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FOSTERING INCLUSION AND SKILL DEVELOPMENT IN CHILDCARE INSTITUTIONS: LESSONS FROM THE VISEGRAD REGION

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Abstract

Children growing up in residential childcare often face restricted access to areas that are essential for their future. These include inclusive education, inspiring cultural experiences and, importantly, the benefits of emerging educational technologies. This study draws on long-term research conducted in children's homes, as well as on an international project supported by the Visegrad Fund, which provided an ideal framework for exploring new and progressive forms of education. The aim was to identify and verify educational approaches that can foster personal growth, social inclusion and readiness for the emerging digital era among children in residential childcare. The research adopted a participatory action research approach based on a qualitative design. The target group comprised delegations from several Czech and Slovak children's homes, as well as a unique group from a Ukrainian children's home evacuated to Poland. Over three months, local educational activities were implemented alongside an international meeting whose core element was an inclusive sports programme accompanied by two parallel workshops. The results obtained were examined in the context of our ongoing research and subjected to detailed analysis. Findings indicate that the combination of cultural, sporting and educational activities enhances collaboration, communication, self-expression and interest in learning among the target group. Modern technologies play a central role in these findings. Artificial intelligence tools not only supported the implementation of the international project but also proved to be an effective means of increasing inclusivity and personalisation in teaching. The study recommends integrating modern technologies into non-formal education within residential childcare while emphasising the ethical and cultural considerations of implementing new educational approaches.

Keywords: *residential childcare, inclusive education, participatory action research, social inclusion.*

Introduction

Children who grow up in residential childcare represent a particularly vulnerable group of our society. Their lives are often shaped by adverse childhood experiences, family breakdown, trauma, and long-term exposure to dysfunctional family systems (Alfandari & Taylor, 2023; Brend, Collin-Vézina, & Daignault, 2025; Daněk, 2024). These children frequently come into residential childcare from diverse social and cultural backgrounds. They face persistent challenges related to social exclusion, educational underachievement, and restricted opportunities for cultural and civic participation (Bach-Mortensen et al., 2022; Sindi, 2022). We can see that significant educational inequalities remain despite continued efforts to reform institutional care in Central and Eastern Europe. Many existing educational interventions in residential childcare are insufficiently tailored to individual needs, do not fully incorporate modern technologies, and fail to support the development of essential twenty-first-century competencies adequately. This fact harms children's emotional, cognitive, and social development (Izzo et al., 2022; Kendrick, 2015).

The educational and social trajectories of children in residential childcare are influenced by a complex set of factors. Among the most frequently identified barriers that children in residential childcare face are the low continuity of educational experiences. Another factors are limited support networks and insufficient coordination between care providers and educational institutions

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(McCafferty, Hayes, & McCormick, 2025). These critical determinants are further compounded by disparities in access to modern educational resources and contemporary technologies (UNICEF, 2023). Such disparities not only constrain the development of educational and digital competencies but also risk deepening existing social and educational inequalities.

Residential childcare is not immune to the dynamic transformations shaping contemporary society. The rapid advancement of modern technologies and sophisticated artificial intelligence (AI) tools is one of the most significant developments of recent years. Increasingly, AI is discussed as a promising means of supporting education, not only within the framework of formal schooling but also in the realm of non-formal, inclusive, and individualised learning (Vieriu & Petrea, 2025; Luckin et al., 2016). The potential of AI lies especially in its capacity to personalise learning content and enable adaptive assessment. AI has fostered the development of twenty-first-century competencies. These are precisely the areas that hold critical importance for residential childcare settings.

It is essential to acknowledge the limitations and ethical considerations surrounding AI integration. It is necessary to foster the protection of personal data, the guarantee of equitable access, and the cultural relevance of educational content (Mainzer & Kahle, 2024; Stárek, 2025). For these reasons, the benefits and possibilities offered by AI emerged as a cross-cutting theme in our research, which is situated within a broader framework that integrates cultural, sporting, and educational activities to promote the inclusive development of children in residential childcare.

Research Problem

There is a marked lack of systematic, methodologically rigorous research on innovative educational approaches adapted to the specific context of residential care. The present study addresses an urgent societal and professional priority by examining the potential of integrating educational, cultural, and sports-based interventions. Those activities are augmented by artificial intelligence tools, into the holistic development of children and young people in residential childcare. The use of artificial intelligence as a supportive pedagogical instrument remains underexplored. This is especially relevant in light of the evolving needs of care-experienced children and the growing demand for inclusive, future-oriented educational frameworks (Daněk et al., 2023; Calheiros & Patrício, 2014). National systems of residential childcare differ significantly, because they are shaped by distinctive policy and cultural contexts (Daněk et al., 2024). Nevertheless, through sustained cooperation with FICE Czech Republic and FICE International, thematic areas have been identified that may carry broader transnational relevance.

Research Focus

This study focuses on the educational opportunities that can be developed within residential childcare through the integration of cultural, sports, and educational activities. Particular attention is given to the use of artificial intelligence tools in the creation of adaptive learning materials, in supporting educators, and in the personalisation of the learning process. The research builds on long-term examination of education in children's homes and employs an international project funded by the Visegrad Fund as a model case for testing innovative approaches. The project brought together participants from the Czech Republic, Slovakia, and a unique group from a Ukrainian children's home that had been evacuated to Poland due to the war.

Research Aim

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The main aim of this study is to identify, describe, and evaluate educational approaches that can foster personal development, social inclusion, and digital literacy among children in residential childcare. The study seeks to provide evidence-based foundations for the broader implementation of innovative methods, including the use of artificial intelligence, within non-formal education in residential childcare settings.

Research Questions

What educational opportunities arise from the integration of cultural, sports, and educational activities within residential childcare settings?

What role can artificial intelligence play in supporting inclusive education for children in residential childcare?

How can these approaches be implemented across diverse cultural and institutional contexts within the Visegrad Group countries?

Research Methodology

General Background

The present study is rooted in our longstanding scientific and professional interest in the education and development of children growing up in residential childcare settings. This population faces significant limitations in access to individualised learning, modern educational technologies, and inspiring cultural or sports activities. Our long-term research activities have therefore focused on identifying effective methods that can compensate for these deficits and better prepare children for life in a digital and highly globalised world.

The project supported by the Visegrad Fund was conceived as a model scenario in which the integration of cultural, sports, and digital educational elements could be tested, while simultaneously examining the role of artificial intelligence within this process. The implementation spanned three months and included both educational and developmental activities within participating residential childcare institutions and an international meeting that made it possible to verify the functionality and transferability of the proposed approaches in an intercultural environment.

This study is situated at the intersection of two lines of inquiry: long-term research into education in residential childcare and a targeted project exploring the potential of cultural, sports, and educational activities for children in care. In parallel, the study examines innovative pedagogical strategies that incorporate artificial intelligence. This framework not only allows for the description of identified educational opportunities. It also outlines a methodology that may serve as a source of inspiration for further research and practice in this field.

In determining the most appropriate methodological design to achieve the objectives of this project, we deliberately excluded quantitative methods and opted instead for a qualitative research model. Given our sustained close engagement with the target population, the most suitable approach for the present study was Participatory Action Research. The following sections of paper describe the study group and the context of the examined activities. This is followed by a detailed presentation of the research instruments, situated within the framework of Participatory Action

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Research. Ethical considerations are addressed, and the limitations of the chosen research approach are critically evaluated.

Research Context

This study was embedded within the international project Sport, Culture, and Education: Empowering Visegrad's Children for a Brighter Future, supported by the Visegrad Fund. The primary fieldwork took place in June 2025 in Zlín, Czech Republic, during a flagship event, the Visegrad Unity Games. This event was designed to promote social inclusion, intercultural dialogue, and participatory educational practices for children in residential childcare settings. The programme brought together participants from the Czech Republic and Slovakia, as well as a unique group of Ukrainian children temporarily relocated to Poland due to the war. Our study involved 68 children from Slovakia and the Czech Republic, along with a unique group of 15 children from a Ukrainian residential childcare facility temporarily relocated to Poland due to the war. These children were accompanied by 21 childcare professionals, educators, and other specialists.

The Visegrad Unity Games

At the core of the programme were the Visegrad Unity Games. This event was planned as an integrative sports-based initiative that went far beyond traditional athletic activities. Unity Games was designed around principles of teamwork, empathy, and intercultural communication. This event provided a structured yet playful environment in which children could interact across linguistic and national boundaries. Physical movement served not only to enhance well-being but also to create a shared symbolic language that supported the development of mutual trust and social cohesion. Rather than positioning inclusion as an abstract goal, the Visegrad Unity Games offered a space where inclusion was enacted in real time, through embodied, cooperative experience. In parallel with the sports programme, two thematic workshops were implemented to promote deeper educational and cultural reflection.

Visegrad Skills for Inclusion: Empowering through Education

This event focused on the role of education in cultivating key civic and social competencies. Children engaged in activities promoting metacognition, self-reflection, and peer exchange, highlighting regional similarities and differences in their educational journeys. Emphasis was placed on agency, motivation for learning, and the development of soft skills essential for 21st-century citizenship.

Cultural Mosaic of the Visegrad Nations

This workshop employed creative methods such as drama-in-education, storytelling, and symbolic art to enable children and staff to share their experiences and co-construct narratives. The workshop was centred on identity, memory, and community. The aim was to strengthen cultural self-awareness and foster mutual respect. The workshop builds a sense of belonging within the diverse cultural landscape of the Visegrad region with the help of cultural activities.

Use of Artificial Intelligence in Participatory Practice

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Both workshops incorporated the intense use of artificial intelligence as a supportive educational and analytical tool. AI applications facilitated personalised content creation, automated transcription of reflections, and preliminary thematic analysis. Additionally, AI-assisted visual design enabled the co-creation of artistic outputs by participants. These innovations will be discussed in more detail in the following sections, where we explore their pedagogical and ethical implications in depth.

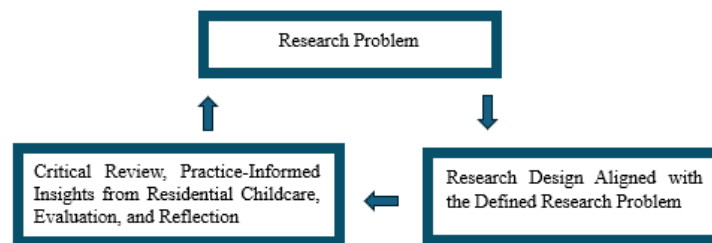
The Zlin event offered a rare opportunity to be part of the process of integration of sport, culture, and education into a single, cohesive experience. The whole program was tailored to the specific needs of children in residential care. By creating a holistic and inclusive educational environment, the event empowered children to engage actively with the concept of inclusion, build their self-confidence, and experience transnational solidarity in action. The programme thus serves as a model for participatory and inclusive practices within and beyond the Visegrad region.

Instrument and Procedures

Pedagogical research is, for us, an ongoing and cyclical process, a continuous sequence of inquiry illustrated in Figure 1. This research cycle begins with the precise identification of the research problem, grounded in prior studies, professional practice, and consultations with both subject-matter experts and representatives of the target population. Based on the defined research problem, an appropriate research design is then selected.

Figure 1

Principle of Research Process



The selection of the methodological framework for the present study stems from the need to examine educational opportunities within residential childcare, with a particular focus on the role of cultural, sports, and educational activities, as well as the integration of artificial intelligence into educational practice. Recognising the necessity of engaging the target group in the research process, we adopted Participatory Action Research as the guiding framework. Within this framework, we implemented a systematic process of data collection using qualitative methods, including direct observation of sport, cultural and educational activities, semi-structured interviews with children and staff, and group discussions.

The collected data were analysed through the combined use of Grounded Theory and Interpretative Phenomenological Analysis, which together enable an in-depth understanding of participants' individual experiences and their positioning within the broader theoretical context of inclusive education, social pedagogy, and the educational application of modern technologies. The analytical results were subjected to critical review within the project team, including representatives of the target group, and further discussed with experts and representatives of participating institutions to ensure validity and, where necessary, refine the interpretative framework.

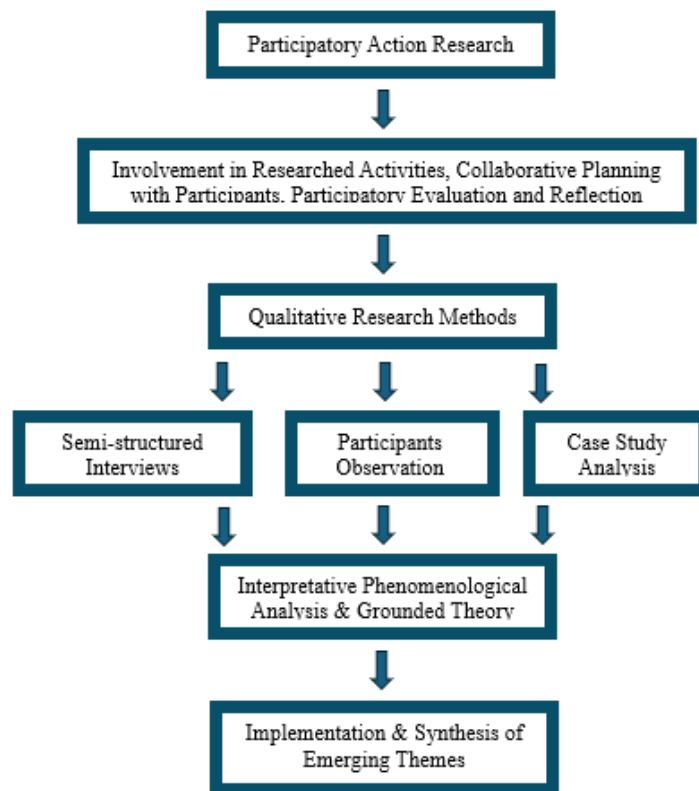
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Validated findings were subsequently disseminated in the form of reports shared with the participating institutions and the wider professional community. The main dissemination channel went through cooperation with FICE Czech Republic. The final stage of the process comprised the evaluation and reflection on the entire research cycle, assessing the extent to which the objectives had been achieved and identifying possibilities for further research and practice. These outcomes informed the formulation of new research questions and initiated the next cycle of Participatory Action Research. At the end of this research, a new research starting point was created. This cyclical approach allows for a flexible and adaptive methodology, particularly well suited to the context of residential childcare, where the conditions and needs of participants may shift rapidly and significantly.

Figure 2

Model of Participatory Action Research (PAR)



Participatory Action Research

Participatory Action Research (PAR) represents a methodological approach that links the process of knowledge creation with purposeful action aimed at fostering change within the environment in which the research is conducted (Baum, 2006; McIntyre, 2008). It is grounded in a partnership between researchers and participants. Both parties jointly identify problems, formulate objectives, engage in data collection and analysis, and interpret the results (Cornish et al., 2023). In the context of working with children and young people, PAR enables the strengthening of their voice and active participation in decisions that directly affect them (Shamrova & Cummings, 2017; Modi, 2020). This approach is regarded ethically and pedagogically beneficial. It provides children

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with the opportunity not only to share their experiences but also to contribute to the creation of solutions that reflect their genuine needs (Flicker, 2008).

PAR is particularly valuable within residential childcare. Children in such settings often face marginalisation and their perspectives are frequently overlooked in decision-making processes (Arnadottir et al., 2025; Hoffnung-Assouline et al., 2025). PAR functions not only as a research method in this context, but also as a tool for fostering competence, building trust, and creating bridges between children, professionals, and the wider community. Its application with children, however, requires methodological sensitivity, particularly when working with very young participants, addressing power imbalances between adults and children, and ensuring meaningful opportunities for participation (Shamrova & Cummings, 2017).

Recent developments in PAR also emphasise its adaptation to the digital environment. New technologies can broaden opportunities for participation but simultaneously introduce new challenges in the areas of digital inclusion, data protection, and the ethics of technology use (Cockerham, 2024). In the present study, the PAR framework was selected not only because it allowed for the examination of educational opportunities within residential childcare, but also because it facilitated the implementation of innovative approaches that directly responded to the needs and experiences of children.

Interviews and Observations

Observation and interviews represent key qualitative methods. They enable researchers to gain an in-depth understanding of participants' experiences and the dynamics of interactions within their natural environment. Observation provides an opportunity to capture a wide range of phenomena such as behaviour, non-verbal communication, and contextual nuances that might otherwise remain hidden. But it is essential to acknowledge its limitations, particularly the potential influence of the researcher's presence on participants' behaviour and the risk of subjective interpretation (Boyko, 2013; Sirris et al., 2022). In this study, observation was employed to systematically monitor the educational, sporting, and cultural activities of children within the project, with particular attention paid to intercultural interactions and engagement in inclusive activities.

Qualitative interviews offer access to the personal experiences and internal perspectives of participants, while also creating a space for the co-construction of meaning between the researcher and the respondent (Espedal, 2022; Dunwoodie et al., 2023). Conducting compelling interviews requires the preparation of open, transparent, and context-sensitive questions. Researchers have to be prepared for active listening, and the ability to respond flexibly to participants' answers (Demirci, 2024). In our research, semi-structured interviews were conducted with both children and accompanying professionals, with particular emphasis placed on creating a safe and trusting environment that encouraged openness and the authentic sharing of experiences. The combination of observation and interviews enabled the collection of a comprehensive picture of the educational opportunities and needs of children in residential childcare, both from the perspective of the participants themselves and from that of their caregivers and educators.

Case study

The case study represents a research approach that enables an in-depth and detailed exploration of a specific phenomenon within its natural context (Hamilton & Corbett-Whittier, 2013; Carter, 2024). In educational research, this method is particularly relevant when the aim is to

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understand complex learning processes, account for the interactions among participants, and analyse the specific conditions under which teaching and learning occur (Grauer, 2012; Shrestha & Bhattarai, 2021). Critical analyses of its methodology emphasise the necessity of clearly defining what constitutes a case study and ensuring that the principles of internal validity and transparent description of the investigated case are upheld (Wohlin & Rainer, 2022).

The case study is especially valuable in the context of inclusive education, because it allows for the capture of nuances and the complex dynamics of inclusion that might be overlooked in other research approaches (Shrestha & Bhattarai, 2021). Within the present study, the case study approach was applied to the unique context of a group of Ukrainian children from residential childcare who had been evacuated to Poland as a result of the armed conflict. This approach created an opportunity to analyse how cultural and social factors influence their educational experiences, adaptation, and participation in inclusive and multicultural educational activities (Takahashi & Araujo, 2019).

Data Analysis

The data analysis in this study combines the approaches of Interpretative Phenomenological Analysis (IPA) and Grounded Theory (GT), which together enable a deep understanding of participants' individual experiences while systematically generating theory grounded in the data. IPA focuses on a detailed exploration of how individuals perceive and interpret their life experiences, placing particular emphasis on the depth of meaning and the subjective perspective of participants (Biggerstaff & Thompson, 2008; Rajasinghe, 2020). This approach is especially relevant in the context of residential childcare, where it is crucial to understand individual trajectories, lived experiences, and the ways children adapt to specific life circumstances (Alase, 2017; Van Manen, 2018).

GT complements this by identifying emergent patterns and categories within the data and integrating them into a broader theoretical framework (Makri & Neely, 2021). This approach is based on the cyclical process of open, axial, and selective coding, which allows for the gradual refinement of analytical categories and their systematic linkage to empirical evidence (Charmaz & Thornberg, 2021). The combination of IPA and GT enables the capture of individual experiences' uniqueness while generating more generalisable insights that contribute to the theoretical understanding of educational processes in residential childcare.

Given the cross-cultural nature of the project, the analysis was conducted comparatively to identify both similarities and differences among groups from different countries. At the same time, the individual perspective of each child was carefully respected, as experiences could vary significantly even within the same group, depending on personal history, prior educational opportunities, and current psychosocial circumstances.

Particular attention was devoted to the interpretation of data from the Ukrainian group. Their experience of forced displacement and life in exile presented specific challenges and opportunities for the educational process. Their reflections offered valuable insights into the role of cultural identity.

Throughout the analytical process, findings were regularly discussed within the research team and triangulated with the perspectives of educators and professionals from participating institutions. This participatory validation helped minimise the risk of interpretive bias and ensured that the resulting themes accurately reflected the lived realities of the participants.

Ethical aspects of research

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The research is designed and implemented following international standards for working with children and young people in sensitive social contexts, and it adheres to the ethical principles of Participatory Action Research (Correia, 2023; Kiernan & McMahon, 2024). It also incorporates the principles of value-sensitive design, which require an explicit ethical commitment in the development of methods and tools, particularly when working with technology (Jacobs & Hultgren, 2021). All participating institutions and individuals are fully informed in advance about the objectives, methods, and intended use of the project's outcomes. Informed consent is obtained from both the legal guardians of the children and the children themselves, using formats appropriate to their age, cognitive abilities, and level of comprehension.

Particular emphasis is placed on protecting participants' identity and privacy. All data are anonymised, and photographs or audiovisual recordings are made only with prior informed consent. No such materials are disclosed without explicit authorisation. Identifiable information is stored separately from research data and is accessible only to a strictly limited group of authorised individuals.

Specific ethical risks are carefully addressed when artificial intelligence tools are employed. The most evident risk areas were especially those related to personal data protection, cultural sensitivity, and the relevance of generated content. All AI-generated outputs are subject to human review prior to use or dissemination to participants, in order to prevent the distribution of inaccurate, inappropriate, or culturally insensitive material.

The principle of minimising the burden on children is consistently applied throughout the project. Participation in both activities and research is entirely voluntary. Individuals may withdraw from research at any time without adverse consequences. A safe and supportive environment is ensured, fostering open engagement without fear of judgement or stigmatisation. Strong adherence to these ethical principles is essential for ensuring the validity of the research findings. A sound ethical research approach strengthens participants' trust and supports the long-term sustainability of collaboration between the researcher, target group and participating institutions.

Limitations of the Study

This study, conducted as part of a long-term investigation into educational opportunities within residential childcare, employed the framework of participatory action research (PAR) to integrate research objectives with practical interventions, authentic engagement of children, and the incorporation of artificial intelligence into both the educational and analytical phases. The target group comprised delegations from Czech and Slovak residential care institutions and a specific Ukrainian group evacuated to Poland, with data collected and analysed through qualitative methods emphasising ethics, intercultural sensitivity, and the validity of findings. Several limitations must be considered when interpreting the results.

First, the project was implemented over three months and involved a relatively small number of institutions. Although the sample included diverse institutional settings and national contexts, it cannot be regarded as fully representative of all forms of residential childcare in the Visegrad countries.

Second, the experiences of the Ukrainian group, which had been fully evacuated to Poland due to the war, represent a unique context that is difficult to compare with other participating groups. These particular circumstances may significantly influence their educational needs and adaptation processes.

Third, the nature of participatory action research, which combines the roles of researcher and facilitator, carries a risk of interpretive bias. While this risk was mitigated through ongoing

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reflection, team triangulation, and validation of findings with participants and staff, it cannot be fully eliminated.

Fourth, the use of artificial intelligence tools was piloted on a limited scale and adapted to the specific needs of the target group. Consequently, findings on the effectiveness of AI in education within residential childcare settings should be regarded as exploratory and require further verification on a larger scale and in different contexts.

Finally, it must be acknowledged that the research took place in a dynamic environment influenced by various external factors, including staff changes, the current legislative framework, and limited material resources, all of which may affect the implementation and sustainability of the innovative educational approaches identified in this study.

Research Results

The findings indicate that a comprehensively designed educational process, integrating learning, sports, and cultural activities, significantly enhances the engagement of children from residential childcare settings and increases their willingness to learn. This synergy creates a stimulating environment in which children not only acquire new knowledge and skills but also strengthen their social bonds, self-confidence, and ability to collaborate.

Throughout the research, the integration of artificial intelligence emerged as a recurring theme, offering new opportunities for the individualisation and adaptation of educational activities. The use of AI was not the primary aim of the project but rather a complementary element that supported an inclusive, child-centred approach.

Owing to the chosen research design, we were able to capture a wide range of noteworthy findings. The following section presents an overview of the most salient recorded codes, along with the most compelling statements from both the participating children and the professional staff who were present during our research activities.

Table 1

Core Themes Emerging from Research

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<i>Code</i>	<i>Description</i>	<i>Example Quote</i>
Holistic Learning Environment in Residential Childcare	Integration of education, sports, and culture creates a stimulating environment for children in residential childcare, fostering motivation, engagement, and collaborative skills.	"When we played games and then did the lesson, it was easier to focus, and I wanted to try."
Educational Engagement through Holistic Activities	Participants reported higher willingness to learn when educational activities were combined with sports and cultural experiences.	"I usually don't like school stuff, but after the sports part, I felt like doing the task."
Key Barriers to Educational Success in Residential Childcare	Low continuity in educational experiences, limited support networks, and insufficient coordination between care and education providers were identified as significant obstacles.	"Every time I move to a new place, the subjects are <u>different</u> and I have to start again."
Role of AI as a Supporting Tool	Artificial intelligence was perceived as an auxiliary instrument enabling personalised learning materials, real-time content adaptation, and efficient feedback analysis.	"The AI made my story easier to read, so I understood it faster."
Multicultural and Multilingual Learning Context	Tailored approaches addressing linguistic diversity and cultural sensitivity significantly enhanced participation and understanding.	"They explained it in my language, and then I could join in the group activity."
Staff Perspectives on Educational Innovation	Educators valued reduced administrative burden and increased time for relational work, while emphasising the importance of ethical safeguards.	"With the AI doing the reports, I could spend more time talking to the kids."
Complex Educational Process – The Synergy Model	The interplay between education, sports, and culture proved essential for building both academic skills and socio-emotional competencies.	"I learned new words while painting, and I also made new friends."

Table 1 summarises the key thematic codes identified through the analysis of qualitative data collected during the project. Each code reflects a distinct dimension of the educational experience in residential childcare, capturing both enabling factors and persistent barriers. The explanations clarify the scope and meaning of each code, while the example quotes, directly drawn from participant statements, provide authentic insight into the lived experiences of children and staff. The combination of holistic activities, personalised support, and culturally responsive approaches emerges as central to fostering motivation, engagement, and socio-emotional development. At the same time, structural barriers such as limited continuity and coordination remain critical challenges.

The findings of our study reveal that the integration of education, sports, and culture within a single programme creates a dynamic and motivating learning environment for children in residential childcare. Participants demonstrated higher willingness to engage in educational activities when these were embedded in a broader set of experiences, including physical activity and creative cultural workshops. This multidimensional approach enhanced both cognitive and socio-emotional development.

One of the key outcomes was the identification of AI as a valuable supporting tool within this complex educational setting. While not the central focus of the intervention, AI's role proved increasingly significant in addressing the diverse and evolving needs of children in residential

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childcare. It facilitated the creation of personalised learning materials, adapted content to varying literacy levels in real time, and supported multilingual communication. Its capacity to rapidly process qualitative feedback enabled facilitators to make timely, evidence-based adjustments to activities, thus maintaining high levels of responsiveness to participant needs.

The analysis further indicated that the use of AI contributed to overcoming specific challenges associated with the fluctuating composition of residential childcare groups, the variability in educational backgrounds, and the multicultural nature of the participant cohort. AI-supported adaptations helped sustain continuity in learning despite these contextual shifts, making it a relevant and necessary tool for an environment characterised by constant change.

At the same time, the results highlight persistent structural barriers to educational success, including limited support networks and insufficient coordination between care and education providers. While AI provided valuable operational and pedagogical benefits, it did not replace the need for strong human facilitation, ethical oversight, and inter-institutional cooperation. The prevailing finding is that in a dynamic residential childcare environment, AI should be viewed as a necessary complement to human-led, holistic education rather than as a substitute for it.

Discussion

The findings of this study reinforce the understanding that effective education in residential childcare must be approached as a complex, multidimensional process. The integration of education, sports, and culture within a unified programme created a stimulating environment that not only improved cognitive engagement but also strengthened socio-emotional skills and collaborative competencies among participants. This synergy supported the intrinsic motivation of children to participate in learning activities, even among those who had previously shown limited interest in formal education. Education, in this sense, serves as a bridge to a better future—one that is not limited to the acquisition of knowledge but extends to the development of competencies essential for full participation in society. For children in residential care, this bridge can be transformative, offering opportunities to overcome structural barriers and expand their life prospects.

A central insight emerging from the research is the growing necessity of artificial intelligence as a supportive element in such a dynamic educational context. Although AI was not the primary focus of the intervention, its adaptability proved crucial in responding to the diverse, multilingual, and often fluid nature of residential childcare groups. Personalised content generation, rapid adaptation to differing literacy levels, and the facilitation of culturally sensitive communication significantly reduced barriers to participation. In addition, AI-enabled real-time analysis of qualitative feedback allowed facilitators to refine activities almost immediately, ensuring that programmes remained responsive to children's evolving needs.

However, the study also highlights the importance of maintaining human-centred practices alongside AI deployment. While AI contributed to efficiency, inclusivity, and continuity in education, it cannot replace the relational, ethical, and contextually informed judgment of educators. The risk of over-reliance on automated processes remains a valid concern, particularly in the context of vulnerable children, where trust-building and emotional safety are paramount.

These findings suggest several directions for future research. Longitudinal studies are needed to assess the sustained impact of holistic, AI-supported educational programmes in residential childcare. Further exploration of culturally adaptive AI models could enhance linguistic and socio-emotional sensitivity, especially in post-conflict or migration-affected contexts. Moreover, comparative studies between AI-assisted and traditional approaches could clarify the extent to which technological tools contribute to long-term educational and developmental outcomes. In this regard,

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our research team has already initiated an experimental study testing AI-assisted design of educational programmes for children from Muslim countries, whose representation in residential care in Central Europe has increased in recent years. This follow-up work aims to assess whether AI can facilitate the creation of personalised, culturally responsive interventions and further strengthen education's role as a driver of social inclusion.

Conclusions and Implications

The present study confirms that education in residential childcare cannot be effectively delivered through isolated interventions or single-domain activities. It must be understood as a holistic and multi-layered process in which education, sports and culture interact synergistically to create a stimulating and inclusive environment. This integrated approach supports cognitive growth and academic achievement while also cultivating socio-emotional skills, intercultural understanding and the capacity for collaborative problem solving. These competencies are essential for children's long-term social integration.

A significant outcome of the study is the positive shift in children's intrinsic motivation to learn when educational activities are combined with cultural and physical components. Even participants with previously limited engagement in formal education demonstrated greater willingness to participate. This suggests that a balanced combination of intellectual, physical and creative stimuli can break down long-standing barriers to learning in care settings.

Although artificial intelligence was not the primary focus of the programme, its emerging role as an adaptive support tool was evident throughout the project. AI-enabled content personalisation, multilingual communication and real-time feedback analysis proved essential in responding to the dynamic and diverse composition of residential childcare groups. This adaptability allowed facilitators to tailor materials to varying literacy levels, cultural contexts and individual needs, reinforcing inclusivity and efficiency. AI also enhanced the responsiveness of programme design by enabling the rapid incorporation of participants' feedback into subsequent activities.

The findings also make it clear that artificial intelligence cannot replace the relational, ethical and contextually informed role of human educators. The trust, empathy and professional judgement required in working with vulnerable children remain beyond the capacity of current technological tools. The challenge for the future is to use the strengths of AI in adaptability, efficiency and data processing while safeguarding the human-centred principles that are foundational to effective education in care environments.

The results point toward several important directions for further research and practice. Longitudinal studies should examine the sustained impact of holistic AI-supported interventions on educational and developmental trajectories in residential childcare. Comparative analyses between AI-enhanced and traditional pedagogical approaches could provide clearer insights into the value of technology in this context. Given the increasing cultural diversity in care settings, including the growing number of children from Muslim-majority countries in Central Europe, future projects should focus on developing and testing culturally adaptive AI models to support tailored educational programming in migration-affected contexts.

This research positions holistic AI-informed education as a promising avenue for expanding the accessibility, quality and relevance of learning opportunities for children in residential care. Embedding technology within a framework that integrates education, sports, and culture can enhance immediate learning outcomes and lay the foundations for lifelong competencies that empower children to participate fully and confidently in society.

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