BRAIN. Broad Research in Artificial Intelligence and Neuroscience
e-ISSN: 2067-3957 | p-ISSN: 2068-0473
Covered in: Web of Science (ESCI); EBSCO; JERIH PLUS (hkdir.no); IndexCopernicus; Google Scholar; SHERPA/RoMEO; ArticleReach Direct; WorldCat; CrossRef; Peeref; Bridge of Knowledge (mostwiedzy.pl); abcdindex.com; Editage; Ingenta Connect Publication; OALib; scite.ai; Scholar9; Scientific and Technical Information Portal; FID Move; ADVANCED SCIENCES INDEX (European Science Evaluation Centre, neredatatics.org); ivySCI; exaly.com; Journal Selector Tool (letpub.com); Citefactor.org; fatcat!; ZDB catalogue; Catalogue SUDOC (abes.fr); OpenAlex; Wikidata; The ISSN Portal; Socolar; KVK-Volltitel (kit.edu)
2025, Volume 16, Issue 4, pages: 7-21
Submitted: August 24th, 2025 | *Accepted for publication:* October 21st, 2025

Empowering Vulnerable Children Through AI: A Participatory Study from Central Europe

Alois Daněk
AMBIS University, Department of Education, Prague, Czech Republic.
Alois.danek@ambis.cz
https://orcid.org/0000-0003-0239-7358

Jarmila Klugerová
AMBIS University, Department of Education, Prague, Czech Republic.
Jarmila.klugerova@ambis.cz
https://orcid.org/0000-0002-7174-3704

František Vlach
AMBIS University, Department of Security Management, Prague, Czech Republic.
Frantisek.vlach@ambis.cz
https://orcid.org/0000-0002-7598-8370

Abstract: *Children living in residential childcare institutions worldwide face significant barriers to social inclusion, personal development, and educational equity. This article reports findings from the international project Sport, Culture, and Education: Empowering Visegrad's Children for a Brighter Future, which integrating non-formal education, cultural expression, and sports to foster inclusion and 21st-century competencies among children in residential childcare. An important innovation of the project was the integrative use of artificial intelligence (AI) to support pedagogical planning, adaptive content creation, and participatory evaluation processes. Employing a participatory action research design and mixed methods, the study involved 68 children from residential childcare institutions in the Czech Republic, Slovakia, and Ukraine, accompanied by 21 childcare professionals. Results show that AI has significantly enhanced the quality and individualisation of educational and cultural interventions, while also improving the efficiency of data collection and analysis. At the same time, our study highlights critical ethical, linguistic, and contextual challenges to the deployment of AI in these vulnerable populations. The article discusses the broader implications of AI in the context of residential childcare. It presents evidence-based recommendations for educators, not only in residential childcare settings but also those seeking to employ AI responsibly and effectively in the fields of child welfare and inclusive education.*

Keywords: *artificial intelligence; inclusive education; residential childcare; social inclusion; participatory action research; digital equity; non-formal education.*

How to cite: Daněk, A., Klugerová, J., & Vlach, F. (2025). Empowering vulnerable children through AI: A participatory study from Central Europe. *BRAIN. Broad Research in Artificial Intelligence and Neuroscience*, *16*(4), 7-21. https://doi.org/10.70594/brain/16.4/1

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1. Introduction

Children growing up in residential childcare institutions across Central and Eastern Europe, including the Visegrad region, continue to face systemic, multifaceted disadvantages. Despite international conventions and regional commitments to inclusive education, access to quality learning, cultural participation, and social integration remains significantly limited for this vulnerable group (UNICEF, 2023). Institutional care often operates outside the mainstream of educational innovation, resulting in children being socially isolated, emotionally under-supported, and excluded from opportunities that foster self-realisation and civic engagement. While it is beyond question that residential childcare has undergone significant positive transformations in recent years, several challenges persist. One of the persisting challenges concerns the integration of artificial intelligence (AI) into the context of residential childcare. Adaptive AI systems, generative educational content, and automated feedback tools hold the potential to personalise support and reduce structural barriers (Holmes, Bialik, & Fadel, 2023; Luckin et al., 2016). However, this potential can only be realised when AI is implemented ethically, inclusively, and with careful attention to local needs, pedagogical values, and human dignity (Zawacki-Richter et al., 2019).

This article presents findings from the international project titled *Sport, Culture, and Education: Empowering Visegrad's Children for a Brighter Future*, conducted in 2025 with support from the International Visegrad Fund. It combined sports, cultural expression, and non-formal education with the exploratory use of AI to promote social inclusion and the development of 21st-century competencies in residential care environments. The study engaged a total of 68 children aged 11 to 18 years from residential childcare institutions in the Czech Republic, Slovakia, and Ukraine, accompanied by 21 childcare professionals. The Ukrainian participants constituted a unique group, as their institution had been temporarily relocated to Poland as a result of the war. Our research draws on participatory action research and mixed-methods evaluation. Through empirical analysis and critical reflection, we examine how AI technologies can enhance the reach and quality of inclusive educational practices. Our findings provide recommendations for researchers and educators seeking to ethically integrate AI into residential childcare settings and enhance the education of children from socially disadvantaged backgrounds.

2. Theoretical Background

Residential childcare should not be viewed as a detached and isolated domain unrelated to broader societal structures. It represents a specific and often marginalised segment of the child welfare system designated for children who have experienced adverse childhood events, family breakdown, and various forms of trauma (Alfandari & Taylor, 2021). While notable progress has been made in care standards across Central and Eastern Europe, children living in residential childcare continue to face challenges related to social exclusion, educational disadvantage, and limited cultural participation. Our research team has been actively engaged in addressing these issues, and our findings have been consistently implemented in residential childcare institutions in the Czech Republic and internationally. Through this work, we have come to understand that residential childcare systems reflect the cultural and policy-specific realities of individual countries (Daněk, Šotolová, & Žolnová, 2023; Daněk, Šotolová, & Stárek, 2024). As evidenced in prior research, institutional care is often inadequate in supporting children's emotional growth, identity development, and social integration. This situation reinforces the current systemic inequalities (Bach-Mortensen, Goodair, & Barlow, 2022; Calheiros & Patrício, 2014). Our article does not aim to provide a comprehensive analysis of the residential childcare system. Instead, it focuses on the role of artificial intelligence as a tool for supporting this vulnerable group.

2.1. Artificial Intelligence in Education: Opportunities and Cautions

Within the context of residential childcare, education plays a pivotal role (Calheiros & Patrício, 2014; Garcia-Molsosa, Collet-Sabé, & Montserrat, 2021). It is not possible to effectively address the complex challenges faced by children in these environments without access to meaningful and high-quality learning opportunities. Artificial intelligence (AI) has emerged as a

transformative force in education over the past few years. AI can provide tools that range from intelligent tutoring systems and automated feedback to generative content creation and adaptive learning platforms (Schultz et al., 2021; Jiang et al., 2024). When implemented within a student-centred educational approach, AI technologies have been shown to support personalisation, enhance learner engagement, and facilitate formative assessment (Hamilton et al., 2021).

At the core of these innovations is the recognition of the uniqueness of each learner—an essential foundation of the inclusive education paradigm (Daněk, 2024). For children living at risk of social exclusion, such as those in institutional care, the possibilities of artificial intelligence constitute an extremely powerful compensatory tool. It can help to satisfy the need for individualised teaching, as well as offer cognitive stimulation and new educational possibilities.

Unfortunately, artificial intelligence has not yet been sufficiently integrated into the daily practice of most childcare institutions. This gap highlights a missed opportunity, as AI-driven interventions are uniquely positioned to accommodate diverse educational needs through their capacity for rapid and flexible information processing. Generative tools such as large language models and multimodal AI systems can also support communication, creative self-expression, and learner agency in novel ways (Ouakili, 2025).

It is essential to critically assess these opportunities with a solid understanding of potential risks. Scholars have warned of algorithmic bias, ethical opacity, and the marginalisation of vulnerable groups in the development and deployment of AI systems (Guérin et al., 2025; Jayasekara et al., 2022). In the context of residential childcare, where children are already subject to increased monitoring and reduced autonomy, the implementation of AI requires rigorous ethical safeguards, participatory design frameworks, and strong pedagogical oversight. Without these, there is a risk that AI could reinforce the existing disparities in access, representation, and voice, rather than reduce them (Jie & Kamrozzaman, 2024). If AI is to contribute to social justice in education, it must be distributed equitably and tailored to the needs of all learners, including those in residential childcare. Rather than becoming a mechanism of exclusion, AI must be deliberately understood as an instrument of inclusion. AI is an important tool capable of being responsive to diversity and sensitive to vulnerability. AI should be regarded as an important part of an inclusive society firmly grounded in the rights and dignity of every child.

2.2. Pedagogical and Ethical Considerations

Principles of equity, transparency, and inclusivity must guide the ethical deployment of AI in educational contexts. Leading scholars and international organisations have emphasised the importance of "human-centred AI" systems that respect learner autonomy, respond to developmental and cultural diversity, and enhance, rather than replace pedagogical relationships (Donoso et al., 2021). In the context of residential childcare, ethical alignment necessitates a comprehensive view of the child, encompassing not only cognitive learning outcomes but also a wide range of needs. Examples include emotional well-being, identity formation, and the development of trust in stable adult figures.

Moreover, AI applications in institutions serving vulnerable children must operate within self-reflective, evidence-informed frameworks that prioritise continuous evaluation, stakeholder co-design, and responsiveness to the lived experiences of learners. Our project, described in this article, does not position AI as a self-sufficient solution but rather as a catalyst for inclusive dialogue. We view AI as a tool for creative expression and a pathway to collaborative learning (Amershi et al., 2019). This approach foregrounds ethical deliberation as a central component of educational innovation. In residential childcare settings, where trust, safety, and relational depth are foundational, any technological intervention must be subject to heightened ethical scrutiny (Kawakami et al., 2022; Boscardin et al., 2024). The risks of surveillance, dehumanisation, or cultural insensitivity are especially acute in such contexts. Accordingly, AI must be understood not as a neutral instrument but as a sociotechnical construct, whose significance is contingent upon

deliberate, child-centred design and implementation (Hamilton et al., 2021). Ethical considerations are not peripheral in residential childcare; they are, in fact, indispensable (UNESCO, 2022).

2.3. Insights from Educational Neuroscience

Educational neuroscience offers an increasingly relevant perspective for understanding how vulnerable children engage with learning processes. Research has demonstrated that the brain remains highly plastic, meaning that appropriate and well-timed interventions can foster both cognitive growth and emotional stability even in adverse conditions (Sousa, 2022). Emotional and cognitive processes are not separate domains but are deeply intertwined; studies show that emotional security provides the foundation for effective learning and that without such grounding, academic outcomes are significantly constrained (Immordino-Yang & Damasio, 2007).

This field also raises important questions about its scope and limitations. Some scholars caution against premature or overly simplistic applications of neuroscience to pedagogy, arguing that the relationship between brain research and classroom practice must be carefully contextualised (Leisman, 2022). At the same time, there is growing recognition of its potential to enrich educational theory and practice by illuminating mechanisms that link motivation, attention, and resilience with long-term developmental outcomes (Jamaludin et al., 2019). When applied with critical reflection, these insights contribute to the design of inclusive environments in which children's capacity for adaptation and learning can be strengthened.

3. Research Context

Our research was conducted as part of the Visegrad Fund–supported project entitled *Sport, Culture, and Education: Empowering Visegrad's Children for a Brighter Future.* The primary fieldwork took place during a flagship event held in Zlín, Czech Republic, in June 2025. Designed around principles of inclusion, participation, and cultural diversity, the Zlín programme offered a comprehensive and immersive experience for children from residential childcare institutions in the Czech Republic and Slovakia, as well as a delegation of Ukrainian children temporarily relocated to Poland as a result of the ongoing war.

3.1. Visegrad Unity Games

Throughout the day, the Visegrad Unity Games served as the central integrative framework, bringing children together through cooperative, team-based physical activities. Far beyond conventional sports programming, these games were carefully designed to foster intercultural dialogue, empathy, and mutual trust through structured play and movement. They provided a dynamic context in which inclusion could be practised and embodied, not merely discussed. In parallel with the sports programme, the research team conducted two professionally curated workshops, each highlighting a different aspect of inclusive development.

3.2. Visegrad Skills for Inclusion: Empowering Through Education

In this interactive session, we explored the role of education in cultivating civic competencies. Participants engaged in self-evaluation and reflection on their learning trajectories, exchanging good practices from across the Visegrad region and Ukraine. The workshop underscored the importance of soft skills, motivation for lifelong learning, and the development of agency as key ingredients of active citizenship.

3.3. Cultural Mosaic of the Visegrad Nations

Focusing on identity, memory, and community, this creative workshop drew upon drama-in-education techniques, storytelling, and symbolic expression. Children and caregivers explored personal and shared narratives, building intercultural awareness and a sense of belonging within the diverse cultural fabric of the Visegrad region.

Both workshops integrated artificial intelligence as a supportive tool, facilitating personalised content generation, transcription, and thematic analysis of participant reflections, as well as the co-creation of visual materials. These AI applications will be further examined in the following sections as innovative instruments for advancing inclusive education and cultural participation. What unfolded in Zlín was a profoundly interconnected experience in which sport, culture, and education functioned as mutually reinforcing pillars of inclusion. The programme supported not only the physical and cognitive development of all participants, but also cultivated emotional resilience, cultural self-awareness, and collaborative competence in all the children involved. The Zlín event offered children in residential childcare a rare and meaningful international experience by integrating these domains into a single, holistic environment. In this unique and inclusive universe, children had the opportunity to strengthen their confidence, enrich their sense of identity, and deepen their understanding of social inclusion.

4. Research Design and Methodology

Our research team has long worked with a broad spectrum of qualitative methods. We understand research not as a finite endeavour but as an ongoing process, where the fulfilment of one objective inevitably gives rise to new questions, problems, and avenues for inquiry. The central question guiding our study is:

How can artificial intelligence support inclusive education, cultural participation, and personal development among children in residential care?

To answer this overarching question in a responsible and analytically manageable way, we stratified it into three specific sub-questions. Each was carefully constructed to act as a conceptual bridge leading towards a coherent response to the primary research aim. While many themes could have been explored, we prioritised clarity and relevance by formulating the following focused sub-questions:

How can artificial intelligence enhance communication among children from diverse cultural backgrounds?

How do pedagogical staff currently working in Visegrad-region residential childcare institutions perceive the use of AI?

How did children in the target group respond to outputs created with the assistance of AI?

In order to provide ethically grounded and contextually sensitive responses to these questions—and to help open the field of AI in residential childcare to broader academic and practical reflection,we adopted a participatory action research (PAR) framework (see Figure 1). This decision was based on the fact that our research team remained in sustained, direct contact with the target population throughout the study. Our study thus draws on the tradition of participatory action research, a methodology particularly well-suited to work with marginalised and vulnerable populations, including children in residential care. PAR emphasises collaboration, empowerment, and reflexivity, positioning participants not as passive research subjects but as active co-creators of knowledge and change (Baum, MacDougall, & Smith, 2006; Pyett, 2002; Kemmis, 2006). This approach enabled the children and educators to be directly involved in co-designing educational and cultural activities, assessing their outcomes, and reflecting on the ethical and practical implications of artificial intelligence in their environments.

The study involved a total of 68 children aged 11 to 18 years from residential childcare institutions, accompanied by 21 childcare professionals. The Czech group consisted of 29 children, including 15 girls and 14 boys. The Slovak group comprised 24 children, including 12 girls and 12 boys. The Ukrainian group consisted of 15 boys from a residential childcare institution that had been temporarily relocated from Ukraine to Poland as a result of the war. In total, the sample included 27 girls and 41 boys.

Through this collaborative structure, the research team was able to anchor interventions firmly in the lived experiences of participants. This insider perspective enhanced the cultural and educational relevance of the findings. It also fostered ethical vigilance by continually involving

children in processes of validation and interpretation. To capture the multifaceted nature of the educational and psychosocial context, the study employed a qualitative design based on multiple complementary methods, including semi-structured interviews, observations, and focus groups. This methodological triangulation enabled us to examine the research problem from multiple angles, which is critical for understanding the phenomenon under study (Creswell, 2014; Dawadi, Shrestha, & Giri, 2021).

This approach facilitated the analysis of complex narratives concerning children's engagement and agency, capturing staff attitudes alongside cultural sensitivities relevant to deploying digital tools in residential childcare. The integration of diverse perspectives also enabled a deeper understanding of institutional dynamics.

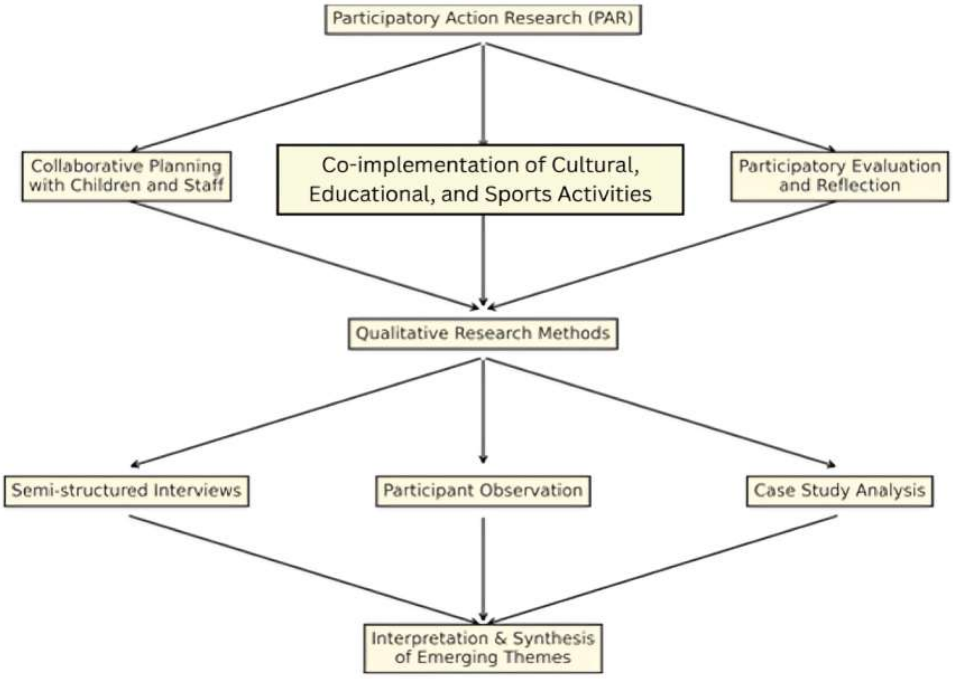

Figure 1. Participatory Action Research (PAR) framework applied in the project.
Source: Research Team

5. The Role of Artificial Intelligence in the Project

As previously discussed, artificial intelligence is only gradually being integrated into the domain of residential childcare. In this section, we outline the specific components of the project *Sport, Culture, and Education: Empowering Visegrad's Children for a Brighter Future* that would have been significantly more difficult—or even impossible—to implement without the support of AI technologies. Throughout the project, we employed ChatGPT (OpenAI, 2025) as a support tool for generating a wide range of educational, cultural, and communication materials. These outputs were not used in a raw or automated manner; instead, all AI-generated content was carefully reviewed, contextually edited, and ethically validated by the research team, following participatory and child-centred research principles. The practical necessity of AI became especially evident during a critical last-minute development. Initially, the project was set to include delegations from all four Visegrad countries. However, at the last moment, teams from Hungary and Poland cancelled their participation. In response, the Polish side arranged for a group of children from a Ukrainian residential care institution—temporarily relocated to Poland due to the ongoing war—to join the programme as substitute participants.

This information reached us late in the evening, just before the event began. Our organising team was left with a minimal window to adapt project materials, educational, and cultural activities to this significant change. It was essential to immediately generate new materials that would

accommodate the presence of Ukrainian children. AI played a pivotal role in this adaptation process. Within a matter of hours, we were able to translate and localise existing materials and adapt content to Ukrainian cultural realities. We also validated communication styles to ensure emotional and linguistic sensitivity, and generated customised educational prompts for inclusive use (see Figure 2). Without AI, such a rapid, multilingual, and culturally responsive transformation would have required a dedicated team of experts working through the night—an unrealistic scenario given the constraints of time and human resources. The case described here highlights the significant potential of AI to serve as a responsive, context-sensitive tool in projects targeting vulnerable populations. In residential childcare contexts—where staff often operate under severe time pressure and resource limitations—AI can significantly enhance the ability to deliver inclusive, adaptive, and ethically sound programming.

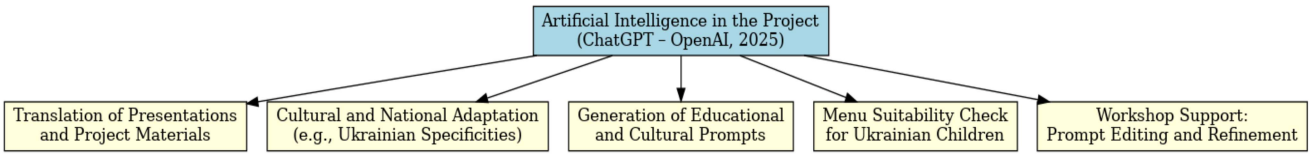

Figure 2. Practical applications of artificial intelligence in the project.
Source: Research team

Earlier projects relied on conventional methods of preparation and translation, which were time-consuming and required extensive coordination with experts. In this study, the use of digital tools enabled a much faster response, allowing for immediate translation, cultural adjustment, and rapid processing of participant feedback. This shift not only reduced the administrative workload but also provided greater flexibility and responsiveness to the specific needs of children and staff.

5.1. Translation of Presentations and Project Materials

One of the most impactful contributions of artificial intelligence within the project was the rapid and effective translation of presentations, workshop outlines, and supporting documents. Given the multinational composition of participants—including children and staff from Slovakia, the Czech Republic, and war-affected Ukrainian regions—ensuring multilingual accessibility was both a logistical and ethical imperative. ChatGPT enabled the generation of accurate and contextually sensitive translations in minutes, significantly reducing the time and resources that would otherwise have been necessary. All translated materials were subsequently reviewed and, where needed, refined by native speakers, who confirmed both their linguistic clarity and contextual appropriateness.

This aspect invites a very needed reflection on structural barriers to inclusion in multilingual environments. It is a sobering reality that language proficiency across many post-socialist countries, particularly among professionals working in residential childcare, remains limited despite gradual improvements in recent decades. This gap in language preparedness is especially evident in residential childcare settings, where an increasing number of children come from diverse cultural and linguistic backgrounds. Their language often differs from that of the host country or institution. In this regard, AI constitutes a transformative tool for overcoming linguistic barriers, not only by enabling immediate translation but also by mediating cultural adaptation and comprehension. In an increasingly globalised and migratory world, where educational and care systems must operate across cultural and linguistic divides, the inclusive potential of AI is both urgent and undeniable.

5.2. Cultural and National Adaptation of Content

Beyond linguistic translation, the project required careful cultural adaptation of its educational and artistic content. ChatGPT was employed to assess whether references, metaphors, and thematic elements embedded within presentations were suitable and intelligible for Ukrainian children experiencing war-related trauma. The AI played a key role in ensuring that materials were

not only linguistically accurate but also emotionally safe and culturally resonant, thereby minimising the risk of re-traumatisation and fostering psychological trust during the workshops. It is imperative to acknowledge that many children engaged in the project had experienced significant trauma, including displacement, loss, and exposure to violence. It must be recognised that even seemingly minor missteps—such as an ill-chosen chapter title or an insensitive joke during an opening speech—can provoke emotional distress or feelings of exclusion. The use of AI-supported review processes provided an additional layer of scrutiny. Our research team was able to identify and remove culturally or emotionally inappropriate elements proactively.

A concrete example illustrates this sensitivity: in the former Eastern Bloc, Russian was the standard second language taught in schools. Given the age profile of many caregivers working in residential childcare, as well as members of the research team, basic knowledge of Russian was common among the adult participants. However, a common misconception persists that Russian and Ukrainian are interchangeable languages—an assumption that is particularly problematic given the current geopolitical situation. In this regard, AI served as a critical mediator of cultural and linguistic nuance. By generating accurate and respectful materials in Ukrainian, ChatGPT helped prevent potential misunderstandings or unintended harm. We must ask: what more compelling evidence can be presented to demonstrate the inclusive potential of AI? It ensured that the language of instruction, welcome speeches, and written materials aligned not only to the linguistic needs but also to the emotional and cultural realities of children. It must be acknowledged how important adequate verbal communication is. This intervention highlighted the capacity of AI to serve as a buffer against culturally insensitive content, particularly in high-stakes environments involving vulnerable populations.

5.3. Transnational and Linguistic Constraints in Practice

Several transnational and linguistic challenges emerged during the project and had a direct impact on the activities. Translations occasionally produced culturally inappropriate or confusing phrasing, which required the team to simplify expressions and consult native speakers to ensure clarity. Language sensitivities also arose when improvised translations shifted between Ukrainian and Russian, reflecting the prior education of some adults. To avoid misunderstandings, all written materials and prompts were standardised into Ukrainian and reviewed before use. Differences in internet connectivity and access to devices across delegations further required practical adjustments. The team prepared prompt banks and outputs in advance and mirrored materials across shared devices to secure equal participation. Concerns regarding data protection highlighted the need for a consistent approach. No personal information was entered into digital tools, children used project pseudonyms, and the research team documented key decisions in an ethics log to guarantee human oversight.

5.4. Generation of Educational and Cultural Prompts

Artificial intelligence played a critical role in generating tailored prompts that supported the themes of workshops. These prompts were implemented throughout educational and cultural sessions to encourage reflection, storytelling, and discussion among participants. For instance, ChatGPT was prompted to create age-appropriate and culturally sensitive discussion starters and thematic activities focused on children's rights, national symbols, and the ethical aspects of sport and teamwork. For example, discussion starters on children’s rights and teamwork were transformed into short role-play exercises and storytelling activities, which the children engaged in with enthusiasm and creativity. Their active responses confirmed the potential of such prompts to stimulate reflection and participation.

A crucial advantage of this approach was its adaptability to the specific characteristics of the target group. Many of the children involved had experienced deprivation and trauma, factors frequently associated with the emergence of special educational needs. As these needs are defined and addressed differently across national systems, the AI model was instructed to generate

country-specific prompts, taking into account both linguistic and cultural-educational variables. This use of AI ensured that materials aligned with the educational frameworks and expectations of participating countries while remaining accessible for each subgroup.

5.5. Menu Suitability Check for Ukrainian Children

One of the most unexpected yet highly impactful applications of AI within the project was related to menu evaluation. Given that some of the participants were Ukrainian children evacuated from war-affected regions, cultural sensitivity extended to the catering arrangements. ChatGPT was tasked with analysing hotel menus to assess their appropriateness based on Ukrainian dietary habits and cultural norms. While this may appear marginal from a scientific standpoint, its psychosocial relevance cannot be overstated. For a displaced child in an unfamiliar environment, receiving a meal that is foreign or incompatible with their cultural expectations can exacerbate feelings of alienation and distress. AI contributed to a climate of emotional safety and attentiveness by facilitating real-time dietary review. It identified potential culturally inappropriate dishes and supported organisers in modifying the menu accordingly. This act of cultural consideration played a subtle but crucial role in fostering trust and comfort among vulnerable participants.

5.6. Workshop Support: Prompt Editing and Refinement

Throughout the educational and cultural components of the project, AI was used to refine and adapt workshop scripts and educational content. Facilitators regularly input draft materials into ChatGPT to check for clarity, linguistic accessibility, inclusivity, and cultural relevance. This iterative, AI-assisted editing was particularly beneficial when designing workshops for mixed-age groups with diverse literacy levels and varying cognitive abilities. The diversity among participating residential childcare institutions presented numerous challenges, as children differed significantly in age, intellectual development, and educational background. Managing such heterogeneity through traditional planning methods would have been highly demanding. With the support of AI, facilitators could adjust content in response to real-time feedback. This immediate reaction was helpful in creating sessions that remained inclusive and engaging for all.

AI proved useful in project evaluation. It enabled us to rapidly process and analyse feedback collected during and after workshops, allowing organisers to implement timely improvements. The research team unanimously agrees that without the capabilities provided by AI, the practical and ethical implementation of this international programme for children in residential childcare would have been significantly compromised.

5.7. Technical Specifications

The study employed ChatGPT (OpenAI, 2025), version GPT-4.5, as the primary large language model. It was used to support the translation of materials, the cultural adaptation of workshop content, the development of educational prompts, and the analysis of qualitative feedback. All outputs were systematically reviewed and edited by the research team to ensure accuracy and appropriateness. An ethics log was maintained to provide transparency and accountability. Limitations were nevertheless observed, including reduced reliability when processing Slavic languages, insufficient sensitivity to emotional nuance, and a tendency toward overly generic responses. These constraints underscored the necessity of sustained human oversight.

6. Discussion and Interpretation of Findings

Implementation of artificial intelligence tools introduces a range of new possibilities into the environment of residential childcare. At the same time, AI with its considerable potential also presents a number of significant challenges. In this discussion section of our article, we explore the specific areas that emerged during our research as being most strongly influenced by the use of AI. Our focus extends beyond the pedagogical advantages brought by AI to include ethical and practical considerations that surfaced as potential limitations when working with our target group. We also

reflect on the recorded perspectives of educational staff. We acknowledge that this discussion addresses only a selection of key topics, while a broader range of issues related to the application of AI in residential childcare remains to be explored. Within residential childcare, this represents a new and largely unexplored domain (Guérin et al., 2025). International research addressing the intersection of institutional care and digital technologies remains scarce, with most existing studies focusing on mainstream educational or healthcare contexts. The findings presented here should therefore be regarded as preliminary indications that highlight potential directions for systematic inquiry rather than conclusive results.

6.1. Personalised Education Support

One of the most significant outcomes of the project was the demonstration of AI's potential to support personalised learning pathways for children living in residential childcare settings. These children often exhibit high variability in educational history, literacy skills, and cognitive readiness, rendering one-size-fits-all approaches pedagogically inadequate. AI tools—most notably ChatGPT—enabled facilitators to customise prompts, simplify language, and adapt instructional content in real-time, thereby meeting children at their respective levels of understanding (Zheng et al., 2023; Chernenko, 2024).

This functionality proved especially valuable in multicultural and multilingual settings, where linguistic differentiation and simplified scaffolding were necessary to ensure effective engagement. The ability to rapidly modify learning materials in response to observed needs contributed to a more inclusive, child-centred pedagogical experience, aligning with the core principles of inclusive education (Chiu, 2024).

6.2. Efficiency in Activity Planning and Feedback Processing

The integration of AI substantially enhanced the efficiency of planning, implementation, and evaluation of educational and cultural activities (Vieriu & Petrea, 2025). By inputting thematic prompts into ChatGPT, facilitators could generate complete workshop scenarios within minutes, a task that traditionally consumed several hours. In comparison with prior projects conducted without AI support, notable time efficiencies were observed, permitting the reallocation of resources towards fostering direct interactions and strengthening relationships with children.

Beyond planning, real-time analysis of qualitative feedback from children and staff enabled immediate adjustments to workshop content and delivery. Open-ended responses were clustered into emergent themes,which facilitated rapid modifications, adjustments to workshop content and delivery (Ali et al., 2024; Celik et al., 2022). This form of rapid, data-informed iteration enabled facilitators to maintain high responsiveness to participant needs. During the Unity Games, for example, AI-assisted analysis revealed recurring emotional responses to specific group activities—insights that might otherwise have remained undetected. The prompt identification of such patterns allowed for evidence-based refinements in activity design and facilitation (Stárek, 2025).

6.3. Staff Perspectives and Ethical Considerations

Childcare staff largely viewed AI as a complementary tool rather than a replacement for pedagogical engagement. Initial apprehensions—centred on fears of dehumanisation and the erosion of human presence—gradually gave way to a more pragmatic stance as staff observed benefits in content creation, translation, and evaluation processes, which helped them to work more effectively. Many educators noted that AI reduced administrative burdens, enabling them to devote more time to the relational and emotional dimensions of their work (Akçayır & Akçayır, 2017). Nevertheless, ethical concerns persisted. Staff emphasised the importance of human agency in decision-making, particularly when working with vulnerable children. Some expressed concerns about the potential erosion of professional identity if reliance on automated systems becomes overly normative. These findings underscore the importance of ongoing ethical dialogue and the

establishment of clear guidelines to maintain the integrity of human-centred education in residential childcare. In conclusion, the dominant perspective did not foresee a future without educators, but rather a future in which they are empowered by the careful and ethically guided integration of AI tools (Klimczak & Petersen, 2023; Chen, Chen, & Lin, 2020).

To translate these ethical reflections into everyday practice, the project team formulated several guiding principles. Digital tools should always remain under human oversight, with childcare professionals retaining full responsibility for decisions affecting children. Educational content must be adapted in ways that are linguistically and culturally accurate, requiring both technical checks and human judgement. At the same time, staff need to approach digital outputs critically, as generative systems are prone to producing fabricated or misleading information. Such distortions are particularly dangerous for vulnerable children, who may lack the capacity to identify inaccuracies. Continuous training therefore becomes essential, and the findings of this study offer a foundation for building professional competence and sharing evidence-based experience across institutions.

6.4. Critical Issues in Deployment

Despite these advantages, several critical concerns emerged. One was the risk of biased translations, where subtle inaccuracies or stereotypes could easily undermine cultural sensitivity. Another challenge was the protection of data privacy, particularly when working with vulnerable children whose confidentiality must remain inviolable. A further risk involved the possibility of an excessive reliance on technology in under-resourced institutions. If technological tools were to replace rather than complement professional work, there would be a danger of diminishing the relational and pedagogical dimensions of childcare.

6.5. Technological and Contextual Limitations

Despite its considerable advantages, the deployment of AI revealed several technical and contextual limitations. Most notably, specific outputs lacked cultural nuance, mainly when translating idiomatic expressions or addressing trauma-informed content relevant to Ukrainian participants. Prompts created in English or Czech often failed to accurately capture emotional subtleties or the socio-political sensitivities required in post-conflict contexts.

Generative models occasionally defaulted to simplified or generic responses, particularly in emotionally charged scenarios. This underscores the limitations of current AI in addressing complex affective realities (Cordella & Gualdi, 2024). Linguistic challenges further compounded these shortcomings. In particular, the morphological and syntactic complexities of Slavic languages differ significantly from English. The resulting outputs sometimes lacked semantic and cultural depth, reinforcing the need for critical human oversight.

Still, these limitations were viewed as manageable and improvable, particularly given the rapid development of multilingual and culturally adaptive AI technologies (Losbichler & Lehner, 2021; Mainzer & Kahle, 2024). As such, the project team remains optimistic that future iterations of AI systems will provide increasingly refined support for educators working in diverse and emotionally demanding environments.

6.6. Long-Term Integration into Residential Childcare

The project was not a stand-alone intervention but rather part of a broader effort to embed digital technologies into the daily practice of residential childcare. Insights gained from the research presented in this article are already being translated into practice. Pilot initiatives are currently testing the use of advanced tools to generate individualised developmental plans, enabling professionals to adapt educational and psychosocial support to the specific needs of each child. These technologies further allow staff to respond more effectively to cultural specificities, thereby strengthening communication and inclusion in diverse groups. At the same time, systematic training of childcare professionals remains indispensable. The findings of this study provide an

evidence-based platform for sharing experiences and building professional capacity, ensuring that technological innovations become a sustainable component of inclusive, child-centred practice in residential institutions.

7. Conclusion

This article examined innovative applications of artificial intelligence (AI) for children living in residential childcare. This study was conducted within the framework of an international project supported by the Visegrad Fund. Our focus was on how children from residential care facilities in three participating countries experienced a holistically designed programme that combined sports, educational, and cultural activities. The research was grounded in a participatory action research framework, which emphasises the active involvement of the target group and the integration of theory and practice. It was demonstrated that AI technologies, when applied ethically and with respect to specific cultural and institutional contexts, can serve as highly effective tools for supporting vulnerable groups of children. In particular, we identified the strong potential of AI in the field of education.

The project underscored not only the potential of AI in implementing inclusive educational approaches but also the essential need to preserve the human dimension in caregiving. While technological innovation plays a growing role, residential childcare remains inconceivable without the presence of human educators and caregivers. At the same time, we cannot envision this environment without professionals who are capable of effectively employing the opportunities that AI provides. The use of technology must not lead to the dehumanisation of care, but rather, it should serve as an enabling tool that allows educators to better respond to the complex needs of children.

Despite the promising outcomes of our research, we also identified several limitations. One of the most critical areas concerns language. Current AI systems still struggle to represent emotionally complex situations, which are integral to the daily lives of our target group. Furthermore, the institutional readiness for integrating new technologies varies widely. These findings underscore the necessity of sustained interdisciplinary collaboration among educators, technology experts, and child welfare professionals. It is essential that artificial intelligence within the domain of child protection remains a tool in the service of humanity, and not a substitute for empathetic interpersonal relationships.

Our future research projects could focus on the long-term impact of AI-supported interventions on children's development within residential care settings. It will be important to analyse systemic conditions to determine whether they are adequately and equitably structured for the implementation of AI-based tools in practice. Artificial intelligence must become a tool for inclusion and social justice. Only then can AI serve as a bridge, guiding children in residential childcare towards a brighter future.

Acknowledgement

This article is based on outcomes from the project *Sport, Culture, and Education: Empowering Visegrad's Children for a Brighter Future*, project ID #22510218. The project was co-financed by the governments of Czechia, Hungary, Poland, and Slovakia through Visegrad Grants from the International Visegrad Fund. The mission of the Fund is to advance ideas for sustainable regional cooperation in Central Europe. The authors gratefully acknowledge the Fund’s generous support, which was instrumental in enabling this inclusive and cross-border initiative.

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