right to education represents a remarkable example of community resilience in the face of extraordinary war challenges. While these measures cannot fully replicate conventional educational experiences, they provide critical opportunities for in-person learning and socialization during the prolonged conflict.

Several key conclusions emerge from this case study. The rapid development and implementation of underground educational facilities demonstrates remarkable strategic innovation in responding to the war. By combining immediate repurposing of existing infrastructure with longer-term development of specialized underground facilities, Kharkiv's educational authorities have created a sustainable approach to maintaining educational continuity despite ongoing security threats. The prioritization of in-person teaching and learning, despite the availability of digital alternatives, reflects a deeply humanistic orientation in the approach to education. This approach recognizes that education encompasses more than just content delivery –it includes socialization, communication, teamwork, cultural transmission, and psychological support, which are difficult to replicate in purely digital environments.

"THE RAPID DEVELOPMENT AND IMPLEMENTATION OF UNDERGROUND EDUCATIONAL FACILITIES DEMONSTRATES REMARKABLE STRATEGIC INNOVATION IN RESPONDING TO THE WAR."

The successful implementation of underground educational initiatives required substantial community mobilization, including coordination between municipal authorities, educational professionals, security personnel, transportation providers, and families. This collective effort demonstrates how the war can catalyze unprecedented levels of cross-sector collaboration. While current underground educational capacity remains limited relative to total need, ongoing development plans suggest continued expansion of these facilities. The planned completion of other underground schools by December 2026 will substantially increase capacity, though full accommodation of all Kharkiv's schoolchildren remains a distant goal.

THE EXPERIENCES documented in this case study offer valuable insights for educational continuity planning aimed at upholding the right to education in war zones worldwide, demonstrating how educational systems can adapt to ensure learning continues even under the most challenging circumstances. Particularly transferable elements include approaches to infrastructure repurposing, priority allocation frameworks, and methods for transforming safety measures into psychologically

supportive environments. The case of Kharkiv's educational adaptation during wartime stands as a testament to human ingenuity and determination. As the city continues to build and expand its underground schools, it sends a powerful message to the world: Education continues despite the war. The resilience and bravery of Kharkiv's people, exemplified through initiatives like the Metroschool and underground schools, contributes to the broader narrative of Ukrainian strength and determination in the face of war.

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