

Development of Trauma-Informed Digital Educational Tools for Children in Ukraine: An Exploratory Evaluation of a Cross-Cultural Collaborative Project

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Abstract

This exploratory study examines student perceptions of the educational value of an international, cross-cultural collaborative project involving American computer science and psychology students and Ukrainian pre-service education students aimed at integrating trauma-informed practices into STEM and social science education. Through this interdisciplinary project, students co-developed digital support tools intended to help Ukrainian children regulate emotional responses associated with war-related stress and trauma. Perceived outcomes were assessed through open-ended survey responses assessing perceived meaningfulness and skill development. Qualitative findings demonstrated strong educational value, with 91.2% of Ukrainian participants reporting that the collaboration experience was meaningful and 84.7% indicating growth in transferable personal and professional competencies. These findings suggest that cross-cultural, project-based collaborations may offer a promising model for integrating socially responsive design into undergraduate curricula, although further research with broader, more robust assessment methods is needed.

Keywords: *Interdisciplinary collaboration; cross-cultural awareness; work readiness; STEM education; stress and trauma.*

1. Introduction

Exposure to stress and trauma alters children's emotional and cognitive development, shaping long-term social and academic outcomes, particularly in contexts of armed conflict where daily life is characterized by violence, disruption, and uncertainty. Globally, almost 19% of children, or 473 million, now live in conflict zones, a dramatic increase from roughly 10% in the 1990s,

exposing more children than at any point since World War II to prolonged instability and toxic stress (UNICEF, 2024).

In Ukraine, the full-scale invasion that began in February 2022 has placed immense psychological burdens on young people. Recent UNICEF surveys indicate that one in three Ukrainian children report feeling so hopeless or sad that they cannot engage in regular activities, and many have experienced loss of loved ones or severe disruption to their lives (UNICEF, 2023). National-level estimates indicate that among adolescents exposed to war, 35% screen positive for clinically relevant psychological trauma, with substantial proportions also exhibiting moderate to severe depression (32%) and anxiety (17.9%) (Goto et al., 2024). These figures point to a growing mental health crisis among Ukraine's youth, with millions in need of ongoing support (UNICEF, 2025).

Given these stark realities, developing diverse forms of physical, psychological, and educational support for children struggling with post-traumatic stress disorder (PTSD), anxiety, and impaired emotion regulation is a pressing priority. Research on children affected by armed conflict more broadly shows that the exposure to prolonged trauma significantly increases the risk of lasting mental health challenges, including PTSD, depression, and anxiety, all conditions known to disrupt learning, social functioning and developmental trajectories (Sourander et al., 2025; Twohig & McNicholas, 2026).

This exploratory study engaged American and Ukrainian university students in an interdisciplinary cross-cultural collaborative project aimed at supporting children in war-affected areas of Ukraine. American computer science and psychology along with Ukrainian secondary education university students were tasked with co-designing an educational web-based tool to help children regulate negative emotional responses to stress and trauma, drawing on their diverse disciplinary skills. By examining both the process and outcomes of this collaboration, the project contributes to emerging research on trauma-informed, cross-cultural learning experiences in higher education and on the design of student-driven interventions for crisis contexts.

While the mental health impact of war on children has been widely documented (UNICEF, 2024; Goto et al., 2024), less attention has been given to how higher education can engage students in designing trauma-informed responses within authentic, cross-cultural contexts (Maier et al., 2025). The present study contributes to this area by examining an interdisciplinary collaborative model in which students co-developed a digital educational tool while engaging in culturally situated, trauma-informed design. The focus of this study is not on evaluating the effectiveness of the tool for children, but rather on understanding student learning experiences and perceived outcomes within this collaborative framework.

2. Method

2.1. Participants and Design

This study used a survey design to examine the educational and developmental outcomes associated with participation in a cross-cultural collaborative project. A total of 62 participants were drawn from two distinct populations. The first group consisted of Ukrainian pre-service teachers ($n=46$), most of whom identified as female (91.3%) and were senior-level undergraduate students majoring in language or secondary education. The second group included American university students ($n=16$), most of whom identified as female (75%). These participants were primarily enrolled in psychology programs, with a subset majoring in Computer Science. The survey instruments included open-ended questions to capture participants' subjective experiences and perceived learning outcomes related to the collaboration.

2.2. Data Collection Procedure

Data were collected during the final phase of the cross-cultural collaborative project via a survey. Participants from both institutions completed surveys and open-ended reflection questions on the Qualtrics online survey platform. All participants were informed of the study's voluntary nature and provided informed consent before participating. Surveys were administered after students had completed the primary design and development activities associated with the project, ensuring that responses reflected the full collaborative experience. Participants completed the surveys independently and anonymously to reduce social desirability bias and encourage honest reflection on both learning outcomes and personal experiences related to the collaboration.

2.3. Qualitative Data Collection and Analysis

Participants were given the opportunity to reflect on their subjective experiences through a series of open-response questions administered after they completed the collaboration. These questions were designed to capture participants' perceptions of meaningfulness and their personal and professional skill development resulting from their participation in the collaborative project. Both American university students and Ukrainian pre-service teachers were asked whether they had developed any skills, at a personal or professional level, as a result of their collaborative experiences. In addition, they were given the opportunity to demonstrate the skills they had developed.

In addition to questions about skill development, Ukrainian participants were asked to reflect on their participation in the collaborative project. This question aimed to capture the subjective

experiences participants valued in the collaboration, as well as the personal significance the project held.

This study was designed as an exploratory qualitative evaluation of participants' perceptions of the collaboration and their self-reported learning outcomes. It was not intended to assess the effectiveness of the digital tool for children or to provide causal evidence of changes in student competencies. Responses were analyzed using thematic analysis in NVivo to identify recurring patterns related to communication, collaboration, cross-cultural awareness, and empathy and trauma awareness.

3. Results

As a result of the cross-cultural collaborative project, students co-developed an educational web-based platform to support emotion regulation and psychological well-being among Ukrainian children in school settings. The website served as a practical application of trauma-informed instructional strategies and provided an authentic design environment where students applied interdisciplinary knowledge and professional skills. The platform reflected contributions from both institutions and offered an initial example of international, interdisciplinary co-design in a higher education setting. While the project was underway, Ukrainian pre-service teachers completed secondary school practicum placements and incorporated the trauma-informed stress-relief strategies presented during this collaboration into their instructional practice.

3.1. Qualitative findings

Open-response survey questions were administered to both American students and Ukrainian pre-service teachers to support post-collaboration reflection. Questions posed to all participants focused on perceived personal and professional skill development. Ukrainian participants were also asked to reflect on whether the collaboration was personally meaningful. Analysis was conducted using NVivo.

Among the Ukrainian participants, 84.7% reported developing or strengthening skills relevant to personal and professional contexts. Similarly, 68.7% of American participants reported skill development as a result of their participation. Although this proportion was lower than that of Ukrainian respondents, it nonetheless suggests that participants perceived the collaboration as educationally valuable.

Regarding perceived meaningfulness, 91.2% of Ukrainian participants reported that the collaboration was personally meaningful. The remaining respondents did not report negative experiences and instead chose not to respond to this item.

Thematic analysis of Ukrainian participants' responses revealed several recurring patterns across skill development and perceived meaningfulness. Prominent themes included communication, collaboration, cross-cultural awareness, empathy, and trauma awareness. Many participants described benefits that extended beyond academic learning to include personal growth and professional preparation.

Communication emerged as the most frequently recognized theme. Among Ukrainian respondents, communication was identified as a meaningful outcome in 63% of responses. When specifically asked to describe skills developed during the project, 45.65% of participants referenced improvements in communication abilities. For coding purposes, responses mentioning language development, listening, and verbal expression were all coded under this theme, reflecting growth in both receptive and expressive communication competencies.

One respondent described this experience by stating, "I have been able to communicate with people who have absolutely different cultures and backgrounds. We were able to find a common language and got a really nice outcome from this work." Many respondents also emphasized increased confidence in using language and engaging in professional communication as a direct result of the collaboration.

Cross-cultural awareness was another prominent theme. Over half of the Ukrainian respondents (54.34%) reported that the collaboration was meaningful in helping them better understand cultural differences and inclusive practices. Participants frequently noted greater awareness of the importance of perspective-taking and cultural sensitivity when working with international partners. One participant reflected, "The collaboration made me think more critically about culture and inclusion."

This theme was particularly relevant given the project's structure, which relied on integrating Ukrainian participants' lived experiences and educational context with the technological and psychological expertise of the American students. The collaboration required continuous negotiation of cultural perspectives and communication styles, reinforcing the importance of intercultural competence.

Collaboration and teamwork also emerged as significant outcomes. 36.95% of respondents reported that the project was meaningful in supporting the development of collaborative and teamwork abilities. When asked to provide concrete examples of skills gained, 47.8% of participants referenced teamwork-related competencies.

Participants frequently described improved task coordination, responsibility sharing, and professional communication within group settings. One participant stated, "I saw how teamwork works when tasks are distributed and understood the value of responsibility and respect," while another noted, "I improved my ability to work as a part of a diverse team." These

reflections highlight the project's role in fostering practical teamwork skills aligned with workplace expectations.

Finally, empathy and trauma awareness were also identified in a subset of participant responses. Approximately 21.6% of Ukrainian respondents reported increased awareness of trauma-related issues and greater empathetic understanding as a result of participating in the project. One respondent reflected that the experience "...helped me become more empathetic and adaptable." Although this theme appeared less frequently than others, it remains an important outcome given the project's trauma-informed focus and its alignment with the broader goal of supporting emotionally vulnerable populations through educational and digital interventions.

4. Discussion

This study offers an exploratory account of a cross-cultural, trauma-informed collaborative project and its perceived educational value for participating students. Through the project, participants co-developed a web-based educational platform to support Ukrainian children experiencing war-related stress and emotional disruption. Designed for use in supervised educational settings, the platform integrates trauma-informed strategies that address anxiety, emotional regulation, and post-traumatic stress responses, providing educators with a practical resource grounded in psychological research and classroom realities. Notably, Ukrainian participants applied trauma-informed stress-regulation strategies in their classroom teaching contexts during the project.

Importantly, the present study evaluates participants' perceptions of the collaborative learning process rather than the digital tool's usability or psychological effectiveness for child end users. As such, conclusions are limited to reported student experiences and do not extend to validated learning outcomes or intervention impact.

Beyond the development of the digital tool, the findings indicate notable educational benefits for participating students. Participants perceived that engagement in an international, interdisciplinary collaboration supported personal and professional growth. By combining the technological and psychological expertise of the American participants with the pedagogical knowledge and lived experience of the Ukrainian pre-service teachers, the project created a learning environment that encouraged authentic problem-solving through cultural exchange. This integration was associated with perceived development of transferable skills, including communication, collaboration, and empathy, which are increasingly recognized as essential competencies in higher education and professional practice across industries and disciplines (NACE, n.d.).

Qualitative analysis indicates that participation in the project supported perceived growth in several key areas aligned with higher education learning goals. Communication and teamwork

emerged as central outcomes. Cross-cultural awareness was also prominently reported, reflecting increased cultural sensitivity and global competence. Additionally, some participants reported gains in empathy and trauma awareness as part of their learning experience.

Collectively, these findings can serve as promising pedagogical models for integrating social-emotional learning, global engagement, and applied skill development within undergraduate education. By situating technical and disciplinary instruction within real-world humanitarian contexts, such collaborations offer students opportunities to engage in meaningful work while developing competencies relevant to both academic success and future professional roles.

These findings are best understood as a preliminary, context-specific contribution that supports the feasibility and educational value of integrating trauma-informed, cross-cultural design into higher education curricula.

4.1. Limitations and Future Directions

Several limitations affect this study's findings. The small, uneven sample and predominance of female undergraduates limit statistical power and generalizability. Findings rely solely on self-reported data without validated measures, triangulation, or pre-/post- comparisons, further restricting conclusions.

Future research should extend this work by evaluating the educational and psychological impact of the trauma-informed website on children's educational experiences. Planned future work will also include formal usability testing of the platform with educators and students to assess accessibility, usability, and instructional effectiveness. In addition, subsequent collaborative projects will focus on co-developing expanded trauma-informed instructional strategies and digital resources, informed by user feedback and classroom implementation. Future studies can also address potential limitations through collaborative projects that use balanced group samples and employ pre- and post-test evaluations.

4.2. Conclusion

This study presents an exploratory example of cross-cultural, interdisciplinary collaboration as a pedagogical approach in higher education. Through a partnership between American and Ukrainian students, participants co-developed a trauma-informed digital resource to support children affected by war-related stress and emotional disruption.

Beyond the development of the web-based platform, findings indicate consistent educational benefits to the participants. Most participants reported personal and professional growth, including improvements in communication, collaboration, cross-cultural awareness, and empathetic understanding. These outcomes highlight the potential of experiential, project-based learning environments to cultivate transferable competencies that extend beyond technical knowledge and prepare students for complex, global professional contexts.

Collectively, the findings suggest that integrating socially impactful, trauma-informed projects into undergraduate curricula can enhance student learning and address real-world challenges. This work contributes to emerging models of international collaboration in higher education and illustrates a transferable instructional framework for institutions seeking to integrate global engagement, interdisciplinary learning, and human-centered technology development with STEM and social science programs.

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