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The Concept of 4Cs Competences as a Challenge for Contemporary Education of Young Children

Kompetencje 4C jako wyzwanie współczesnej edukacji małego dziecka

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Wprowadzenie

Najnowszy raport World Economic Forum (2025) stwierdza, że w przeciągu najbliższych 5 lat przeciętny pracownik może się spodziewać, że 2/5 jego dotychczasowych umiejętności (39%) ulegnie transformacji lub stanie się nieaktualna. Zdaniem większości indagowanych przez WEF pracodawców szybko postępująca dezaktualizacja umiejętności stanowi główną barierę w rozwoju efektywnej i zrównoważonej gospodarki. Za główne przyczyny rosnącej presji na nieustanne doskonalenie zawodowe WEF uznało: poszerzanie się cyfrowego dostępu do informacji związane z rozwojem sztucznej inteligencji, a w konsekwencji postępującą robotyzację i automatyzację pracy; konieczność łagodzenia zmian klimatu i wyzwania związane z zieloną transformacją gospodarki; rosnące koszty życia, a także presję inflacyjną przy jednoczesnym spowolnieniu gospodarki; zmiany demograficzne związane ze starzeniem się wielu społeczeństw i zmniejszaniem liczby osób pracujących, a także napięcia geopolityczne, zwiększające niepokój społeczny (2025, s. 6).

Opisywane przez WEF makrotrendy pozwalają zrozumieć, dlaczego tak dużą wagę przywiązuje się we współczesnej pedagogice do refleksji nad kompetencjami przyszłości. Bywają one różnie nazywane w literaturze: kompetencje XXI wieku, kompetencje STEAM, kompetencje 4C (z języka angielskiego: *communication*, *collaboration*, *critical thinking*, *creativity*) czy ostatnio kompetencje 7C (*charakter*, *citizenship*, czyli obywatelstwo, oraz *computational thinking* – myślenie obliczeniowe). Choć przywołane akronimy nieszczególnie sprawdzają się w tłumaczeniu na język polski, to znakomicie oddają istotę problemu – chodzi o metakompetencje nienależące do żadnej konkretnej dziedziny wiedzy, a zarazem „transwersalne" (*transversal skills*), uniwersalne (*cross-functional*) czy inaczej „przekrojowe" (*transferable skills*), leżące u podłoża całożyciowego uczenia się i rozwiązywania złożonych, interdyscyplinarnych problemów. Co

ciekawe, najnowsze badania coraz mocniej podkreślają sferę postaw i wartości, która dostarcza kompasu moralnego pozwalającego nawigować w zmiennym i niepewnym świecie nadmiaru danych. Stąd w wykazach umiejętności XXI wieku, oprócz cech intelektualnych, takich jak zdolność do samoregulacji uczenia się, podejmowania metapoznawczej refleksji nad własnym myśleniem i jakością zdobywanej wiedzy, pojawiają się także cechy pozaintelektualne (zarówno intra- jak i interpersonalne), takie jak: wytrwałość i odporność na stres (rezyliencja), samodyscyplina i samokontrola (zdolność do odraczania gratyfikacji), poczucie sprawczości własnej, sumienność i determinacja w dążeniu do celu (*grit*), poczucie odpowiedzialności za własne czyny czy empatia (Lamb i in., 2017; OECD, 2018, 2019). Zdaniem wielu badaczy taka kombinacja dyspozycji intelektualnych i pozaintelektualnych jest konieczna dla rozwoju odpowiedniej postawy wobec uczenia się czy szerzej nastawienia na rozwój (*mindset*).

Rozwijanie takich kompetencji jest możliwe i konieczne już od najwcześniejszego dzieciństwa, a zdaniem wielu badaczy jest także zgodne ze specyfiką uczenia się małego dziecka – uczenia się poprzez odkrywanie i badanie rzeczywistości, wielozmysłowe doświadczanie świata, zadawanie pytań, testowanie hipotez, formułowanie wniosków. Wymaga jednak przebudowania systemu edukacji nie tylko pod kątem sposobu formułowania celów, konstruowania programów kształcenia/podstaw programowych, dobierania metod edukacyjnych, standardów ewaluacji osiągnięć i wysiłku edukacyjnego dziecka, ale także tworzenia sprzyjającego rozwojowi środowiska i dbałości o dobrostan dziecka. Zacząć należałoby zatem od znalezienia odpowiedzi na pytanie: Jakiej szkoły potrzebuje dziecko, które wejdzie w dorosłość w 2040–2050 roku? Być może w przypadku edukacji przedszkolnej i wczesnoszkolnej wcale nie chodzi o złożone wykazy kompetencji czy standardy osiągnięć, ale o zapewnienie dzieciom wartościowych i osobiście ważnych doświadczeń. Lilian G. Katz od wielu już lat postuluje, by w przypadku małych dzieci standardy osiągnięć zastąpić „standardami doświadczeń", jakich powinna dzieciom dostarczyć dobra edukacja. Małe dziecko powinno mieć prawo często doświadczać w szkole (2010, s. 2):

- poczucia celu i sensowności uczenia się;
- intelektualnego zaangażowania, pochłonięcia problemem, mierzenia się z trudnymi wyzwaniami intelektualnymi;
- poczucia satysfakcji z własnych osiągnięć, samodzielnego pokonywania przeszkód;
- okazji do przejmowania inicjatywy, podejmowania własnych decyzji i przyjmowania odpowiedzialności za własne działanie i osiągnięcia;
- poczucia pewności siebie, zaufania do własnych zdolności i swoich pytań;
- poczucia przynależności do grupy rówieśniczej, bycia jej ważnym członkiem;
- zaangażowania w różnorodne interakcje (okazji do rozmawiania, dyskutowania, wymiany poglądów, spierania się z innymi i negocjowania znaczeń);

- okazji do pomagania innym w odkrywaniu wiedzy i lepszym rozumieniu świata, etc.

Czy i w jaki sposób takie przeorientowanie edukacji przedszkolnej i wczesnoszkolnej z podręczników i kart pracy na holistyczny rozwój i dobrostan dziecka jest możliwe w polskim systemie edukacyjnym? Jak przygotować nauczycieli do takiej zmiany? Jak sami nauczyciele postrzegają istotę kompetencji przyszłości? Zapraszamy do lektury!

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Introduction

The latest World Economic Forum (2025) report states that in the next 5 years the average employee can expect 2/5 of their existing skills (39%) to transform or become outdated. According to the majority of employers interviewed by the WEF, the rapid obsolescence of skills is a major barrier to the development of an efficient and sustainable economy. The WEF identified the following as the main reasons for the increasing pressure for continuous professional development: broadening digital access to information linked to the development of artificial intelligence and the consequent progressive robotisation and automation of work; climate change mitigation and the challenges of a green transformation of the economy; increasing costs of living, as well as inflation pressures with a slowing economy; demographic changes caused by the ageing of many societies and the reduction of the working population; and geopolitical tensions, increasing social unrest (2025, p. 6).

The macro-trends described by WEF allow to understand why so much importance is attached in contemporary pedagogy to reflect on the competences of the future. These competences are variously referred to in the literature as 21st century competences, STEAM competences, 4C competences (communication, collaboration, critical thinking, creativity) or more recently as 7C competences (character, citizenship and computational thinking). Although the acronyms do not translate well into Polish, they perfectly capture the essence of the problem – we are talking about meta-competences that do not belong to any specific field of knowledge, but at the same time are 'transversal', universal (cross-functional) or otherwise 'transferable skills', underlying lifelong learning abilities and solving complex, interdisciplinary problems. Interestingly, recent research increasingly emphasises the realm of attitudes and values, which provide a moral compass for navigating a volatile and uncertain

world of data overload. Hence, in addition to intellectual qualities, such as the ability to self-regulate learning, undertake metacognitive reflection on one's thinking and the quality of knowledge acquired, non-intellectual (both intra- and interpersonal) qualities appear in lists of 21st century skills, such as: perseverance and resistance to stress (resilience), self-discipline and self-control (the ability to delay gratification), a sense of self-efficacy, conscientiousness and goal-determination (grit), a sense of responsibility for one's own actions or empathy (Lamb et al., 2017; OECD, 2018, 2019). According to many researchers, this combination of intellectual and non-intellectual dispositions is necessary for the development of an appropriate attitude towards learning or, more broadly, a growth mindset.

The development of such competences is possible and necessary from the earliest childhood and, according to many researchers, is also in line with the specificity of young children's learning – learning through discovery and exploration of reality, multi-sensory experience of the world, asking questions, testing hypotheses, formulating conclusions. However, it requires a reconstruction of the education system not only in terms of the way goals are formulated, curricula/basic curricula are constructed, educational methods are selected, standards for evaluating the child's achievements and educational efforts, but also in terms of creating an environment conducive to development and supporting the child's well-being. We should therefore start by finding an answer to the question: what kind of school is needed by children who enter adulthood in 2040–2050? Perhaps preschool and early childhood education is not at all about complex lists of competences or standards of achievement, but about providing children with valuable and personally meaningful experiences. For many years now, Lilian G. Katz has been advocating that, for young children, standards of achievement should be replaced by 'standards of experience' that a good education should provide children with. A young child should have the right to experience often at school (2010, p. 2):

- a sense of purpose and meaningfulness of learning;
- intellectual engagement, being absorbed by a problem, facing difficult intellectual challenges;
- a sense of satisfaction with one's own achievements, overcoming obstacles independently;
- opportunities to take initiative, make their own decisions and take responsibility for their own actions and achievements;
- a sense of self-efficacy, trust in their own abilities and their own questions;
- a sense of belonging to a peer group, being an important member;
- involvement in a variety of interactions (opportunities to talk, discuss, exchange ideas, argue with others and negotiate meanings);

- opportunities to help others discover knowledge and better understand the world, etc.

Is such a reorientation of pre-school and elementary education from textbooks and worksheets to children's holistic development and well-being possible in the Polish educational system, and how? How to prepare teachers for such a change? How do teachers themselves perceive the essence of the competences of the future? We invite you to read more!

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THEMATIC ARTICLES

ARTYKUŁY TEMATYCZNE

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The Concept of 4C Competences in Pre-School and Early School Education: Challenges, Opportunities and Pedagogical Recommendations

Koncepcja kompetencji 4K w edukacji przedszkolnej i wczesnoszkolnej – wyzwania, szanse i rekomendacje pedagogiczne

KEYWORDS

early childhood education, preschool education, elementary education, key competences, 4C competences, innovative teaching methods

ABSTRACT

This article analyses the concept of 4C competences: critical thinking, creativity, communication, and cooperation, as a key component of modern education for preschool and early school-age children. The main objective was to synthesise and organise existing knowledge on these competences and to suggest practical, application-oriented guidelines adapted to the specific context of early childhood education. The methodological framework was based on an analytical review study involving systematic identification, selection, and thematic analysis of publications from academic databases covering the first two decades of the 21st century. The results are presented across four major thematic areas: theoretical foundations, implementation challenges, didactic methods, and pedagogical recommendations. The analysis indicates that the effective development of 4C competences requires conscious didactic strategies, reflective and continuously developing teachers, active engagement of parents and the local community, highlighting the social dimension of fostering future competences, and strong systemic support. The article makes a significant contribution to educational literature by addressing the gap between theoretical discourse and the practical implementation of 4C competences in early education. Its innovative character lies

in the comprehensive treatment of the 4C concept's specificity in early childhood education and in the presentation of pedagogical recommendations grounded in contemporary educational research. Unlike most previous studies, this article bridges theoretical perspectives with specific solutions applicable in practice. It also indicates directions for future empirical research to verify the effectiveness of the suggested recommendations.

SŁOWA KLUCZE

edukacja małego dziecka, edukacja przedszkolna, edukacja wczesnoszkolna, kompetencje kluczowe, kompetencje 4K, innowacyjne metody nauczania

ABSTRAKT

W artykule przeanalizowano koncepcję kompetencji 4K: krytyczne myślenie, kreatywność, komunikacja, kooperacja, jako istotnego elementu nowoczesnej edukacji dzieci w wieku przedszkolnym i wczesnoszkolnym. Główny cel opracowania stanowiła synteza i uporządkowanie istniejącej wiedzy na temat tych kompetencji oraz zaproponowanie praktycznych wskazań aplikacyjnych dostosowanych do specyfiki edukacji najmłodszych dzieci. Ramę metodologiczną stanowiło podejście analitycznego badania przeglądowego, obejmującego systematyczną identyfikację, selekcję i analizę tematyczną publikacji z naukowych baz danych, z pierwszych dwóch dekad XXI w. Wyniki analizy przedstawiono według głównych obszarów tematycznych: podstaw teoretycznych, wyzwań implementacyjnych, metod dydaktycznych oraz rekomendacji pedagogicznych. Z analizy wynika, że skuteczny rozwój kompetencji 4K wymaga świadomych strategii dydaktycznych, refleksyjnych i odpowiednio przygotowanych oraz doskonalących się nauczycieli, aktywnego zaangażowania rodziców i środowiska lokalnego, co podkreśla społeczny kontekst rozwijania kompetencji przyszłości oraz zdecydowanego wsparcia systemowego. Artykuł wnosi istotny wkład do literatury edukacyjnej, wypełniając zauważalną lukę między teorią a praktycznym wdrożeniem kompetencji 4K w edukacji wczesnodziecięcej. Jego nowatorski charakter polega na kompleksowym ujęciu specyfiki koncepcji kompetencji 4K w edukacji wczesnoszkolnej oraz prezentacji rekomendacji pedagogicznych opartych na współczesnych badaniach edukacyjnych. W odróżnieniu od większości dotychczasowych opracowań artykuł łączy perspektywę teoretyczną z konkretnymi rozwiązaniami możliwymi do bezpośredniego zastosowania w praktyce. Ponadto opracowanie wskazuje kierunki dalszych badań empirycznych, mogących zweryfikować skuteczność przedstawionych rekomendacji pedagogicznych.

Introduction

Dynamic changes taking place in the modern world require a redefinition of the goals of education. The traditional approach, based on imparting knowledge, is no longer sufficient in preparing children for a reality dominated by technology, multiculturalism and dynamic social and economic change. In this context, the concept of 4C competences: critical thinking, creativity, communication, and cooperation, i.e. key elements of modern education, is becoming increasingly important. These competences, also referred to as "21st century competences" (Lamri, 2018/2021; Harari, 2018/2021), are essential for successful functioning in both social and professional contexts. Developing 4C competences from an early age is a part of the concept of lifelong education, aiming to foster attitudes that encourage independence, creativity and cooperation with others. They are particularly relevant in pre-school and early childhood education, as the early childhood period is crucial for the formation of attitudes, habits and basic socio-emotional and intellectual competences. Despite growing awareness of the importance of 4C competences, their effective implementation in educational practice remains a significant challenge for teachers and educational institutions. This is because it requires changes in the preparation of teachers and in the approach to traditional teaching methods, as well as systemic support for educators in developing their own methodological and psychological-pedagogical competences.

The analysis of the literature on the subject made it possible to demonstrate the potential of implementing these competences in elementary education, to indicate practical ways of developing them and to suggest specific recommendations for teachers, enabling them to effectively develop these skills in children from their first years at school. Special attention was paid to modern teaching methods and how they can be adapted to the specific features of working with the youngest learners. Indeed, the introduction of 4C competences into pre-school and early school education is not only a challenge, but, above all, an opportunity to create a more aware, competent and challenge-ready generation of the future. The methodological framework of this scholarly inquiry is based on the approach of an analytical review study, which employed a systematic procedure for the identification and selection of publications from the years 2000–2023. The literature search was conducted using academic databases, including ERIC, Google Scholar and JSTOR. Source selection was guided by carefully formulated keywords including: 4C competences, critical thinking, creativity, communication, cooperation, early childhood education, elementary/primary education, 21st century skills, innovative teaching methods, implementation of key competences, competency-based education. The analysis included publications addressing the development of 4C competences in pre-school and early primary education, with a clear reference to pedagogical practice, and meeting criteria of recency,

scientificity and practical relevance. Sources were excluded if they did not concern the specified competences, focused exclusively on other educational stages, lacked a didactic component, were of a non-scientific nature, or failed to demonstrate practical applicability. This search strategy enabled the selection of highly relevant publications, which were then subjected to thematic analysis according to four key categories: theoretical foundations, implementation challenges, didactic methods, and pedagogical recommendations. The main methodological contribution of this article lies in the integrated synthesis and categorization of fragmented research results into cohesive guidelines for educational practitioners, thereby filling a noticeable gap concerning practical, actionable recommendations tailored explicitly to early childhood educational settings. The novelty of the article lies in its comprehensive examination of 4C competences, taking into account the specific features of early childhood education, and in presenting pedagogical recommendations based on an analysis of contemporary educational research.

Origin and Development of the 4C Competence Concept

The concept of the 4C competencies: critical thinking, creativity, communication and collaboration (P21, 2019), originated from the widely discussed 21st-century competencies that have gained popularity in the context of global economic, technological, and social change (Trilling & Fadel, 2009). These ideas began to emerge at the turn of the 20th century in response to the labour market's needs and the dynamic development of digital technologies (Voogt & Roblin, 2012). Initially, the concept encompassed a broad set of skills, but, over time, these four core skills have been singled out for emphasis. The Partnership for 21st Century Skills (P21) has played a crucial role in popularising and embedding this concept, highlighting that these skills are essential for functioning in the modern world (P21, 2019; OECD, 2018, 2019). Their development is also linked to constructivist and socioconstructivist approaches in education, which assume the active participation of the learner in the learning process and the importance of social interaction for knowledge development (Vygotsky, 1978; Bruner, 1996). In such a context, 4C competences are not just a set of skills, but an integral part of the educational process (Scardamalia & Bereiter, 2006). An important moment in the development of this concept was also the publication of the Future Competences reports, which identified their crucial importance for successful functioning in the information society as a condition for an individual's educational and social success (Schleicher, 2018; UNESCO, 2015). Nowadays, 4C are seen as crucial at all levels of education, with a particular focus on pre-school and early childhood education, where basic attitudes and habits of learning and knowledge selection

are formed (Pianta et al., 2009). Integrating these competences into curricula is now a significant challenge and goal of educational strategies in many countries around the world (Care et al., 2016; Voogt & Roblin, 2012).

Critical thinking is the ability to analyse, evaluate, and synthesise information consciously, which is essential for rational decision-making (Facione, 1990; Ennis, 1985). In early childhood education, it is developed through questioning, analysing perspectives and formulating conclusions (Halpern, 2003). Research indicates that children taught critical thinking are more responsive, perform better and solve problems more efficiently (Abrami et al., 2015). It also underpins citizenship education, fostering a reflective and responsible approach to information (Lipman, 2003; Paul & Elder, 2002; UNESCO, 2015).

Creativity is the ability to produce valuable and original ideas that transcend patterns (Runco & Jaeger, 2012). In education, it also includes the development of thinking, expression, and problem-solving through children's natural curiosity (Chappell et al., 2008; Craft, 2005; Torrance, 1974; Vygotsky, 2004). Research confirms that fostering creativity supports cognitive, social and emotional development (Guilford, 1967; Kim, 2006). Creativity also enhances identity, a sense of agency and inclusiveness (UNESCO, 2015), especially in models such as "creative pedagogy" (Lin, 2011) or "teaching for creativity" (Craft, 2005), where the importance of an educational environment that supports students' creative activities is emphasised through the freedom to express ideas or the absence of fear of making mistakes.

Communication is another key competence of the 21st century supporting learning, collaboration and social development (Mercer, 2000). It involves expressing, listening and interpreting messages, and influences the development of empathy, conflict resolution and self-regulation (Hargie, 2011; Bodrova & Leong, 2007). As language shapes thinking (Vygotsky, 1978), early stimulation of communication by teachers and parents promotes educational success, especially in children from disadvantaged backgrounds (Snow et al., 1998). Modern teaching models are based on dialogue and the co-construction of knowledge (Alexander, 2008; Gillies & Boyle, 2010; Gillies, 2016). What is characteristic of today's world, digital and intercultural communication are becoming equally relevant (Banks, 2015), and in the context of the digitalisation of education and the growing importance of media communication, it is important to build competences for clear, responsible and ethical communication in electronic media also in virtual spaces (Livingstone & Haddon, 2009).

Cooperation is the ability to work together effectively to achieve common goals and it is crucial in the education of children who have been shown to achieve better educational outcomes and a greater sense of belonging to a group when working collaboratively (Roseth et al., 2008). This promotes not only the acquisition of knowledge but also the building of social and emotional competence (Wentzel & Watkins, 2002).

Effective strategies include group projects, cooperative games, peer tutoring (Kutnick et al., 2008; Slavin, 2014), as well as language games, role-playing, guided discussions, storytelling, shared reading, and Socratic dialogue (Fisher, 2007). It is essential not only to provide opportunities for collaboration but also to teach specific social skills, such as active listening, reasoning together, making decisions in a group, and giving constructive feedback (OECD, 2017).

Challenges of Implementing 4C Competences in Educational Practice

At the same time, attention is drawn to the challenges of implementing 4C competences in educational practice. These relate to the pressure to standardise educational achievement, which is often accompanied by insufficient preparation of teaching staff, a shortage of teaching materials, or an unsatisfactory system of support (Fullan, 2007; OECD, 2020). Therefore, developing 4C requires a comprehensive paradigm shift in education, from a transmissive to a constructivist, reflective, and participatory approach, as well as a revised professionalization of teachers.

The implementation of 4C competences in educational practice, despite growing awareness of their importance, faces several significant systemic, institutional, and methodological barriers. One of the main challenges is the lack of explicit guidelines and strategies for implementing 4C competences in pre-school and early childhood curricula, which results in their fragmented or declarative treatment (Voogt & Roblin, 2012). Teachers are often not sufficiently competent in constructivist pedagogy and working with activity-based methods. Research findings indicate that a large proportion of teachers in Europe report a lack of preparation for methods that develop critical thinking, creativity or co-operation. This problem is due to both deficiencies in initial teacher education and a lack of systematic in-service training opportunities (Darling-Hammond et al., 2017; OECD, 2019). The organisational culture of schools and pre-schools also remains a challenge. Traditionally oriented teaching models (transmission-testing-assessment) often fail to foster approaches based on collaboration, dialogue and reflection (Fullan, 2007). The pressures of standardisation and testing, especially in countries with a strong emphasis on educational performance as measured by exam results (e.g. Poland, France, UK, USA, Japan), result in children being taught to reproduce content instead of independent exploration and inference, which limits the development of higher-order thinking competencies (Lucas et al., 2013). This can lead to the marginalisation of soft competencies in favour of cognitive competences measurable by tests (Biesta, 2010). This, in turn, discourages teachers from experimenting and using innovative teaching methods.

The lack of adequate teaching materials and evaluation tools (Redecker, 2017), i.e. diagnostic tools to monitor students' progress in the area of social-cognitive competences, is also significant. Finally, limited systemic institutional support is an important challenge. Many educational reforms focus on structural measures, neglecting the need for systematic and systemic teacher support, networking, mentoring, or collaborative development of pedagogical practice (Hargreaves & Fullan, 2012).

It should be pointed out that, despite the above barriers, there are examples of successful implementations of 4C competence-oriented education. Examples include the Finnish education system, which emphasises integrated cross-curricular teaching, flexible curricula and a high degree of teacher autonomy (Jagiełło-Rusiłowski, 2011; Sahlberg, 2014), and the TeWhāriki model in New Zealand, which is based on the values of collaboration, communication and independent discovery of the world (Carr & May, 2000). In Poland, the Good Behaviour Game programme, implemented in grades 1–2 (also known as Let's Play Together), performs similar functions (Kwatera & Dzięglewski, 2023).

Therefore, the implementation of 4C competences in education requires not only methodological but also systemic changes, including: reform of teacher training, introduction/extension of institutional support, redefinition of educational goals, and recognition of the importance of social and emotional skills as equally important as cognitive skills (Karbowniczek, et al., 2011).

Innovative Didactic Methods as an Opportunity to Support the Development of 4C Competences

Contemporary education, focused on developing competences for the 21st century, requires the use of modern didactic methods that support students in developing critical thinking, creativity, communication, and cooperation (Kulesza & Michalak, 2018). Traditional transmission models prove to be insufficient in the context of children's social and cognitive needs (Sawyer, 2011).

One of the most effective methods to support CK development is considered to be the Project-Based Learning (PBL) approach in which students work to solve an authentic problem by integrating knowledge from different disciplines, working in teams and learning to build reflection and self-reflection (Thomas, 2000). PBL has been proven to improve academic achievement and develop social competence, especially in groups with diverse learning abilities (Bell, 2010; Holm, 2011). Equally effective is the Inquiry-Based Learning (IBL) method, which promotes questioning, independent inquiry and the formulation of conclusions. IBL fosters the development of critical thinking and communicative competence, especially when implemented

in groups and under the guidance of a teacher-facilitator (Hmelo-Silver et al., 2007; Laevers, 2005; Skałbania, 2020; Wells, 1999) who uses methods such as drama and storytelling that support creativity and communication. Through enactments and narratives children learn to express emotions, take different perspectives, develop imagination as well as empathy and social competence, fostering a climate of trust and acceptance within the peer group (Cremin et al., 2006; Wright, 2007). The Co-operative Learning (CL) approach is considered particularly effective in developing cooperative and communicative competences. This increases engagement, improves educational outcomes and develops conflict resolution skills (Johnson & Johnson, 2009; Slavin, 2014).

Among the innovative methods, it is also worth mentioning gamification, i.e. the use of game procedures in the teaching process. They stimulate creativity, logical thinking, as well as competition and cooperation, supporting children's intrinsic motivation and allowing them to achieve their educational goals in an engaging and attractive manner (Menezes & De Bortolli, 2016). Modern tools, such as digital technologies (IT), are relevant here, as their use enables children to access educational resources, collaborate online, create digital content and share it (Redecker, 2017). They support the personalisation of learning and communication between students and a teacher, while developing the ability to use technology in a responsible way (Beetham & Sharpe, 2013). The successful implementation of modern teaching methods requires adequate teacher preparation and an openness for change, enabling teachers to design practical learning situations (Laurillard, 2012).

Pedagogical Recommendations for the Development of 4C Competences in Pre-School and Early School Age Children

Developing the 4C competences requires well-considered and coherent systemic and didactic actions as well as adequate teacher preparation. The analysis of the literature on the subject allows us to identify the most relevant recommendations that can improve the process of shaping these key skills in the youngest learners:

1. Introduce changes in teacher education programmes that take into account modern pedagogical concepts, such as action learning, constructivism, project pedagogy and reflective teaching, and in their professional development (Darling-Hammond et al., 2017). It is crucial that teachers have theoretical and practical knowledge of developing 4C and other competencies of the future (Kwiatkowski, 2018).

2. Educational environment should be designed to foster the child's autonomy, opportunities for exploration, interaction and collaboration. The educational space needs to be flexible, allowing for arrangements that support group and creative work, be rich in stimuli and learning materials, and be adapted to different learning styles (Laevers, 2005).
3. It is crucial for teachers to use activating teaching strategies and methods (Cohen & Lotan, 2014; Hmelo-Silver et al., 2007), especially problem-solving and interdisciplinary tasks that require students to be critical and creative, and to communicate and interact with others.
4. Supporting children's emotional and social development should be considered as a foundation for 4C competence. Developing empathy, conflict resolution skills, and self-awareness fosters effective communication and cooperation (Denham et al., 2014; van de Pol et al., 2010).
5. Systematic observation and documentation of children's development in the 4C competences should be conducted. Assessment should be formative, supportive and tailored to the child's developmental abilities (Broadfoot et al., 2002). Instead of testing, it is advisable to use portfolios, achievement mind maps, self-evaluation, or personalised pedagogical documentation that allows the child, as well as the teacher and parents, to reflect on the learning process and outcomes (Carr & Lee, 2012).
6. Collaborate with parents who should be informed about the importance of the 4C competences and involved in activities that support children's development, both in the pre-school and home spaces (Sheridan et al., 2009). Joint projects, workshops, open-ended activities and consultations help to build coherence in educational interactions.

Summary and Conclusions

The 4C competences: critical thinking, creativity, communication and cooperation, are the foundation of modern education. In pre-school and early childhood education, their development is crucial for shaping cognitive, emotional and social attitudes that influence a child's future development and life functioning.

Research indicates that the effective promotion of these competences requires a move away from the traditional teaching model to a child-centred, constructivist approach. Here, the teacher acts as a designer of the learning environment, a reflective guide, a scaffolder and a facilitator supporting children's development in a holistic way (Darling-Hammond et al., 2017; Kulesza & Michalak, 2018; van de Pol et al., 2010).

Modern teaching methods, such as projects, drama, storytelling, educational games, and digital technologies, support the development of 4C competences; however, their implementation faces systemic difficulties, a lack of resources, and insufficient teacher preparation (Biesta, 2010; Niemi et al., 2014). The overview analysis shows that:

1. 4C competence should be an overarching goal of education from the earliest stages.
2. Teachers require systematic support and training.
3. A flexible education policy supporting innovation and autonomy is needed.
4. Cooperation with parents and the community is a condition for success.
5. Age-appropriate diagnostic and evaluation tools for children are needed.

In conclusion, the development of 4C competence is not only a question of teaching methods, but also a matter of a broad, systemic approach that takes into account the cooperation of all educational stakeholders. It is an investment in the future of children and a society capable of acting creatively, reflectively and responsibly in the complex reality of the 21st century.

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Philosophical Foundations for 4C-Oriented Early Childhood Education in the Context of Artificial Intelligence

Filozoficzne podstawy edukacji wczesnoszkolnej ukierunkowanej na rozwój kompetencji 4C w kontekście sztucznej inteligencji

KEYWORDS

philosophy, 4C competences, artificial intelligence, ethics of artificial intelligence, early childhood education, communication, creativity, critical thinking, cooperation

ABSTRACT

This article discusses the philosophical foundations of early childhood education, focusing on the development of the 4C competencies – communication, collaboration, critical thinking, and creativity – as essential for preparing students to function in a world increasingly shaped by artificial intelligence. It presents a theoretical and conceptual framework, applying a methodology grounded in insights from various philosophical sub-disciplines. The research problem addresses how philosophy can provide grounding for early childhood education and support pedagogical approaches in the face of technological challenges, particularly students' over-reliance on AI. The potential of philosophy to shape children's attitudes is illustrated through practical applications in early education. When introduced in a playful and age-appropriate way, philosophy can both stimulate the development of 4C competences and raise students' awareness of the need to reinforce these skills amid advancements in artificial intelligence. The study concludes that philosophy, understood as an exercise in thinking and dialogue, can play a critical role in addressing young learners' overreliance on AI tools, which may weaken their cognitive abilities. As a method of strengthening 4C competencies, philosophy can contribute to developing rationality and a critical attitude towards technology in children, while at the same time serving as an intriguing alternative to AI systems.

SŁOWA KLUCZE

filozofia, kompetencje 4C, sztuczna inteligencja, etyka sztucznej inteligencji, edukacja wczesnoszkolna, komunikacja, kreatywność, krytyczne myślenie, współpraca

ABSTRAKT

Celem artykułu jest omówienie filozoficznych podstaw koncepcji edukacji wczesnoszkolnej opartej na rozwijaniu kompetencji 4C – komunikacji, współpracy, krytycznego myślenia i kreatywności – jako fundamentu przygotowującego ucznia do funkcjonowania w świecie zdeterminowanym przez sztuczną inteligencję. Artykuł ma charakter teoretyczno-koncepcyjny i wykorzystuje metodologię i idee wywodzące się z różnych subdyscyplin filozofii. Problematyka badawcza koncentruje się na pytaniu, w jaki sposób filozofia może dostarczać podstaw i wspomagać edukację wczesnoszkolną w obliczu wyzwań związanych z rozwojem technologii, zwłaszcza w zakresie nadmiernego polegania przez uczniów na sztucznej inteligencji. Artykuł wskazuje na potencjał filozofii jako narzędzia kształtowania postaw oraz prezentuje przykłady praktycznego zastosowania idei filozoficznych w dydaktyce wczesnoszkolnej. Rozważania pozwalają stwierdzić, że filozofia wprowadzona w zabawowy sposób, odpowiednio dostosowana do etapu rozwojowego dziecka, może stymulować budowanie kompetencji 4C, a zarazem uwrażliwiać uczniów na konieczność ich rozwijania w kontekście postępu technologii sztucznej inteligencji. Analiza prowadzi do wniosku, że filozofia traktowana jako ćwiczenie myślenia i dialogu może odegrać kluczową rolę w odniesieniu do kwestii nadmiernego polegania uczniów na narzędziach sztucznej inteligencji, które prowadzi do osłabienia kompetencji poznawczych. Natomiast wykorzystanie filozofii jako metody wzmacniania kompetencji 4C przyczynia się do kształtowania w dzieciach racjonalności i krytycznego stosunku do technologii. Filozofia staje się w ten sposób intrygującą alternatywą dla systemów sztucznej inteligencji.

Introduction

Artificial intelligence is revolutionising education systems worldwide. In this context, traditional models, characterised by the teacher's authoritarian role, rote memorisation, test-based assessments, and rigid curricula, are increasingly anachronistic and fail to address the contemporary challenges.

As technological progress accelerates, learners need to acquire interdisciplinary skills to adapt to changes in today's complex world. Moreover, the growing demand for 4C skills of creativity, collaboration, communication, and critical thinking reflects awareness of labour-market shifts, where emerging professions require advanced human cooperation and flexible collaboration with AI systems. Education should, therefore, prioritise the holistic development of young learners, with a central focus on 4C competencies, while also supporting teachers in adapting their pedagogical approaches.

Another point is that technological advances in education, particularly students' overreliance on AI tools, which diminish young learners' cognitive abilities, indicate the need to lay the groundwork for reshaping education from the earliest school stages. Consequently, this study attempts to recognise and explore the philosophical foundations for a 4C-oriented early childhood education in the context of artificial intelligence.

Research Methods and Tools

One possible approach to addressing the impact of the AI revolution on education is to anchor it in philosophical principles. Practical philosophy, understood as a method of critical reflection, has the potential to equip young learners with essential human competencies.

This article introduces an interdisciplinary overview that integrates critical pedagogy, practical philosophy, and technology ethics. It presents a conceptual and theoretical framework, arguing that in an AI-dominated world, both ancient and some modern philosophical sources may provide the foundations for an early childhood education designed to equip students with 4C skills. After being adapted to the developmental stage of young learners, philosophical ideas are aligned with each of the four 4C competences, as outlined in chapter four.

The methodology is grounded in analysing philosophical methods and theoretical sources encompassing philosophy of education, ethics, aesthetics, ancient Greek philosophy, social philosophy, modern epistemology, philosophy of language, philosophy of dialogue, and hermeneutics. The study also provides examples of applying selected philosophical concepts at the level of early school education. On the whole, examining philosophical thought aims to formulate theoretical and practical proposals.

4C Competencies in Early Childhood Education

Recognised as 21st century skills, the 4Cs – creativity, collaboration, communication, and critical thinking – can be seen as meta-competencies that enable individuals to meet rapidly changing societal and technological expectations (Thornhill-Miller et al., 2023, p. 4).

An attempt to define the essential competences that prepare people to face the challenges of today's world has been made by the Organisation for Economic Co-operation and Development (OECD), which launched the Programme for International Student Assessment (PISA). OECD conceptualises a set of key competencies which comprise „the capacity of students to analyse, reason and communicate

effectively as they pose, solve and interpret problems in a variety of subject matter areas" (OECD, 2010, p. 3) and are able „to report on their own motivation to learn, beliefs about themselves and learning strategies" (OECD, 2010, p. 3).

Various organisations, including the American Management Association (2010), the Commission of the European Communities (2008), the Consortium of National Arts Education Associations (Mahlmann, 1994), and the Partnership for 21st Century Skills (2019), have developed views and recommendations on a future-oriented framework of competencies that should be taught to school students. OECD, in publication *The Definition and Selection of Key Competencies: Executive Summary,* developed the list of 21st century skills (2010, pp. 1–20) that originated the concept of the 4Cs, namely creativity, collaboration, communication, and critical thinking. Integrating these competencies from an early age aims to enable individuals to think independently, express their views in a thoughtful and intellectually responsible way, and actively shape their personal and ethical growth.

When characterising the framework of 4C competencies, significant value is placed on reflective thinking. According to OECD, reflectiveness is considered „the heart of key competencies" (OECD, 2010, p. 8) and involves "the ability to deal with change, learn from experience and think and act with a critical stance" (OECD, 2010, p. 5). Viewed broadly, the concept of the 4Cs, integrating cognitive, social, communicative, and creative competencies with reflective awareness, offers a natural foundation for the inclusion of philosophy in education.

Introducing Philosophy and Philosophical Methods in Early Childhood Education

The educational role of philosophy for young learners was emphasised by Matthew Lipman, the founder of the Philosophy for Children programme, who in the 1970s introduced an innovative curriculum designed to enhance schoolchildren's philosophical inquiry through collaborative and thought-provoking classroom discussions (Lipman, 1973).

Observations that young children spontaneously engage in philosophical thinking have also been made by Gareth Matthews. He argues that young learners act as natural philosophers capable of addressing existential problems, playing with ideas, wondering about the nature of reality, and questioning fundamental issues concerning values and human knowledge (Matthews, 1980).

From an overall perspective, integrating philosophy into the curriculum at an early stage of education undoubtedly enables students to develop reasoning skills and a critical approach to the world around them. Nevertheless, in line with James Funston's

view, pedagogy that seeks to nurture children as philosophical thinkers and engage them in dialogue should give them the freedom to develop modes of thinking that do not necessarily follow adult lines of reasoning, thereby strengthening philosophically-interesting pathways of thought (Funston, 2017, pp. 14–15).

From a philosophical perspective on education, this approach is rooted in Deweyan pragmatism, which presents the child as an active agent who learns through direct experience and exploration of the world, enriched by cooperative practices, analytical reflection, and dialogic engagement processes (Dewey, 2011).

When considering the role of philosophical approaches in conceptualising children's learning, the views of Piaget (1977), Erikson (1950), Vygotsky (1934), and Bruner (1977) cannot be overlooked. Their various theoretical frameworks outline patterns in early childhood education that integrate experiential and developmental aspects with cultural and individual purposes, while acknowledging learner diversity across different epistemological, ontological and ethical perspectives (Peters & Tesar, 2017, p. 12).

The Potential of Philosophy for a 4C-Oriented Early Childhood Education in the Context of Artificial Intelligence

The ongoing development of artificial intelligence calls for an educational framework that, from the earliest stages, enhances adaptive capacities required to meet the demands of rapidly evolving technologies.

Recent research indicates that schoolchildren increasingly rely on AI tools instead of engaging in independent reasoning (Pathan & Kanth, 2023, pp. 1711–1716). Experimental studies conducted by a team led by Nataliya Kosmyna show that students who use AI models, such as ChatGPT, demonstrate significantly less brain activity and weaker metacognitive engagement than their peers who use search engines or study by themselves (Kosmyna et al., 2025). Over time, this reliance on artificial intelligence may weaken fundamental cognitive skills such as reasoning, reflective analysis, argumentation, creativity, and evaluating the reliability of information. Young children are particularly susceptible to this problem because their judgmental abilities are still developing, making them prone to accepting results generated by artificial intelligence that are potentially incorrect (Pathan & Kanth, 2023, p. 1715).

In light of these circumstances, teachers should employ methods that enhance creativity, collaboration, communication, and critical reflection to address children's excessive reliance on AI tools. Thus, incorporating diverse philosophy-based approaches into early school didactics appears particularly beneficial.

Aesthetics in Early School Curricula to Enhance Creativity in the Context of Artificial Intelligence

Recognised as one of the key competences in the age of generative AI, creativity can be conceptualised through four fundamental factors: personal properties, cognitive processes, environmental conditions, and the nature of creative outcomes (Oppert et al., 2023, pp. 1–2). Accordingly, a creative attitude is characterised by considering different possibilities and alternative viewpoints, combined with curiosity and manifested in fluency, flexibility, the ability to make connections, find solutions, and shift perspectives (Dere, 2019, pp. 652–658; Harold, 2024, pp. 1–2). Katherine Harold concludes that „it is a mixture of curiosity and exploration which finally results in discovery" (Harold, 2024, p. 2).

Particular emphasis should be placed on the creative process in an educational setting when teaching students diverse ways of thinking. Within this context, it is essential to acknowledge young learners' natural capacity for creative thinking, which, if neglected during childhood, may prove more challenging to develop in adulthood. Furthermore, given that creativity goes beyond innate predispositions, such as personality and intelligence, and encompasses thinking styles, motivation, and knowledge (Mazeh, 2020, pp. 8–10), early childhood educators have the opportunity to integrate creative processes into classroom practice through a variety of pedagogical tools. This objective can be achieved by applying pedagogical instruments drawn from philosophical approaches to teaching children.

In a world increasingly dominated by artificial intelligence, aesthetics, among the different branches of philosophy, can significantly enhance the creative potential of the youngest learners if adjusted to students' level of understanding. To give an example, creativity can be taught by guiding learners to seek, notice, and name beauty, and to respond to it playfully in their everyday surroundings – from the colours of clothes and the shapes of plants like grass, pine cones, seed heads, or tree roots, to the architecture of the school building and even the rhythm of footsteps in the hallway. In this regard, the concept of everyday aesthetics goes beyond the realm of fine arts, encompassing how individuals perceive and appreciate *beauty* in common objects, activities and places, connecting such experiences to personal well-being and ethical awareness, and offering a compelling alternative to the colourful and playful worlds created by artificial intelligence.

In line with John Dewey's view, aesthetic experience is part of daily life and emerges from meaningful interactions with the world around us (Dewey, 1934, pp. 3–57). Within an educational framework, everyday aesthetics can encourage children to recognise and create *beauty* in their immediate settings, stimulating curiosity, openness, flexible thinking, and a sense of care for the natural environment (Marini, 2020, pp. 39–50).

In an era defined by artificial intelligence, enhancing creativity through an appreciation of *beauty* in everyday life has the potential to help young learners, growing up in a globalised, technology-driven world, develop symbolic, abstract, and imaginative thinking, while rediscovering and appreciating values grounded in the natural world.

Furthermore, encouraging children to discover various ways of identifying the creative features in objects, activities, and places, guiding them to wander through nature in order to explore *beauty* through integrated senses, and engaging them in play with colors, smells, tastes, or shapes may enhance children's sense of emotional attachment to the real world, as opposed to the intense emotions triggered by interactions with AI technologies.

Social Philosophy in Early Education to Strengthen Collaboration in the Age of Artificial Intelligence

In many areas of human life, achieving complex goals often requires collaborative efforts rather than individual endeavours. In the age of artificial intelligence, the ability to work together is becoming increasingly crucial not only within human communities but also in cooperation with AI systems.

The term *collaboration* is defined as "a type of interaction in which individuals, teams, or organisational members work together to reach a common shared goal, activity, or production" (Keyton et al., 2017, p. 93). Reflecting Laurie Lewis's perspective, a collaborative process involves interpersonal relationships with other team members while focusing on problem solving, playing, participating in discussions, making decisions, and exchanging knowledge (Lewis, 2006, pp. 219–220).

The power of collaboration in school settings lies in strengthening relationships across the wider educational community, particularly through peer interactions and dialogue between students and teachers. As Julian Kitchen, Mandi Berry and Tom Russell noted, such connections positively contribute to developing fresh perspectives, expanding knowledge, and promoting a willingness to share practices with others (Kitchen et al., 2019, pp. 93–97).

Collaborative strategies in educational practice are now implemented for students born in the midst of advanced technological developments, the impact of which on social interaction remains a matter of concern. Experimental studies conducted by a team led by Herlina Ike Oktaviani indicate that early childhood teachers need training to adjust the learning process to changes brought about by increasing virtualisation. Pre-school learners, who are now immersed in virtual reality, are likely to benefit from group collaboration aimed at achieving shared goals, provided that collaborative learning is adequately implemented (Oktaviani et al., 2023, pp. 329–337).

Collaboration, referred to as attitudes related to interdependence, cooperativeness, and view exchange, is one of the subjects addressed by social philosophy. In early childhood education, this subdiscipline of philosophy may be applied as a framework of methodological instruments and a source of philosophical narratives and ideas that facilitate understanding of the value of social interactions.

The model of collaborative learning has been examined by several philosophers of education. John Dewey in *Democracy and Education* encouraged educators to teach children collaborative engagement and the exchange of experiences in order to prepare them for life in a community (Dewey, 1916, pp. 12–47, 94–162). In contrast, Jürgen Habermas developed a communicative model of collaborative learning based on the conditions of an ideal learning situation, in which all students engage in meaningful communication with equal and unrestricted participation rights (Habermas, 1984, p. 25). Needless to say, it was Maria Montessori who recognised the power of collaboration in early childhood education, conceptualised it theoretically, and later implemented it widely in schools worldwide (Montessori, 1912).

Alongside the methodological principles of collaboration rooted in philosophical thought, teachers may draw upon social philosophers' ideas and encourage young learners to explore philosophical stories together through play-based group activities. To give an example, selected passages from Plato's *The Republic* (2021) might be adapted into a drama or short story illustrating harmonious community life and the cultivation of social virtues. Similarly, Aristotle's view of friendship (*Philia*), presented in *The Nicomachean Ethics* (2020) as an idea to enhance happiness through mutual support and cooperation, could be included in the school curriculum by introducing very young children to age-appropriate practices such as storytelling about helping friends, role-playing scenarios of sharing and kindness, or classroom projects where they cooperate to achieve a common goal. An early education programme may also benefit from incorporating insights from Jean-Jacques Rousseau's *Émile ou de l'Éducation* (1762), which portrays children as eager to interact with peers and delighted by the discovery of the world, through activities such as guided nature walks, where naturally curious young learners collect and discuss simple objects.

a) Philosophical Foundations for Early Communication Skills in the Era of Artificial Intelligence

Applying philosophical methods, stories, or concepts to achieve cooperative outcomes and build social connections from the earliest stages of education gains particular significance in light of current research indicating that interactions with artificial intelligence may contribute to social deskilling and weakened communication skills (Malfacini, 2025).

On the one hand, AI-generated messages sent on behalf of humans have the potential to facilitate interpersonal communication in terms of speed, emotional tone, and positive impression (Hohenstein et al., 2023). According to studies conducted by a team led by Desy Misnawati, "reliance on chatbots and virtual assistants can reduce essential social skills, such as empathy, listening skills, and the ability to read non-verbal expressions in face-to-face conversations" (Misnawati et al., 2025, p. 436).

First and foremost, communication skills have been cultivated in philosophy since ancient times, notably through the rhetorical techniques outlined by Aristotle in *Rhetoric* (2015) and inquiry-based dialogues employed by Socrates in Plato's *Dialogues* (1961). Integrating such philosophical frameworks into the learning environment can help children perceive language as an active, context-bound, and creative phenomenon.

Early education can help children develop empathy and respect through the way they communicate. Emmanuel Lévinas's ideas (1969), adapted to early childhood education, may inspire children to realise that every conversation is a response to *the Other*, understood as another person. This encourages them to listen attentively, care for their peers, and take responsibility for participating thoughtfully in dialogue. In this way, students learn to build relationships through conversation – a skill truly valuable nowadays and one that offers a meaningful alternative to interactions with chatbots in virtual reality.

Furthermore, adapted to early childhood education, certain insights derived from the philosophy of language may help students understand how communication functions and how meaning is conveyed. For instance, based on Wittgenstein's concept of *language games* (1958, §7, §23, §27), teachers can design activities allowing children to explore the meanings of metaphoric words and simple idiomatic phrases by playing with language. By imaginatively adapting Austin's theory of speech acts (Austin, 1962) through game-based techniques, teachers may help children recognise that utterances such as promises, requests or greetings function as real actions that establish relationships and shared understanding.

b) Enhancing Young Learners' Critical Thinking Through Philosophy in the Context of Artificial Intelligence

Critical thinking, defined as the capacity to evaluate, analyse, and synthesise information, encompasses cognitive processes such as decision-making, problem-solving, and reflective reasoning (Gerlich, 2025, p. 1), which play an essential role in 21st-century school education.

Recent social studies have shown that human reasoning and analytical abilities are influenced by interactive AI tools, which may have both positive and negative consequences for critical thinking. On the one hand, artificial intelligence algorithms

can support cognitive processes by suggesting alternative solutions, stimulating reflection and discussion, and encouraging individuals to critically examine assumptions and strive for understanding. On the other hand, plenty of researchers indicate an increasing reliance on AI tools contributing to diminished cognitive engagement and hindering the development of reasoning skills (Gerlich, 2025, pp. 1–29; Szmyd & Mitera, 2024, pp. 1022–1039).

In the educational setting, teachers are responsible for balancing these effects and achieving an appropriate equilibrium between integrating artificial intelligence and promoting critical thinking (Szmyd & Mitera, 2024, p. 1027). This aim can only be achieved by maintaining ethical principles, ensuring transparency, and exercising critical reasoning among students.

In early childhood education, critical thinking may be introduced by simplifying insights rooted in diverse philosophical subdisciplines into playful, age-appropriate activities. A thought-provoking starting point for inspiring children to explore ideas through dialogue may be the philosophical statement *I know that I know nothing* expressed by Socrates, who, as Katarzyna Szmyd and Ewelina Mitera observed, "is considered the father of critical thinking" (Szmyd & Mitera, 2024, p. 1025). Taken this way, teachers can introduce young learners to Socratic dialogues, engaging them in questioning, listening, and formulating answers, thereby supporting the development of early reasoning and open-mindedness.

For instance, René Descartes's philosophy, adapted to early childhood education and introduced through playful techniques, may inspire young learners to question his fundamental insight*: cogito, ergo sum* (1960). In this context, children might question simple everyday assumptions while playing with stacking cubes. Scepticism towards unverified claims, such as deepfakes, potentially generated by AI, could also be enhanced by exploring Descartes's doubts. Furthermore, inspired by playfully adjusted Immanuel Kant's insights (1999), students can be encouraged to reflect on the limits of the human mind compared to AI information processing. With reference to Kant's concept of the limits of cognition, children could identify examples of how they use their senses – sight, hearing, taste, smell, and touch – in everyday life and then do analogous experiments to test the sensory capacities of AI tools.

Against the background of increasing cognitive offloading caused by the overuse of AI systems, philosophical hermeneutics has the potential to develop critical thinking skills in early childhood education. Hans-Georg Gadamer's *fusion of horizons* that emerges in contextual, culturally and historically situated dialogue (Gadamer, 1989) can be introduced to very young learners through activities such as listening to stories from different cultures, relating narratives to their life experiences, role-playing everyday situations like sharing toys, or discussing how characters in a tale might feel. Gadamer's method, which guides children to see and compare various viewpoints in

familiar situations and encourages openness to diverse perspectives rather than rigid answers, seems highly valuable under today's circumstances, where excessive reliance on information delivered quickly and effortlessly by AI systems has been observed.

Results of the Conceptual Analysis

As artificial intelligence becomes increasingly influential, strengthening 4C competences in early education has the potential to prepare children for living in an uncertain future world. Addressing young learners' overdependence on AI tools, this study is focused on philosophical concepts, sources, and methodological principles that could help establish new pedagogical foundations and values applicable in early childhood education.

In light of students' declining concentration skills due to overexposure to technological devices, as well as their tendency to prioritise access to information over its comprehension, it becomes necessary to abandon the stereotypical perception of philosophy as merely abstract narratives lacking clear or practical relevance to reality. Instead, early childhood education can draw pedagogical value from practical philosophy grounded in various subdisciplines and methodologies, including the philosophy of education, ethics, aesthetics, ancient Greek philosophy, social philosophy, modern epistemology, the philosophy of language, the philosophy of dialogue, and philosophical hermeneutics.

Furthermore, philosophical approaches that encourage reflection are inherently linked to developing 4C competences such as creativity, collaboration, communication, and critical thinking. In practical application, philosophical reasoning may be introduced through role-playing, dialogues, adapted games, and other activities that engage children in questioning, listening, responding, doubting, and reasoning, all anchored in their real-life experiences.

Finally, this study reveals that, paradoxically, the rapid development of artificial intelligence leads to human-centric approaches and prompts a shift towards educational frameworks that prioritise skills such as creativity, collaboration, communication, and critical thinking. These transformative changes in education reflect a growing awareness and a revival of the Renaissance vision of humans as versatile individuals equipped with a wide range of competencies.

Conclusion

In summary, exercising philosophical thinking at the level of early school education can contribute to developing 21st century skills in children. Given the increasing overreliance on AI tools, philosophy, when introduced in an age-appropriate way, has the potential to encourage reflection in young learners. Philosophical concepts and methods adapted to their developmental stage can play a critical role in stimulating intellectual engagement and a desire to know. Inspired by philosophical ideas, children may learn through games, role-playing scenarios, or other fun activities to think independently and act according to reasoned principles.

In a nutshell, philosophy as a method aimed at strengthening 4C competencies – creativity, collaboration, communication, and critical thinking – can contribute to developing rationality and a critical attitude towards technology in children. Moreover, adjusted to children's learning style and emotional needs, philosophy can stimulate curiosity and offer an intriguing alternative to AI algorithms that deliver information quickly and effortlessly.

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4Cs Competences and Teacher Self-Efficacy in Elementary Education (2020–2030 Report and Foresight)

Kompetencje 4K a poczucie skuteczności nauczycieli edukacji wczesnoszkolnej (raport i prognoza na lata 2020–2030)

KEYWORDS

4Cs competences, teacher self-efficacy, elementary education, STEAM, 21st Century Skills, competences, ICT, AI

ABSTRACT

The aim of the article is to examine how the 4Cs – Critical Thinking, Creativity, Communication, and Collaboration – are embedded in elementary education between 2020 and 2030, with a particular focus on Poland in comparison to selected international cases. The research addresses the problem of uneven policy traction and classroom practice, exploring how national strategies, professional development systems, and technology initiatives shape both pupil competences and teacher self-efficacy. Methodologically, it adopts a narrative literature review, drawing on OECD data, international policy documents, and empirical studies in English and Polish. The analysis progresses through four stages: (1) mapping policy frameworks, (2) assessing links between 4Cs and teacher self-efficacy, (3) evaluating pedagogical models such as STEAM and project-based learning, and (4) analyzing the impact of ICT, AI, and post-pandemic realities. Results show that jurisdictions embedding explicit 4Cs standards and sustained professional development (e.g. Finland, Korea) report higher teacher self-efficacy, while discretionary uptake leads to fragmented practice (e.g. Poland, several U.S. states). The article concludes with recommendations for statutory 4Cs descriptors, STEAM-oriented professional development, digital infrastructure,

and well-being supports, thus contributing new evidence-based perspectives to pedagogical thought. The self-efficacy is highest when 4Cs training permeates both pre- and in-service programmes which introduces new research areas focusing on the education of future early childhood teachers to prepare educators and learners for a complex, technology-rich future by 2030.

SŁOWA KLUCZE

kompetencje 4K, poczucie własnej skuteczności nauczycieli, edukacja wczesnoszkolna, STEAM, kompetencje XXI wieku, TIK, AI

ABSTRAKT

Celem artykułu jest zbadanie, w jaki sposób kompetencje 4K – myślenie krytyczne, kreatywność, komunikacja i kooperacja – są wdrażane w edukacji podstawowej w latach 2020–2030 w Polsce w porównaniu z innymi krajami. Badania poruszają problem nierównomiernego wdrażania założeń 4K do praktyki szkolnej. Analizują, w jaki sposób strategie krajowe, systemy rozwoju zawodowego i inicjatywy technologiczne kształtują kompetencje uczniów i poczucie własnej skuteczności nauczycieli. Zastosowano narracyjny przegląd literatury, opierając się na danych OECD i badaniach empirycznych w języku angielskim i polskim z lat 2020–2025. Analiza obejmowała cztery etapy: (1) mapowanie ram polityk oświatowych, (2) ocena powiązania 4K z poczuciem własnej skuteczności nauczycieli, (3) ewaluacja modeli pedagogicznych, takich jak STEAM, i uczenie się oparte na projektach oraz (4) analiza wpływu ICT, AI i realiów postpandemicznych. Wyniki pokazują, że wdrożenie jasno określonych standardów 4K i stały rozwój zawodowy (np. w Finlandii, Korei) sprzyja wyższemu poczuciu własnej skuteczności nauczycieli, podczas gdy dyskrecjonalne wdrażanie prowadzi do fragmentacji praktyki (np. w Polsce, USA). Artykuł kończą rekomendacje dotyczące ustawowych deskryptorów 4K, rozwoju zawodowego zorientowanego na STEAM, infrastruktury cyfrowej i wsparcia dobrostanu, wnosząc tym samym nowe, oparte na badaniach perspektywy do refleksji pedagogicznej. Poczucie własnej skuteczności jest wyższe, gdy szkolenia 4K obejmują obecną i przyszłą kadrę, co sugeruje dalsze badania kształcenia przyszłych nauczycieli wczesnej edukacji, tak aby do 2030 roku przygotować edukatorów i uczniów do złożonej, bogatej w technologie przyszłości.

Introduction

Education reformers argue that schooling must do more than transmit facts; it must enable young learners to navigate a technology-saturated world. The competences cited as critical for such navigation are the 4Cs – Critical Thinking, Creativity, Communication and Collaboration. Routine cognitive work is shrinking as AI automates rule-based tasks, while jobs requiring creativity and interpersonal problem-solving are

expanding (OECD, 2024). In parallel, the World Economic Forum's skills surveys place analytical thinking, flexibility and teamwork as the top future work attributes (WEF, 2023). Yet naming the 4Cs in policy documents does not guarantee classroom uptake (So et al., 2017). Teachers act as linchpins: their willingness and capability to redesign lessons around open-ended inquiry, peer dialogue and prototyping determines the 4Cs implementation (Patston et al., 2021). Teacher self-efficacy – rooted in Bandura's (1977) social-cognitive theory – emerges as a determinant (Holzberger & Prestele, 2021). Higher self-efficacy implies greater use of student-centred methods and resilience (Barni et al., 2019).

The article asks: How do national strategies, professional-development systems and technology initiatives cultivate both the 4Cs in learners and teachers' self-efficacy? The analysis pays attention to STEAM-based pedagogies, the digitalisation forced by the COVID-19 pandemic, and the diffusion of AI, which shape primary schooling to 2030. The review is also situated within the BANI (Brittle, Anxious, Non-linear, Incomprehensible) paradigm, which posits that volatility may break systems in unexpected places. The goal is to generate evidence-based insights and recommendations for preparing educators and students.

Research Methods

To address the research questions, a narrative literature review was undertaken. This approach was selected as particularly suitable for mapping complex educational, sociocultural, and technological phenomena, while allowing for a combination of theoretical insights and empirical evidence (Sukhera, 2022). Moreover, in a narrative literature review, relevant documents containing ideas, data, and opinions are selected to identify the main issues and debates surrounding the topic under study. This allows potential gaps in policy or literature to be identified and highlighted, and suggests directions for future research (Creswell, 2009).

Unlike systematic reviews, narrative reviews are not constrained to a pre-defined methodology for selecting and assessing studies. However, the initial stage of this analysis involved systematic searches across Scopus, ERIC, Google Scholar, and institutional portals (OECD, UNESCO, Eurydice), covering sources in English and Polish. The inclusion criterion was to accept only texts that 1) explicitly refer to the 4Cs concept and/or teacher self-efficacy in primary education, with optional references to STEAM, ICT, or AI; 2) were published from 2020 to 2025 and thus reflect post-pandemic transformations and AI adoption trends.

This study explores global frameworks for the future international education and case-based analysis of Polish and chosen educational policies in the world. First, texts

were subjected to thematic coding, whereby recurring issues such as policy frameworks, professional development, pedagogical models, technology integration, and teacher well-being were identified. Second, the material was categorised into analytical clusters aligned with the article's objectives: (1) policy recognition and curricular embedding of the 4Cs; (2) professional preparation and self-efficacy; (3) pedagogical innovations (STEAM, PBL, inquiry-based learning); (4) technological and post-pandemic challenges; and (5) cross-national comparative insights. Finally, a process of synthesis and interpretation was undertaken, linking evidence to the conceptual frame of teacher self-efficacy and to foresight scenarios extending to 2030.

This layered procedure ensured not only a comprehensive overview of the literature but also a structured categorisation of findings, enabling the identification of gaps, recurrent patterns, and actionable recommendations.

4Cs in Education Policy

Education policy increasingly foregrounds "whole-child" competences. Since routine tasks are automated, schooling must prioritise creativity and critical thinking (Vincent-Lancrin et al., 2019). Forecasts rank creativity, critical thinking, communication, and collaboration among the foremost skills for tomorrow's workforce (World Economic Forum, 2023), the transversal competences. Most EU states embed them in primary syllabi, whereas Poland references them only indirectly, leaving enactment to individual schools (European Agency for Special Needs and Inclusive Education, 2023). In contrary, South Korea's 2015 curriculum prescribes "creative thinking competency" and "communication competency" as obligatory outcomes (Jeong, 2020). Finland's core curriculum similarly threads equivalent skills through phenomenon-based modules, supplying teachers with detailed rubrics, while the United States relies on the voluntary Partnership for 21st Century Skills framework, yielding heterogeneous uptake. Thus, policy recognition is universal, yet while 4Cs may be on the educational agenda, guidance in some countries or states is lacking on pedagogy and assessment (Lucas, 2022). Where 4Cs are codified (e.g. Korea's "creative experiential learning" hours) teachers receive clearer directives and resources to integrate them across subjects (KERIS, 2021).

4Cs and Teacher Self-Efficacy

Teacher self-efficacy predicts instructional innovation and perseverance with SEN pupils (Bandura, 1977; Barni et al., 2019). Evidence indicates a reciprocal relationship: confident, comprehensively trained teachers tend to embed the 4Cs regularly

which consolidates professional competence. Sutjonong et al. (2022) showed that efficacy partially mediates the link between creative pedagogy and perceived pupil creativity. Likewise, TALIS respondents with cross-curricular training reported superior efficacy in creativity and critical-thinking instruction (OECD, 2020).

Analyses confirm that professional development targeting 21st-century skills elevates both individual confidence and collegial collaboration (Vincent-Lancrin et al., 2019). Conversely, curricula overloaded with factual content or absent scaffolded inquiry depress efficacy – particularly among novices unfamiliar with STEAM approaches. Consistent with Bandura's "mastery-experience" mechanism, both initial preparation and in-service programmes must integrate 4Cs pedagogy (Long et al., 2024). Collaborative school cultures intensify these gains: teacher teams and learning communities focused on 4Cs projects strengthen collective efficacy (Wullschleger et al., 2025). Hence, developing students' 4Cs and sustaining innovative practice depend on systemic provision of training, resources and structured peer support (Holzberger & Prestele, 2021).

Educational Models and 4Cs Implementation

Certain pedagogical models (Montessori, Waldorf) cultivate the 4Cs by emphasizing learner agency, hands-on inquiry and socio-emotional growth – qualitative studies report elevated teacher confidence in facilitating open-ended tasks (Lucas, 2022). Likewise, schools organising interdisciplinary projects demanding communication, teamwork and critical problem-solving usually provide high teacher autonomy and collective morale.

Cross-national evidence corroborates the pattern: Finland's phenomenon-based modules and Singapore's inquiry cycles coincide with higher self-efficacy for student-centred strategies (Schaffar & Wolff, 2024). In the United States, sustained participation in professional learning communities (PLCs) similarly raises self-efficacy and uptake of innovative practice (Anderson & Olivier, 2022). In sum, interdisciplinary, learner-centred formats most reliably advance 4Cs, provided teachers obtain specialised preparation and ongoing support.

Optimal Practices for 4Cs

Project- and inquiry-based formats (PBL, IBL) constitute the most consistently documented conduits for 4Cs integration (Vincent-Lancrin et al., 2019). Elementary PBL studies register measurable gains in communication and creative problem-solving (Lucas, 2022), while a meta-review of STEM/STEAM initiatives shows that

well-scaffolded projects enhance creativity and critical thinking, contingent on teacher guidance (Kwon & Lee, 2025). In a 16-week professional-learning community, 49 in-service teachers who co-designed hands-on STEAM tasks reported substantial growth in interdisciplinary self-efficacy, though design-specific confidence required continued support (Gülhan, 2024). This suggests that intensive STEAM-focused professional development can strengthen teacher beliefs in their ability to teach 4Cs.

Additional practices include integrated thematic units linking science with visual or performing arts, maker education that embeds digital fabrication, and structured collaborative groups followed by guided reflection. Each approach demands explicit scaffolding: facilitation protocols, formative rubrics, and portfolio assessment are pivotal for teachers to feel capable of sustaining open-ended inquiry. Therefore STEAM and PBL are the most promising practices for cultivating the 4Cs (Tran et al., 2021), provided that the pedagogy is genuinely inquiry-driven and inclusive of creativity. Accordingly, schools with exemplary 4Cs outcomes typically pair PBL/STEAM curricula with ongoing coaching or mentorship, enabling continuous reflection and confidence building.

Technology, AI, and Post-COVID Realities

ICT and AI present ambivalent prospects for 4Cs education. Virtual collaboration suites, creative-design software and serious games can broaden communication and creativity; digital storytelling (Churchill, 2020) and coding simulations illustrate such affordances. AI-driven tutors likewise personalize critical-thinking practice by adaptive questioning. However, research cautions that technological benefits for 4Cs depend entirely on how it is used by teachers (Kim et al., 2022).

The COVID-19 lockdowns exposed this contingency. Emergency remote schooling revealed stark digital divides – devices and bandwidth were scarce in disadvantaged communities – and many Polish teachers, with limited ICT training, struggled to transpose collaborative projects online. Studies reported reduced engagement and fewer 4Cs activities, attributable to screen fatigue and social isolation (Plebańska et al., 2020). Nevertheless, inventive educators used breakout rooms for peer debate and maker apps for at-home prototyping (Squire, 2021); teachers with higher tech-efficacy sustained 4Cs practice despite constraints.

Post-pandemic agendas thus emphasise blended provision and "smart education" initiatives (Jeong, 2020; García-Tudela et al., 2021) and infrastructures (Wang et al., 2021). OECD systems now pilot AI laboratories and digital-skills frameworks, trends accelerated by COVID-19 (European Commission, 2020). Poland's rapid-response webinars seeded competence but long-term integration remains uneven. Research

consequently urges robust professional development: teachers require design heuristics, data-ethics guidance and scaffolded communities of practice to translate ICT and AI into 4Cs gains.

The volatility of a BANI world amplifies this imperative (Taguma et al., 2024). Adaptable, tech-savvy educators are essential for future disruptions provided that training is available. Teacher well-being and self-efficacy therefore constitute critical mediators (Kim & Asbury, 2020). Future shocks will demand educators who can pivot to new methods while still fostering critical thinking, creativity, communication, and collaboration.

Comparative Perspective: Poland and International Trends

Poland. The primary curriculum references autonomy, communication and creativity, yet concrete 4Cs progression and the national cross-curricular mandate remain absent. Implementation rests on local discretion and isolated initiatives such as mandatory coding. Reforms introduced active-method courses, but classroom practice often leans on traditional techniques – worksheets – especially during remote instruction (Plebańska et al., 2020). TALIS places Polish self-efficacy near the OECD mean, supported by optional CPD modules and occasional 4Cs criteria in internal evaluations.

Polish teachers often report that they enjoy creative teaching but cite a lack of time, training, or resources as barriers (Baran-Łucarz & Klimas, 2020). A key challenge is addressing rural-urban disparities in resources and training, despite strong PISA scores. Participation in Erasmus+ networks modestly boosts collaboration and collective efficacy, yet a coherent national strategy is still required.

Finland. Phenomenon-based learning and transversal competences sit at the core of the Finnish curriculum (Lucas, 2022). Teachers enjoy high autonomy and routinely engage in collaborative planning (e.g. team-teaching), which aligns with the high teacher self-efficacy and professional satisfaction. Teacher education emphasizes educational psychology and innovative pedagogy (Schaffar & Wolff, 2024). Finnish schools commonly integrate critical thinking and creativity across subjects, supported by assessments that value student self-reflection and metacognition. Continuous peer inquiry sustains an ecosystem where 4Cs flourish.

United States. State-level variability defines K-5 provision: Common Core embeds communication, while NGSS promotes inquiry. Numerous districts run PBL or STEM academies, and nationwide coding initiatives expand problem-solving opportunities. Teacher preparation, however, is uneven; high-stakes testing and resource disparities constrain inventive practice (Lucas, 2022). Districts investing in tech

coaching and collaborative planning show heightened efficacy (Reimers & Opertti, 2021), whereas underprivileged schools often default to traditional methods (Ingersoll & Tran, 2023). Pandemic-driven remote learning accelerated digital competence for some teachers, yet exposed persistent support gaps.

South Korea. Reforms stressing "creative convergence education" embed Creative Thinking and Communication in the 2015 curriculum (Jeong, 2020). Weekly Creative Experiential Learning (CEL) sessions promote self-directed projects, but exam culture tempers risk-taking (So et al., 2017). Large-scale workshops and guidebooks elevate efficacy (KERIS, 2021). Teachers report strong classroom-management efficacy, although implementing innovative techniques remains uneven amid time constraints and pressure to cover tested content.

Cross-model insights. Alternative environments – U.S. charter "design schools," democratic schools – link small classes, coaching and autonomy with robust 4Cs implementation and teacher morale. Collectively, the comparative evidence indicates that explicit curricular anchoring, systemic PD, and adequate resources consistently predict higher teacher self-efficacy and stronger 4Cs outcomes, whereas reliance on local initiative alone yields fragmented practice.

Results of the Comparative Analysis

Cross-system comparison exposes challenges and divergences. Every jurisdiction formally endorses the 4Cs, yet policy traction and pedagogical depth differ. Framework-rich systems – Finland and South Korea – provide teachers with descriptors, exemplar tasks and funded professional development, whereas Poland and many U.S. states depend on individual initiative and local interpretation. Empirical studies confirm that self-efficacy is highest where 4Cs training permeates both pre- and in-service programmes (Gülhan, 2024). TALIS evidence that cross-curricular PD elevates efficacy (OECD, 2025) accordingly implies that Polish academies should embed more competence-oriented modules.

The synthesis indicates several patterns:

1. Resource constraints. Polish teachers voice enthusiasm for creative methods but cite lack of time and materials; OECD surveys record lower preparedness scores than Finnish or Korean peers (Madalińska-Michalak, 2020).
2. Collaboration–efficacy nexus. Structured teaming and peer observation predict collective efficacy and richer 4Cs practice. EU networks enhance collaboration, yet coverage remains uneven.
3. Digital resilience gap. COVID-19 accelerated ICT uptake, but transition was varied: Finland and Korea leveraged prior investment, whereas Poland experi-

enced an early decline in student engagement, which impacted teacher confidence. As systems recover, digital readiness is an area of focus.

4. STEAM activator. Programmes coupling STEM projects with teacher training correlate positively with student competences and educator confidence (Gülhan, 2024). The reinforcing cycle between teacher self-efficacy and 4Cs integration leads to better student outcomes and further validating the approach.

Despite limited cross-country measures of teacher self-efficacy in teaching 4Cs, some indicators (e.g. PISA "learning environment" and TALIS "teacher innovation" items) suggest that Poland is mid-range internationally, with considerable room for growth through targeted reforms (OECD, 2019).

Conclusions and Recommendations

This review highlights 4Cs competences as increasingly central in primary education goals. Their effective implementation is strongly linked to teacher self-efficacy. This leads to several key conclusions and recommendations:

Embedding 4Cs in Policy. Systems with statutory 4Cs descriptors (Finland, South Korea) furnish schools with clear expectations, assessment criteria and textbook alignment. Poland's autonomy model, while flexible, risks under-prioritising these competences; curriculum documents should therefore articulate explicit cross-curricular 4Cs objectives and assessment rubrics. Such codification signals to publishers, exam designers and teacher-education faculties that 4Cs are integral.

Teacher Education and Professional Development. Empirical studies demonstrate that dedicated training in creativity and critical thinking elevates self-efficacy (Gülhan, 2024). Pre-service programmes should benchmark Finnish micro-teaching, collaborative lesson-study and U.S. 21st-century-skills modules. For in-service staff, ministries should fund iterative CPD around STEAM, inquiry and ICT, preferably organised as Professional Learning Communities. Policymakers should consider incentives for teachers to engage in such collaborative PD.

STEAM and Innovative Pedagogy. Authentic STEAM, integrating the arts into STEM inquiry, simultaneously advances student 4Cs and re-engages teachers. Authorities should pilot weekly interdisciplinary blocks, supply coaching for novice facilitators and disseminate curated lesson templates aligned with national goals.

ICT and AI Integration. Hardware alone is insufficient; targeted PD in collaborative platforms, creative software and data ethics is required. By 2030, baseline AI literacy will be indispensable (European Commission, 2024). Ministries should commission guidelines and modular training on adaptive tutoring systems, creative co-authoring tools and algorithmic bias, thus safeguarding teacher agency while exploiting AI's personalisation potential.

Resilience in a BANI world. The 4Cs constitute a curricular antidote to volatility, yet educators need parallel supports. Policymakers ought to integrate well-being services, peer counselling and flexible timetabling into reform packages. Scenario-based contingency planning – project-based learning that migrates online during crises, community collaboration protocols – should be embedded in school emergency procedures, ensuring the 4Cs remain "non-negotiable" under stress.

Cross-National Collaboration. Erasmus+ exchanges, participation in eTwinning projects and EU competence clusters accelerates policy diffusion and nurtures professional solidarity. Bilateral research projects – e.g. Polish-Finnish collaborations on creative problem-solving – can test and iterate implementation models.

In sum, fulfilling the promise of the 4Cs in primary education requires aligning curriculum, pedagogy, and teacher support. By strengthening teacher self-efficacy through targeted educational reforms and innovative professional practices, Poland and other systems can better equip both teachers and learners for the challenges of 2030 and beyond. Teachers who believe in their capacity to teach in new ways are the pillars of any 21st-century skills initiative. Supporting them with clear policies, training, technology, and trust will pay dividends in the form of more engaged students, more creative classrooms, and more resilient educational communities.

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The 4C Skills Among Early Childhood Education Teachers

Kompetencje 4K wśród nauczycieli edukacji wczesnoszkolnej

KEYWORDS

teaching competences, key competencies, 4C competences, elementary education, early childhood education teachers

ABSTRACT

The main objective of this article is to present pilot research on critical thinking, cooperation, creativity, and communication skills conducted among early childhood education teachers from the Opole Province. The theoretical and cognitive objective of the study was to diagnose the level of 4C competencies among early childhood education teachers from the Opole Province. The practical and implementation objective was to develop practical recommendations related to improving teachers' competencies in this area. The research issue was related to the question: what 4C competencies do the surveyed teachers declare in their self-assessment? The study used a diagnostic survey method and a questionnaire technique. An original survey questionnaire was used for the research. The research tool consisted of four different scales, which assessed the characteristics of the phenomenon under study on a five-point ordinal scale. The first scale concerned creativity, the second – critical thinking, the third – communication, and the fourth – cooperation. The results of the research showed how

the teachers assessed their own competencies. The conclusions of the research were an interpretation of the relationships between individual variables, which were calculated using the JASP statistical program. The data analysis showed how teachers from different age groups assessed their level of innovation, independence, and teaching proactivity, as well as their educational practices. In particular, statistically significant differences were noted among teachers aged 35-46 and those with the professional rank of appointed teacher. These groups rated their professional aptitudes higher than the others.

SŁOWA KLUCZE

kompetencje nauczycielskie, kompetencje kluczowe, kompetencje 4K, edukacja wczesnoszkolna, nauczyciele edukacji wczesnoszkolnej

ABSTRAKT

Głównym celem niniejszego artykułu jest przedstawienie pilotażowych badań dotyczących kompetencji krytycznego myślenia, kooperacji, kreatywności i komunikacji przeprowadzonych wśród nauczycieli edukacji wczesnoszkolnej z terenów województwa opolskiego. Celem teoretyczno-poznawczym podjętych badań była diagnoza poziomu kompetencji 4K wśród badanych nauczycieli edukacji wczesnoszkolnej. Celem praktyczno-wdrożeniowym było wypracowanie zaleceń praktycznych związanych z podnoszeniem przez nauczycieli kompetencji z tego zakresu. Problematyka badawcza była związana z pytaniem: Jakie kompetencje 4K deklarują badani nauczyciele w ramach samooceny? W badaniach zastosowano metodę sondażu diagnostycznego, technikę ankiety. Do badań wykorzystano autorski kwestionariusz ankiety. Narzędzie badawcze składało się z czterech różnych skal, których przedmiotem oceny były cechy badanego zjawiska na pięciostopniowej skali szacunkowej, porządkowej. Pierwsza skala dotyczyła kreatywności, druga – krytycznego myślenia, trzecia – komunikacji, a czwarta kooperacji. Wyniki badań przedstawiały, jak swoje kompetencje oceniają badani nauczyciele. Wnioski badań stanowiły interpretację zależności pomiędzy poszczególnymi zmiennymi, które były obliczone za pomocą programu statystycznego JASP. Analiza danych wykazała, jak nauczyciele z poszczególnych grup wiekowych oceniają poziom swojej innowacyjności, samodzielności i prokreatywności dydaktycznej, a także swoje praktyki edukacyjne. W szczególności zauważono różnice istotne statystycznie wśród nauczycieli w wieku 35–46 lat oraz ze stopniem zawodowym nauczyciela mianowanego. Grupy te oceniały swoje predyspozycje zawodowe wyżej od pozostałych.

Introduction

"21st century competencies" and key "soft skills" known as "4C" (creativity, critical thinking, communication, and cooperation) are the subject of particular interest to many researchers. According to Stefan T. Kwiatkowski (2017), teachers should be characterized by three essential categories of 21st-century skills:

- those related to learning and innovation (including critical thinking, communication skills and cooperation, creativity);
- related to the circulation and sources of information, the use of media and modern technology products;
- related to broadly understood everyday functioning and professional career (e.g., adaptability, initiative, productivity, leadership, and social skills).

Everyone needs a solid grasp of 21st-century skills to function effectively in today's world. Many organizations have formulated their own definitions of these skills, but the same key elements appear in all of them. At a minimum, critical thinking and problem solving, ingenuity and creativity, teamwork, and communication are widely recognized as fundamental competencies for the 21st century. Mastering these areas is essential for students to meet the challenges of today (Budiyanto et al., 2024). The 4C competencies have become the foundation of modern education. These skills support students in solving complex problems and enable them to achieve success in various areas of life (Burieva, 2025).

Teachers play a key role in equipping students with the necessary knowledge, skills, and competencies that will enable them to shape their own future and prepare them to face the changes that are expected in tomorrow's society – and thus directly affect the students themselves. Above all, students should be introduced to ways of thinking such as creativity, critical thinking, problem solving, decision making, and lifelong learning (Auzina, 2018).

One of the key issues for understanding the 4C competences and their implementation in educational practice, which is directly related to the issues mentioned above, is their multidimensionality, interconnections, and transdisciplinary usefulness. It is precisely these characteristics that can, on the one hand, facilitate the process of teaching them and, on the other hand, pose a serious challenge in terms of their reliable assessment (Thornhill-Miller et al., 2023).

21st-century competencies refer in particular to innovative and learning-related skills, which consist of (Trilling & Fadel, 2009):

- **Creative skills** manifest themselves in the ability to think imaginatively, a high level of cognitive curiosity, a willingness to explore and take on new challenges, a love of challenging situations, and the ability to function in and understand ambiguity.

- **Critical thinking skills** are manifested in an individual's ability to make decisions, formulate responses and comments in a thoughtful manner, willingness to correct one's own mistakes, ability to systematically analyze phenomena, courage to speak the truth despite difficulties, meticulousness, honesty, sincerity, fair conduct, and avoidance of actions that harm others.
- **Communication skills** include the ability to listen actively and understand, ask questions aimed at solving problems, and set goals to achieve mutually beneficial solutions.
- **Cooperation skills** indicate responsibility for one's own actions, the ability to work productively, flexibility and the ability to compromise, effective task or project management, and mutual respect for others.

In turn, J. Lamri (2021) defines individual competencies as follows:

- **Creativity** is a process whose goal is either to transform what already exists in an original way or to create something new.
- **Critical thinking** is a set of mental processes, strategies, and ideas used by people to solve problems, make decisions, and learn new concepts.
- **Communication** is the ability of a sender to send messages to a recipient in a given context in a way that is accurate and friendly, as well as the ability of the recipient to receive messages from the sender in a given context in a way that is accurate and friendly.
- **Cooperation** is *a positive interdependence* that seems to combine communication skills with conflict and problem solving, decision making, and negotiation.

In particular, educational institutions have the task of teaching students problem-solving, teamwork, and communication skills, as this promotes creativity and progress in the learning process (Stanikzai, 2023). In addition, as emphasized by S.K. Nazaruk and J. Marchel (2019), the issue of teacher education and their practical professional competences is linked to the constant need for pedagogical research, one of the objectives of which is to learn about their self-assessment of competences.

Research Methods and Tools

The main objective of this article is to present pilot research on critical thinking, cooperation, creativity, and communication competencies conducted among early childhood education teachers from model training schools operating in the Opole Province.

The theoretical and cognitive objective of the study was to diagnose the level of 4C competencies among early childhood education teachers from the Opole Province.

The practical and implementation objective was to develop practical recommendations for teachers to improve their competences in this area.

The research project posed the following questions:

1. What level of creativity competence do the teachers surveyed declare in their self-assessment?
2. What level of critical thinking competence do the teachers surveyed declare in their self-assessment?
3. What level of communication competence do the teachers surveyed declare in their self-assessment?
4. What level of competence in cooperation do the teachers surveyed declare in their self-assessment?
5. Are there statistically significant correlations between the level of self-assessment of individual competences and other research variables?

The study used a proprietary questionnaire. The research tool consisted of four different scales, which assessed the characteristics of the phenomenon under study on a five-point ordinal scale (1 – definitely not, 2 – rather no, 3 – neither yes nor no, 4 – rather yes, 5 – definitely yes) (Nowak, 1965, Pilch, 1998, Łobocki, 2011). The first scale concerned creativity, the second – critical thinking, the third – communication, and the fourth – cooperation.

The first stage of preparing the tool was a thorough analysis of the literature on issues related to 4C competencies, with particular emphasis on the use of these competencies by teachers.

The second stage of the research consisted of evaluating the research tool by six competent judges. They were academic and teaching staff (2), methodologists from teacher training institutions (2), and early childhood education teachers (2). All these people had knowledge and experience related to early childhood education and strengthening teachers' competences. Thanks to the opinions gathered, two items contained in the tool were discarded, seven were modified and three were added. The final version of the questionnaire consisted of 45 items (12 related to creativity, 13 related to critical thinking, 10 related to communication, and 10 related to cooperation).

Then, after conducting a pilot study, Cronbach's alpha reliability coefficient was calculated, which was 0.90. The data was analyzed using the JASP statistical software, which uses statistical methods related to testing the statistical significance of differences between variables.

It should be emphasized that these research also have their limitations. Respondents may assess themselves subjectively (they may overestimate or underestimate their competencies). This may be influenced by self-assessment, self-confidence, mood, or the desire to present oneself in a better light. The results may differ from the actual level of competence (which could be verified by practical tests or external assessment).

The study involved 296 teachers (290 women and 6 men), which is consistent with the specific nature of the profession, which is highly feminized. Teachers aged up to 25 accounted for 10.8% of the respondents, those aged 26–35 accounted for 39.9%, those aged 26–45 accounted for 35.1%, those aged 46–55 accounted for 12.9%, and those aged over 56 accounted for 1.3% of the respondents. These were mainly teachers with little professional experience: up to 5 years – 62.2%, 6 to 15 years – 22.3%, 16-25 years – 10.1%, and over 25 years – 5.4%.

Most of the respondents were teachers with the professional rank of beginner – 55.0%. The rank of appointed teacher was held by 23.5%, and certified teacher – 21.5%. More than half of the respondents worked in primary schools in the city – 53.4%. 10.8% of the respondents worked in urban-rural municipalities, and 35.8% of teachers worked in rural institutions.

Analysis of Results

In terms of creativity, the survey results showed that the vast majority of teaching staff encourage children to come up with new ways of solving a given task: 31.1% answered rather yes and 59.5% answered definitely yes. The vast majority encourage their pupils to come up with their own original ways of solving a given task (41.2% of statements were rather yes and 45.9% were definitely yes).

A total of 264 people (89.2%) expressed a positive opinion on the use of innovative solutions in their professional work. It can therefore be concluded that the vast majority of teachers surveyed declare a pro-innovation professional attitude.

Most of the respondents declared a preference for non-standard ways of solving tasks (53.4% indicated rather yes and 20.3% definitely yes). This indicates that more than three-quarters of the respondents are open to a creative, non-stereotypical approach to the performance of professional tasks.

In addition, a total of 256 people (86.5%: 45.9% answered rather yes and 40.5% definitely yes) expressed a willingness to implement their own ideas in their work with children. This result indicates a high innovative and creative potential among the teachers surveyed.

However, it should also be noted that 85.8% of teachers (47.3% answered rather yes and 38.5% definitely yes) showed attachment to the use of methods that have already been tested and developed in practice. This result indicates that teachers have great confidence in teaching methods that have proven effective in working with children. In addition, 64.1% of respondents (48.6% – rather yes and 15.5% – definitely yes) indicated a positive attitude towards the use of original teaching methods. This indicates a significant, though not dominant, level of individualization of the teaching

approach in the work of teachers. A total of 63.5% of teachers (44.6% – rather yes and 18.9% – definitely yes) confirm the use of teaching methods based on previous, proven experience. This result, as in previous analyses, suggests a clear confidence of the surveyed teachers in already known and effective pedagogical solutions. In addition, less than half of the respondents indicated that their sense of security in teaching is based on the use of proven methods – 43.2%.

The majority of teachers, 66.9% (37.8% – rather yes and 29.1% – definitely yes), expressed confidence in expressing their own opinions in their contacts with other teachers. Fewer, 57.4% of respondents, said that they feel comfortable in their interactions with the headteacher and are able to express their opinions. The situation is different in contacts with parents, where almost three-quarters of respondents (49.3% – rather yes and 24.3% – definitely yes) stated that they are not afraid to express their opinions when talking to parents.

Nearly half of the respondents (47.3%) felt that they were not irritated by criticism from other people. In addition, a total of 91.2% (answers rather yes and definitely yes) of teachers stated that they encourage students to express their opinions in their classes. However, only 62.8% of respondents (27.7% rather yes and 35.1% definitely yes) declared that they are not afraid of criticism from students.

More than two-thirds of teachers declared that they use teaching methods that they consider most effective in their work – 68.2%. The vast majority, as many as 82.4% of respondents (46.6% – definitely yes and 35.8% – rather yes) said that they like to discuss different solutions to problems.

However, only slightly more than one-third of respondents (37.1%) believed that teachers should be periodically evaluated by their superiors. Despite these statements, the majority of teachers (89.9%) declared that when their superiors point out mistakes they have made while teaching, they accept this as practical guidance and try to correct their teaching methods (90.5%).

The vast majority of teaching staff (41.9% – rather yes and 42.6% – definitely yes) declared that they try to assess different situations based on facts, not information heard from others, and 72.3% indicated that there is no single, objective truth.

When it comes to communication, the vast majority of respondents (44.6% – rather yes and 48.6% – definitely yes) declared that they are able to understand the feelings and emotions of others. Significantly fewer people (43.2% – rather yes and 22.3% – definitely yes), and over a quarter (25.7%) had difficulty giving a clear answer to the statement "I find it easy to express my needs."

A very large number of respondents (40.5% – rather yes and 46.6% – definitely yes) stated that they are open to new ideas and concepts. Respondents rated similarly the issue of ease in establishing contact with other people (43.2% – rather yes and 39.2% – definitely yes) and the statement that they are able to communicate

instructions to children in a precise manner (45.3% – rather yes and 38.5% – definitely yes).

The situation was similar with the statement "I try to present arguments in my statements." The "definitely yes" responses accounted for 31.8%, and the "rather yes" responses accounted for 51.4%.

Fewer people said that they willingly engage in discussions with others (45.3% – rather yes and 31.8% – definitely yes), and almost one-fifth of respondents (18.9%) said that they found it difficult to answer this question.

The answers to the statement "I can talk clearly about problems that bother me" were completely different. In this case, as many as 35.1% of respondents were unable to answer this question unequivocally. Only 14.2% of teachers answered definitely yes and 38.5% answered rather yes.

Similarly, when asked "I like heated discussions conducted in a constructive manner," as many as 27.0% of teachers answered difficult to say and 12.8% rather no. The answers rather yes and definitely yes were 33.8% and 23.0%, respectively. Even more teachers had less decisive answers to the statement "I believe that in every difficult case, one should express one's opinion, even though it may hurt other people" (10.1% – rather not and 42.6% – difficult to say). Only 32.4% of respondents declared "rather yes" and 10.1% – definitely yes.

The last area analyzed was cooperation. More than half of the teachers (55.4%) responded rather yes to the statement in teamwork, "I achieve goals that are accepted by everyone," and 19.6% responded definitely yes. However, 20.9% of respondents did not give a clear answer in this case. It is satisfactory that the vast majority declared that they are able to work in a group (35.8% answered rather yes and 59.5% answered definitely yes). A similar number of respondents also believed that they take other people's views into account (35.1% answered rather yes and 58.8% answered definitely yes). The vast majority also stated that they are sensitive to other people's problems (27.7% answered rather yes and 66.9% answered definitely yes). Similar responses were given regarding the tendency to compromise when making group decisions. Half of the respondents answered definitely, and 40.5% answered rather yes. Even more teachers (25.0% answered rather yes and 70.9% answered definitely yes) declared that they would willingly help people who asked them for help.

Only 10.1% of respondents declared that their goals were more important than those of others, but 44.6% answered difficult to say. The answers were definitely not 14.2%, and rather not 28.4%.

A large number of teaching staff responded that they are able to listen actively to others (46.6% – rather yes and 41.2% – definitely yes). An equally large number of respondents said that it is worthwhile to negotiate in order to reach an agreement (35.8% – rather yes and 54.1% – definitely yes).

When it comes to performing tasks assigned by the headteacher, 14.9% (rather yes) and 4.1% (definitely yes) of respondents prefer to do so independently rather than as part of a team, while as many as 40.5% of respondents were unable to give a clear answer to this question. 27.0% (high degree) and 13.5% (very high degree) of respondents prefer to work in a team.

Results of Scientific Analysis

This section of the article will only show statistically significant correlations.

Data analysis showed that teachers aged 36–45 are more likely than others to deviate from patterns and encourage students to come up with new ways of solving a given task ($x^2 = 56.587$, $df = 16$, $p < 0.001$, $V(c) = 0.219$), encourage children to come up with their own original ways of solving a given task ($x^{(2)} = 65.409$, $df = 16$, $p < 0.001$, $V(c) = 0.235$), and to use innovative solutions ($x^2 = 45.814$, $df = 12$, $p < 0.001$, $Vc = 0.227$). The same age group more often than others stated that in their work they try to use their own new ideas to work with children ($x^2 = 86.215$, $df = 12$, $p < 0.001$, $V(c) = 0.312$) and use teaching methods they consider most effective ($x^{(2)} = 77.677$, $df = 12$, $p < 0.001$, $V(c) = 0.296$).

Table 1. Use of Own New Ideas at Work and Age

In my work, I am always looking for new ideas for conducting classes with children.		Age				
		Up to 25	26	36	46	56 and older
rather not	Number	4,000	0	0	0	0
	% in column	12.500	0.00	0	0.000	0.000
	% of total	1.351	0.000	0.000	0.000	0.000
difficult to say	Quantity	4,000	10,000	2,000	0	2
	% in column	12.500	8.475	1.923	0.000	50.000
	% of total	1.351	3.378	0.676	0.000	0.676
rather yes	Frequency	2,000	32,000	40,000	12,000	2,000
	% in column	6.250	27.119	38.462	31.579	50.000
	% of total	0.676	10.811	13.514	4.054	0.676

In my work, I am always looking for new ideas for conducting classes with children.		Age				
		Up to 25	26	36	46	56 and older
definitely yes	Number	22,000	76,000	62,000	26,000	0
	% in column	68.750	64.407	59.615	68.421	0.000
	% of total	7.432	25.676	20.946	8.784	0.000

$x^2 = 86.215$, $df = 12$, $p < 0.001$, $Vc = 0.312$. Source: own research.

On the other hand, teachers aged 46–56 were more likely than other age groups to declare that they were constantly looking for new ideas for teaching children ($x^2 = 66.802$, $df = 12$, $p < 0.001$, $Vc = 0.274$).

In turn, teachers with the highest professional promotion indicated more often than others that they base their work on teaching methods they have developed themselves ($x^2 = 29.803$, $df = 8$, $p < 0.001$, $Vc = 0.224$).

The results of the study also showed that certified teachers were more likely than others to indicate that they were not afraid to express their opinions during conversations with the principal ($x^2 = 35.348$, $df = 8$, $p < 0.001$, $Vc = 0.244$). In addition, certified teachers demonstrated greater self-confidence and interpersonal skills related to expressing their opinions during conversations with parents ($x^{(2)} = 45.496$, $df = 8$, $p < 0.001$, $V(c) = 0.277$).

Table 2. Expressing One's Opinion During a Conversation With the Principal and the Degree of Professional Advancement

I am not afraid to express my opinion during conversations with the principal.		Level of professional advancement			
		beginner	appointed	certified	Overall
definitely not	Number	10,000	2,000	0	12,000
	% in column	4.505	5.000	0.000	4.054
rather not	Quantities	30,000	6,000	2,000	38,000
	% in column	13.514	15.000	5.882	12.838
difficult to say	Number	72,000	0	4,000	76,000
	% in column	32.432	0.00	11.765	25.676

I am not afraid to express my opinion during conversations with the principal.		Level of professional advancement			
		beginner	appointed	certified	Overall
rather yes	Number	64,000	22,000	12,000	98,000
	% in column	28.829	55.000	35.294	33.108
definitely yes	Number	46,000	10,000	16,000	72,000
	% in column	20.721	25.000	47.059	24.324

$x^2 = 35.348$, $df = 8$, $p < 0.001$, $Vc = 0.244$, Source: own research.

As S. Graham-Clay (2024) points out, teachers are increasingly aware that communication between home and school is fundamental to parental involvement and student success, which is a welcome development.

The place of work also statistically differentiated the respondents' answers. It turned out that teachers from rural schools are more convinced that they are not afraid to talk to parents ($x^2 = 41.092$, $df = 8$, $p < 0.001$, $Vc = 0.263$). The same research group also declared that they are not afraid of criticism from students ($x^{(2)} = 29.766$, $df = 8$, $p < 0.001$, $V(c) = 0.224$).

Research by M. Trzcińska-Król and B. Pilipczuk (2015) showed that teachers from rural areas, compared to teachers from urban areas, rate the legitimacy of using such forms of communication as text messages, internet portals, discussion forums, chats, instant messengers, school newspapers, and pedagogical consultations in parent-teacher relations higher, which may also be important in relations with parents.

Place of residence also differentiated responses related to the willingness of teachers to perform tasks assigned by the headteacher independently. It turns out that teachers working in rural schools more often than others declared that they prefer to work alone ($x^2 = 29.443$, $df = 8$, $p < 0.001$, $Vc = 0.223$).

When it comes to communication, it turns out that teachers who completed a single-cycle master's degree (i.e., teachers with relatively little experience) expressed the highest level of ease in expressing their own needs compared to teachers who completed a two-cycle degree ($x^2 = 49.920$, $df = 6$, $p<0.001$, $Vc = 0.290$).

The data analysis also showed that teachers aged 36 to 45 are more open to new concepts and ideas than others ($x^2 = 53.389$, $df = 12$, $p < 0.001$, $Vc = 0.245$), and also claim that they can easily establish contact with other people ($x^2 = 53.398$, $df = 12$, $p < 0.001$, $V(c) = 0.245$) and are able to communicate instructions to children precisely ($x^2 = 31.013$, $df = 8$, $p < 0.001$, $Vc = 0.229$).

Table 3. Openness to New Concepts and Ideas and the Age of the Respondents

I am open to new concepts and ideas		Age					
		1	**2**	**3**	**4**	**5**	**All**
2	Quantity	0	4.000	0	2.000	0	6.000
	% in column	0.000	3.390	0.000	5.263	0.000	2.027
3	Number	10.000	4.000	6.000	10.000	2.000	32.000
	% in column	31.250	3.390	5.769	26.316	50.000	10.811
4	Quantities	6.000	56.000	40.000	16.000	2.000	120.000
	% in column	18.750	47.458	38.462	42.105	50.000	40.541
5	Quantities	16.000	54.000	58.000	10.000	0	138.000
	% in column	50.000	45.763	55.769	26.316	0.000	46.622

$x^2 = 53.389$, $df = 12$, $p < 0.001$, $Vc = 0.245$. Source: own research.

As shown in the OECD report prepared by V. Suarez and J. McGrath (2022), the teacher professional development model refers to the following effects of professional identity: teachers' participation in continuing professional development, their teaching practices, and teachers' commitment to their profession and decision to remain in it, which may be related to this age group.

In turn, respondents aged 46–55 were more likely than others to declare that they were willing to engage in discussion with other people ($x^2 = 69.382$, $df = 16$, $p < 0.001$, $Vc = 0.242$). This also applied to teachers with the longest seniority ($x^2 = 59.409$, $df = 12$, $p < 0.001$, $Vc = 0.259$), which is understandable.

In the area of cooperation, teachers aged 36-45 were more likely than others to declare that it is worthwhile to negotiate in order to reach an agreement ($x^2 = 60.655$, $df = 12$, $p < 0.001$, $Vc = 0.261$). In addition, they also stated more often that they were willing to help people who asked them for help ($x^{(2)} = 80.222$, $df = 12$, $p < 0.001$, $V(c) = 0.301$). Furthermore, teachers with a higher professional grade were more likely to say that they are able to listen actively to others ($x^{(2)} = 36.016$, $df = 8$, $p < 0.001$, $V(c) = 0.247$).

These skills are particularly important for teachers around the world, as emphasized by the authors of the TALIS study (OECD, 2025).

Conclusions and Recommendations

Research by J. Gralewski (2016) showed that teachers want to be creative and innovative, but social and educational pressure makes this difficult for them. Therefore, acting in good faith, teachers use proven and effective teaching methods which, in their opinion, ensure that students achieve high grades.

The data analysis showed that teachers in the 36–45 age group are characterized by the highest level of innovation, independence, and teaching proactivity in their self-assessment. Perhaps this manifests itself in a conscious departure from established patterns, the promotion of original thinking among students, and the use of original educational solutions. This may be related to their professional development and the attainment of higher professional qualifications.

Teachers aged 36–45, who are usually at the peak of their professional careers, already have significant practical experience, and at the same time remain open to professional development and changes in education, are more likely than other age groups to declare openness to new concepts and ideas.

In addition, this same group indicated more often than others that it is worthwhile to engage in negotiations to reach an agreement, which can be seen as a sign of high social and professional maturity among teachers of this age. Educational practice at this stage of life and professional career is often associated with a more developed awareness of interpersonal relationships, the need for joint action, and a greater understanding of the role of cooperation in the school environment.

Teachers with a higher professional promotion grade than others declare that they are able to listen actively to others, which may indicate that teachers at this stage of their career develop interpersonal and social competences, perhaps as a result of greater professional experience, participation in training or more frequent participation in task forces, where active listening is a key skill supporting effective cooperation.

Further conclusions relate to the fact that the experience and professional development of certified teachers translate into greater self-confidence in interpersonal contacts, both in vertical (with superiors) and horizontal (with parents) relationships. Such attitudes may result from longer service, participation in interpersonal training, the development of soft skills, as well as a natural increase in professional autonomy with each successive career level.

The results of the study suggest that teachers working in rural areas may be more accepting of criticism from their students and feel more at ease when talking to parents, which may be due to the more integrated nature of local communities and more frequent and less formal contacts with parents and students. This may also be related to the fact that some teachers previously taught parents and now teach their children, which is common in some rural schools. In addition, teachers working in rural schools

are more likely than their colleagues in cities and urban-rural municipalities to carry out tasks assigned by their superiors independently. This may be related to the nature of the work environment – in smaller schools, teachers often have to act more autonomously due to limited staff and greater organizational flexibility. In addition, this attitude may reflect a stronger sense of individual responsibility and a habit of solving problems independently, which is common in environments with lower levels of institutional support.

The younger generation of teachers – raised and educated in an environment with a greater emphasis on soft skills, who have completed a uniform master's degree program – demonstrate open communication and an individualized approach to work, and are more likely to articulate their own needs in the professional environment.

The results also indicate that people with longer seniority and those in middle age (45–56 years) may feel more confident in the professional environment, which makes it easier for them to speak up in situations requiring an exchange of opinions. On the one hand, this may result from developed self-confidence, knowledge of procedures, and interpersonal experience; on the other hand, it may result from an established position in the institutional structure.

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The Role of Mindfulness, Silence, and Reflection in Developing 4Cs Competencies in Early Childhood Education

Rola uważności, ciszy i refleksji w rozwijaniu kompetencji 4C w edukacji małego dziecka

KEYWORDS

mindfulness, 4Cs, early childhood education, contemplative pedagogy, creativity

ABSTRACT

The aim of this article is to present the educational potential of contemplative practices – mindfulness, silence, and reflection – in supporting the development of 21st-century competencies, commonly referred to as the 4Cs: creativity, critical thinking, communication, and collaboration. The starting point is the assumption that fostering these competencies in preschool and early primary education requires tools that enhance not only cognitive but also emotional and social dimensions of child development. Drawing on an analysis of the relevant literature, the article discusses both the theoretical foundations of the 4Cs framework and the significance of mindfulness, silence, and reflection within educational contexts. Research findings indicate that regular engagement in contemplative practices promotes cognitive flexibility, strengthens emotional awareness, and enhances communication and collaboration skills in children. The article emphasizes the importance of creating educational spaces in which structured moments of silence, mindful presence, and reflective dialogue become an integral part of daily pedagogical routines. It concludes that the integration of contemplative strategies in early childhood education offers meaningful support for the holistic development of 4C competencies and contributes to the creation of more empathetic and conscious learning environments.

SŁOWA KLUCZE
uważność, 4C, edukacja wczesnoszkolna, pedagogika kontemplacyjna, kreatywność

ABSTRAKT

Celem niniejszego artykułu jest zaprezentowanie edukacyjnego potencjału praktyk kontemplacyjnych – uważności, ciszy i refleksji – we wspieraniu rozwoju kompetencji XXI wieku, powszechnie określanych jako 4C: kreatywność, krytyczne myślenie, komunikacja i współpraca. Punktem wyjścia jest założenie, że rozwijanie tych kompetencji w edukacji przedszkolnej i wczesnoszkolnej wymaga narzędzi wspierających nie tylko poznawcze, lecz także emocjonalne i społeczne aspekty rozwoju dziecka. Na podstawie analizy literatury przedmiotu omówiono zarówno teoretyczne podstawy modelu 4C, jak i znaczenie pedagogiki ciszy, uważności i refleksyjności w procesie nauczania. Wyniki badań wskazują, że regularne angażowanie się w praktyki kontemplacyjne sprzyja elastyczności poznawczej, podnosi świadomość emocjonalną oraz rozwija umiejętności komunikacyjne i współpracy w grupie. W artykule podkreślono także znaczenie tworzenia przestrzeni edukacyjnej, w której momenty ciszy, uważnej obecności i refleksyjnego dialogu stają się elementem codziennej praktyki pedagogicznej. Artykuł kończy się wnioskiem, że integracja praktyk kontemplacyjnych w edukacji wczesnej stanowi ważne wsparcie dla holistycznego kształtowania kompetencji 4C oraz może przyczynić się do budowania bardziej świadomego i empatycznego środowiska uczenia się.

Introduction

Contemporary socio-technological transformations, driven by the rapid advancement of science, digital technologies, and artificial intelligence, have profoundly reshaped the ways individuals live, work, and acquire knowledge. These developments, often described within the framework of the Fourth Industrial Revolution (Industry 4.0), signal a new phase in civilizational progress marked by automation, algorithmization, and the increasing interdependence of technological and human systems. In this context, education systems are confronted with the growing challenge of preparing learners to function effectively in complex, rapidly changing environments (Supena et al., 2021).

Aligned with the principles of 21st-century education, particular emphasis is now placed on developing four interrelated competencies – critical thinking, creativity, communication, and collaboration – collectively known as the 4Cs. These have been recognized by the Partnership for 21st Century Skills as essential for full participation in global, knowledge-based societies.

Scholarly discourse increasingly emphasizes that the development of the 4Cs is indispensable for fostering cognitive flexibility, lifelong learning, and cooperative

engagement in educational and professional contexts (Supena et al., 2021). Importantly, these competencies should be cultivated from the earliest stages of education. Therefore, preschool and early primary education must move beyond traditional knowledge transmission to support children in acquiring foundational competencies needed to navigate the demands of contemporary society.

Despite this, educational practice frequently prioritizes external stimulation and activity-based learning, often overlooking the formative potential of contemplative elements such as silence, mindfulness, and reflection. These seemingly understated strategies may, in fact, provide fertile ground for deep learning, self-awareness, and interpersonal connection – thus meaningfully supporting the development of the 4Cs. This article seeks to examine the extent to which practices of mindfulness, silence, and reflection may contribute to the development of 4C competencies, and to elucidate the underlying mechanisms through which this influence occurs. This article aims to offer a pedagogical argument for the integration of contemplative practices – namely mindfulness, silence, and reflection – into early childhood education as tools for fostering the 4C competencies. Drawing on theoretical perspectives from pedagogy and neuroscience, the author highlights the relevance of contemplative education in an age increasingly defined by sensory overload, haste, and fragmentation.

The method applied in this study is a critical review of scholarly literature. Selected theoretical and empirical works concerning the role of silence, mindfulness, and reflection in the education of preschool and early primary school children were analyzed. Particular attention was devoted to Polish- and English-language literature available in databases such as Google Scholar and ERIC, with a focus on reflective pedagogy, contemplative education, and neurobiological foundations of the development of 21st-century skills, specifically the 4Cs (creativity, critical thinking, communication, and collaboration).

It is important to note that this review does not constitute a systematic literature review in the strict methodological sense. Due to the relatively broad thematic scope and the interdisciplinary nature of the subject matter, the present study adopts the form of a narrative scoping review, aiming to outline the potential links between practices of silence, mindfulness, and reflection, and the development of key 21st-century competencies in early childhood. This approach enables the identification of major interpretative and research directions that may be explored further in future theoretical or empirical inquiries.

This article does not attempt to conduct a meta-analysis of available empirical data. Rather, it seeks to conceptually explore the educational potential of contemplative practices – specifically silence, mindfulness, and reflection – as tools supporting the acquisition of key competencies in early childhood education (teoretical and empirical studies involving preschool-aged children (3–6 years), earlyschool-aged were

included in the literature review. Findings from studies with older children or adults are cited solely to provide theoretical context).

Accordingly, this paper is positioned as a theoretical proposition intended to stimulate further investigation and to provide a conceptual framework for future empirical research in this field.

Thinking, Creating, Communicating, Collaborating – the Theory of 4C Competencies in Early Childhood Education

In pedagogical literature, increasing importance is attributed to so-called 21st-century skills, among which four are considered fundamental: creativity, critical thinking, communication, and collaboration – collectively referred to as the "4Cs" (Saavedra & Opfer, 2012). The development of these competencies at the preschool stage is regarded as strategic for students' later educational and social success (Fullan, 2013). The cultivation of the 4Cs should not be confined to subject teaching but integrated into everyday pedagogical practice, also addressing the emotional, social, and cognitive development of the child.

Education in the 21st century demands from learners higher-order thinking skills, including critical and creative thinking. These competencies form the foundation for confronting complex problems, rapid technological progress, and social dynamics requiring reflective thinking and innovative solutions (Trilling & Fadel, 2009).

Critical thinking, as emphasized by Lang (2000), is a fundamental skill in problem-solving because it enables students to identify the root causes of difficulties and find appropriate, relevant solutions. Critical thinking is a goal-directed mental process involving problem identification, analysis, and decision-making. A lack of critical thinking skills often results in low perspective awareness in understanding events.

Critical thinking is not limited to a single discipline; it can and should be fostered across various fields of knowledge. Teachers play a key role in designing educational situations that activate this competence (Fullan, 2013; Supena et al., 2021).

Critical thinking in early childhood education manifests itself in, among other things, the ability to ask questions, recognize cause-and-effect relationships, and analyze diverse perspectives (Facione, 2010). Children learn to distinguish facts from opinions and recognize the intentions of others, which is a prelude to advanced cognitive reflection.

Another important competency is creative thinking, understood as the ability to generate innovative and original solutions beyond conventional rules. It allows students to view problems from multiple perspectives and become more open to

problem-solving (Brata et al., 2023). Facione (2010) highlights that creative thinking produces new ideas and action patterns both personally and culturally. Students who demonstrate creativity eagerly engage in intellectual challenges, share ideas, and are receptive to feedback (Brata et al., 2023).

Creative thinking engages divergent abilities (e.g., sensitivity to problems, fluency, flexibility, originality, and elaboration) as well as evaluative skills, such as recognizing gaps and inconsistencies, with a focus on redefining problem situations (Schmidt, 2017, p. 52).

Creativity in young children develops primarily through free play, exploration, and exposure to art and narrative. Symbolic play and creative experimentation foster cognitive flexibility, understood as the ability to generate multiple solutions to a single problem and transfer knowledge to new contexts (Craft, 2005). Research indicates that children who develop creative expression early are more open to innovative solutions in the subsequent educational process (Gabora & Unrau, 2018).

Equally important is communication competence, encompassing not only the ability to convey information orally and in writing but also listening skills, expressing oneself, and writing (Darmuki et al., 2017). Communication is foundational for contemporary educational and social interactions and is key to personal and professional success.

Communication competence involves multiple components, including:

- linguistic knowledge and skills (ensuring understanding and grammatical accuracy),
- the ability to adjust speech based on social perception,
- cognitive skills,
- intentional realization of speech acts,
- social skills related to defining speaking situations,
- interactional abilities reflected in knowledge and application of linguistic and extralinguistic rules,
- and cultural skills connected to participating in group rituals according to norms and values (Smółka, 2004, pp. 15–16).

Building communication competence aims to enhance students' ability to convey ideas precisely, effectively, and systematically. This skill includes subskills such as linguistic ability, contextual understanding, and audience awareness to ensure accurate message transmission (Brata et al., 2023). It is important to remember that the first six years of a child's life constitute the critical period for communication skill development; deficiencies during this time are difficult to remediate later.

Developing communication skills in early childhood encompasses both the refinement of language skills and the development of social and emotional competencies. In this context, educational practices that encourage co-creation of narratives,

collaborative problem-solving, and the presentation of individual ideas are particularly important (Wieczór, 2021).

Collaboration refers to the ability to work effectively and ethically within a team, respecting diversity and making joint decisions to achieve common goals. It includes elements of leadership, decision-making, and group cooperation (Darmuki et al., 2017). Collaboration not only prepares young learners for effective social functioning but also positively impacts their personal development, interpersonal skills, and increases their chances for academic and career success (Musiał, 2024, p. 75).

Collaboration is a key element of group learning. As early as preschool, children experience situations requiring negotiation, sharing resources, and establishing rules together through games and play. They also learn the consequences of violating these norms. Such experiences foster empathy, conflict management skills, and responsibility for shared goals (Lawson et al., 2019). Collaboration develops social skills and also strengthens intrinsic motivation, as children learn that working together leads to more rewarding outcomes (Miśkowiec, 2012).

As one of the key 21st-century competencies, collaboration – alongside communication, critical thinking, and creativity – plays a vital role in shaping student attitudes for life and work in a complex, dynamic world. Collaboration extends beyond mere task completion to include abilities in team decision-making, conflict resolution, shared responsibility, and perspective-taking (Trilling & Fadel, 2009).

It's worth noting that socio-emotional and cognitive skills, such as self-regulation, concentration, and empathy, are the foundation for building the 4C competencies.

Self-regulation, in particular, supports critical thinking and collaboration – children who can control impulses and regulate emotions better analyze problematic situations, while also being able to act appropriately in a group (Diamond & Lee, 2011).

Concentration is linked to communication and creativity. The ability to maintain attention promotes active listening and precise expression, while also enabling the creation of new solutions and ideas.

Empathy strengthens collaboration and communication, as the ability to recognize others' emotions and respond appropriately builds a foundation for understanding, trust, and cooperation. The development of empathy is a key element of education focused on supporting social and moral competencies (Zelazo & Lyons, 2012; Ritchhart et al., 2011).

In summary, early childhood is a "developmental window" for developing the 4C competencies. Supporting children through appropriately designed educational strategies – including both cognitive stimulation and practices that promote emotion regulation – builds the foundation for future educational and social achievements (Craft, 2005).

Mindfulness, Silence and Reflection – the Pillars of the Contemplative Approach in Education Supporting the Development of 4C Competences

In the process of teaching and upbringing, tools are increasingly being used that were recently marginalized or treated as "alternative". Among these practices are mindfulness, silence, and reflection, which collectively hold significant potential for supporting children's psychosocial and cognitive development. Their common denominator is the creation of a space conducive to profound engagement with oneself, others, and one's own experience, thereby directly fostering key competencies such as self-regulation, empathy, and metacognition – the foundational elements underpinning the development of the 4C competencies.

Silence in educational contexts has traditionally been associated with discipline or inactivity; however, it is progressively recognized as an active constituent of the learning process (Palmer, 1998). Silence facilitates information integration, deepens reflection, and cultivates relational mindfulness – the capacity to be present with others without distraction. In early childhood education, silence may serve as a space for establishing safety, trust, and internal coherence – values essential for effective collaboration and communication (Siegel & Bryson, 2012).

As a pedagogical value, silence remains insufficiently articulated in scholarly discourse. Yet, within frameworks such as contemplative pedagogy (Zajonc, 2006), it functions as a "transformational space" wherein the child can integrate experiences, recognize emotions, and nurture intrinsic motivation. Silence is thus not conceptualized as mere absence of sound, suppression of speech, or denial of self-expression, but as a deliberate suspension of activity and sensory input conducive to deeper cognitive processing and self-regulation (Koopman, 2015; Nitecka-Walerych, 2021).

The phenomenon of silence in pedagogical terms can be construed as positioning the individual along a continuum between overwhelming noise and absolute silence, wherein each person identifies an optimal state that subjectively satisfies current needs. These needs encompass focus, reflection, contemplation, cognitive elaboration, as well as the spontaneous expression of emotions during physical activities (Nitecka-Walerych, 2021; Olearczyk, 2021).

In education based on silence, it is postulated to consciously introduce moments of silence into the educational space as a tool supporting the inner development of the student. Silence, understood not as void or sensory deprivation but as a qualitative domain of contemplation, reflection, and self-awareness, becomes a tool facilitating deeper assimilation of content, enhancement of concentration, and cultivation of mindfulness.

In this context, mindfulness constitutes a complementary construct to the education based on silence. Mindfulness involves intentional, nonjudgmental awareness of present-moment experience. This practice entails attending to one's ongoing experiences with impartiality and equanimity (Zelazo et al., 2018; Schuman-Olivier et al., 2020).

Mindfulness-based interventions, increasingly implemented in educational settings, contribute to enhanced emotional self-regulation, stress reduction, and improved interpersonal relationships, thereby exerting a positive influence on the educational climate and psychological well-being of students (Keng et al., 2011). The integration of the education based on silence with mindfulness practices thus fosters an educational milieu conducive not only to cognitive but also to holistic child development.

Mindfulness in early childhood education does not equate to formal meditation; rather, it encompasses practices such as attentive listening, conscious breathing, smooth transitions between activities, and reflective questioning. These practices enable children to pause, ground themselves in their experience, and strengthen meta-awareness, which serves as the foundation for critical and creative thinking (Ritchhart et al., 2011).

Empirical research consistently demonstrates that regular mindfulness exercises positively impact executive functions, particularly emotional and behavioral self-regulation (Zelazo & Lyons, 2012). Self-regulation – the capacity to modulate one's emotions, impulses, and behaviors – is recognized as a crucial component of school readiness and overall child well-being (Blair & Raver, 2015). Consequently, children develop enhanced ability to identify and manage emotional states and respond adaptively to stress-inducing situations. Children with high self-regulation skills are aware of their emotions and accept them as a natural part of life. They are also able to read the signals sent by their bodies that indicate they are experiencing emotions. A high level of emotional self-regulation allows students to cope with strong emotions by using various methods of self-calming. The results indicate that students with low levels of emotional self-regulation are less likely to cooperate, less assertive, and have lower levels of prosocial behaviour than their peers with medium and high levels of self-regulation (Gajda, 2023).

Regarding attentional capacity, mindfulness practices contribute to prolonged focus and improved selective processing of stimuli (Diamond & Lee, 2011). Within educational contexts, these enhancements translate into greater learning efficiency, better comprehension of instructions, and increased autonomy in problem-solving.

Moreover, the development of empathy and social competencies is significantly associated with mindfulness practices. By fostering introspective abilities and conscious inhibition of reactive responses, mindfulness supports both cognitive empathy

(understanding others' emotions) and affective empathy (emotional resonance), which are vital for interpersonal relationships and effective collaboration (Schonert-Reichl & Lawlor, 2010). Studies reveal that children engaged in mindfulness programs exhibit more prosocial behaviors and fewer impulsive or aggressive reactions (Flook et al., 2010).

In the education based on silence, reflection occupies a central role – not as cognitive analysis (associated with analytical thinking, reasoning, and evaluating situations based on data and logical premises), but as a profound process of self-reflection requiring internal stillness and mindfulness. This entails a deep, attentive, and holistic examination of experience, enabling the child to develop self-awareness, empathy, and emotional insight. Silence, understood as a space of intentional quietude, fosters the self-regulation of attention and emotions in the learner, within which introspective reflection unfolds. The integration of mindfulness practices, grounded in conscious, non-judgmental presence in the "here and now," not only enhances the relaxing and contrasting function of silence but transforms it into a space for active introspection (Kosz-Szumska, 2022). As a result, the process of reflection becomes an integral part of learning – students acquire the ability to "pause" and attentively observe their own thoughts and emotions, which supports the development of self-awareness and critical thinking. The literature emphasizes that both silence and mindfulness practices lead to the synthesis of knowledge and experience, transforming the content delivered in the classroom into deeply personal knowledge grounded in the student's own experience. This reflective dimension of education fosters holistic development – intellectual, emotional, and ethical (Kosz-Szumska, 2022).

The Educational Potential of Silence, Mindfulness, and Reflection in the Context of Developing the 4Cs Competencies Among Preschool and Early School-Age Children

In an era marked by intensive digitalization, sensory overload, and increasing educational demands, silence, mindfulness, and reflection gain significance as alternative strategies for supporting the development of key competencies in children. The potential of these practices is particularly evident within the concept of so-called "21st-century skills," known as the 4Cs – Creativity, Critical Thinking, Communication, and Collaboration. These four domains – creative and critical thinking, communication skills, and collaboration – are currently regarded as fundamental in preparing children for future challenges. Silence, mindfulness, and reflection not only support

the child's individual emotional and cognitive development but also create conditions conducive to cultivating these competencies.

It is worth noting that although practices such as mindfulness, reflectivity, and the education based on silence are increasingly present in educational discourse, their connections with the development of the 4Cs still require further in-depth analysis. The subsequent sections of this study will demonstrate how silence – as a space for contemplation – mindfulness – as a form of conscious presence – and reflection – as a mechanism for deepening understanding – can jointly create an environment that fosters creativity, critical thinking, collaboration, and communication already at the preschool education stage. From a theoretical standpoint, these practices constitute not only tools for supporting cognitive and emotional development but also activate self-regulatory and metacognitive mechanisms essential for integrated and long-term learning.

An integrated approach to silence, reflection, and mindfulness allows them to be seen not as separate techniques but as elements of a shared developmental space, which – when appropriately introduced – can support all four key 21st-century competencies effectively.

The development of creativity requires creating conditions that encourage children's free exploration, openness to new experiences, and reflective processing of experiences (Craft, 2005). Silence, understood as a qualitative space free from external disturbances, enables a child to withdraw from the overload of stimuli and concentrate on internal creative processes. Being in silence fosters the integration of information and the emergence of new, non-obvious connections between ideas, which is the foundation of divergent thinking – a key component of creativity (Kaufman & Gregoire, 2016).

Mindfulness, in turn, facilitates conscious presence in experience, allowing the child to better observe their surroundings, attend to details, and notice nuances of reality. Such mindful exploration forms a basis for creative activities, as it helps children combine seemingly unrelated elements and use them in innovative ways (Hölzel et al., 2011). Mindfulness practices also introduce elements of playfulness and openness, which, according to L. Vygotsky (1978), are crucial for the development of creativity through interaction with others and the environment.

Reflection enables the conscious processing of experiences along with associated emotions and thoughts, which fosters metacognition – the ability to analyze one's own cognitive and creative processes. As a result, the child learns to recognize, evaluate, and modify their ideas, strengthening creativity as a dynamic and evolving process (Mezirow, 2000). Silence, mindfulness, and reflection create an integrated educational space in which creativity can flourish through the combination of internal calmness, conscious exploration, and deep contemplation of personal experiences.

The development of critical thinking in early childhood education requires an environment that supports not only the cognitive but also the emotional aspects of information processing and enables the child to independently arrive at an understanding of the world. Reflection plays a key role in this process. Through reflection, a child can distance themselves from a situation to understand causal relationships, diverse perspectives, and the consequences of their own and others' actions. The development of critical thinking in children begins precisely with asking questions and recognizing meanings in everyday experiences. Reflection encourages cognitive openness, tolerance for ambiguity, activates children's independent quest for answers, and stimulates metacognitive processes essential for critical thinking (Zelazo & Lyons, 2012). Silence and mindfulness support this process by creating space for reflection and internal information processing. The reduction of external stimuli fosters concentration and deeper thinking, facilitating the child's analysis of situations and more conscious evaluations.

An integrated approach combining silence, reflection, and mindfulness thus creates an educational environment conducive to building critical thinking in children. This competency, cultivated from an early educational stage, forms the foundation for further cognitive, social, and civic development.

Communication – understood as the ability to express thoughts, feelings, and needs clearly, attentively, and appropriately to the situation – is a key component of a child's social and cognitive competencies. In the context of preschool and early school education, developing this skill requires not only practicing linguistic forms of expression but, above all, fostering attentive listening and conscious presence in interactions with others (Roskos & Christie, 2011).

Attentive listening and mindful speech are two mutually complementary pillars of effective communication. The former requires full cognitive and emotional engagement with the other person's message, free from prejudice, interruptions, or automatic reactions. The latter involves consciously choosing words, tone, and manner of expression, taking into account context and the interlocutor's sensitivity. Mindfulness practices help children better recognize their emotional states, which in turn facilitates behavior regulation in communicative situations and nurtures empathetic attitudes toward peers (Schonert-Reichl & Roeser, 2016). Mindfulness also teaches children co-regulation – the synchronization of emotions and speech with others (Siegel & Bryson, 2012).

Silence, as a pedagogical practice, can be an effective tool supporting the development of these skills. Quieting the environment, introducing moments of shared silence or mindful listening to one another, creates conditions conducive to reflective and empathetic dialogue within the group. As T. Olearczyk (2021) observes, silence in an educational context is not an absence of activity but an active space of mindfulness

and internal dialogue that allows children to process information more deeply and build relationships based on mutual understanding.

In summary, communication extends beyond verbal expression to encompass conscious and empathetic participation in the dialogical process. In this context, silence, mindfulness, and reflective presence in relationships become invaluable tools supporting the development of communicative competencies already in early childhood.

Collaboration, as one of the fundamental 21st-century competencies, entails the ability to work with others consciously, mindfully, and empathetically. In early education, it is crucial not only to develop interpersonal skills but also to foster communal attitudes and responsibility for relationships. Practices such as group mindfulness, rituals of silence, or shared moments of reflection can serve as valuable tools in cultivating children's cooperative abilities.

Mindfulness enables group members to align emotionally and cognitively. Such practices promote the building of a climate of trust and mutual respect, facilitating empathy, compassion, and openness to others (Schonert-Reichl & Roeser, 2016). The presence of silence within the group is not merely a moment of rest – it becomes a space of "being together" without pressure to act, which strengthens bonds and helps children understand the dynamics of interpersonal relationships.

Moreover, individual and group reflection conducted in an atmosphere of acceptance and mindfulness can be an effective tool for conflict resolution and enhancing collaborative skills. Children who learn to recognize and name their emotions are also more inclined to understand others' emotions, leading to more constructive approaches to misunderstandings and differences. Reflecting on shared experiences – both successful and challenging – enables participants to analyze interactions, recognize their roles, and learn flexible responses within the group.

Furthermore, practices of silence and reflection may provide the foundation for developing shared compassion, which strengthens the sense of community and responsibility for the well-being of other group members (Jennings et al., 2013). In this perspective, collaboration is not merely a technical skill but an expression of conscious presence in relationships and the ability to co-create meaningful educational experiences.

Summary

The development of the 4Cs – creativity, critical thinking, communication, and collaboration – should proceed in a continuous and balanced manner to optimize children's developmental potential (Brata et al., 2023). Mindfulness practices, silence, and reflection represent valuable pedagogical strategies that significantly support the

holistic growth of preschool and early primary school learners. By facilitating a space for internal stillness and focused presence, these practices enable children to deepen their awareness of internal experiences, foster empathic listening, engage in reflective thinking, and enhance creative problem-solving and critical analysis.

Consequently, contemplative practices constitute powerful tools for nurturing 21st-century competencies through an integrated approach addressing both cognitive and emotional learner needs. Although often marginalized amid the demands of everyday educational settings, their neuroscientific foundations and psychosocial benefits underscore their considerable pedagogical value.

The preschool and early school years mark a critical "window of opportunity" for 4Cs development due to rapid neurocognitive maturation and elevated brain plasticity during this period. Mindfulness-, silence-, and reflection-based interventions are particularly suited to this developmental stage, promoting emotional-cognitive integration and supporting the sustained cultivation of essential skills for both academic success and social participation (Zelazo et al., 2018).

In summary, early childhood is a 'developmental window' for shaping 4C competencies. Supporting children through appropriately designed educational strategies – including both cognitive stimulation and practices that promote emotional regulation – lays the foundation for further educational and social achievements (Craft, 2005).

It should be noted that although the pedagogical potential of contemplative practices in early childhood and early school education is increasingly recognised, there are still significant gaps in the literature. Firstly, most of the research to date has been exploratory in nature and based on small samples, which limits the possibility of generalising the results. In the future, research based on long-term and more extensive empirical projects is needed to assess the lasting impact of mindfulness, silence and reflection on the development of 4C competences in children.

Secondly, there is still a lack of in-depth analysis of how contemplative practices support social-emotional and cognitive development in the context of early childhood education. Interdisciplinary research is needed that combines the perspectives of developmental psychology, didactics and neurobiology to better understand the process of developing empathy, self-regulation and communication skills through the practice of mindfulness. Only such an approach will enable the full potential of silence, mindfulness and reflection to be exploited in shaping the key competences for 21st century education.

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Childhood as a Source of Creative Creation for Art Brut Authors

Dzieciństwo jako źródło twórczej kreacji autorów art brut

KEYWORDS

art brut, childhood, subjectivity, sense of identity, disability

ABSTRACT

Childhood is a crucial period for the development of subjectivity and a sense of identity, unfolding in relation to both individuation and relationships with others. The aim of this article is to present the work of art brut authors – Judith Scott and Hawkins Bolden – in the context of childhood shaped by the experience of disability, accompanied by isolation and limited opportunities to fulfill developmental tasks. The study was based on a qualitative case study, employing the analysis of documents: the films Judith Scott at The Museum of Everything and Make. Outsider Art. Documentary. The interpretation of the artists' works was grounded in Stanisław Popek's model of the layered structure of an artistic product. The analysis sought to answer two research questions: How is the artist's creativity constructed by the experience of childhood? How is the creative process connected with formulating responses to the fundamental questions: "What can I do?", "Who am I?". Three common features were identified in the work of both artists: the repetitiveness and rituality of the creative act, the use of unusual materials, and the exploratory character of the creative process. In light of the analysis, the artists' work emerges as an act of reconstructing identity and regaining control over one's life. These analyses provide a starting point for reflection on the nature of disability and, above all, on the value of pedagogical practice based on balancing the recognition of children's shared developmental needs with respect for their uniqueness and striving for agency, even in the context of disability.

SŁOWA KLUCZE

art brut, dzieciństwo, podmiotowość, poczucie tożsamości, niepełnosprawność

ABSTRAKT

Dzieciństwo stanowi kluczowy okres kształtowania podmiotowości i poczucia tożsamości, przebiegający w odniesieniu do indywiduacji oraz relacji z innymi. Celem artykułu jest ukazanie twórczości autorów art brut – Judith Scott i Hawkinsa Boldena – w perspektywie dzieciństwa z doświadczeniem niepełnosprawności, łączącym się z izolacją i ograniczeniem możliwości realizacji zadań rozwojowych. Badania oparto na jakościowym studium przypadku, wykorzystując analizę dokumentów zastanych: filmów *Judith Scott at The Museum of Everything* oraz *Make. Outsider Art. Documentary*. Podstawą interpretacji twórczości badanych był model warstwowej struktury wytworu plastycznego Stanisława Popka. Analiza zmierzała do odpowiedzi na pytania: Jak twórczość artysty jest konstruowana przez doświadczenie dzieciństwa? Jak proces twórczy łączy się z formułowaniem odpowiedzi na pytania: „co mogę?", „kim jestem?"? Wyodrębniono trzy wspólne elementy charakteryzujące twórczość badanych: powtarzalność i rytualność aktu kreacji, użycie nietypowych materiałów oraz eksploracyjny charakter procesu twórczego. W świetle przeprowadzonych analiz twórczość badanych jawi się jako akt rekonstrukcji tożsamości i przejmowania kontroli nad własnym życiem. Analizy te stanowią przyczynek do refleksji nad istotą niepełnosprawnością, ale i znaczeniem praktyki pedagogicznej opartej na równowadze między uznaniem wspólnych potrzeb dzieci a poszanowaniem ich wyjątkowości i dążenia do bycia podmiotem sprawczym, także w sytuacji niepełnosprawności.

Introduction

This study aims to describe and analyze the work of two art brut creators – Judith Scott and Hawkins Bolden – through the lens of their childhood experiences. Both artists' biographies were profoundly shaped by disability, social isolation, and the inability to assume roles and tasks that could have allowed them to experience themselves as agents. Their spatial works were created in a distinctive, individual, and almost ritualized manner, resulting not only in untitled artistic objects but also in acts of self-reconstruction.

Grounded in the interpretative paradigm, the study employed a qualitative case study approach (Stake, 2009), particularly suited for examining the functioning of persons with disabilities and understanding disability as a personal, social, and cultural phenomenon (Gajdzica, 2016).

The research was guided by two principal questions:

How do childhood experiences shape the development of artistic creativity?

How does the creative process contribute to negotiating fundamental questions of subjectivity and identity, specifically: "What can I do?" and "Who am I?"

Data were collected through documentary analysis (Kubinowski, 2010), drawing on two films that depict the artists' creative processes: *Judith Scott at The Museum of Everything* (Museum of Everything, 2011) and *Make. Outsider Art. Documentary* (Hearn, & Ogden, 2011). The analysis followed Popek's model of the layered structure of an artwork (1999), which distinguishes three dimensions:

I. Representational – examines what the work depicts or illustrates, the cognitive content it conveys, and the degree of concreteness versus abstraction in its visual elements.
II. Formal – considers the artistic means through which the content is expressed, including the visual "language" or symbolic system employed.
III. Axiological – assesses the creative value of the work, including its originality, generativity, potential applications, and social recognition.

In line with Eco's concept of the "open work" (1994), the interpretations presented here are offered as one of multiple possible readings of the artists' creations.

The Essence of Art Brut

The term "Art Brut" was first described in 1945 by the avant-garde artist Jean Dubuffet to designate works produced in isolation, free from formal education and artistic conventions, arising from the creator's innate impulse and almost as a necessity to create, rather than for social recognition. In the catalog of the first exhibition of works from his collection, Dubuffet wrote:

> By this, we mean works created by individuals untainted by artistic culture, works in which imitation – unlike what is often seen among intellectuals – plays little or no role; their creators draw entirely from their own resources, rather than from the conventions of classical art or the art that happens to be in fashion. Here, we encounter art in its rawest form; we observe how it is completely transformed at every stage of creation by the talent of the artist (Dapena-Tretter, 2017, pp. 16–17).

Consequently, Dubuffet did not offer a precise definition based on strict criteria. As Joanna Daszkiewicz (2018) notes, the term functioned rather as a label for his own collection – a concept which, due to the "attempts to establish a common denominator by various 'users'", should be understood as a "traveling concept" (Bal, 2012).[1]

1 In an effort to preserve the distinctive integrity of his collection, Dubuffet carefully regulated the use of the term he had coined, resisting attempts to equate it with notions such as folk art, naïve art, children's art, or psychopathic art, as well as its appropriation by other collectors. Over time, this led to the emergence of related designations, including raw art, raw vision, intuitive art, self-taught art, création franche, and hors-les-normes art. In English-language scholarship, Roger Cardinal (2005) proposed outsider art as

The creators of works included in Dubuffet's collection, as observed by the distinguished Polish anthropologist Aleksander Jackowski after meeting him, were "people from the social margins, vagrants, street prophets, inmates of correctional facilities, and patients of psychiatric hospitals… Dubuffet believed that, in order to be truly oneself and free from cultural influences, one must oppose social norms and conventions" (1994, p. 60).

To emphasize the independence of *art brut* from tradition, official art, and the prevailing cultural system, he employed the terms "product" instead of "work of art" and "author" rather than "artist" (see Daszkiewicz & Doda-Wyszyńska, 2015).

Art brut emerged as a negation of what is conventional, accepted, unambiguous, and traditionally established. Contemporary *art brut* encompasses a plurality of works that lack shared formal or generic characteristics, which would allow them to be unequivocally assigned to a single category. Each creator is thus an individual entity requiring distinct description, as every product is rooted in a unique experience, often linked to social marginalization, illness, disability, and/or poverty. Using Jackowski's terminology (1994), *art brut* can be described as an "anti-style."

What undoubtedly unites the creators of *art brut*, however, is their autotelic, self-propelling motivation to create, as well as spontaneity and authenticity (Bouillet, 2011), alongside the exceptional integration of their work with the author's own biography. Their creations have no reference to what has already appeared in art and will have no continuation, because each work, reflecting the internal world of its author, constitutes a "closed unit" (Chlewiński, 2018).

They are also not intended for a specific audience; rather, they serve to organize, helping to interpret and come to terms with what is difficult, alien, and sometimes elusive even for the creator. "Thus, we are dealing here with the inseparability of life from the work, with a tenacious clinging of one to the other. This is why, alongside the aesthetic aspect, the existential and ethical dimension becomes so strongly activated" (Daszkiewicz & Doda-Wyszyńska, 2015, p. 131).

Although these works are often created using whatever materials are available to the author at the moment and do not exhibit a wealth of artistic technique, they are full of archetypal signs and individual codes intertwined into a unique whole (Jackowski, 1994). In this context, *art brut* emerges not only as a distinct record of the creator's experiences and life history but also reflects their subjectivity, sense of identity (Lubińska-Kościółek, 2017), and pursuit of emancipation (Pawlik, 2017).

an equivalent of art brut; however, this term does not fully capture Dubuffet's original conception of the concept.

Childhood as a Foundation for Subjectivity and a Sense of Identity

Contemporary scholarly reflection on the child and childhood, focusing on the individuality of the child, understanding diverse ways of experiencing, the multiplicity of contexts in which subjective childhood worlds are created, and the child's social participation, emphasizes recognition of the child's rights and autonomy as a person competent for dialogue and partnership with adults, collaboration and co-creation of living spaces, as well as for self-development and self-determination (see Jarosz, 2018). A child's perspective on perceiving and understanding the world, their experiences in relation to others, revealed through expressions, choices, activities, and ways of interpreting and attributing meaning to their experiences, allows insight into the child as a person, forming the foundation for establishing authentic relationships between the child and adults (Miś & Ornacka, 2015).

The child, as a relational subject acting and experiencing through action, not only undergoes external influences but also exerts an impact on their environment (Archer, 2013). Perceiving and experiencing oneself as a subject is the source of an active attitude toward the world, engagement associated with effecting change, being a creator of events, and assuming responsibility for one's own actions (see Czerepaniak-Walczak, 2006; Górniewicz, 2001). According to J. Juszczuk-Rygałło (2016), the subject's conviction regarding "what I can do" constitutes a foundation for identity related to the question "who am I?"

From a developmental perspective, identity is primarily grounded in social interactions and the challenges encountered by the individual in the process of personal development. A sense of identity, understood as a subjective conviction regarding one's existence, encompasses a sense of distinctness from the environment, continuity of the self, internal coherence, and possession of inner content (Sokolik, 1993, pp. 10–11).

According to E. Franz and K.M. White (1985), the fundamental dimensions shaping a sense of identity are intertwined in human life histories: the thread of individuation, associated with constructing individual identity, and the thread of relationships with others, which strengthens social identity. Individuation is thus linked to attaining a sense of distinctness, agency, and independence, while social bonds provide a means for establishing one's place in the world, which is also shaped by cultural context (see Brzezińska, 2006).

The child's ongoing reinterpretation of the self within close, influential relationships with others enables the acquisition of cognitive and emotional schemas that shape both their sense of "I" and their social identity. From the very beginning of life, being inherently prepared to live among others, the child requires a caregiver who is available both physically and emotionally (Schaffer, 2005). The attachment

experience developed in this relationship—described as a "record of the attachment figure's responses to the infant's affect" (Plopa, 2019, p. 491) – serves as a foundational template for the individual's future interactions with the world.

In later years, the substantive content of a child's sense of identity undergoes dynamic transformation through the discovery of physical and psychological distinctness from others and the accumulation of personal experiences derived from exploring the world. Growing independence in performing basic self-care tasks, moving about, and investigating the environment allows the child to become familiar with their body and its capabilities, and to discern similarities and differences relative to others. Several other factors related to the child's ongoing psychological development play a significant role in this process, including the gradual development of self-evaluative feelings (e.g., pride), the formation of first friendships, opportunities to assume social roles, and, in later childhood, the emergence of self-awareness from the perspective of agentive action (Brzezińska et al., 2016).

Researchers indicate that situations of disability can pose a threat to both answering the questions "Who am I?" and "What can I do?" Social stigmatization and exclusion ("you are different," "you are not capable"), overprotective parenting limiting opportunities for self-exploration, and the inability to assume social roles can lead to internal identification with the label *"disabled"* and the experience of oneself as incapable of constructing one's own life or being its author (Głodkowska, 2014; Głodkowska & Gosk, 2018).

Childhood with the Experience of Disability in Art Brut as Exemplified by the Works of Hawkins Bolden and Judith Scott

Hawkins Bolden (1914–2005) was born and raised in Memphis. He came from a poor, religious, large African American family. He shared a particularly close bond with his twin brother, Monroe. Both dreamed of playing professional baseball, and like many other children in Memphis, they devoted considerable time to training. At the age of seven, as a result of being struck on the head by a ball, Hawkins suffered an injury that soon triggered epileptic seizures and ultimately led, within a few months, to permanent loss of vision. This experience left a profound mark on his memory. "I couldn't stop looking at the sun," he later recounted, "I looked, and darkness covered my eyes. I never saw anything again. I feel things. I know the sun" (Arnett, 2001, p. 148). At this point, his formal education also came to an end. In the early 1920s, the social and economic status of his family virtually condemned him to social isolation. Until the end of his life, he lived with his older sister (Arnett & Arnett, 2001).

Bolden's works were created from anything he could find on the streets of Memphis and in its littered alleys. Wagons, chairs, old night lamps, Christmas tree ropes, scraps of carpet and artificial trees, even pots and license plates, became his artistic building materials, the raw matter from which his peculiar sculptures emerged. Most of his works are representational in nature. Bodies and faces predominate, some of which are self-portraits.

Whenever he felt the need to create, he would take objects from his dark "studio," located directly under the house. Bent over on all fours, he reached for the necessary materials. He then cut, drilled holes, and attached elements to form extraordinary constructions. Bolden worked almost continuously, claiming that he had been given a gift from God (Willson, 2004).

Bolden's distinctive artistic code, for which his works are recognizable, included eye-like holes drilled into metal and scraps of frayed material, along with weavings reminiscent of African totems. He is particularly known for the collection of "scarecrows" he created in his own yard – a type of assemblage that began to appear in the 1960s. Initially, the scarecrows served a purely practical function, protecting the vegetables he cultivated for his family, but over time they became an obsession. "The birds think something will get them. They are scared. They stay away," Bolden explained when asked about the numerous sculptures in front of his house (Arnett, 2001, p. 160).

This demonstrates that he did not perceive his works as belonging to the world of artistic production, nor did he identify himself as an artist. Nevertheless, his creations – resembling masks and totems intended to ward off evil and imbued with references to his disability, religiosity, and background – have been recognized as artistic objects admired for their precision and extraordinary symbolism (Arnett, n.d.)[2].

Judith Scott was born in 1943 in Cincinnati, Ohio. Her parents were not only unprepared for the birth of twins but were also unaware for several months that one of their daughters had been born with Down syndrome. While her twin sister Joyce began to speak, Judith was initially capable of producing only isolated sounds. Later, it became apparent that she had lost her hearing as a result of scarlet fever. By the age of five, she experienced rejection due to her disability and was mistakenly diagnosed as profoundly intellectually disabled. Deprived of information regarding available support and educational opportunities, her parents – under pressure from doctors and psychologists – decided to place her in a state institution for persons with disabilities located in Columbus, nearly 170 kilometers from their home. In the context of wartime America, this distance effectively condemned Judith to total separation from

2 The artist's works and information about exhibitions can also be found on the websites of renowned galleries, such as New York's SHRINE (https://www.shrine.nyc/hawkins-bolden) and London's The Gallery of Everything" (https://www.gallevery.com/artists/hawkins-bolden#).

her family environment. Analysis of the few surviving documents concerning Judith's time in institutional care indicates that the supervision she received was not only superficial but often marked by instances of abuse.

Years later, her twin sister located Judith and assumed legal guardianship. Joyce enrolled Judith in the Creative Growth Art Center in Oakland, where, unexpectedly, after two years, Judith began creating works reminiscent of "cocoons" (Scott, 2016).

Judith Scott began creating art at the age of forty-four. After multiple attempts with graphic and pictorial work, she discovered her own form, entirely independent of existing artistic references, combined with a unique creative process. Her first work, produced in 1988, consisted of a bundle of wooden sticks wrapped in fabric and bound with strands of yarn. She achieved her characteristic style by the mid-1990s. She began her creative process by collecting or "stealing" objects, usually ordinary items related to everyday life, such as keys, an umbrella, or a magazine. These objects became the core of her peculiar installations. Day after day, she enveloped them in intricate layers of multicolored threads, fibers, and cords until the object was completely hidden within the sculpture. She worked meticulously on each piece for several weeks, carefully modulating every detail.

The "cocoons" (Collection de l'Art Brut, n.d.), which initially retained recognizable, often zoomorphic or anthropomorphic shapes, over time became increasingly abstract and gradually began to open up (Morris & Higgis, 2014).

The extraordinary act of creation in which Judith Scott simultaneously concealed and shaped objects, when interpreted in light of her life experiences, reveals, according to the distinguished art brut scholar Lucienne Peiry (2013), a process of reclaiming identity that ultimately leads to an abstract expression of inner rupture. This process was initiated by her physical and emotional reunion with her sister. The cocoon plays a crucial role in embodying the presence of her twin, from whom she had been separated. One of the first works her sister saw was a delicately connected form composed of two twin elements, which she interpreted as a representation of their two bodies intertwined as one (Scott, 2016).

The textile sculptures, constructed from thousands of threads, appear not to protect the object itself but rather some secret of the creator. Wrapping the objects serves to restore order and confers power to the item hidden within. In this way, the sculptures resemble fetishes and seem to possess a special connection both to life and to death (Peiry, 2013).

The Creative Process as Expression and Reconstruction of Experience

Almost every form of isolation – whether resulting from illness, disability, marginalization, exclusion, or direct confinement – that profoundly marks human existence, may become a source of expression. This expression is not necessarily addressed to an audience but rather constitutes a form of self-communication. Beyond the more or less evident attempt to interpret a work integrated into the sphere of symbolic culture, there exists a deeply personal act of creation (Bouillet, 2011), particularly in the case of this group of creators. The very process of creating, of collecting non-random objects, selecting them, and deciding on their mode of presentation – as well as the undeniable fact that they act outside the necessity of finding an audience for their works, let alone granting them the status of artistic objects – demonstrates its significance from the perspective of the subject undertaking the action. It is an attempt to respond to the questions "What can I do?" and "Who am I?". There is, in fact, no conscious artistic intention designed to result in a completed artwork. Each author acts as a being defined by their own history, in which childhood experiences of disability play a crucial role.

An analysis of the works of J. Scott and H. Bolden allows for the identification of common elements characterizing their creative processes.

The first of these is the repetition and rituality evident in the act of creation.

In Scott's case, this is manifested in the intense, meticulous wrapping of objects – a practice that serves not only as her creative technique but perhaps also as a way of redefining the object from her own perspective (Możdżyński, 2008) and/or as a ritualized passage into a new stage of life (Peiry, 2013).

Bolden's creative activity, in turn, is characterized by the recurring motif of "scarecrows," constructed each time in a similar manner. Having experienced familial closeness and being rooted in its traditions, Bolden drew upon motifs characteristic of his culture (masks, totems), thereby affirming the foundations of his cultural identity (Brzezińska, 2006).

The very process of creating may therefore be interpreted as an attempt to restore the sense of security lost in childhood. Hiding objects, carefully interweaving colorful threads, or protecting the home with self-made guardians all contribute to a sense of control over one's world, a sense of agency in relation to reality, and thus the recognition of oneself as a subject who assumes responsibility for shaping one's life (Głodkowska, 2014).

The second common element rooted in childhood experience is the use of found materials.

Bolden primarily utilizes old, worn objects and discarded materials, granting them not only new functions but also summoning them into existence through creative activity. Scott, by contrast, begins with a deliberate selection of an object that is then "stolen" and enclosed within her sculpture, which she wraps with colorful threads, fibers, and strips of fabric.

In both cases, the choice of material is significant, as their sculptures can be read as "the language of things" (Barański, 2008) rather than conventional artworks. Bolden seems to restore meaning to what was once rejected and deemed useless, much as he reclaims meaning for his own existence through an activity that, though directly oriented toward the object, simultaneously becomes an act of self-subjectification (Czerepaniak-Walczak, 2006; Górniewicz, 2001). Scott, on the other hand, favors what is unique – what was lacking in her life of isolation from others and from the world of objects with which people normally interact on a daily basis (Barański, 2008). By protecting her "treasure," she reconstructs the lost reality, also in its physical dimension.

A third distinguishing aspect is the exploration characteristic of childhood (Brzezińska et al., 2016), which informs their creative process.

Both Scott and Bolden engage in a kind of exploratory activity that involves movement as well as sensory experiences. They experiment with material, thereby satisfying the need not only to know but to understand the world and to frame it from their own perspective. In creating, they explore matter and their surrounding environment, make choices, and test boundaries. Unlike children exploring the world, however, they do not require words or labels in acts directed toward themselves.

The sculptures of Scott and Bolden are silent narratives of childhood marked by isolation, loneliness, the inability to experience closeness, the lack of opportunity to make choices, and the profound need for self-understanding. They constitute a symbolic space for shelter and healing, but also for the creative expression of the self. In this sense, their activity may be regarded as assuming authorship of one's own life (Głodkowska & Gosk, 2018). Yet, one cannot disregard the purely artistic perspective, which situates the works of Bolden and Scott within the realm of art as resonant voices of artists – voices that unsettle, engage, and compel reflection.

Summary and Conclusions

Analyzing the works of the authors presented in this text – selected from among many extraordinary individuals representing the world of the "Other," creating outside the mainstream art scene and without aspiring to the status of "artist" – one cannot help but concur with the interpretations offered within the art cultural sphere by

experts, enthusiasts, or academically trained artists. Aleksander Jackowski, an eminent ethnographer and researcher of phenomena emerging outside the mainstream of art, far from the exhibition halls of major galleries, wrote: "Even if I cannot anticipate what I will encounter in the exhibition, I can be certain of what I will not see" (Jackowski, 1994, p. 61). Indeed, we will see nothing conventional or imitative, as each work encapsulates a unique personal set of experiences.

The analyses conducted indicate that, in the case of the presented art brut creators, the primary formative experience of their childhood was disability. Themes related to loss, the characteristic childlike exploration and intuitiveness of their creative acts, as well as the materials employed, suggest a close intertwining of the artwork with the creator's biography, particularly experiences from childhood. In the authors' works and creative processes, one can also discern the memory of these experiences, which may serve a protective function. In Scott's case, this was expressed through the bond with her twin sister, reflected in ritualized intertwining. In Bolden's work, there is a clear grounding in the religiosity and culture of the family.

At the same time, their creative process undeniably reflects subjectivity and the striving of individuals in extreme circumstances to define their existence. It functions as a form of autobiography and world reconstruction, a mode of communication, as well as an attempt to introduce order and exercise control over one's life. In this context, the case analyses provide data for understanding both the universal and the exceptional aspects of individuals with disabilities. They serve not only as a point of departure for reflection on the nature of disability and its personal and socio-cultural origins but also as a stimulus for teachers' self-reflection regarding pedagogical practice, particularly in the context of working with children with diverse developmental and educational needs.

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Creativity, Critical Thinking, Communication, and Cooperation of Children at Primary School No. 83 Named After Emilia Waśniowska "Łejery" in Poznań

Kreatywność, myślenie krytyczne, komunikacja i współpraca dzieci w Szkole Podstawowej nr 83 im. Emilii Waśniowskiej „Łejery" w Poznaniu

KEYWORDS

creativity, critical thinking, communication, collaboration, children at Emilia Waśniowska

ABSTRACT

This study aims to present ways to support the development of students in grades 1–3 of the non-standard, yet universal, Primary School No. 83 named after Emilia Waśniowska in Poznań, "Łejery." This school, unique in Poland due to its pedagogical experiment: "Theatre as a Means of Comprehensive Development – Entrepreneurship Education," is celebrating its 35th anniversary this year. Jerzy Hamerski and Elżbieta Drygas founded it for children who desire to develop creatively. The author used an individual case study based on source analysis and participant observation techniques, which she implemented during the 2023/2024 school year. The research concentrated on the following variables: ways to support the development of students at Primary School No. 83 in Poznań, social relations within the social space of Primary School No. 83 in Poznań, and the use of art in the education of children at Primary School No. 83 in Poznań. As a result of the analysis of the research material, it was noticed that the students in the institution are consistently supported in the development of future competences, and the success of education in this area is proven not only by the fact that the "Łejer" children achieve many educational and social success, but also by the fact that the first adult graduates of the school hold positions of public trust.

SŁOWA KLUCZE

kreatywność, krytyczne myślenie, komunikacja, współpraca, dzieci ze Szkoły Podstawowej nr 83 im. Emilii Waśniowskiej w Poznaniu

ABSTRAKT

Celem opracowania jest przedstawienie sposobów wspierania rozwoju uczniów klas 1–3 niestandardowej, choć powszechnej Szkoły Podstawowej nr 83 im. Emilii Waśniowskiej w Poznaniu „Łejery". Szkoła ta, unikatowa w skali Polski ze względu na realizowany w niej eksperyment pedagogiczny: „Teatr jako środek wszechstronnego rozwoju – nauka przedsiębiorczości", obchodzi w bieżącym roku 35-lecie istnienia, a założona została przez Jerzego Hamerskiego i Elżbietę Drygas dla dzieci, które pragną rozwijać się w sposób twórczy. Autorka posłużyła się metodą analizy indywidualnego przypadku z zastosowaniem techniki analizy źródeł oraz obserwacji uczestniczącej realizowanej do roku szkolnego 2023/2024, która koncentruje się przede wszystkim na następujących zmiennych: sposoby wspierania rozwoju uczniów SP nr 83 w Poznaniu, relacje społeczne w przestrzeni społecznej SP nr 83 w Poznaniu, zastosowanie sztuki w edukacji uczniów SP nr 83 w Poznaniu. W wyniku analizy materiału badawczego dostrzeżono, że w placówce uczniowie wspierani są konsekwentnie w zakresie rozwoju kompetencji przyszłości, a o powodzeniu edukacji w tym obszarze świadczy nie tylko fakt uzyskiwania przez „łejerskie" dzieci wielu sukcesów edukacyjnych i społecznych, ale także piastowanie przez pierwszych dorosłych absolwentów szkoły funkcji zaufania publicznego.

Introduction

The Polish preschool and early school education continues to be characterised by a directive model of education, in which teachers focus on imparting knowledge contained in textbooks and on developing academic skills such as reading, writing, and arithmetic. These skills are acquired through training by completing various tasks, most often in an exercise book tailored to the so-called "average" (within the scope of developmental capabilities) of the entire class. Despite successive educational reforms, pedagogical practice still ignores the social and emotional competencies of students. Children's active participation in the educational process is limited, and so-called "content" related to these areas is scarce in approved government textbooks. As Dorota Klus-Stańska (2009) points out:

> In Polish early childhood education, social studies as an area of children's competence development is marginalised. It occupies little space in the curriculum, and where it does appear, it is often reduced to moralizing and persuasive norms of politeness, stereotypically presented social roles, banal genre images, typical stories from well-known everyday life, or, conversely, exotic but extremely superficial images from cultures other than our own (p. 15).

The "curriculum-centric" teaching methods prevalent in Poland drive teachers to rush to implement the content of "ready-made" teaching aids, often selected by school principals. Children, in turn, adapt to expectations and quickly make sure they are expected to provide the "only correct" answers. Meanwhile, the world that students in the lowest grades of primary school increasingly consciously enter is not a fixed concept but a changing one; it is not pre-existing but constructed, so even the most thoroughly developed textbook should not dictate the teacher's actions; they should observe and transform the world together with the child. A child's future success will be determined primarily by competencies related to functioning in interpersonal spaces, because it is there that, "by entering into relationships with others, we construct meanings" (Bałachowicz, 2017, p. 32).

The purpose of contemporary education is not "solely to provide the economic world with qualified employees" (Delors, 1998, p. 81), and education itself is not intended "for the human being as an economic factor, but as a goal of development" (Delors, 1998, p. 81). While

> […] we can imagine a person devoid of above-basic mathematical or chemical knowledge, someone whose social knowledge remained solely at an elementary, 'perceptual' level would be doomed to daily failures, would be a source of constant conflict and difficulties, and would be even less capable of meaningfully engaging in activities for the benefit of others (Klus-Stańska, 2009, pp. 15–16).

The competencies of the future – creativity, critical thinking, communication, and collaboration – are four competencies of the area of social competencies. They are the ones that determine success in the further educational path and the life of an individual in a changing world, because, as Józefa Bałachowicz (2017) notes: "only an active, reflective, creative person who can make himself or herself a subject, both in the field of personal development and active participation in the public sphere, can effectively change his or her situation" (p. 14).

An example of a school that, from the very beginning, opposed training and reconstructive "teaching" of children along the so-called "track" is Primary School No. 83 in Poznań named after Emilia Waśniowska, known in the Poznań community as "Łejery." In this institution, often called the "wings rental" (Hamerski, 2020), the concept of education is understood more broadly than just teaching – children, parents, and teachers together create not only the school culture but also coexist in the so-called "group," "family," because the concept of "Łejery" pedagogy is a concept of education through art, but with scouting and democratic traditions (Sadowska, 2024b).

This study aims to present ways to support the development of students in grades 1–3 of the non-standard, yet universal, Primary School No. 83 named after Emilia Waśniowska in Poznań, "Łejery." This school, unique in Poland due to its pedagogical experiment: "Theatre as a Means of Comprehensive Development – Entrepreneurship Education," is celebrating its 35th anniversary this year. It was founded by J. Hamerski and E. Drygas for children who desire to develop their creative abilities. The research was based on an individual case study. The author approached with a source analysis and participant observation techniques, which she conducted during the 2023/2024 school year. The research concentrated on the variables: ways to support the development of children, social relations and the use of art in the education of students at Primary School No. 83 in Poznań.

A Proprietary Program and Pedagogical Experiment Implemented at Primary School No. 83 in Poznań

"Łejery" is an expression from the Poznań dialect that denotes a child's wonder at the world (an exclamation expressing the same thing as "oh my!" or "oh my!"). "Łejery" pedagogy is a concept developed by J. Hamerski since 1975. It combines elements of aesthetic education, democratic education, scouting, and education "in dialogue" with the child (Sadowska, 2025). Many of the "Łejery" postulates draw on the pedagogy of Janusz Korczak, especially the child's right to respect. Back in the 1970s, J. Hamerski founded the then-controversial "Otwarci" scout troop, which included young people attending Primary School No. 76 on Sierakowska Street in Poznań. The name was not accidental, as Hamerski described the tribe's educational program as "Four Keys to Man" (Hamerski, n.d., p. 9).

The first "key" was meant to open hands – it was the "key" to establishing interpersonal relationships and seeking what unites people despite their diversity. The second "key" opened hearts – it was meant to awaken sensitivity to the fate of others. The "third" key served to open minds for intellectual development, awakening the need for reading and inquiry (Hamerski, n.d., p. 9). The fourth "key" opened eyes – it signified critical thinking. These keys seem to be a kind of analogy to the 4C competencies, as they focused on creativity, collaboration, communication, and critical thinking, which, in those times, still dominated by a totalitarian system, were an important educational postulate for rebellious and innovative educators.

Primary School No. 83 in Poznań represents a systemic solution to the concept of "Łejery" pedagogy, and its creation was made possible because of the cooperation of J. Hamerski and E. Drygas. At the dawn of Poland's political transformation, both educators "dreamed" of a "school with soul" (Sadowska, 2024a), something they lacked

in their childhoods. Drygas and Hamerski developed their curriculum and began their activities by establishing a "theatrical preschool," located in the Youth Cultural Centre No. 2 at the Poznań Citadel. In the initial phase of its operation, the institution was based on the guidelines of the Order of the Minister of National Education of November 1989 regarding the principles of conducting innovative activities in schools (Zarządzenie…, 1989). Because the founders wanted their students to be immersed in democracy from the very beginning, the school in question, at its inception, began working with the children and their parents to create a "Little Łejery Constitution" which continues to guide the school's activities. At the school, the power relationship between teachers and students is being replaced by social participation. Student recruitment to the school is conducted through a competitive process. In practice, this means that candidates are invited to creative workshops, and children particularly gifted in this area become first-grade students (currently, the school does not have a "0" class). Since 2019, the school has been conducting a pedagogical experiment accredited by the Ministry of National Education, entitled "Theater as a Means of Comprehensive Student Development – Teaching Entrepreneurship" which focuses on the use of theatrical methods in supporting a child's comprehensive development (and is expected to be implemented by 2039).

Primary School No. 83 is in the building of a former Dutch school on Brandstaetter Street in Poznań since 1995. The building was transported from Mierlo on 13 trucks as a volunteer effort by parents and teachers (Czekała, 2016, pp. 318–319). Currently, the school has ten classes (grades one through eight), with 25 students in each class. The school has a public school status and is free of charge. The school resembles a theatre – instead of a school hall, there is a "foyer" furnished with theatre seats, a historic piano, and a cage with two parrots. The space is filled with props obtained from the Nowy Theatre, the Animation Theatre, and other cultural institutions. The walls are decorated with distorted mirrors and photographs of the entire "Łejery" community (children, staff, and friends of the school). Students move freely throughout the school, and there are no bells. In 2013, a professional theatre was added to the building – the "Common Stage", run by three entities: the "Łejery" Association, Primary School No. 83 "Łejery" and the "Children's Art Centre".

The pedagogical experiment is aimed at students with exceptional sensitivity, rich imagination, and emerging artistic talents. The authors of the study are Anna Zawadzka (drama teacher), Karol Sarna (school principal), E. Drygas, and J. Hamerski[1]. The experiment aims to "improve students' competences and knowledge, as well as

1 Pedagogical experiment "Theatre as a means of comprehensive development of students – entrepreneurship education" in force at Primary School No. 83 in Poznań, co-authored by Anna Zawadzka, Karol Sarna, Elżbieta Drygas and Jerzy Hamerski, obtained in pdf form from the resources of Primary School No. 83 in Poznań (Zawadzka et al., n.d.).

develop their emotional and social intelligence, which should be demonstrated by [...] noticeable pro-social activity in various areas of school, family, and professional life" (Zawadzka et al., n.d.). The experiment is being conducted at all levels of education. In grades 1–3, children are inspired to engage in creative activities, both during compulsory drama classes and during early childhood education. In grades 4–6, students move from the inspiration stage to the "creation of ideas" stage, while in grades seven and eight, the focus is on implementing these ideas. All teachers are required to work closely with theatre teachers, and two teachers are assigned to each class. As part of the experiment, the school not only features theatre education but also volunteer work, cross-class projects, and cross-curricular projects. Conflicts are resolved through a list of issues or with the participation of a constitutional "judicial authority" composed of students, teachers, and parents.

Creativity in Children's Education at Primary School No. 83 in Poznań

A space that encourages children to engage in creativity, perceived in the institution as the ability to generate new and original ideas, concepts, or solutions that lead to the creation of something new, valuable, and useful, is created by teachers from the moment a child enters school. Parents (actively participating in the children's education) also demonstrate creativity. They, along with teachers, discuss their children's plans and support their initiatives, including, for example, furnishing the space, sewing puppets, and providing materials necessary to implement their ideas. Fostering children's creativity is achieved through the following activities, traditional for this school:

- Morning reading in a circle, with which the teacher and children in grades 1–3 begin each day (the reading ritual begins at 8:00 a.m. and lasts approximately half an hour. The children then eat breakfast, and only from 9:00 a.m. do they begin the next scheduled activities. This activity is linked to a puppet theatre that accompanies the children throughout the school year (The books are linked to a class puppet, e.g., Pippi, Lamelia the Happy, or other characters.) The teacher's presentation is interspersed with a conversation with the children, who pose and answer questions and draw conclusions based on the discussion.
- Establishing a hero (the mentioned puppet) of the year and working with the stage puppet. Several special events take place throughout the school year around the character represented by the puppet (Zawadzka & Sypniewski, 2019/2020); the puppet most often becomes the inspiration for theatre activities (three times a week in smaller groups in each class).

- Paratheatrical forms in early childhood education. Theatrical inspirations are implemented both during drama classes and during early childhood education (including Polish, mathematics, natural and social sciences, as well as computer science and English). They are most often initiated by children who, encouraged by the teacher, independently propose, negotiate, and then implement specific inspirations. Students, with the non-interfering accompaniment of an adult, create their own stories, performances using drama techniques, write invitations, letters, diaries (e.g. a "weekend" diary of a stage puppet's stay at their place of residence), books, create elements of theatrical set design, costume elements, design and create posters, while learning to write, they make their notebooks of letters, giving them a personal meaning, they also prepare dictionaries of "difficult" words in terms of spelling, they independently invent mathematical problems, they visually document various experiences, prepare tickets for performances and special events, create names (including neologisms) that they think are necessary to describe the phenomena they experience, they discuss poems and prose that accompanies them every day at school, etc. (Drygas, 2014);
- Volunteering, which is part of the "Łejery" pedagogy (Drygas, 2024), in which children not only raise funds independently (e.g., by preparing concerts or selling their resources), but also by producing material goods during various workshops, such as sewing, cooking, DIY, etc. Each class at Primary School No. 83 is responsible for the educational adoption of a child from Madagascar. Each class cares for the next eight years, providing them with the funds needed for their school education. Children come up with ways to get money. It is also worth mentioning that "Łejery" organises special collections dictated by current events in need. All aid initiatives are an opportunity not only to shape the creativity of the school's youngest students but also to sensitise children to the needs of others.
- Free play, which is part of the "Łejery" pedagogy. Both in the garden and in the common room, students do not engage in so-called "guided play," and all the play they engage in is free-form. Children most often play in a "group" (the most common theme in play is theater), build together using blocks available from the school's resources, play board games, including a typical "Łejerska" game called button ball (on specially prepared mats), and have complete freedom to choose and pursue physical activity (they jump, run, dance, and teach each other acrobatics, including in the common room, which is located between the lower-grade classrooms and is an open space equipped primarily with a large carpet and physical activity aids). Children are not silenced or restricted in their motor skills, and teachers accompany them, assuming the role of silent observers;
- School special events, which require children (often including parents) to design not only the physical space but also the most important elements of the event

(Hamerski, 2011). Some of these events stem from school traditions, such as "Nocowanka" (Nightshake Night), "Dzionki Szalonki" (held on April 1st), "Zajączek" (Easter Bunny), "Christmas," and "Family Day." Some events also stem from themes related to stage puppetry. There are also other occasions, which are often spontaneous and result from the observation of specific needs by children and teachers.

"Łejery" creativity has many dimensions and also translates into the work of teachers, who prepare many teaching aids themselves based on work with each child. An example of such creativity is a student's notebook, in which teachers differentiate tasks prepared for children according to their individual needs and abilities. Children in the same class are assigned different tasks, teachers make separate entries in notebooks for each student, and address a separate request to each student to complete a specific task (e.g., they write down words that the teacher believes require consolidation for a given child, and then ask the child to write, for example, five sentences on a chosen topic, specifying that these words should be used in their speech).

Parents participate in school events, in lessons, and, when teachers encourage this, design the physical space of the classrooms, co-create set designs, theatre costumes, etc.

Critical Thinking and Social Cooperation in "Łejery" Early Childhood Education

Critical thinking is one of the most important principles in the school described here, as from first grade, children are required to make many decisions independently, evaluate their actions, and reflect on ways to improve the world in a broad sense. Responsibility for oneself and for functioning effectively within a "group" is one of the guiding principles, which can be seen upon entering the school, which is open (children move freely throughout the school). When describing ways to support the development of critical thinking at "Łejery," it is important not only to refer to the activities already described in the description of supporting the development of creativity, as all the highlighted forms of supporting this competence are also related to critical thinking, but also to the fact that everyone, regardless of age, functions within the same building. As mentioned, there are no bells at the school, so students keep an eye on their time for play and learning and are responsible for not being late. The school has so-called "timeouts." Social contracts named by the founder of "Łejery": "gentlemen's agreement", i.e. contracts based on trust (Drygas & Hamerski, 2024). Older students are obligated to care for younger ones (each seventh-grade student is cared for by one first-grade student, who is then cared for by eighth-grade students

as well). The school implements inter-class projects, there is no isolation or selection, and the entire student community gets to know each other perfectly.

At the beginning of the school year, each class draws up a contract between students and their teachers. This contract also contains several obligations imposed on the teacher, as it is co-created by the students in partnership with their "friend" or "girlfriend." As the founders of the school point out:

> Most often, such a contract, especially in the older grades, is drawn up during a 'sleepover', a period of several hours spent at school with the teacher, combined with an overnight stay, during which educational activities, games, shared meal preparation, etc., take place. In younger grades, drafting a contract can take up to several days (with breaks). As I begin working on the contract, I remind the children that certain standards must apply everywhere. Otherwise, cooperation would be impossible. To demonstrate this, I ask them to close their eyes and imagine a situation where there are no traffic rules whatsoever. Everyone can drive as they please – right or left – without observing road signs or regulations about who has the right of way. The students unanimously respond that this causes numerous accidents and massive traffic jams that practically make driving impossible. Classroom life must also have certain rules to avoid disasters. And we ask the children to create such rules (Hamerski, 2020).

According to E. Drygas and J. Hamerski, the contract aims to ensure "a safe classroom, no one gets hurt, everyone can learn as much as possible in a pleasant atmosphere, we feel good together, we feel good with the teachers" (Hamerski, 2020).

Children work on individual points in groups, preparing their proposals. The rules apply to both student and teacher conduct. Preschool and first-grade students draw their suggestions, and older children write them down. After developing proposed rules for each point, the groups present them in turn. There is time for discussion, negotiation, acceptance or rejection of the proposals. After all the points are approved, they are written on a large sheet of paper, read again, and formally signed by the children and teacher. The contract is then hung in a visible place in the classroom.

Adherence to the contract stems from the internal motivation of each community member, as "Łejery" is guided by the principle of respect for the needs of others (Drygas & Hamerski, 2024, p. 23).

All conflicts are resolved through a "to-do list," which is written down by the children (and in the case of first grade, written down at the children's request by the teacher or presented graphically in a way that the child expresses problems).

As J. Hamerski recounts the origins of the "to-do list" concept:

> "From the very first days, the biggest educational problem was complaining: 'I ask the girls, I ask the boy, and he punched me, and she's fighting...'" And so a list of things emerged, which we devised in self-defence. The children learned that there would be no

> complaining or constant running to the companion (teacher). Instead of complaining and getting offended, we'd write things down on a special board. When Piotrek kicked Marta, she wouldn't run to us; she'd write "M/P" on the board (Piotrek has a line on her). And when Marta got over it during the day, or Piotrek apologised, she'd draw a smiley face next to "M/P." There was also an opportunity to express thanks. A heart would then appear between the first letters of each person's name. Each day ended with a circle meeting. Kasia would then sit across from Jacek and, looking into his eyes, say, "Jacek, I'm angry with you because you kicked me." Now, Jacek had to explain it, and most often, he apologised, while we watched from the sidelines. The children would decide among themselves "who started it" and find a solution. They also learned to express not only their regrets, but their feelings, for example: "I felt sad when you made fun of me" or "It hurt when you pulled my hair." When this method was consistently implemented, "smiley faces" usually dominated the board. The children handled matters on their own, without our help (Hamerski, 2020).

All matters on the list are considered very carefully, and children have the right to argue their positions. Each case is resolved in such a way that, as Janusz Korczak used to say, "forgiveness" (Rogowska-Falska 1928, pp. 33–34). In difficult cases, the class may decide to refer the matter to a tribunal. It operates on principles similar to Janusz Korczak's peer tribunals and it is also the third and independent judicial authority in the school (alongside the president/principal and the Sejm and Senate).

Critical thinking and teamwork are reflected in a tendency to support the development of children's autonomy and a sense of responsibility for their decisions. As mentioned, "Łejery" students undertake many initiatives, which are often discussed in class or group discussions. They frequently face the need to modify their ideas and are also exposed to criticism. At the same time, teachers ensure that any criticism is constructive and that children don't become discouraged if their ideas are not implemented.

Because a "Łejery" school is a school where children constantly perform on stage, critical thinking is fostered through numerous rehearsals and performances in front of an audience. Students are required to participate annually in a recitation competition, which is participation of the entire school community. Each child independently selects a text, seeks sources of inspiration, and critically analyses their personal choices.

A common task for students in the first classes is a public presentation of their chosen reading material, and each choice must be well-reasoned.

Children are also encouraged to research a variety of information. Among the tasks they are required to perform are many that require analysing information from acquired sources. Starting in first grade, teachers initiate projects in which students conduct research and interviews, both independently and in groups, where they often select information.

Critical thinking and collaboration are also developed in the process of preparing for theatre performances – children are not always given tasks they are comfortable with; they often have to abandon their ideas and adhere to certain rules of the game.

Among the "Łejery" values, tolerance for differences is often emphasised, perceived as openness to innovation and a willingness to co-create and, as mentioned, provide assistance (Drygas & Hamerski, 2024, p. 23). A child is fully convinced that if they seek help from an older student, a cleaning "teacher," or a "friend" responsible for, for example, maintaining the school garden, they will receive assistance. Every person associated with the school is obligated to respect the child's right to respect (Drygas & Hamerski, 2024, p. 23), and every person must care for the dignity of others.

"Łejery" is a school where "children's individualities are nurtured" (Drygas & Hamerski, 2024, p. 23). In practice, this means that the facility is a place where "the courage to express one's own opinion and creative disagreement constitutes an educational and organisational value" (Drygas & Hamerski, 2024, p. 23).

"Łejery" Communication

"Łejery" is a lesson in democracy (Drygas & Hamerski, 2024, p. 23), so at the communication level, there are no "ladies" or "gentlemen," and each child addresses adults using the words "druh" or "druhna" ("compan"). A specific linguistic etiquette also applies to adult communication. Parents and teachers most often address each other by their first names, but in the presence of children, they use the same terms as children. Respect dominates in "Łejery" communication; every so-called "school instruction" is expressed through a request, and polite words are embedded in the language culture both in lessons and during play. Teachers formulate all information with care, ensuring that their requests are justified, bearing in mind that they are role models for the children. Every student has the right to discuss the validity of these requests and can express their opinion on any topic, but must do so in a manner. Statements that violate personal dignity are reported to the "case list" or, in more drastic cases, to the tribunal.

Maintaining a culture of communication is a key element of theatre classes, where children are often encouraged to practice drama techniques. In a safe environment, conflicts and misunderstandings are simulated, attention is paid to how others perceive words and gestures, and the reception of messages by other group members is analysed.

Each educational lesson is conducted with the utmost care and always focuses on current issues identified by the teacher and children in the classroom or school.

Because there are two teachers, there is a chance of the lesson being cancelled (if one teacher is absent, the other teacher will lead the lesson).

The "Łejery" communication, due to the postulate of "poznańness", i.e. shaping attitudes of local patriotism (Drygas & Hamerski, 2024, p. 22), is rich in phrases borrowed from the Poznań dialect, but also in many neologisms, the aim of which is to build a school culture in which everyone should feel like in one big family, like in a warm, friendly home.

Hence, instead of a staff room, there's a "druhówka"; instead of a cafeteria, there's a "jadalka". There are also "łejernie" - theatre rooms. This naming convention aims to make school the facility's space, moving away from the rigid framework of Polish education. For example, "Behind the movable wall lies the 'mizdrzalnia', where the girls have a mirror, a dressing table, a collection of hats, and a screen to shield them from prying eyes" (Gajdzińska, 1997, p. 8).

Assessment at Primary School No. 83 in the youngest grades (including the upper grades) is expressed through friendly, relatively short, and substantive feedback. Students first learn what they have achieved, and then the teacher identifies areas for improvement. Because first-grade students cannot read fluently, the information provided by the teacher is verbal. If the assessment is recorded, the parent is asked to read it to the child at home. It always begins with the child's name (e.g., Tosiu! Adasiu!), and only then does the body of the information emerge, followed by, for example, congratulations or requests for work on certain areas. Formative assessment encourages children to develop a sense of self-worth. Children have the motivation to make an effort. Frequent use of their first names allows them to feel a close emotional bond with the teacher.

"Łejery" communication is often heard in performances; children "play" with words, searching for synonyms and homonyms, which they use in everyday situations and during theatrical performances. Because art is a leading educational tool at Primary School No. 83, the school boasts a vast literary and musical repertoire. Works for the "Łejery" have been written by Wanda Chotomska, Emilia Waśniowska, Grzegorz Przewoźniak, and other authors (Hamerski, 2011; Drygas & Hamerski, 2008; Drygas & Hamerski, n.d.; Chotomska, 2005). Children in grades 1–3 eagerly engage with the "Łejery" repertoire, and E. Waśniowska's poems and the lyrics of "Łejery" songs become a kind of linguistic dictionary for them, which they use with pleasure in everyday life – the children are immersed in literary works of high artistic quality. Communication, in its specific form, also occurs through theatre, which is often created by children and accompanied by a theatre teacher.

Children's community theatre, as the leading institution in the school in question, fosters effective communication and broadly understood comprehensive education, as it is perceived by "Łejery" educators as an educational means rather than a goal

achieved through hours of repetition, arduous rehearsals, or re-creative work led by a directive director. Theatre in the "Łejersy" institution aligns with the principles of theatre pedagogy described by Aleksandra Denkowicz (2022) as: "creative dialogue [...] around topics that are considered difficult or controversial, through theatrical-pedagogical techniques enabling reflection on the issues raised in performances, critical reception of performances, and the process of naming what happens in the confrontation between theatre and reality" (p. 53). In "Łejery" theatre, an act of communication characteristic of educational theatre occurs, which can be considered on several levels and planes. The first level of communication is "verbal contact, the second is non-verbal means" (Kalinowski, 2001, p. 29).

Educators of "Łejery" theatre seem to be well aware that the first challenge posed by education through theatre is, as Daniel Kalinowski (2001) points out, verbal communication. "In educational theatre activities, one must devote considerable time to building a common language with the participants" (p. 29), building effective verbal communication requires special consideration and sensitivity, because the people with whom one works are people "with different expectations and perceptions [...] and all work in the same workshop group" (pp. 29–30). Non-verbal communication is also crucial in the pedagogy of "Łejery" theatre, perceived in theatre pedagogy as "non-verbal communication, more closely related to the art and the stage" (Kalinowski, 2001, pp. 29–30).

Conclusion

In contemporary Poland, regardless of the institution children attend (whether it's a nursery, preschool, or school), the prevailing model of formal education is one with a strong emphasis on teacher, instructor, or caregiver-led activities and the development of work plans with predetermined learning outcomes. Meanwhile, curriculum orientation (of upbringing and teaching) is always external to children's needs, wills, interests, and aspirations (Klus-Stańska, 2019, p. 271). At Primary School No. 83, as in Jan Korczak's pedagogy, the "experts" are the children (Kirchner, 2013, p. 171). "Łejery" is an example of a non-standard school where, from the very beginning, the founders aimed to "break stereotypes" (Drygas & Hamerski, 2024, p. 22). From the very beginning of his teaching career, J. Hamerski noticed that competences such as creativity, cooperation, critical thinking and communication are key in the life of a conscious person.

This extraordinary "school, not a school" (Drygas & Hamerski, 2024, p. 1) is a place that the youngest students often compare to *Mr. Kleks's Academy* (Brzechwa, 2018), and the art, kindness, and atmosphere of agency surrounding it equip them

with competencies that, over the years, lead them to achieve many successes. This is evidenced by the fact that subsequent "Łejery" graduates go on to prestigious secondary schools, are laureates of numerous competitions, and "Łejery" children are laureates of the "Odyssey of the Mind" competition. As the school's founders say about their graduates:

> They are often class presidents. They have organisational skills. They establish theatres or cabarets. When someone needs to be sent to the principal to deal with difficult matters, they send "the Łejer". And finally, they are not afraid of public speaking [...]. They are not afraid to have their own opinions and defend them to the bitter end (Drygas & Hamerski, 2024, p. 40).

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Information Processing Speed and Academic Success: A Qualitative Inquiry Into the Perception of Teachers and Parents by Students

Szybkość przetwarzania informacji a sukcesy szkolne. Jakościowe badanie postrzegania uczniów przez nauczycieli i rodziców

KEYWORDS

mental speed, motor speed, school performance, school performace, cognitive abilities

ABSTRACT

In the article, the construct of mental speed is analysed as a biologically predetermined basic cognitive skill. It presents the results of research aimed to investigate the relationship between motor/mental speed and students' school performance from the point of view of teachers and parents. Applying procedures of the qualitative research paradigm, the central method of data collection was a semi-structured interview with 17 teachers and 10 parents of students with extreme (both high and low) values of mental and motor pace. The analysis of the interviews with the teachers provides information on stereotyping pupils with a higher mental and motor pace. In their teaching practice, teachers do not reflect enough on students' different mental and motor pace. There are almost no modifications of the curriculum, levels of task difficulty, differentiation of assignments e.g. according to cognitive demands of assignments. Also, a connection was revealed between both teachers and parents' self-perceived temperament types and their attitude towards children with a low mental pace.

SŁOWA KLUCZE

szybkość mentalna, szybkość motoryczna, wyniki szkolne, zdolności poznawcze

ABSTRAKT

W artykule analizowany jest konstrukt szybkości mentalnej jako biologicznie uwarunkowanej podstawowej zdolności poznawczej. Przedstawiono wyniki badań dotyczących związku między szybkością motoryczną i mentalną a wynikami uczniów w szkole z perspektywy nauczycieli i rodziców. Wykorzystując procedury jakościowego paradygmatu badawczego, podstawową metodą zbierania danych był półustrukturyzowany wywiad przeprowadzony z 17 nauczycielami oraz 10 rodzicami uczniów o skrajnych (zarówno wysokich, jak i niskich) wartościach tempa mentalnego i motorycznego. Analiza wywiadów z nauczycielami dostarcza informacji na temat stereotypizacji uczniów o wyższym tempie mentalnym i motorycznym. W praktyce dydaktycznej nauczyciele nie uwzględniają w wystarczającym stopniu różnic w tempie mentalnym i motorycznym uczniów. Niemal nie dokonuje się modyfikacji programu nauczania, poziomu trudności zadań ani różnicowania poleceń np. pod względem wymagań poznawczych. Ponadto ujawniono związek między samoocenianym typem temperamentu nauczycieli i rodziców a ich podejściem do dzieci o niskim tempie mentalnym.

Introduction

When defining both the construct of intelligence and the structure of a person's cognitive abilities, fundamental constructs are often considered. In older sources of psychological literature a large number of studies can be found focused on investigation of biological foundations of human intelligence. Basic cognitive mechanisms are perceived as more fundamental than other elementary mechanisms of cognition. According to Roberts & Stankov (1999), these biologically predetermined constructs include the concept of mental speed, also referred to in professional literature as information processing speed. More recent studies of cognitive performance speed perceive it as a phenomenon causing differences in a person's other cognitive characteristics. Extensive research focused on mental/cognitive speed has been carried out in many different countries. In the current literature, there are a substantial number of empirical studies investigating the relationship between a person's mental speed and cognitive abilities. McAuley & White's (2011) research results show that information processing speed, inhibition and working memory are separable abilities and the extent of this separability is stable during development. In other words, it cannot be automatically expected that a "slower" person with lower information processing speed inevitably has a lower level of other executive and cognitive processes. Nuño et al. (2021) examined mental speed in a clinical population of patients with depression.

Neurological correlates of information processing speed were a subject of research by Silva et al. (2019). Andersen et al. (2023) analysed influences of digital technologies on changes in a person's mental speed. Experimental interventions to increase mental speed have also been explored: e.g. Moore et al. (2023) assessed the impact of the ReadRx reading intervention on cognition including information processing speed. Tsai et al. (2019) studied the connection between motor competence and muscular fitness with information processing speed in preschool children.

The research by McEachern (2017) has shown that slow information processing in students is often misinterpreted as laziness, which can negatively affect their self-esteem and school success. The authors identified a significant relationship between processing speed, working memory and mathematics performance, considering these factors as predictors of numerical intelligence. In contrast, Malone and colleagues (2022) highlight the relationship between motor skills and executive functions as elements of school readiness. Although they are related, the researchers emphasise their partial independence. The strongest correlations between these abilities are observed in early childhood (Kim et al., 2018; Floyer-Lea & Matthews, 2004), supporting Anderson's (2007) concept of shared brain areas involved in different cognitive tasks. The research by Roebers et al. (2014) and Pitchford et al. (2016) indicate that executive functions are more important for school achievement than motor skills – particularly in reading, writing and mathematics.

In our article, the subject of analysis is students' mental speed as a determinant of school performance. The construct is examined from the point of view of parents and teachers.

Research Problem

The data presented in this article is a part of a more complex research focused on the relationship between mental speed, cognitive flexibility and school performance (Kovalčiková & Miecznik-Warda, 2022). The research also includes questions of a descriptive nature: How do teachers evaluate performance of students with different mental speed during class? How do teachers take into account students' mental pace during the education process? How do parents think about their children's mental pace in relation to their academic results?

Methodology of Research

Participants. The research was carried out at a randomly selected elementary school in Sosnowiec (Province of Silesia), Poland. The sampling frame was the online search

engine for schools and educational institutions on the website of the Ministry of Education and Science of the Republic of Poland. Three schools were included in the research by lottery from the database of schools in the Province of Silesia. The basic selection criterion for the school to be chosen was the school management willing to participate in the research activities. The study included students, teachers and parents of children from the 3rd, 4th and 5th grades of the primary school. The research was carried out in 2022–2023. Phase 1 included 100 students of the 3rd, 4th and 5th grades, diagnosed with tools measuring mental and motor speed (hereinafter MeMoS). In the relational research investigating relationships between MeMoS and school performance (Kovalčiková & Miecznik-Warda, 2022), pupils with extreme (both low and high) MeMoS values measured with D-KEFS TMT (Delis et al., 2001) and the test "Pętelkowanie" ["Looping"] (Bogdanowicz et al., 2008) were identified. The first test belongs to the D-KEFS group of tests to measure the level of executive functioning of children and adults aged 8–89 years. It was developed by Dean Delis, Edith Kaplan and Joel Kramer and published in 2001. The Road Test – D-KEFS (TMT – Test of Test Taking) focuses on cognitive flexibility, visual attention, mental and motor speed. It consists of 5 subtests: visual research, number layout, letter layout, alternating letters and numbers – cognitive flexibility and mental speed as well as motor speed. In the study in question, a subtest examining motor and mental speed was used to select the group. Another test aimed to select the research group is the "Looping" test. This is a subtest of the "group of methods for diagnosing the causes of pupils' school failure" (Bogdanowicz et al., 2008). It assesses the level of fine motor skills, hand mobility (exercised activity), hand dominance and eye coordination. A respondent draws loops in one minute. By comparing the test results with the standardised performance, we also get information about the person's motor speed.

Teachers and parents of those children, who were diverse in personality, both calm and reflective and energetic and socially active, were then included in the study.

Thus, the interviewed participants were intentionally selected based on results of the previous phase of research. Seventeen teachers participated in the study, including 12 women and 5 men, with professional experience ranging from 9 to 22 years. They represented various specialisations: four Polish language teachers, three mathematics teachers, five early childhood education teachers, two natural science teachers, one history teacher, and two art teachers. The majority were nominated teachers (N = 9), while the remainder were chartered teachers (N = 8).

Ten parents also took part; all of them were mothers of the pupils (six mothers of boys and four mothers of girls). The mothers' socio-cultural status was assessed using three indicators: level of education, occupation and place of residence. The analysis showed that six of the mothers held a higher-education degree, and four had completed secondary education. In terms of employment, some worked in the service and

trade sector, some in specialised professions, and the rest as administrative/clerical staff or self-employed business owners. Most lived in medium-sized and large cities (N = 8), while two respondents came from rural areas. The collected data indicate that these mothers can be classified as having a moderate to high socio-cultural status.

Tools and Procedures

The basic method of data collection was a semi-structured interview. Questions posed to teachers concerned their self-assessment of temperament traits, knowledge of pupils' cognitive characteristics, diagnostic practices in the educational process, and their approaches to working with students exhibiting different MeMoS. They were as follows:

- Which temperament type do you identify with? Are you more impulsive and fast-paced, or rather slower, calm, and reflective?
- How do your students differ from one another? With which students is it easier for you to work: those who are more impulsive and quicker, or those who are calmer, slower, and more reflective? Why?
- In your work, can you recognise students with low mental processing speed? How do they function in class? Do they encounter difficulties? What kind? How do they cope?
- Similarly, can you recognise students with high mental processing speed? How do they function in class? Do they encounter difficulties? What kind? How do they cope?
- What test results do students with high processing speed achieve? And those with low processing speed?
- Do you notice differences in test outcomes between these two groups? What academic results do they attain?
- Do you believe that students' academic outcomes are related to their mental processing speed?
- How do you individualise your instruction for these students? Which forms and methods do you use?
- With which type of student is it easier for you to work with? Why? What are the advantages of working with each type of students and how do you leverage them?
- What challenges arise when working with a student who has low mental processing speed? How do you address them?
- In your opinion, how do children with low mental processing speed function within the school environment?

- In light of our conversation, what kinds of support measures do you think would be helpful for these students?
- Questions posed to parents concerned their self-assessment of temperament dispositions, their children's school achievements from the parents' perspective, and their children's study habits at home:
- How would you describe your child? What temperament type do they exhibit? Are they slow and calm, or quick and impulsive?
- How do you assess your child's level of knowledge and skills?
- Does your child enjoy going to school? Do they enjoy studying?
- What academic results does your child achieve? Are they satisfied with them? How about you?
- Does your child experience difficulties in learning? If so, what kind of difficulties?
- Are these difficulties primarily school-based or related to homework? How does your child cope with them?
- Do you think these learning difficulties are related to your child's temperament traits?
- If your child has difficulties at school, what form of support does the school provide? Do teachers respond to these difficulties? How?
- If there are no difficulties, do you believe this is related to your child's temperament or their work habits in class?
- How does your child handle homework at home? How much time do they spend studying? Do they work slowly or quickly? Do these traits help or hinder their work?
- Is your child independent in their studies? Do you assist them? To what extent? Does your child expect your help?
- What is the atmosphere like during home study sessions?
- In your opinion, how does your child function academically both at school and at home? How do they cope with assigned tasks?
- Considering our entire discussion, what recommendations would you make regarding the education of students like yours?

Data Analysis

Recorded interviews with parents and teachers were transcripted. Categories of the data were formed ad hoc from the empirical material. The analysed categories represented a generalisation based on the level of specific relationships between acquired pieces of information. The study was conducted using Reflexive Thematic Analysis in accordance with Braun and Clarke's (2022) guidelines. Semi-structured interviews

with teachers and parents of pupils displaying varying processing speeds (MeMoS) were subjected to a six-phase thematic analysis:

1. Familiarisation with the data: Interview transcripts were read repeatedly, with initial observations and potential areas of interest noted.
2. Coding: Based on excerpts from the participants' accounts, codes were generated, including: difficulties copying from the board; accuracy versus speed; catch-up strategies during breaks; experienced stress and frustration; impulsivity of faster students. Each code reflected a specific strategy, problem, or emotional aspect described by the respondents.
3. Generating initial themes: Codes were grouped into four primary thematic threads: perceptions of slower and faster pace (codes: graphomotor difficulties; perceived ability), Coping strategies (codes: breaks; borrowing notebooks; additional tasks), Emotional and social consequences (codes: stress; diminished motivation; peer relationships), Educational recommendations (codes: time individualisation; task adaptation; parental expectations)
4. Developing and reviewing themes: Themes underwent iterative review; some codes were merged (e.g., "stress" with "frustration"), others separated (e.g., "strategy of hiding unfinished work" from "working during breaks"), to better capture the diversity of the participants' experiences.
5. Refining, defining, and naming themes: Each theme was assigned a descriptive label reflecting its essence: Slower and Faster Pace – Classroom Perceptions; Pupils' and Teachers' Coping Methods; Emotional and Social Effects of Pace Differences; Expectations and Recommendations for the Education System.
6. Writing up: Findings were presented alongside illustrative quotations from teachers and parents.

This analytic approach provides an in-depth understanding of how differences in processing speed influence students' academic success and identifies strategies and recommendations to improve instructional practice.

Interviews With Teachers

Perceiving slower vs. faster pupils. Teachers describe pupils with slower MeMoS as less successful, as weaker and having trouble keeping up with peers. Their problems are related to writing off the blackboard within the specified time, slower performance of written exercises, failure to fulfil assigned tasks in class, and failure to finish both tests and written work. Art teachers report that such pupils usually fail to finish art and technical works. They believe that the "slowness" of performance is most likely related to students' less developed fine motor skills. Elementary teachers think that the child, who writes slowly, writes misshapen letters usually of different sizes, does

not follow the line, and has problems with graphomotorics. Some teachers report that students work slowly because they care too much about the quality of their handwriting. Their work is precise and handwriting neat, but they are not able to finish work within the specified time.

Pupils of higher grades try to cope with the problems of keeping up with the work pace on their own. Teachers report that students work during breaks, borrow exercise books from school mates, take photos of the blackboard (with the teacher's permission) and finish school tasks at home. One teacher notes that these pupils' problems are related to stress due to their inability to keep up with others, resulting in decreased achievement motivation. Teachers also observe that if students fail to finish tasks, they often try to hide the unfinished work to prevent working during breaks or they ask for the option to finish the work at home. Their exercise books often contain gaps, empty lines and unfinished tasks. One teacher pointed out that *"these students get stressed by the fact that the others have finished and they have not; (…) they get tired of the task because it takes them longer than the others, and they get frustrated quicker with what is happening during the lesson"*.

According to teachers, pupils with high MeMoS write fast, perform manual, art, technical and manipulation works fast. They learn well and cause no problems in class. Some teachers note that pupils with high MeMoS are often imprecise, the handwriting of pupils who write fast is not neat, and they often make spelling and punctuation mistakes, omit letters or change their shapes. According to teachers, the mistakes are the result of impulsive behaviour and a lack of concentration. Art teachers note that the work of such pupils is superficial and lacking in detail.

According to most respondents, slow MeMoS students achieve considerably lower academic results than their peers working faster in class.

Assessing pupils' mental speed. All teachers report to be able to recognise differences in their pupils' mental speed even without specific diagnostic means. The above behaviours reported by teachers can be summarised as follows: low MeMoS pupils are passive, do not respond to stimuli and orders, solve tasks slowly and have fewer ideas for solution of problem tasks than their faster-thinking peers. They are unlikely to finish a test within the specified time. The biggest problem is "to keep up" with other pupils when working together in class. This leads to the need for an individual approach to the student and additional instructions. Slow pupils require repeated reminders of work instructions and frequent guidance on specific tasks. Based on teachers' observations, such pupils are perceived by their peers as weaker and less helpful in class. Most teachers treat them as unable to cope with school demands.

According to teachers, high MeMoS students are the most visible in class. They have many task-solving ideas, they are active, always first to respond, they always finish tests in advance, they are first in math calculations and with ideas for solving

problems. Teachers add that such pupils are usually over-impulsive in their reactions; they think fast and respond fast, sometimes without thinking. They often work in the "trial/error" scheme. The speed with which they react means that they sometimes loose attention or the ability to notice details and think in terms of the requirements of the tasks they are performing. They may be superficial. Respondents also notice that some high MeMoS pupils can overwhelm the teacher with their presence, "rush" others with their work pace, are impatient and less tolerant towards slower students. Having solved their tasks, they often disturb others. Such experience, however, does not influence the general opinion of most respondents that pupils with high mental speed are perceived as more talented and skilful than their peers.

Educational procedures. Interviewed teachers say that they try to implement various ways and methods of work with pupils with extremely different paces. All report that they take into account differences in such students' activities in class. All interviewed teachers unanimously report that, according to their observations, pupils with lower mental speed, i.e. slow thinkers, write and also perform various practical activities at a slow pace. Thus, respondents perceive the connections between the mental speed. Teachers report various ways and methods of work with pupils with different MeMoS. For high MeMoS pupils, they prepare additional tasks, worksheets, workbooks for development of cognitive processes, (e.g. analytical thinking, visual perception), use classroom libraries – work with encyclopaedias, read books, delegate looking up concepts relating to the subject matter in encyclopaedias and presenting them to the class after completion of tasks by all pupils, create classroom rules for subsequent activities after finishing work (tidy up one's place, help a school mate, read an interesting fact from the presented envelope and inform others about it, pick another task from the "task box" and complete it).

Low MeMoS pupils are adjusted the number of tasks in tests, extended time for tests – allowed to finish tests during breaks; reduced the amount of text to write off from the blackboard, allowed to take photos of the blackboard, notes from schoolmates; teachers themselves decide which pupil will answer the question (to eliminate "pupil hand raising").

Interviewed teachers report these advantages of working with higher MeMoS pupils: dynamic work in class, progress by curriculum, possible use of other attractive forms and methods of work in result of the created time space. In the education process, teachers prefer to work with higher MeMoS pupils.

Interviews With Parents

Description of pupils' situation at school. Analysis of statements of parents of children diagnosed (in a previous phase of our research) with a lower level of MeMoS shows

a general tendency in the opinions that these children have problems at school. Most respondents confirm that their children, despite their willingness to go to school, do not want to learn. It is difficult for them to fulfil school duties and study. Their performance at school is often assessed as below average. Parents report that the children do not seem to be less intelligent; their problems with learning are rather caused by their slow work pace, problems with concentration, and insufficient time to complete assignments. Their greatest difficulties are caused by tests, because the children are unable to complete them on time. Moreover, such children experience stress in every lesson, because they have problems to write off the blackboard, complete the assignment in the time limit and keep up with their school mates. Then, at home, they have to ask their friends what is for homework because they did not have time to write it down in exercise books. Parents are aware of children's under-achievement at school. They have to try hard to help their children catch up on what they missed at school. However, they report that the extent of the child's problems depends on the teacher's ways of working. Some parents are aware of their children's slow pace of work, but they know that their teachers prefer the children to finish the task in the common room during breaks. In general, parents appreciate teachers' work because teachers often spend their free time during breaks helping their children.

Interviews with parents show that another problem of low MeMoS pupils is relationships with peers. Such children, especially in higher grades, are considered slow thinkers; there are situations when they are laughed at by their peers for their "slowness", inability to "keep up" with the class, as well as for slow movement reactions in physical education class. One mother described her child's difficulties with peer relationships in the classroom as follows: *"She's in a pretty dynamic class and she's quieter; she has different interests than her peers. They found a sort of weaker link in her (...); unfortunately she began to function in the classroom as the class fool who can be laughed at and who will not react. (…) After that, she had a blockage because they were laughing at her. The same at PE. She excels in individual sports, but in team sports she cannot keep up with her colleagues, her friends. There's a problem because she didn't run that fast, she didn't catch the ball. Well, so they are laughing at her".*

Opinions of parents of high MeMoS children are different. Such children like school. Respondents say that teachers talk positively about these pupils, they appreciate that they are active, respond promptly and fulfil instructions fast. The children have no problems in relationships with peers. However, parents notice some problems, especially during tests and exams. "Fast" children are often inattentive; they do not read instructions till the end and misinterpret them. Respondents think that it is caused by the desire to finish the task quickly, "to be the first", and by the reluctance to sit at the desk for a long time. Parents of younger pupils note that, if in a hurry, these children's handwriting is illegible, their descriptions of things in a creative assignment

are too brief, and they use short sentences instead of complex clauses. Parents report that some teachers ask those students to correct their work while other teachers do not require it. Most parents say that they are not satisfied if teachers do not require corrections of fast but imperfect performance. Parents agree that not all teachers adjust teaching methods and procedures to pupils with a different work pace. As a standard, teachers work with the whole class at a uniform pace without differentiating tasks and time demands. They require the same and at the same time from all pupils. Parents try to help their children with homework giving some tips, advice, and even clocks to watch the time, or send them to special courses helping them to concentrate.

Description of students' situation at home. Mothers of slow MeMoS pupils describe how much time their children spend on homework. Such children require constant care and supervision. They work, write, learn and think at a slow pace. Mothers attribute it either to children's bad concentration or calm nature. As one interviewee stated, *"my son's favourite expression is 'I don't know'. And it's 'I don't know' not because he doesn't know; it's because he probably doesn't want to think. I have to pour out my frustration on him sometimes to make him want to think"*. These mothers admit that the atmosphere at home while working is unfortunately not positive. In some homes, there are even conflicts and tensions between a child and a parent. Mothers often used to say that their children would then retreat into themselves, and no longer give anything of themselves and give up.

Mothers describing themselves as energetic cannot understand why their children need so much time to finish tasks. They attribute this condition to laziness or bad concentration. One mother describes her son as follows: *"I must admit that my son is completely different from me. He is much calmer, even phlegmatic, which drives me mad. I guess he does not know what I think inside, because I do everything for him and I do not want him to feel it. I try not to hurry him, not to stress him, but it is a challenge"*. Mothers describing themselves as calm and rather reflective try to create enough time for their children to do homework and seek professional advice to help them. They say that it is no great frustration or problem for them; they understand their children's needs.

According to their parents, high MeMoS pupils do homework quickly and efficiently, but often inconsistently. The time they spend on learning is too short. Parents say that their children are energetic, active and bright. Teachers endorse parents' opinions. Homework is done in a positive atmosphere at home. Parents report that their children do not like to correct their mistakes when pointed out, do not like to return to the work done, do not like to check the completed assignment. As a result, according to parents, although the children complete tasks quickly, they often make mistakes due to inattention.

Parents demand teachers to pay more attention to slow MeMoS pupils, to use methods allowing all pupils to understand the subject matter. Parents express the

opinion that teachers should adjust the amount and type of homework to children's work pace, and that it is not right if most teachers adjust the pace of work to the fastest pupils in class.

Discussion

Professional discussion on students' cognitive characteristics provides space for reflection on methods of working with pupils with different educational needs. Research in the cognitive construct of mental speed allows perceiving information processing speed as a determinant of such individual behaviours that are considered constituents of "intelligence" or cognitive abilities. However, manifestations and contexts of cognitive abilities predetermined by mental speed in the school context are not a frequent subject of research. The finding of the present descriptive investigation is that there is a connection between the teacher's and the parent's (self)perceived temperament type and the relationship between assessing and respecting differences in children's mental speed. In the opinion of teachers describing themselves as energetic and temperamentally strong, low MeMoS pupils are passive and academically weaker. Such assessment of low MeMoS pupils exerts a significant influence on the evaluation of their performance at school and their school achievement manifested in the classification grade. Teachers describing themselves as temperamentally balanced and introverted believe that the speed of work does not influence academic results if pupils have enough time to complete tasks. Interviews show that these teachers individualise instruction more.

In general, teachers claim to recognise pupils with different MeMoS without problems. Low MeMoS pupils write slowly and think slowly. Interviews with teachers provide information about positive stereotyping of higher MeMoS pupils. All interviewed teachers perceive them as bright and quick thinkers, active and creative ones. Paradoxically, however, teachers also report that their literary or art works often lack precision, are rather brief and without details. Some of such students are also superficial and imprecise. Their responses are influenced by impulsiveness – they are not always well thought out and right. Yet, fast MeMoS pupils, especially if they are also talkative, are considered more intelligent, and they are easier to work with in class. Some teachers seek educational solutions in individualised instruction. They prepare supplementary tasks and worksheets for high MeMoS pupils. On the other hand, they give more time to low MeMoS pupils to complete assignments, but often at the expense of breaks. They even reduce the number of tasks in tests. Respondents' answers show that there are almost no modifications of the curriculum, levels of task difficulty, assignment differentiations, e.g. by cognitive requirements. In this context, it is appropriate to state that while higher mental speed is in general associated with better academic performance, it is only one of many factors contributing to pupils'

academic success. Other cognitive abilities, such as working memory, attention control, motivation and metacognition, also play a significant role (Md Hassan & Rahman, 2017; Prokhoroy et al., 2015). Pupils with lower mental speed may show other cognitive strengths contributing to their academic success and ability to learn. Their strengths may include e.g. the quality and depth of thinking, level of analytical thinking – although they need more time to analyse information, this may lead to a deeper understanding and critical evaluation of concepts. Such pupils often excel in social science subjects requiring thoughtful reflection. Slower information processing allows pupils to create unique ideas and approaches to problems. We are of the opinion that current teacher training should include applied knowledge about the pupil cognitive equipment as the basis for effective individualised education also of slower, but perhaps more analytically thinking, students.

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The Importance of Physical Activity in the Holistic Development of Children in Early School and Preschool Education

Znaczenie aktywności ruchowej w holistycznym rozwoju dziecka w wieku edukacji wczesnoszkolnej i przedszkolnej

KEYWORDS

physical activity, pedagogical innovations, cross-curricular integration, educational balls EDUballs

ABSTRACT

Movement, as an integral part of education, is an important element supporting children's holistic development. An interdisciplinary approach to education is the foundation of contemporary teaching and learning, integrating various areas of student development. Numerous studies on the characteristics of preschool and early school-age children confirm this, indicating that integral teaching is the optimal solution for organizing the teaching process, as it focuses on children's well-being, their holistic functioning, and their comprehensive development. Physical activity supports neurogenesis and the development of cognitive functions such as memory and concentration, which has a direct impact on the effectiveness of teaching and learning processes. The interdisciplinary combination of education and movement is distinguished by a more comprehensive achievement of teaching objectives. The aim of the research, conducted over 20 years, was to determine the effects of using EDUballs and during movement classes integrated with subject content (Polish, English, and mathematics) on physical and cognitive development. To this end, 13 pedagogical experiments were conducted in natural settings using EDUballs. It was found that there are positive relationships between physical activity integrated with subject content using EDUballs and students'

reading, writing, and numeracy skills. EDUballs also positively impact students' motor skills, eye-hand coordination, time-space orientation, and graphomotor skills.

SŁOWA KLUCZE

aktywność ruchowa, innowacje pedagogiczne, integracja międzyprzedmiotowa, piłki edukacyjne EDUballs

ABSTRAKT

Ruch jako integralna część edukacji stanowi ważny element wsparcia holistycznego rozwoju dzieci. Interdyscyplinarne podejście do edukacji stanowi fundament współczesnego nauczania-uczenia się, integrując różne obszary rozwoju uczniów. Potwierdzają to liczne badania nad właściwościami dzieci w wieku przedszkolnym i młodszym szkolnym, wskazując, że nauczanie integralne jest optymalnym rozwiązaniem organizowania procesu dydaktycznego, gdyż skupia się na dobru dzieci, ich całościowym funkcjonowaniu i wszechstronnym rozwoju. Aktywność fizyczna wspiera neurogenezę oraz rozwój funkcji poznawczych, takich jak pamięć i koncentracja, co ma bezpośrednie znaczenie dla efektywności procesów nauczania i uczenia się. Interdyscyplinarne połączenie edukacji z ruchem wyróżnia się pełniejszym osiągnięciem celów dydaktycznych. Celem zrealizowanych w ciągu 20 lat badań było określenie efektów wykorzystania piłek edukacyjnych EDUball podczas zajęć ruchowych zintegrowanych z treściami przedmiotowymi (językiem polskim, angielskim, matematyką) w zakresie rozwoju fizycznego i poznawczego. W tym celu przeprowadzono 13 eksperymentów pedagogicznych w warunkach naturalnych z wykorzystaniem EDUballi. Okazało się, że istnieją pozytywne związki pomiędzy zajęciami ruchowymi zintegrowanymi z treściami przedmiotowymi realizowanymi z EDUballami a umiejętnościami czytania i pisania uczniów oraz rachowania. EDUballe pozytywnie wpływają także na umiejętności ruchowe uczniów, na zdolności koordynacyjne: oko-ręka, orientacja czasowo-przestrzenna czy umiejętności grafomotoryczne.

Intoduction

Movement is an important element in the educational process, playing a key role in the development (not only physical and motor) of preschool and early school-age children. Research clearly indicates that movement can also support the development of cognitive, emotional, and social functions (Webster et al., 2015; Donnelly et al., 2016; Klichowski & Przybyła, 2017; Tremblay et al., 2017; Daly-Smith et al., 2020; Mavilidi et al., 2023; Rokita et al., 2024; Rościszewska & Klichowski, 2024; Mavilidi et al., 2025).

The physical fitness status of children and adolescents in Poland in 2024 is highly concerning. The systematic, significant deterioration in strength, coordination, and

endurance test results is causing considerable concern. Negative trends have been observed for several decades, including weight gain (increasing numbers of overweight and obese young people) and decreased physical fitness, which in many cases has fallen below the levels observed in Poland at the turn of the 1970s and 1980s. Przewęda defined this phenomenon, for both boys and girls, at the beginning of the 21st century as the "spreading scissors syndrome" (Dobosz, 2024). Not only is physical fitness declining, but there is also a noticeable lack of motor skills. Basic motor skills are essential in children's motor development, providing the foundation for more complex physical and sporting activities (Barnett et al., 2016). Early school age (6–9 years) is a key period for the development of skills such as running, jumping, throwing, and kicking. These skills not only support the development of coordination and physical fitness but also strengthen children's self-confidence, both in new movement challenges and in building social relationships (Makaruk, 2025). Firek (2025), in a report, compared literacy skills, and I would also add numeracy skills (i.e., basic competencies of early childhood education students), which enable understanding the world, meanings, and words, to movement skills, which allow people to understand, experience, and act in the physical world, in which the body is not a tool or an adjunct to the mind but an integral element of human identity and cognitive, emotional, and social abilities.

The younger school age, around 7–10 years old, is the period when children achieve the best results in motor learning (Raczek, 2010). One of the key achievements of this period is the development of motor coordination and precision, which allows children not only to write but also to play instruments, draw, and cut.

Especially in the early stages, people develop their entire selves simultaneously (Pesce et al., 2016). Development in one area has consequences in others. It is therefore not surprising that physical activity positively affects all areas of human functioning: emotional, physical, cognitive, and social (Kruszwicka, 2023). Physically, physical activity affects physical fitness, stimulates body growth, influences skeletal mineralization, prevents and corrects postural defects, strengthens and stabilizes joints, strengthens attachments, tendons, and ligaments, increases the cross-section and volume of muscle fibers, has a positive effect on the respiratory and immune systems, enhances cardiac function, increases brain volume, and has a beneficial effect on BDNF protein levels in the blood. Mentally, physical activity improves well-being, reduces stress, develops responsibility, improves self-esteem, stimulates a sense of security, facilitates adaptation processes, provides relaxation, reduces anxiety, and prevents mental illness and reduces symptoms of depression, bipolar disorder, schizophrenia, and anxiety disorders. Cognitively, physical activity positively affects academic progress, develops attention, memory, and executive functions, shortens decision-making time, increases selective attention, improves concentration and perception, increases cognitive control, accelerates information processing, develops problem-solving skills, improves

planning ability, increases decision-making speed, and stimulates creativity. In the social sphere, physical activity teaches interpersonal and social communication, teaches cooperation and collaboration, promotes the formation of relationships with others, supports the acquisition of social skills, promotes the creation of bonds, love, and cooperation, and teaches how to cope with victories and defeats (Kruszwicka, 2023).

Recently, in May of this year, Psychological Bulletin published the article "How physical activity context relates to cognition across the lifespan: A systematic review and meta-analysis," in which the authors conducted a review and meta-analysis of the impact of physical activity on cognitive functions. Mavilidi et al. (2025) found that the impact of physical activity on cognitive functions depends on many factors, including individual factors (age, gender, special educational needs, motivation, and emotions) and those directly related to physical activity (where it is performed, when and why, how and with whom, how often, with what intensity, for how long, and what type). The greatest impact of physical activity on cognitive abilities was observed in situations of prolonged outdoor physical activity of moderate to high intensity and high cognitive load, as well as in the case of sudden episodes of moderate-intensity outdoor physical activity (Mavilidi et al., 2025).

Considering the above considerations regarding the importance of physical activity in the holistic development of early childhood education, it is clear that it significantly supports physical, social, emotional, and cognitive development. The question that arises is: are early childhood and preschool teachers sufficiently prepared to implement curricular activities integrated with physical activity (whether in the classroom, in the gym, or outdoors)?

Research by Daly-Smith et al. (2020) and Webster et al. (2015) indicates that teachers equipped with the ability to integrate curricular content with physical activity achieve higher levels of teaching effectiveness and student engagement.

The aim of this study was to determine the relationship between the implementation of proprietary curricula integrated with subject-specific content, implemented using EDUballs, and reading, writing, mathematical skills, fine motor skills, and graphomotor skills. Research questions: What relationships exist between the implementation of proprietary curricula integrated with subject-specific content, implemented using EDUballs, and reading, writing, mathematical skills, fine motor skills, and graphomotor skills?

Method

The author conducted a systematic review of the literature on the use of EDUballs in pedagogical experiments (Cichy et al., 2020, 2022a, 2022b, 2022c; Kaczmarczyk

& Rokita, 2011; Krysmann & Rokita, 2011; Pham et al., 2021, 2023; Rokita, 2008; Rokita & Cichy, 2014; Rokita & Kaczmarczyk, 2011; Rokita & Krysmann, 2011; Rokita et al., 2017, 2024; Wawrzyniak et al., 2015, 2017, 2019a, 2019b, 2021, 2022).

Results

It turned out that 13 pedagogical experiments were conducted in natural settings using EDUballs. In all EDUball interventions, the independent variable was a proprietary curriculum integrated with subject content implemented using EDUballs. The interventions were implemented at the early childhood education stage, with the exception of one, which was implemented in a preschool group of 6-year-olds. The vast majority of interventions were implemented throughout the school year, but there were also three-year and semester-long interventions (Rokita et al., 2024). The dependent variables were reading and writing skills (Cichy, 2022a, 2022b; Krysmann & Rokita, 2011; Rokita & Krysmann, 2011; Rokita, 2008; Rokita & Cichy, 2014; Rokita et al., 2017; Wawrzyniak et al., 2017, 2019b, 2022), mathematical skills (Cichy et al., 2020; Kaczmarczyk & Rokita, 2011; Rokita & Kaczmarczyk, 2011; Rokita et al., 2017; Wawrzyniak et al., 2019a, 2022), physical fitness (Cichy et al., 2022c; Pham et al., 2021, 2023; Rokita & Kaczmarczyk, 2011; Rokita & Krysmann, 2011; Wawrzyniak et al., 2015, 2022), and graphomotorics (Wawrzyniak et al., 2017, 2021).

The interventions were implemented in public schools (Cichy et al., 2020, 2022a, 2022b, 2022c; Kaczmarczyk & Rokita, 2011; Krysmann & Rokita, 2011; Rokita, 2008; Rokita & Cichy, 2014; Rokita & Kaczmarczyk, 2011; Rokita & Krysmann, 2011; Rokita et al., 2017, 2024; Wawrzyniak et al., 2015, 2017, 2019a, 2019b, 2021, 2022) and private schools (Pham et al., 2021, 2023), in integrated schools attended by children with disabilities (Rokita et al., 2024), and in schools for students with dyslexia (Rokita & Krysmann, 2011; Krysmann & Rokita, 2011).

The research was carried out in Poland (Cichy et al., 2020, 2022a, 2022b, 2022c; Kaczmarczyk & Rokita, 2011; Krysmann & Rokita, 2011; Rokita, 2008; Rokita & Cichy, 2014; Rokita & Kaczmarczyk, 2011; Rokita & Krysmann, 2011; Rokita et al., 2017, 2024; Wawrzyniak et al., 2015, 2017, 2019a, 2019b, 2021, 2022) and in Vietnam (Pham et al., 2021, 2023). Regardless of where and when the intervention using EDUballs was implemented, the experimental groups always achieved better results in reading, writing, arithmetic, graphomotor skills, and physical fitness, which was always at least at a level comparable to the control groups that implemented the traditional physical activity program (without EDUballs).

The article by Wawrzyniak et al. (2022) provides some particularly interesting research results. The authors conducted a year-long intervention with three experimental

groups and one control group. The aim of the study was to investigate the relationships between fundamental motor skills, graphomotor skills, and academic achievement of first-grade primary school students and the implementation of movement activities integrated with subject content conducted with EDUballs.

The question was also answered whether students who followed the same program of physical activity classes using EDUballs but with different teachers (one group with an early childhood education teacher, another with a physical education teacher, and another with an early childhood education teacher and a physical education teacher simultaneously) achieved similar and better results in terms of fundamental motor skills and graphomotor skills and had better academic achievements in other subjects, such as Polish or mathematics, compared to students from a class in which EDUballs were not used during classes conducted by early childhood education teachers. At the beginning and end of the 2015/2016 school year, fundamental motor skills were assessed using the Test of Gross Motor Development 2nd Edition (Ulrich, 2000), graphomotor skills were assessed using the MovAlyzeR software (Neuroscript LLC, USA), and school achievements were assessed using the School Start-Up Skills Test (Kaczan & Rycielski, 2012).

The teaching process in all first-grade classes was implemented in accordance with the school's educational program (Rozporządzenie…, 2009). The experimental classes (E1-E3) and the control class (K) followed the same integrated curriculum: "Our Primer: Autumn, Winter, Spring, Summer" (Lorek & Wolman, 2014a, 2014b; Lorek et al., 2014a, 2014b). An experimental element was introduced in the experimental classes (E1-E3), which consisted of a program of physical activity using Eduballs integrated with the subject content of Polish language and mathematics. During the year-long pedagogical experiment, lesson plans and scenarios using Eduballs were prepared in consultation with teachers. These plans were compatible with the subject content taught in the classroom and in line with the thematic cycle and the daily theme.

In all classes, both experimental and control, physical education classes were held for three hours per week. In the experimental classes, physical activity classes were held twice a week with EDUballs and once without them, while in the control class, all three hours of physical activity classes were conducted without EDUballs.

After a year of intervention, it was found that students from all experimental classes (E1, E2, and E3 – regardless of who led the physical activity classes integrated with subject content using EDUballs) achieved better academic achievement than students from the control class (K). Results of the Test of Gross Motor Development were similar across all groups (no statistically significant differences were found) (Wawrzyniak et al., 2022).

Summary and Conclusions

Over 20 years of experimental research carried out in natural conditions using EDUballs during movement activities integrated with subject content (Polish, English, and mathematics) allows us to state with certainty that there are positive relationships between movement activities integrated with subject content implemented with EDUballs and students' reading, writing, and arithmetic skills (Cichy et al., 2020, 2022a, 2022b; Kaczmarczyk & Rokita, 2011; Rokita & Kaczmarczyk, 2021; Krysmann & Rokita, 2011; Rokita & Krysmann, 2011; Rokita, 2008; Rokita & Cichy, 2014; Rokita et al., 2017; Wawrzyniak et al., 2017, 2019a, 2019b, 2022). EDUballs also positively impact students' motor skills, eye-hand coordination, time-space orientation, and graphomotor skills (Cichy et al., 2022c; Pham et al., 2021, 2023; Rokita & Kaczmarczyk, 2011; Rokita & Krysmann, 2011; Wawrzyniak et al., 2015, 2017, 2021, 2022). Physical activities with EDUballs are attractive to children, in part because children "learn through play." And yet, a child does not cease to be a child once they enter school (Rokita et al., 2024). A child aged 6–10 explores the world with all their senses, preferably directly experiencing it through their own activities (Michalak, 2011).

Many researchers have confirmed that movement supports the teaching-learning process (Michael, 2006; Webster et al., 2015; Daly-Smith et al., 2020; Mavilidi et al., 2023; Rościszewska & Klichowski, 2024). Children's acquisition of key competencies such as writing, reading, and counting (including in English) occurs in interaction with mastery of both gross and fine motor skills. Education through movement is not only an opportunity to teach/improve reading, writing, and counting skills (including in English) – it also impacts children's emotional and social development (Tremblay et al., 2017; Bailey, 2006).

Examples of Good Practices in Education Through Movement

One of the few examples of integrating movement into the teaching process in early childhood education, verified over 21 years in 13 pedagogical experiments, are classes with EDUballs (https://eduball.awf.wroc.pl/) and (https://eduball.awf.wroc.pl/?lang=en).

EDUballs are teaching aids recommended for school use, developed over 20 years ago at the University of Physical Education in Wrocław (Rokita & Rzepa, 2005).

Photo 1. EDUballs in the Basket

Photo 2. Numbers and Mathematical Symbols Placed on EDUballs

Photo 3. The Word „Tort"/„Cake" Made of EDUballs

Photo 4. Letters, Mathematical Symbols, and Others Placed on EDUballs

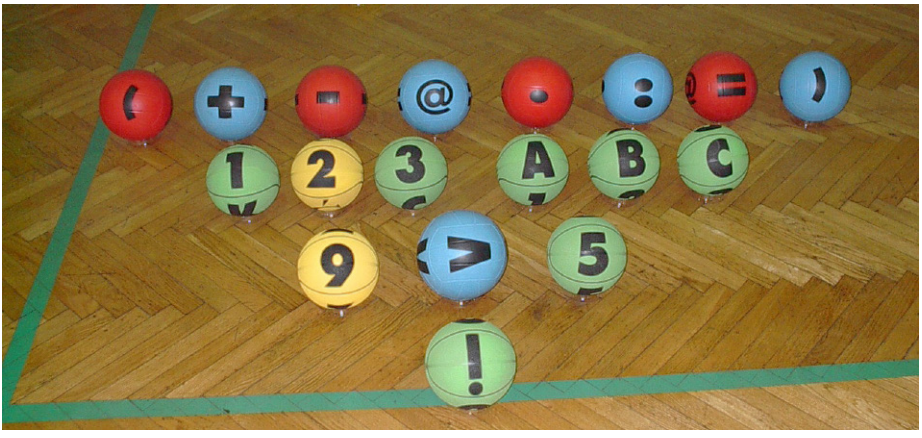


Photo 5. The Phrase "How are you" composed of EDUballs

EDUball activities (photos 6–10) are based on games and activities using a set of 100 colorful balls for mini team games (basketball, volleyball, soccer, and handball). The letters, numbers, and symbols printed on the balls allow for the combination of motor and cognitive activities in one activity. This allows children to learn math, Polish, foreign languages, and other subjects through movement, while simultaneously developing their motor skills and improving their motor skills. The activities implemented with EDUballs are tailored to the daily theme or weekly activity cycle.

Children participating in physical activities with EDUballs improve their ability to distinguish colors and consolidate the letters and numbers learned at school and practice arithmetic operations (addition, subtraction, multiplication, and division)

while developing their fine and gross motor skills as well as basic movement skills (e.g., passing and catching, dribbling, throwing, hitting, and receiving the ball).

Fun exercises and games with EDUballs are based on natural forms of movement (running, jumping, throwing, catching, etc.) and holistically stimulate children's development. The introduction of numbers, letters, and mathematical symbols, as well as the selection of appropriate ball colors, allows for their wide use in teaching or improving content from almost all curriculum areas in grades I–III (including Polish, English, mathematics, and science) (Rokita et al., 2017; Rokita et al., 2018). Properly designed and integrated with the subject content (Polish, mathematics, foreign language, and science), fun, games, and exercises with EDUballs become a very helpful, utilitarian tool in implementing the core curriculum in grades I–III of primary school.

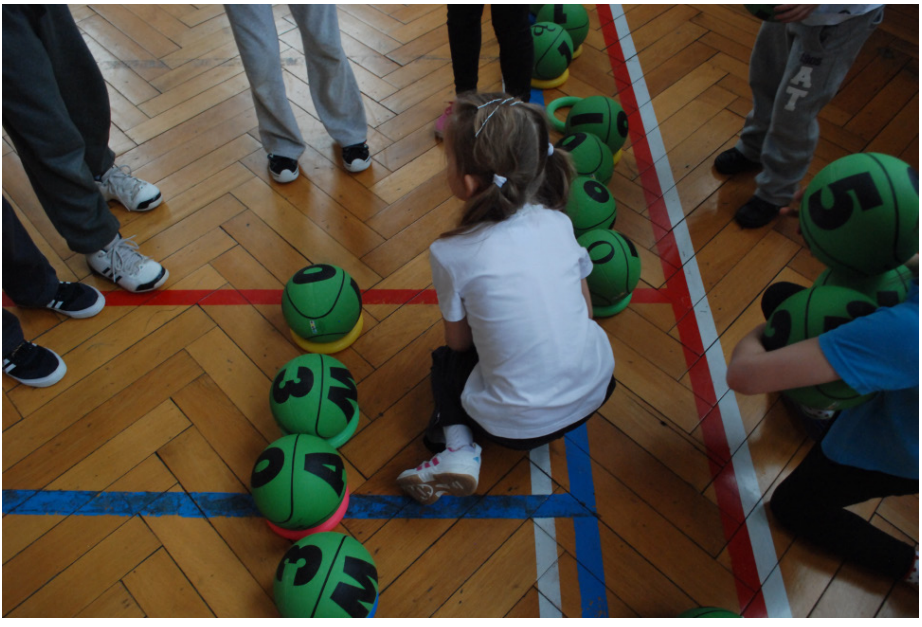
Photo 6. Children During Physical Activity With EDUballs

Photo 7. Children During Physical Activity With EDUballs

Photo 8. Children During Physical Activity With EDUballs

Photo 9. Children During Physical Activity With EDUballs

Photo 10. Children During Physical Activity With EDUballs



Examples of Exercises, Activities, and Games with EDUballs (Rokita et al., 2024)

Example 1: Language Education (Polish)

Objective: Improving the ability to create words beginning with the letter "a" and teamwork, developing selected motor skills and movement abilities.

- Number of participants: any
- Supplies: Eduballs
- Location: sports hall or outdoor area

Description: Students are divided into two teams (yellow and green teams). Each team receives a ball with the letter "a," which they place in a ring at the starting line. The students' task is to create as many words starting with the letter "a" as possible. The yellow team uses green balls, while the green team uses yellow balls. Time to complete the task is 4 minutes. After completing the task, the teacher checks the correctness of the words.

Organizational notes: The teacher may assign points to teams: 1 point for each word or 1 point for each letter in the word. The team with the most points wins.

Example 2: Math Education

EVEN AND ODD NUMBERS

Objective: Consolidate recognition of even and odd numbers, improve selected motor skills.

- Number of participants: any
- Supplies: Eduballs
- Location: sports hall or outdoor area

Description: Educational balls scattered throughout the room. Students line up in a circle in the center of the room. The teacher indicates the locations of the even and odd balls in each corner of the room. Students move around the room in any way they like. On the teacher's signal, students are tasked with sorting all the balls according to the guidelines.

Organizational notes: Team competition can be implemented.

Modification: All students have a green or yellow ball. The teacher indicates the bases of the even and odd balls in each corner of the room. Students move around the room in the manner directed by the teacher. On the teacher's signal, students are tasked with moving as quickly as possible to the base according to the number and color of their ball. After completing the task, students exchange balls.

Example 3: Foreign Language Education (English)

WORDS

Objective: Expanding English vocabulary and improving selected movement skills.

- Number of participants: any
- Supplies: an eduball for everyone
- Location: sports hall or outdoor area

Description: All students have yellow or green eduballs and move around the room in any way they like. At the instructor's signal, students exchange balls by saying an English word that begins with the letter on the ball they received. The person giving the ball back must translate it into Polish. After saying the words, the students exchange balls.

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