EduCare: Designing an Integrated Mobile Learning and Mental Healthcare App for Ukrainian Refugee Children

Full research paper

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Abstract

An estimated 33 million children globally are displaced due to war-induced conflict. In Ukraine alone, over five million children have been displaced following Russia's invasion, with their education and mental health severely impacted. Help from the Information Systems (IS) discipline is urgently needed, requiring us to go beyond prior works that focus narrowly on either mobile learning or mental health, and mostly in developed nations. In response, this paper proposes a scenario-based design of an integrated mobile learning and mental health app for Ukrainian war refugees. The proposed conceptual app 'EduCare' seeks to deliver structured, contextually relevant education in a language familiar to the children while simultaneously fostering mental wellbeing. In conclusion, this study highlights the interconnection of mobile learning and digital mental health amidst crisis, contributing to the broader dialogue on the role of IS scholarship to strengthen education continuity in disruptive times.

Keywords Mobile learning, mental health, education, Ukrainian refugees, scenario-based design

1 Introduction

War imposes disastrous, lasting impacts on civilians, with children being particularly vulnerable, as their education and mental health are gravely impacted during conflicts. As UNICEF (2023b) notes, education is the first service to be suspended during war and the last to be restored. An estimated 33 million children globally are unable to attend school due to forced displacement (UNESCO 2022), presenting a pressing global challenge. The long-term economic damage ensuing from a lack of education compounds the disruption of wellbeing, with schools playing a vital role in providing social support and fostering the mental health of children (Nickerson 2023; UNICEF 2023b).

The ongoing war in Ukraine, our focus, is no exception. It has already damaged and destroyed more than 3,300 schools (MENRU 2023), disrupting education for nearly 5 million students (UNICEF 2022). Further, about two-thirds of refugee children are not yet enrolled in their current host country's education system (Lowery 2023). The number of refugees, forced to leave Ukraine to escape war or persecution, grows significantly. This implores the IS community to help provide quality education and mental health support for this vulnerable population that is in urgent need of support.

Education–the development of knowledge, skills, and values–and *mental health*–one's cognitive, emotional, and social well-being–interact and influence each other in various ways. For children, education is essential as it lays the foundation for cognitive and social development, emotional well-being, and equips them with the necessary skills for active participation in society (Robinson-Pant 2008). Early educational experiences shape a child's personality, critical thinking, and adaptability, setting the groundwork for lifelong learning and health (Mazzonna 2014; Shonkoff & Philipps 2000).

The relationship between education and mental health forms a cycle that can either be virtuous—where quality education and good mental health benefit each other—or vicious, where struggles in one area exacerbate issues in the other (Smith & Lewis 2011). Quality education can promote mental health by enhancing self-esteem, cognitive development, and social skills (Banks & Mazzonna 2012; Kim et al. 2022). Conversely, good mental health can foster educational achievement by enhancing concentration, motivation, and the ability to interact positively with peers and educators, improving students' ability to handle everyday demands such as stress management, decision-making, and relationship building (Suldo et al. 2013; Wang et al. 2011).

However, prior literature has focused on either education (usually, higher education) or mental health in isolation, with scant attention given to the unique needs and challenges of elementary and secondary education and their interaction with mental health. Burgeoning research on *mobile learning*—learning using mobile devices allowing access to customizable educational resources from anywhere at any time (Fulantelli et al. 2015)—underscores its potential to democratise education access by transcending temporal, geographical, and socio-economic barriers (Krotov 2015; Murphy et al. 2014; Shuib et al. 2015). Studies exploring students' attitudes towards mobile learning have reflected a positive inclination (Al-Emran et al. 2016; Althunibat 2015), with technological and quality factors identified as critical success determinants (Sarrab et al. 2016; Yeap et al. 2016).

More recent work has begun to consider the use of mobile technologies among refugees (Canevez et al. 2022; Dahya et al. 2019; Kaufmann 2018), emphasizing their role in fostering social support networks and a sense of community. Recent research also explores the potential of digital mental health interventions (Allemand & Flückiger 2022). Nevertheless, most studies concentrate on higher education in developed countries, overlooking the specific needs of vulnerable populations such as refugees. Yet, prior experience with the comparable situation of Syrian refugee children suggests a pressing need for digital innovations to complement the efforts of governments and NGOs to support their education and wellbeing (Sirin & Rogers-Sirin 2015). Thus, we ask: *How can mobile technology support Ukrainian refugees' learning and mental health?*

In addressing this vital research question, we apply a scenario-based design approach (Rosson & Carroll 2002) to envision an integrated mobile learning and mental healthcare app using narratives derived from publicly available evidence. For all we know, this is the first study of its kind. Our paper contributes to the IS literature in two significant ways: by providing insights into the relation of mobile learning and mental health support in crisis contexts and emphasizing the potential of digital apps for addressing complex real-world problems, particularly those involving vulnerable populations.

2 Literature Review

2.1 Mobile Learning

The need to understand both non-digital and digital interventions, especially mobile learning, in the education of war-affected populations arises from an examination of various literature streams. The predominant focus on education across both prosperous and fragile contexts reveals significant gaps, substantiating the necessity for an integrated mobile learning app designed specifically for Ukrainian war refugees. Solutions must align with the United Nations' (UN) Sustainable Development Goals (SDGs): #3 (good health and well-being), and #4 (quality education), incorporating digital and non-digital strategies to address education in conflict-stricken areas and countries hosting refugees.

Non-digital interventions, although resource-intensive and fraught with risks, have ensured educational continuity in conflict zones through alternative means, such as bomb shelters (Cassidy, 2023), temporary classroom construction, and school building reconstruction (Grønhaug, 2018). Efforts like resilience programs by the World Bank (2023) have shown mixed results in addressing underlying behavioural obstacles to quality education.

With the ongoing Ukrainian conflict and sustained displacement, the limitations of these solutions become apparent. Critically, while ensuring physical safety remains paramount, the psychological toll of enduring such a protracted lack of a regular learning environment can induce a sense of demoralisation and a gradual decline in mental well-being. This slow psychological distress, as Cacioppo and Patrick (2008) note, highlights the compounded strain of chronic disruptions and limited daily companionship. On the flip side, fostering a sense of community and facilitating connections with peers can significantly mitigate these detrimental effects, underscoring the potential of digital innovations in improving educational and psychological outcomes simultaneously. Such digital interventions, therefore, present an unprecedented opportunity to address both educational disruptions and the deep-seated, often overlooked, psychological needs unique to these dire circumstances.

The COVID-19 pandemic has accelerated the digital transformation in education, spawning innovative solutions like e-learning and virtual schools (Cassidy 2023; Li & Lalani 2020). Although these methods demonstrate potential, they often struggle with scalability and adaptability to the ever-changing dynamics of war and displacement. The transition from conventional to digital learning also presents significant challenges, particularly in primary and secondary education (Pimmer et al. 2016). The ubiquity of mobile devices has made learning outside physical classrooms possible (Billinghurst & Dünser 2012). Students' positive perception of mobile learning, its flexibility, and potential role in building social networks are critical for refugees who face educational discontinuity (Al-Emran et al. 2016; Dahya et al. 2019). However, obstacles such as network accessibility, software compatibility, and quality content design persist (Fulantelli et al. 2015; Sarrab et al. 2016).

2.2 Digital Mental Health

The traumatic consequences of war and forced displacement have profound effects on refugees' well-being, often leading to long-term psychological disturbances, including post-traumatic stress disorder, depression, and anxiety (Elbert et al. 2015). Support for mental health in conflict zones has evolved to include both non-digital and digital interventions. Traditional emotional support networks and community-based strategies remain vital (Arega 2023; Murthy & Lakshminarayana 2006), complemented by digital tools like chatbots and online therapy (Gartoulla & Joshi 2022; Parfeniuk & Bond 2023).

However, digital tools come with challenges; they often face limited scalability, especially in resource-constrained environments, and may lack the depth of functionality required during times of acute stress and high demand. With an increase in refugee numbers globally and the pressing need for immediate interventions, the demand often outweighs the digital supply, causing service disruptions (Elbert et al. 2015). There is a clear gap in prior literature concerning an integrated, proactive, context-specific solution catering to the unique needs of war-torn populations like Ukrainian refugees. The complexity of displacement, cultural dislocation, and transitory nature of refugee situations calls for adaptable, mobile-based solutions that can respond to changing circumstances (Canevez et al. 2022).

There is a noticeable lack of solutions addressing both educational and mental health needs of war-affected children (Kaufmann 2018). This highlights an urgent need for integrated mental health supports tailored to the education of these vulnerable students. This study, thus, addresses this gap by developing an integrated mobile learning and mental healthcare app for Ukrainian war refugees. In doing so, it seeks to contribute to the UN's SDGs and inspire further inquiry in this critical area.

3 Research Method

This study employs a design science research (DSR) approach (Hevner et al. 2008), a common research method in IS. As Peffers et al. (2007) note, DSR allows the extension of human and organisational capabilities by formulating practical solutions and then deriving generalised abstractions from the problem-solution pair. Our study integrates DSR with a scenario-based design approach (Rosson & Carroll 2002) to clarify a specific problem and potential solutions related to displaced Ukrainian children. The methodology follows Hevner's (2007) three DSR cycles: relevance, rigour, and design. These three cycles actively shaped the entire development process of 'EduCare,' a prototype for an integrated mobile learning and mental health app. Named symbolically, 'Edu' refers to education, and 'Care' emphasises the importance of mental healthcare.

The *relevance cycle* ascertains the contextual applicability and contribution of a solution (Hevner 2007). In the case of EduCare, the relevance is pertinent due to the urgent need to support displaced students. Education's critical role in academic development and secondary socialization (Nickerson, 2023) underlines our effort. The alarming increase in refugees—35.3 million in 2022, with 40% being children (UNHCR 2023)—further underscores the importance. In the case of Ukraine, over 2 million children have fled to refugee-hosting countries, with many remaining outside the host country's educational system (UNICEF 2022). With the aim to contribute hands-on guidance to the problem, we conceptualised and envisioned the EduCare app using scenarios. While the app is in its conceptual phase, the ideas and functionalities were derived through collaborative and interdisciplinary expertise and supported by the evidence cited throughout this paper.

To ensure a comprehensive approach to tackling the challenges faced by displaced Ukrainian children, EduCare adopts a two-layered strategy. This model embodies design principles of *awareness*–a state of consciousness where information, learning, and understanding are key components–and *empowerment* –a process through which individuals gain control, ownership, and power to act on issues they define as important. Currently, EduCare primarily focuses on awareness, but the artifact's design allows for the future incorporation of empowerment strategies, conditional upon acquiring sufficient knowledge (Høiland et al., 2020).

The *rigour cycle* that underpinned the development of EduCare ensured both its robustness and validity through meticulous planning and execution (Hevner 2007). Initially, our team embarked on intensive iterative rounds of hermeneutic literature reviews, guided by the methodology described by Boell and Cecez-Kecmanovic (2014). The process began with defining specific research questions concerning education continuity, mental health support, and mobile learning, particularly in contexts involving young war refugees. Utilizing the academic search engine www.litbaskets.io, we incorporated a wide array of keywords, along with their variations, such as "mobile learning," "mental health in conflict zones," "education continuity during crisis," "e-learning for refugees," "war-affected children's education," and "trauma-sensitive learning environments".

These searches were complemented by filters for scholarly articles, peer-reviewed journals, and seminal works to ensure the credibility and relevance of our sources. Through continuous rounds of review and synthesis, our team integrated new insights into existing knowledge, facilitating a comprehensive understanding of the complexities involved in educational interventions in conflict zones. This iterative process enabled us to identify specific challenges, opportunities, and best practices that contributed to the design of EduCare. Whereas the relevance cycle anchored our study to the real-world problems faced by displaced Ukrainian children, guiding our research objective, the rigour cycle ensured that the conceptual design of EduCare was underpinned by solid academic research and evidence. In essence, the rigour cycle shaped the foundational knowledge and best practices that formed the building blocks of EduCare.

The design and development of EduCare unfolded along Peffers et al,'s (2007) suggested structure encompassing four primary DSR stages. First, the *problem identification* stage emphasises the urgent need for quality education and mental health support for school-aged children displaced by conflict, especially considering the digital divide and economic hardships in regions like Ukraine. The *solution objective* of EduCare is crafted to address multiple facets of education continuity, mental health support, cultural sensitivity, and sustainability, utilizing key metrics of desirability, viability, and feasibility. In addition, we created a solution scenario tailored to evoke high-quality feedback. In the *solution design and development* phase, we conceptualised EduCare's application with a two-layered strategy, focusing on awareness and empowerment of the displaced Ukrainian children. We built a prototype with Figma and used Canva for storyboarding to ensure the solution aligns with the needs of all stakeholders.

The planned evaluation of our solution will utilise a formative and naturalistic model, focusing on continuous improvement and feedback. Recognizing the urgency and ethical complexity, the strategy will follow Iivari et al.'s (2021) framework, emphasizing accessibility, importance, novelty, and effectiveness, along with flexibility for future needs. Ethical considerations will align with Myers and Venable (2014), underscoring ethical conduct and participant rights. The plan will also incorporate the FEDS Framework by Venable et al. (2016) offering an approach to assess practicality and alignment with objectives. The formative-naturalistic approach aims to enable continuous adaptation, actively seeking stakeholder feedback for validation and refinement. This integrative application of frameworks creates a robust, ethically grounded plan, highlighting the solution's innovative effectiveness, ethical responsibility, and adaptability to meet the dynamic needs of the target population.

The *design cycle* focuses on the conception and development of EduCare. Utilising the scenario-based design approach (Rosson & Carroll 2002), we create a narrative revolving around Ivanna, a 10-year-old Ukrainian refugee, to represent the real-world issue and its possible resolution. Divided into three sequences—before, during, and after the war—the scenario illustrates Ivanna's struggles and how EduCare aids her. These sequences (Figure 1), contextualise the needs of children in similar situations.

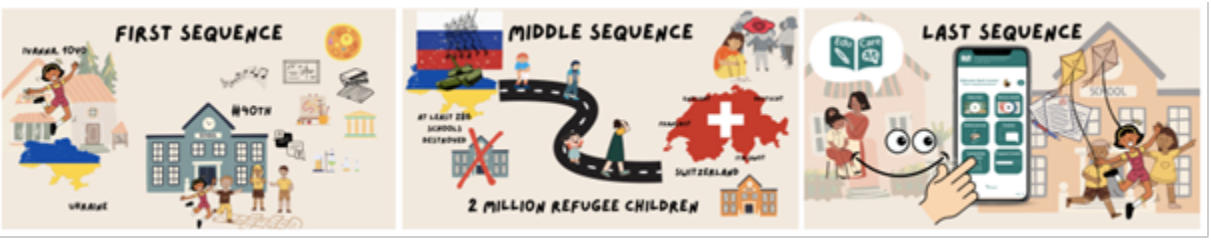

Figure 1: Main sequences of our scenario-based approach

1) *Before the War*: In the initial sequence, we portray the pre-2022 Ukrainian educational landscape, marked by a decent ranking of 40th worldwide (WPR 2023), with compulsory education from ages 6 to 15. Subjects taught include Ukrainian language and literature, foreign language, history, mathematics, sciences, and arts. Socialization flourished in schools and extracurricular activities.

2) *During the War*: The middle sequence covers the invasion of Ukraine by Russia, resulting in the destruction of at least 341 schools (MENRU 2023) and the displacement of two million children (UNICEF 2022). The impact on education, socialization, and mental health is immense. Ivanna and her family's relocation to Switzerland is marred by cultural challenges and language barriers, affecting her education and mental well-being.

3) *After the War*: The final sequence introduces EduCare, a multilingual, culturally informed app offering educational and mental health content. Ivanna's use of EduCare leads to marked improvement in her school performance and social interactions.

At the core of the design cycle is our hands-on approach, where we used the scenario-based design approach to bring EduCare to life. This approach enabled us to envision the EduCare app's functionality, user interface, and user experience in response to the challenges identified through the relevance and rigour cycles. Our involvement in the design cycle was iterative and collaborative. Being directly involved allowed us to adapt and refine the EduCare app design based on our ongoing discussions and the insights garnered from our literature reviews.

4 Results: Designing EduCare

In this section, we detail the design and implementation of our project, following the DSR structure as articulated by Peffers et al. (2007).

4.1 Problem Identification

The problem identification stage was steered by recognizing and precisely defining the problem. Through this highly iterative phase, we identified our users as primary and secondary school-aged children displaced from conflict-stricken areas. The core requirements are to ensure their access to quality education and mental health support. Nickerson (2023) and UNICEF (2023a) point out that schools play an indispensable role in a child's social development, not only imparting cultural norms and values but also managing mental health challenges stemming from conflict situations. Disruption of schooling due to war displacement can therefore lead to severe long-term consequences.

The problem is further exacerbated by the digital divide in developing nations, evidenced by disparities in internet usage between developed countries and Ukraine (UN-Habitat 2021). The challenge goes beyond mere connectivity; the affected population also needs digital literacy skills to engage with digital services and education. In Ukraine, where millions have become refugees (Temnycky 2022) and where the economy has experienced a significant contraction (Horowitz 2023), education has become a secondary priority, aggravating limited access to education. Thus, we suggest the problem statement:

Problem statement: *Currently, school-aged children displaced by the war in Ukraine are experiencing gaps in quality education and mental healthcare, especially in regions with digital divides and economic hardships. These challenges are a result of not only the physical dislocation but also the lack of digital literacy skills and adequate emotional support mechanisms. This project will deliver an integrated support system that will meet the objectives of not just providing internet connectivity, but also imparting digital literacy and emotional well-being. This approach will enable the attainment of a comprehensive education and mental health foundation, allowing these children to thrive in a world filled with upheaval and uncertainty.*

4.2 Solution Objective

In the wake of identifying the pressing challenges faced by school-aged children displaced by conflict, particularly in areas grappling with digital divides and economic turmoil, our pursuit for a solution converged on the conceptualization of EduCare. We crafted the solution objective of EduCare to address multiple facets, namely 1) education accessibility: enabling uninterrupted access to quality education, irrespective of geographical or socio-economic barriers, thus mitigating the educational divide, 2) mental health support: Creating an ecosystem where displaced children can connect with professionals and support groups, fostering emotional well-being and resilience, 3) cultural sensitivity: ensuring content and support are culturally appropriate, enhancing engagement and comfort for the children, and 4) sustainability and scalability: ensuring that the solution is adaptable to various contexts, sustainable in the long run, and can be scaled.

We evaluated the potential solutions using three key metrics: desirability, viability, and feasibility. These metrics are integral to DSR methodology (Hevner et al. 2008) and provide a comprehensive assessment of the solution's potential effectiveness and applicability.

Desirability refers to the attractiveness or appeal of a solution to its intended users and stakeholders (Brown 2008). For 'EduCare,' desirability is supported by its persistent and accessible nature, aligning with the displaced Ukrainian children's need for education and emotional stability. It must foster a sense of familiarity and continuity, crucial for mental well-being, especially during times of upheaval.

Viability encompasses the legal, technical, financial, and operational aspects that ensure a solution can be sustained over time (Brown 2008). Insights from a PESTLE Analysis underlined the importance of adapting to the changing dynamics of war-affected environments. The priorities identified were timeliness, maintaining quality operation, and ensuring continuity of core activities, thus contributing to sustainable adaptability both during and post-crisis.

Feasibility reflects the practicality of implementing a solution, often evaluated through cost-benefit analysis (Brown 2008). For 'EduCare,' feasibility was analysed based on the principle that digital innovation is often costly to produce, but cheap to reproduce, implying few recurring costs outside of maintenance if new solutions build on existing ones. This allows for scalability and accessibility, vital in addressing the widespread educational and mental health needs of the young Ukrainian refugees.

The DSR approach played a critical role in guiding us to the solution objective. It required a systematic inquiry into the problem space, leading to a generalised knowledge about the potential solution. The importance of having a well-defined solution objective was thus crucial; it served as a roadmap, bridging the gap between the identified problem and the ultimate solution, and ensuring alignment with the values and requirements of the stakeholders involved. Through a synthesis of insights and analysis, the following solution scenario emerged as a robust and flexible artifact to encapsulate our solution objective, tailored to evoke high-quality feedback, aligning with Rosson & Carroll's scenario-based design method. It represents a conscientious response to a complex problem, manifesting our commitment to create a meaningful impact on the lives of displaced children.

Solution Objective: *We need to provide an integrated support system that bridges the gap in quality education and mental healthcare for school-aged children displaced by conflict, especially in regions suffering from digital divides and economic hardships. This solution must extend beyond mere internet connectivity, equipping the displaced children with both the digital literacy skills and the emotional support they need to thrive in a world marred by upheaval and uncertainty.*

Solution Scenario: *Ivanna, a 10-year-old refugee from Ukraine, moved to Switzerland with her mother after fleeing the Russo-Ukrainian War. Transitioning to her new school proved difficult as she struggled to keep up with her peers and was burdened with trauma from the war, often worrying about the family and friends she left behind. Her mother, Ivanka, and her teacher, Mrs. Keller, became concerned about Ivanna's behaviour and lack of participation in class. Mrs. Keller recommended the integrated mobile learning and mental health app "EduCare". Ivanna was intrigued, finding comfort in the Ukrainian cultural connection and community support. The app provided educational videos on subjects like Mathematics and English, and connected her with registered counsellors, enabling her to join support groups with children facing similar struggles. After using the app, Ivanna began to develop coping skills and strategies, enhancing her confidence, optimism, and academic performance. The combination of educational modules, personal journaling, and support services provided a nurturing environment, fostering a sense of purpose and drive. With EduCare's support, Ivanna was empowered to set goals and nurture her career dreams, embarking on a path of healing and growth.*

4.3 Solution Design and Development

Striving to be mindful of the educational and emotional needs of displaced Ukrainian students (OECD, 2022), this section explains our strategy to promote awareness and empowerment.

4.3.1 Awareness: Facilitating Understanding and Connection

EduCare's primary focus is on promoting awareness, with functionalities that strengthens the learning mechanism and connect users to essential and sensitive topics. This can be achieved through various means, including **educational videos** that are tailored to the user's curriculum, employing visual and auditory learning methods to reinforce memory and recall (NTS 2023). The interactivity can be enhanced through short quizzes that encourage reflection and ownership (Brame & Perez, 2016). The inclusion of **asynchronous active team learning** features, based on the principles of media synchronicity theory (Dennis et al. 2008), serves a dual purpose. On one hand, they nurture relationships between students, facilitating the exchange of experiences and fostering a robust community spirit. On the other, they exemplify how certain tasks, like sharing lived experiences, benefit from asynchronous communication, allowing for more reflective and thoughtful exchanges. Within this framework, EduCare might incorporate assignments designed to connect Ukrainian students abroad, encouraging them to share and contrast their experiences of living amidst different cultures

Mental health awareness videos initiate dialogues on mental health and associated topics. For instance, informational videos about self-care, bullying, and support resources could engage partnerships with non-governmental organizations like United for Global mental health and Ukrainian Community Self-Help. An **online journal and progress tracker** could offer both an emotional outlet for students and a valuable means of ongoing improvement for the app, potentially featuring gamification elements that motivate continued engagement. In addition, the app could suggest professional support and resources in case of early warning signs of mental health issues. These features collectively aim to create an environment of support and understanding, acclimatizing the students to the challenges they face and building bridges between their shared experiences.

4.3.2 Empowerment: Enabling Action and Control

The second layer of EduCare's strategy focuses on empowerment, with plans to implement features that provide tools for users to actively engage with their situation. A built-in **social messaging** feature would facilitate connections across the globe, allowing children to bond over shared values and experiences, fostering friendships. A **chatbot** could provide 24/7 availability and emergency mental health support, improving access to treatment (Malgaroli et al. 2020). The rapidly advancing capacities of generative Artificial Intelligence (AI) and conversational agents could offer a much-needed remedy for the overstretched healthcare system. Complementary, children could book **professional counselling sessions** through EduCare to share their experiences and receive tailored support.

However, these empowerment features remain at the prototype stage for now, as they are hindered by the current technological landscape's ethical and security challenges and a lack of rigorous research to address these challenges. Particularly as highly sensitive data about children would be involved, considerable challenges are presented by privacy protection, data ownership, and compliance with medical privacy laws – such as the *Health Insurance Portability and Accountability Act (HIPAA) 1996* in the US, the *Privacy Act 1988* in Australia and the *General Data Protection Regulation (GDPR) 2016* in the EU (Ienca & Malgieri 2022). The consideration of possible emotional dependencies, digital therapeutic bonds, and content safety for minors adds complexity to these functionalities (Darcy et al.

2021). The potential for harm – whether through abuse, malfunctioning, or ill-designed features – is considerable and would be antithetical to our intended vision for EduCare.

Overall, an appropriately designed mobile learning and mental health app needs to go beyond mere technical considerations to instead emphasise the socio-technical nature of such a solution. With EduCare, we have explored a promising approach to addressing the complex needs of young Ukrainian refugees. Intertwining elements of awareness and empowerment offers an integrated support system that recognises both the educational and emotional challenges faced by this vulnerable population. Figure 2 presents illustrative examples of EduCare's mobile learning and mental health features. The author team has carefully crafted a Figma prototype of EduCare to present illustrative examples of the app's mobile learning and mental health features. It can be accessed at: https://tinyurl.com/34rkdady

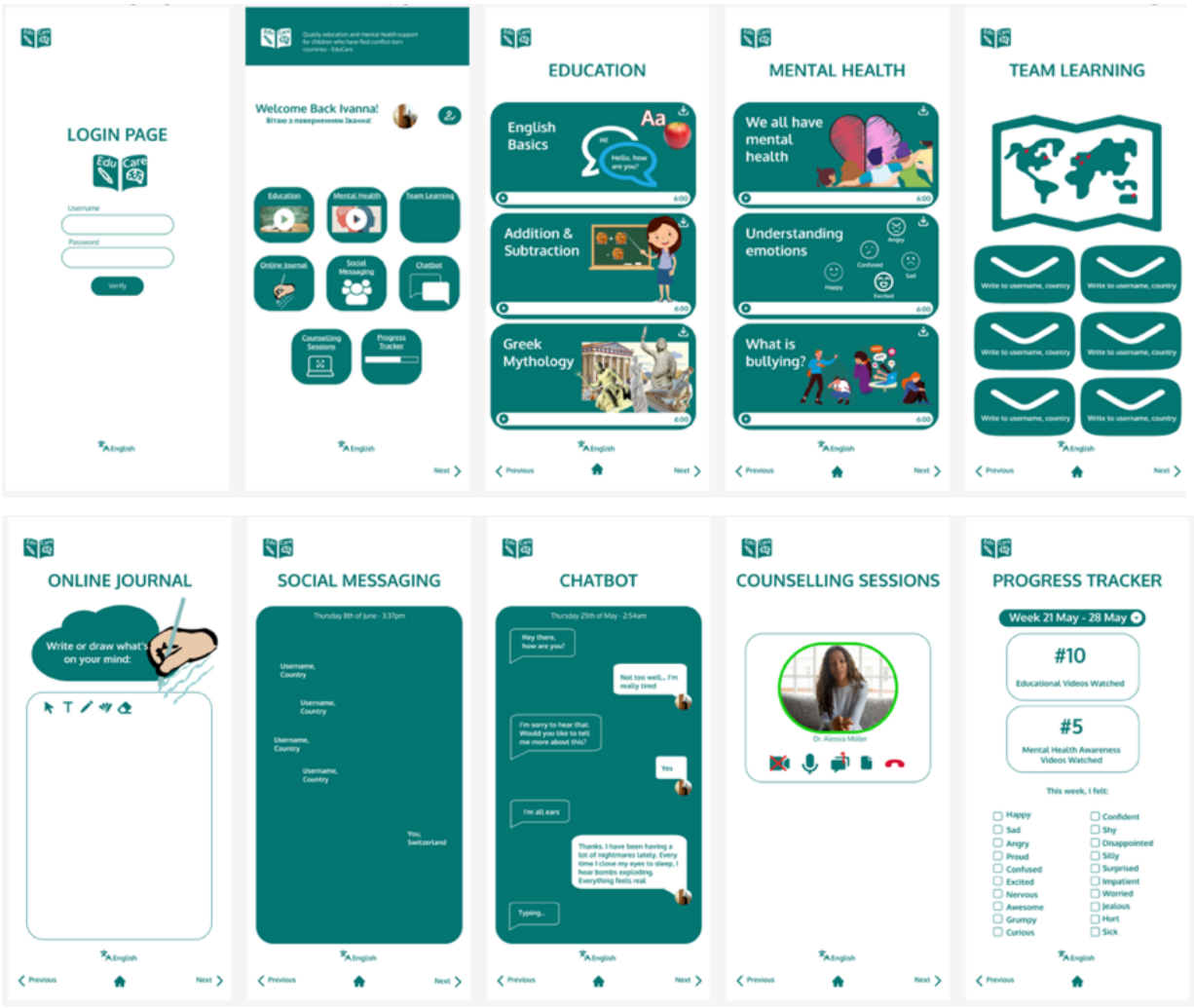

Figure 2: EduCare's Figma Prototype (top: learning features, bottom: mental health features)

4.4 Proposed Evaluation

A conventional empirical evaluation is not feasible at this stage, given the sensitive and dynamic nature of the situation. The involvement of sensitive data and the urgency of the ongoing crisis present unique challenges and ethical concerns, particularly concerning the privacy and emotional well-being of displaced Ukrainian children. Ethical sensitivity is paramount, as dealing with children's data and emotions requires utmost caution and adherence to regulations. The ongoing conflict in Ukraine adds an unprecedented level of complexity, potentially endangering participants or revealing their location.

Our design process for EduCare has been an inclusive and collaborative one. We have had in-depth discussions among the seven authors, which include a diverse group of students, PhD researchers, and faculty, ensuring multiple perspectives are considered. In addition to these internal discussions, the proposed design ideas were presented to a wider group of IS scholars within our institution, and their

feedback was invaluable in refining our concept. While we have not yet sought feedback directly from human stakeholders, we have used publicly available news articles, blogs, and data from NGOs like UNICEF to inform our conceptual design. Although we are not considering seeking feedback from children directly, our next steps include garnering insights from experts who interact closely with our target demographic. As a forward step, we are gearing up to conduct a more comprehensive evaluation by engaging key stakeholders such as digital designers, educators, guardians, and psychologists experienced in the Ukrainian context.

Our proposed evaluation strategy focuses on continuous improvement and ethical grounding. By using robust design evaluation frameworks like Iivari et al.'s (2021), the FEDS framework by Venable et al. (2016), Myers and Venable's (2014) principles for ethical DSR, the evaluation can ensure that the design is culturally sensitive, innovative, and ethical. The development of a prototype is a valuable step, representing an emergent, actionable solution to an urgent and complex problem. This is supported by a well-defined evaluation strategy that, despite the absence of empirical data, does not imply a lack of rigorous analysis. The planned evaluation captures the best practices in the field and offers a pathway for future researchers. It also places emphasis on usability, resonation with the target population, and accessibility, aligning with the evaluation stage of the DSR process. Throughout the process, adherence to ethical principles as outlined by Myers and Venable (2014) ensures that the research maintains its integrity, respects human dignity, and contributes to knowledge without causing harm.

The absence of empirical evaluation for EduCare is a careful and deliberate choice, recognizing the intricate realities of the current situation. The rigorous approach to designing and planning the evaluation, along with the availability of a prototype, underscores the potential contribution of an integrated mobile learning and mental healthcare app. The ethical challenges and war context might decelerate traditional empirical approaches, but they need not stop the progress of research. The design and strategy presented in EduCare offer a solid foundation for future researchers navigating similar terrains, uniting innovation, compassion, and ethics, even in the face of adversity. Empirical data to validate EduCare's design could be collected through a carefully controlled pilot study involving a representative sample of displaced Ukrainian students and educators. This study would entail user testing, monitoring engagement, and qualitative feedback. Ensuring compliance with ethical guidelines and privacy laws, the collected data would provide insights into the app's usability, effectiveness, and resonance with the target population, allowing for iterative improvements and validation of the design.

5 Discussion

The EduCare app represents a pioneering approach to address the intertwined challenges of Ukrainian refugees: the provision of quality education and mental health support. By integrating educational videos, mental health awareness content, and interactive tools, EduCare creates a supportive environment designed to foster both academic growth and emotional healing. This innovative synergy addresses the complex needs of refugees within the unique cultural and ethical landscape of Ukraine.

5.1 Theoretical Contributions

Our theoretical contribution to the IS literature is twofold, providing insights into both the problem domain and the method by which the problem can be addressed. First, our study contributes insights into the combined application of mobile learning and mental health support in crisis contexts. The study's findings extend the literature by highlighting the potential and intricacies of applying mobile learning in crisis situations. EduCare's design leverages the accessibility and flexibility of mobile apps to bring education to displaced children, while also incorporating targeted mental health interventions. This punctuates the realization that education and mental health cannot be siloed in a crisis context, rather providing a model where both can be nurtured simultaneously. The success of EduCare's model in addressing this crisis context hints at a broader applicability to other emergency situations, where traditional schooling and mental health supports may be disrupted or unavailable.

Second, our study emphasises the potential of scenario-based design for addressing complex real-world problems. EduCare's scenario-based design offers a valuable framework for engaging with complex, multifaceted problems, particularly those involving vulnerable populations. By grounding the design process in realistic scenarios that reflect the unique experiences, values, and needs of Ukrainian children, the app was crafted with an empathy and sensitivity that might elude more traditional design approaches. This method holds promise as a broader tool for social innovation, where design must navigate cultural nuance, ethical complexity, and the delicate dynamics of human vulnerability.

5.2 Implications for Practice

For stakeholders ranging from educators to technology developers, mental health practitioners, and policymakers, the development and conceptualization of EduCare provide vital lessons on addressing the intertwined challenges of education and mental well-being amidst conflict and displacement.

Take an Integrated Approach: While traditionally, education and mental health have been treated as distinct domains, it is essential for practitioners to appreciate their interconnectedness. Integrating mental health support directly within the educational framework ensures that the holistic well-being of the child is prioritized. → Actionable recommendation: Introduce mental health modules or sessions alongside regular educational content, providing students with accessible tools and resources to address their psychological needs.

Ensure Cultural Fit: The importance of culturally appropriate content cannot be overstated in the context of EduCare. For any educational or therapeutic tool to be effective, it should resonate with the cultural values, traditions, and lived experiences of its users. → Actionable recommendation: Collaborate with local communities, educators, and counsellors familiar with the cultural nuances to co-create content that is both relevant and respectful.

Maintain Ethical Conduct: Given the vulnerable status of the target group, there is an added responsibility to ensure data privacy, safety, and ethical conduct. Confidentiality, especially in the context of mental health, is vital. → Actionable recommendation: Deploy rigorous data protection protocols and ensure transparency with users about how their data will be used, stored, and protected.

Ensure Scalability and Adaptability: Given the diverse needs of refugee populations and the evolving nature of conflict zones, solutions must be flexible. EduCare's conceptual design highlights the need for adaptability, ensuring that the solution can be scaled or modified according to specific contexts or emerging needs. → Actionable recommendation: Design modules and features in a way that allows easy customisation and involve continuous feedback loops with users to ensure the app remains relevant.

Facilitate Stakeholder Collaboration: Collaboration between various stakeholders, from tech developers to educators and mental health professionals, is crucial. An integrated solution like EduCare benefits from multidisciplinary insights and expertise. → Actionable recommendation: Organise regular interdisciplinary workshops or feedback sessions, ensuring that the app benefits from a wide range of expert perspectives.

Safeguard Appropriate Funding: Given the potential of EduCare and similar initiatives, policymakers should consider investing in and supporting the development of integrated digital solutions that address both education and mental well-being. → Actionable recommendation: Governments and NGOs can provide funding, facilitate partnerships, and create conducive environments for the testing and deployment of such solutions in affected regions.

Continuous Evaluation: As with any intervention, regular assessments are crucial to measure effectiveness, identify areas of improvement, and ensure the evolving needs of the target population are met. → Actionable recommendation: Establish regular monitoring and evaluation metrics, and actively engage with users for feedback, making iterative improvements based on their insights.

Incorporating these recommendations will not only enhance the utility and effectiveness of tools like EduCare but also elevate the overall approach to addressing the complex needs of displaced children, ensuring they receive holistic support in their quest for education and emotional well-being.

5.3 Limitations and Future Research

While the EduCare app offers a promising approach to addressing the educational and mental health needs of Ukrainian war refugees, it is essential to recognise some limitations of our study. One major constraint is the lack of empirical validation. Due to the time-sensitive and ethically complex nature of the crisis, our study did not include an empirical validation of EduCare with the target population. While our design was informed by a deep understanding of the context and needs, the absence of user testing means that we lack direct evidence of its efficacy and acceptability. The ethical complexity of working with Ukrainian children, a vulnerable population, presents additional considerations, which may have constrained some aspects of the design and research process.

Thus, further research is needed to support the design of appropriate empowerment features in apps like EduCare. Ethical and cultural sensitivities must be carefully handled. Design efforts should align with Ukrainian values, norms, and beliefs. As such, sensitivity towards triggers of post-traumatic stress

and cultural nuances such as family dynamics and mental health stigma need to be an integral part of the design (Moore 2022). Further, as Myers and Venable (2014) note, ethical principles of respect, honesty, transparency, privacy, and continuous learning must be considered, maintaining the integrity and task-appropriateness of digital interventions that consider the dual potential for benefit and harm.

These limitations point to fertile paths for further research. Future studies could engage in rigorous empirical evaluation of EduCare with displaced Ukrainian children, considering ethical guidelines, to understand its actual impact and refine its design further. Additionally, exploring the adaptability of the EduCare model to other crisis contexts, or how the scenario-based design approach can be generalised to other complex, real-world problems, offers exciting directions for expanding understanding and application of these innovative approaches.

6 Conclusion

The EduCare app's approach to integrated educational and mental health support for displaced Ukrainian children provides both a practical solution and a rich source of theoretical insights. Its blend of mobile learning, mental health intervention, cultural sensitivity, and scenario-based design offers a blueprint for others seeking to navigate the complex interplay of education, mental health, culture, and ethics in crisis contexts. While our study has limitations, including the lack of empirical validation, the lessons learned, and the pathways opened for future research contribute to an evolving dialogue on how we can better support those in crisis through compassionate design.

Beyond theoretical contributions, our work holds tangible benefits for those committed to alleviating the plight of war-torn communities. By marrying educational needs with mental health support within an affordable, flexible app, we have forged a blueprint for future humanitarian interventions. But the journey does not end here. Urgent questions remain—about scalability, adaptability, long-term impacts, and potential technology integrations. We, therefore, call upon our fellow researchers in the IS community to join us in advancing this vital discourse. The challenges are daunting, the issues are sensitive, but together, we can ensure that Ukrainian refugees stand strong, even amidst crises.

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