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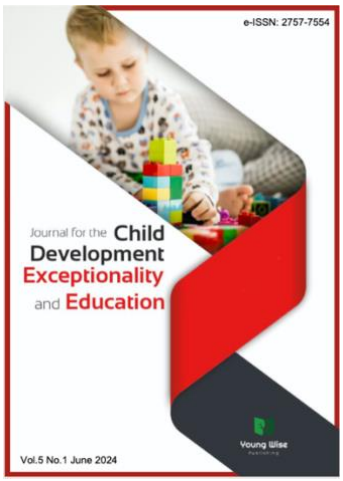

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Research Article

An ecosystemic analysis of resistance to and advocacy for involvement in comprehensive sexuality education: Sub-Saharan Africa example

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Abstract

Over the last two decades, there has been a global push to scale up Comprehensive Sexuality Education (CSE), particularly in sub-Saharan Africa (SSA). However, this educational framework has often been approached from Euro-American perspectives, overlooking the distinct cultures and traditions that shape how SSA perceives, defines, and educates about sexuality. Notwithstanding significant progress in the past decade, this paper primarily focuses on implementation challenges and resistance to CSE in SSA. Drawing on Bronfenbrenner's ecological systems theory of human development, the author offers a nuanced analysis of interconnected factors, including Afro-centric philosophical worldviews, indigenous modes of sexuality education, cultural traditions, religious practices, and more, which impede the proper implementation of CSE at various ecological systems. The author concludes by advocating for a collective engagement model across the microsystem, mesosystem, exosystem, macrosystem, and chronosystem levels. Additionally, the author emphasizes the need to establish common ground for effective and culturally sensitive sexuality education programs in SSA. In conclusion, this paper modestly contributes to the ongoing discourse surrounding the acceptance of CSE in SSA.

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Introduction

Sexuality is a multifaceted concept encompassing dimensions such as sex, sexual orientation, gender roles and identities, eroticism, intimacy, and reproduction, as outlined by the UNESCO (2018). Understanding these various aspects is a lifelong process that commences in childhood and unfolds through adolescence into adulthood. This paper initiates with a global perspective on Comprehensive Sexuality Education (CSE) before focusing on sub-Saharan Africa (SSA). Grounded in Bronfenbrenner's (1979) ecological systems theory of human development, the paper explores challenges in CSE implementation within SSA, examining the microsystem, mesosystem, exosystem, macrosystem, and chronosystem ecological levels. The analysis delves into how African philosophical worldviews, cultural traditions, indigenous modes of sexuality education, religion, media, and more are interwoven within each ecological system, forming significant resistance to CSE. The paper aims to address and mitigate this resistance by proposing a collective engagement model across all levels of ecological systems to establish common ground. The diagram below offers a visual representation of an exosystemic approach in comprehending the intricacies of resistance to CSE and promoting system-wide collaborative initiatives to mitigate the resistance.

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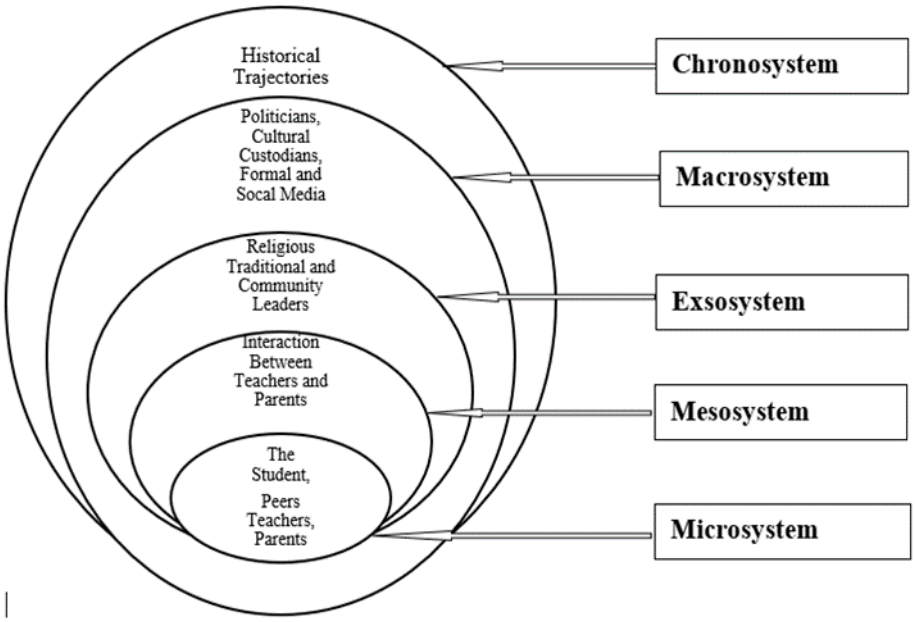

Figure 1. Exosystemic approach of comprehending and promoting system-wide collaborative initiatives to mitigate resistance to CSE.

CSE, as defined by UNESCO (2018), is a curriculum-based process that involves teaching and learning about the cognitive, emotional, physical, and social dimensions of sexuality. It emerged as a response to the need for a comprehensive approach to sexuality education that extends beyond conventional models focused solely on reproductive biology. The curriculum addresses a range of topics, including gender relations, HIV/AIDS prevention, sexually transmitted infections, and emotional responsibilities related to sexuality (Herman et al., 2013). Notably, it also incorporates discussions on gender identity, sexual orientation, consent, and prevention of dating violence (Woolweaver et al., 2023). According to UNESCO, CSE aims to empower children and young people with knowledge, skills, attitudes, and values that enable them to realize the importance of their sexual health, well-being, and dignity. It emphasizes the development of respectful social and sexual relationships and encourages consideration of the impact of choices on personal well-being and that of others. In collaboration with other agencies, UNESCO (2018) developed the *International Technical Guidance on Sexuality Education*, providing guidance to stakeholders involved in designing, implementing, monitoring, and evaluating CSE.

A well designed and properly implemented CSE has demonstrated positive outcomes across various domains. For instance, a growing body of evidence supports the effectiveness of CSE in HIV and pregnancy prevention. Researchers from different parts of the world have also revealed broader positive outcomes, including advancements in gender equality, self-efficacy, and critical thinking (Haberland & Rogow, 2015; Vanwesenbeeck et al., 2016).

Global Commitments to Comprehensive Sexuality Education

Given its perceived effectiveness, CSE has garnered a lot of global attention. The International Conference on Population and Development Program of Action, held in Cairo in 1994, was among the first to acknowledge the significance of integrating sexuality education into formal education. The subsequent year, the Beijing Declaration and Platform for Action emphasized the need for CSE to address the specific needs of women and girls. In 2010, UNAIDS established a Global Review Panel, recognizing CSE as being aligned with broader goals for HIV/AIDS prevention. CSE also aligns with certain United Nations Sustainable Development and Millennium Development Goals, both of which are aimed at enhancing people's overall health and well-being.

Global organizations have actively collaborated with governmental and non-governmental entities and civil society to scale up the implementation of CSE in schools. According to UNESCO (2023), 85% of the 155 nations reviewed in 2021 had policies supportive of CSE. However, a comparative review of a selected sample of 50 countries globally revealed substantial variations in actual implementation. Different countries covered a wide array of topics differently, with fewer than 20% addressing LGBTQIA+ and sexual orientation topics.

Sexuality education remains a topic of controversy and debate, often influenced by cultural, religious, and political factors. In the United States, for instance, CSE curriculum is determined at the state level, resulting in considerable variability among states in both content and approach. According to the Guttmacher Institute (2023), approximately half of the US states mandate the teaching of sexuality, HIV education, and contraception options in public schools, while others emphasize abstinence. Some states require the curriculum to be inclusive of gender identity and sexual orientations, while other states stress the importance of heterosexuality.

Method

Research Paradigm

The transformative research paradigm provided guidance for this study as its inherent assumptions align with the research objectives. According to Mertens (2016), one of the proponents of the transformative paradigm, the axiological assumptions within this paradigm focus on prioritizing the voices of the disadvantaged. Regarding ontology, the understanding of reality is contextualized within political, cultural, and socioeconomic value systems (Romm, 2015). Epistemologically, the transformative research paradigm underscores the importance of comprehending historical and social contexts surrounding phenomena, fostering relationships that recognize power differentials, and cultivating trust among involved parties (Mertens, 2016).

A pivotal assumption within the transformative research paradigm is its emphasis on empowerment and human agency. Another crucial characteristic is the paradigm's commitment to social justice, challenging discriminatory practices, promotion of inclusivity, and recognition of diverse perspectives (Mertens, 2016). In light of these assumptions, the transformative research paradigm was deemed appropriate to guide the examination of resistance to CSE with an advocacy for collaborative engagement. The ultimate goal of the study is to instigate a paradigm shift that fosters social change, empowerment, and the transformation of existing norms and practices within the realm of sexuality education.

Research Model

What distinguishes the transformative research paradigm, particularly from a methodological standpoint, is its flexibility to accommodate any research method, as long as it aligns with the paradigm's underlying assumptions (Mertens, 2016). The present study employs a historical research method. The approach involves a thorough examination of the development and evolution of sexuality education over time in SSA, uncovering historical contexts, cultural influences, and societal attitudes that have influenced the trajectories.

The study adheres to Lundy's (2008) five-stage framework for historical research. That said, the exploration commences with the identification of the research phenomenon: resistance to CSE. The subsequent stage, as per Lundy's guidance, encompasses the formulation of research objectives and the selection of a guiding theoretical perspective. The chosen theoretical framework is Bronfenbrenner's (1979) ecological systems theory of human development. Following this, per Lundy's recommendation, the next stage involves the exploration of pertinent data, succeeded by the analysis of the collected evidence. The last stage is the presentation and interpretation of findings. Ultimately, utilizing a historical approach into the critical analysis of resistance to CSE brought about profound understanding of the concept of resistance to CSE.

Data Sources and Collection Procedures

Historical research predominantly relies on primary data. That said, this study utilized existing documents as the primary sources of data. As Atkinson and Coffey (1997) characterize, documents are 'social facts' that offer a tangible means for tracing background information, historical insights, and the evolution of the studied phenomenon. Academic research studies and reports from health organizations evaluating CSE implementation in SSA constituted the core documents. Additionally, the researcher analyzed national legislations and educational policies delineating CSE integration in school curricula from various countries. The inclusion of formal media articles and discussions on social media platforms addressing CSE further diversified the array of analyzed documents. This diverse compilation of documents provided a

nuanced understanding of the historical and socio-cultural contexts influencing the conceptualization and implementation of CSE in various countries within SSA.

Data Analysis

Data analyses was guided by Bronfenbrenner's (1979) ecological systems theory of human development. With its five nested systems (microsystem, mesosystem, exosystem, macrosystem, and chronosystem), the theory provided a framework to examine the interplay of various elements shaping individuals' perceptions of CSE within their immediate and broader environments. The theory also offered a structured and comprehensive approach to understanding the multifaceted factors that influence resistance to CSE.

Results

The subsequent sections of this paper will present the contextual details derived from the analysis of the chosen documents. Each subsection delves into the intricacies encapsulated within these documents, thus, unraveling the complexities surrounding the notion of resistance to CSE in SSA. Overall, the findings enrich the discourse on resistance to CSE by providing valuable insights for an informed paradigm shift.

The Urgent Need for Sexuality Education in SSA

While the global need for CSE is evident, the specific challenges and health indicators in SSA emphasize the critical importance of adapting and scaling up CSE programs in the region. It is, however, crucial to recognize the incredible diversity within SSA, where each country and often each region within a country, possesses unique ethnicities, languages, and cultural traditions. Economic conditions vary, with some states experiencing rapid growth while others face economic challenges. Political stability also differs across countries. Meanwhile, the religious landscape encompasses a mix of traditional indigenous religions, Christianity, Islam, and other faiths. Discussing sexuality education in SSA, therefore, requires an awareness of these heterogeneities. Despite this diversity, this paper treats SSA as an integrative region with shared commonalities.

One such commonality is the region's predominantly young population. According to UNESCO (2021), 32% of the population in SSA is between the ages of 10 and 24. Sub-Saharan African countries also share similar healthcare challenges. A significant concentration of people living with HIV is found in this region. Despite accounting for only about 13% of the world's population, SSA represented approximately 67% of new HIV infections in 2021 (UNAIDS, 2022). As UNAIDS further highlights, youth aged 15-24 constitute the highest-risk age group, with the majority of infections. Notably, girls aged 15-19 disproportionately account for six in seven new HIV infections. The region also grapples with high rates of teenage pregnancies, estimated at 15-25%, ranking among the highest globally (UNESCO, 2021). Given these statistics, the urgency of CSE cannot be overstated.

Initiatives and Efforts on Sexuality Education in SSA

Confronted with these stark statistics, several continental and regional organizations in SSA have committed to CSE. The African Charter on Human and People's Rights on the Rights of Women pioneered the advocacy for incorporating CSE into school curricula in 2003. A decade later, the momentum for a more systematic scaling up of CSE was revitalized as 20 African countries signed the *Ministerial Commitment on CSE and Sexual and Reproductive Health Services for Adolescents and Young People in Eastern and Southern Africa*. The agreement aimed to facilitate the adaptation and implementation of CSE. This was also seen as an integral measure to combat HIV among youth (UNESCO, 2021). The initiative received support from both the Southern African Development Community and the East African Community.

In subsequent years, CSE has consistently gained recognition. In 2019, 14 ministers of education and of health from different countries in SSA participated in a dialogue initiated by UNESCO in Ghana, centered on sexuality education. Similar endeavors were undertaken in 2023 when delegates from 33 African countries, including government officials and civil society organizations, devised the "*Our Rights Our Lives Our Future*" program in Zanzibar, Tanzania. The program's focus was on developing strategies for providing young people with high-quality, accurate, cultural, and rights-based education on health and well-being (UNESCO, 2023).

Challenges in Implementing and Adapting CSE in SSA

In keeping with the commitment by continental organizations, numerous countries in SSA have made notable progress, particularly in formulating relevant policies to integrate CSE into school curricula. As Manguvo and Nyanungo (2018) observed, what initially started as HIV prevention curricula in most countries evolved into CSE. However, member states find themselves at different stages of implementation, with varied content coverage.

A review conducted by UNESCO (2021) encompassing 24 countries in SSA assessed the 'comprehensiveness' of content based on international guidelines, assigning cumulative average scores categorized as latent (<25%), emerging (25-50%), established (50-75%), or advanced (>75%). The majority of countries scored in the latent or emerging categories. In a related study, Chawhanda et al. (2021) evaluated CSE provision in schools across six countries in Southern Africa from the perspectives of learners and teachers. While basic education policies in all six countries aligned with international guidelines, full implementation remained incomplete. Examining sexuality education programs in Ghana, Malawi, Burundi, Zambia, and Kenya, Vanwesenbeeck et al. (2015) also reported intentional omissions or abbreviations of certain topics. Meanwhile, a study by Wekesah (2019) revealed that teachers in SSA often resort to fear-based and risk-focused communication in sexuality education. All these studies point to widespread inadequacies and variations in implementing CSE in SSA.

The obstacles to effective implementation of CSE in SSA are indeed intricate and multifaceted. As UNFPA (2015) submits, barriers encompass the absence of clear frameworks for translating policies into practice, lack of coordination, weak regulation and supervision, inadequacy of well-trained teachers, and shortage of technical and financial resources. While the significance of these factors, whether considered individually or collectively, is undeniable, it is noteworthy that resistance persists even in schools where financial and human resources are conducive. The following sections will provide a dimension to the ongoing discourse by delving into the concept of resistance to CSE through the lens of an Afrocentric ecological systems theoretical framework.

Resistance to Sexuality Education

The widespread resistance to CSE in SSA is not merely an individual effort but is deeply rooted within broader social contexts. As stated earlier, Bronfenbrenner's (1979) ecological systems theory of human development offers valuable insights into unraveling the intricacies of this resistance. The theory delineates nested but interconnected systems that influence children, spanning from the microsystem, where children engage with immediate environments like family, peers, and school, to the mesosystem, involving interactions between these microsystems. The exosystem encompasses external factors such as community and faith-based organizations, while the macrosystem incorporates elements like government laws and policies, cultural traditions, and the media. The chronosystem acknowledges the impact of historical changes and transitions over time. Crucially, there is reciprocity between the child and the systems, where factors within each system can directly or indirectly influence the child, and vice versa (Bronfenbrenner, 1979).

Applying the ecological systems theory not only enhances comprehension of the intricate dynamics surrounding resistance to CSE but also offers a valuable framework for fostering collaborative initiatives to address this resistance. In this process, involving stakeholders across diverse ecological systems is a pivotal step. This may involve open communication, focused activities, learning forums, and in-person meetings to secure stakeholder buy-in. The remainder of this paper will explore the intricacies of resistance to CSE in SSA at each ecological systems level, followed by recommendations for fostering intra and inter-level collaborative engagements to mitigate the resistance.

The Microsystem

The microsystem, a foundational component in ecological systems theory, refers to the immediate environments where children interact and directly experience their daily lives. Understanding this level's needs and resistance to CSE is vital for effective implementation.

The Student and Peers

The primary stakeholder at the microsystem level is the intended recipient of the curriculum, the student as well as their peers. Studies conducted in various parts of SSA uncovered a noticeable disconnect between CSE content and local needs. For instance, in a series of focus groups with Tanzanians aged 18-34, Coultas et al. (2020) found that the most

recurrent perception was that much of the CSE content was 'not for us.' Similarly, a study with South African adolescents identified masculinity as a prioritized theme, yet it is not emphasized in CSE content (Pattman & Bhana 2017). This illustrates a widespread belief that CSE is not addressing local needs.

The reasons for students' resistance to CSE are multifaceted. While most needs of the youth are universal, understanding and engaging with the local needs, priorities, and perspectives when designing the curriculum is vital (Mukoro, 2017). For example, designing the Yathu Yathu (For Us, By Us) project in Zambia involved significant contributions from the youth, thereby empowering them to take ownership of the project (Simuyaba, 2021). This is a practical roadmap to combat resistance from the intended recipients. Additionally, collaborative effort on preferred delivery strategies is also key to the acceptability of CSE.

Teachers

Teachers emerge as the most critical determinants of the success of CSE. Their perceptions and commitment significantly influence students' attitudes. Furthermore, teachers' competence in content delivery directly impacts students' understanding of the concepts. Despite their crucial role, research has depicted teachers in SSA as hesitant to teach CSE. In Zimbabwe, for example, primary school teachers reported feeling 'uncomfortable' teaching certain content due to cultural restrictions (Matswetu & Bhana, 2023). Similarly, teachers in Lesotho reportedly omitted topics perceived as divergent from their own values (Khau, 2012). Comparable findings were reported in Ethiopia (Miedema et al., 2020), Uganda (Vanwesenbeeck et al., 2016), and Kenya (Sidze et al., 2017). Considering their direct influence on students' microsystem and their trusted position as credible sources of information, teachers' attitudes can easily influence students' perception of CSE. Moreover, the success of any curriculum heavily relies on teachers' willingness, commitment, and ability to deliver. Their reluctance is, therefore, a significant impediment to proper implementation of CSE. For this reason, Ahmed et al. (2022) have recommended careful selection of CSE teachers based on aptitudes, willingness, and commitment.

Parents

Presuming all teachers were committed to properly teaching CSE, parents, another immediate and direct influence in the students' microsystem, pose another formidable resistance force, acting outside the school system. Research conducted in various parts of SSA has highlighted this resistance. For instance, studies by Francis (2013) and Mturi and Bechuke (2019) reported South African teachers encountering resistance from parents. Studies conducted in Ghana and Gambia also revealed many parents expressing unfavorable attitudes toward CSE (Kah, 2021; Nyarko, 2014). A meta-analysis by Shibuya et al. (2023) revealed similar negative attitudes from parents in various sub-Saharan African countries.

The Mesosystem

The mesosystem denotes the interactions between the child's microsystem components, particularly focusing on the interplay between teachers and parents. Successful implementation of CSE requires buy-in from all immediate and direct microsystem environments of the student. Harmonious relationships promote effective provision, while discordant relationships can be detrimental. Enhancing the mesosystem involves fostering open communication and promoting collaboration between teachers and parents. The approach incorporates parents' perspectives and values, addressing their concerns, and fostering a sense of ownership. For instance, in Ethiopia, parents were engaged, leading to a recommendation to restructure the curriculum to include abstinence-only programs at primary school and abstinence-plus programs at the secondary school level (Fentahun et al., 2012). Involving parents enables them to support and reinforce key concepts at home, thus, contributing to a more comprehensive learning experience for students. Collaborative engagement also bridges the gap between the home and the school. It also prevents confusion arising from conflicting teachings. Ultimately, parent-teacher collaboration significantly mitigates resistance to CSE.

The Exosystem

The exosystem, encompassing social settings that children do not directly experience, also significantly influences the provision of CSE. Elements within the exosystem include leaders of school boards, custodians of indigenous forms of sexuality education, and leaders of faith-based institutions.

Guardians of Indigenous Sexuality Education

During the pre-colonial era, ethnicities in SSA had indigenous forms of sexuality education. These involved separate teachings for boys and girls to prepare them for their respective adult roles, often celebrated though rite of passage ceremonies. Despite being vilified during the missionary and the colonial eras, these traditional modes have remained tenacious (Miskinzod, 2023). Examples include the *Bogwera* in Botswana, *Chinamwali* among the Chewa people of Malawi and Zambia, the *Emuratare* among the Maasai people of Kenya and Tanzania, and the *Poro* among the Senufo people in Ivory Coast, Mali, and Burkina Faso (Schroeder et al., 2022).

While indigenous sexuality education and CSE may share certain aspects, conflicts arise in others. For instance, the emphasis on gender equality in CSE conflicts with traditional gender roles and stereotypes. In many rites of passage, girls are taught 'feminine' roles while boys are instructed on how to 'act like a man.' This dissonance is revealed from a study discussed earlier, where South African youth identified masculinity as the most prioritized theme in sexuality education, and yet, the topic is not covered in the CSE curriculum (Pattman & Bhana 2017). Malawian youth also reported of the confusion emanating from contradictory gender role teachings from school and community elders (Likupe et al., 2020).

Successful CSE implementation, therefore, requires understanding and recognition of existing indigenous patterns of sexuality education. There is a need to acknowledge the culture specific wisdoms embedded in some aspects of the indigenous models of sexuality education. Affirming non-harmful aspects while challenging harmful gender norms, when necessary, may be an effective roadmap to finding common ground. It may also be necessary to revamp traditional approaches to sexuality education to align them with the demands of modern times.

Guardians of Faith, Spirituality, and Belief Systems

Leaders of the various belief systems inherent in various religions and faiths also pose as strong resistance forces to CSE. Many schools in SSA were established by missionaries, as such, they incorporate religious education into the curriculum to instill good morals (Mahoso et al., 2022). Consequently, resistance to and even prohibition of CSE by the leaders is prevalent (Chavula, 2022). Some have even advocated integrating CSE into the religious education curriculum (Bweyale & Sekaye, 2023). Collaborative engagement at the exosystem level must, therefore, involve religious, traditional, and community leaders. This collaborative approach has reportedly been proven key to successful implementation in some states in Nigeria (Kunnuji, 2017).

The Macrosystem

Macro-level resistance to CSE encompasses opposition occurring at broader societal or systemic levels, including political ideologies, government policies, and overarching philosophical and cultural norms. Understanding macro-level resistance is essential for the implementation of CSE.

Political Leaders

Several topics within the CSE curriculum have sparked heated debates among political figures in SSA (Mulholland, 2023). In most cases, the resistance is influenced by perceived external influence, and, subsequently, sovereignty concerns, which oftentimes leads to restrictive policies and legislations. For instance, political leaders in Uganda publicly condemned topics that dealt with non-binary sexual orientations. The despondency prompted a government ban on all CSE programs in 2016, both in school and non-school contexts, 'until an Afro-centered framework was formulated' (Ninsiima et al., 2020). This move faced criticism among non-governmental organizations and health activists with some launching lawsuits against the ban (Fallon, 2017). Similar political turmoil occurred in Mali over a CSE blueprint, leading to a complete halt of sexuality education programs in the country in 2018 (Kah, 2021). UNESCO (2021) has also reported reluctance to CSE at a policy level in Cameroon.

Political resistance to CSE in SSA is a result of various factors, intertwining with other systems-level aspects to shape political leaders' decisions. National-level coordination and open communication across different ecological levels are, therefore, necessary when formulating government policies regarding CSE. Uganda provides an example where multidisciplinary stakeholder groups were established to inform policy formulation and curriculum revision after the ban in 2016 (Ninsiima et al., 2020). The initiative at least resulted in restoration of some form of sexuality education.

While this initiative led to the partial restoration of sexuality education, it emphasizes the adage that obtaining half a loaf is preferable to nothing at all. Multidisciplinary stakeholder groups were also formulated in Senegal to inform the formulation of policies around sexuality education curriculum (Chau et al., 2016). Such collaborative approaches are effective in mitigating resistance at multiple ecological levels.

Custodians of Cultural Practices and Traditions

The macrosystem also encompasses custodians of broader cultural traditions who can form a formidable force of resistance to CSE. Their resistance is rooted in the misalignment of CSE with African socio-philosophical worldviews. As described by Manguvo and Mafuvadze (2015), the African worldview, characterized by a holistic and anthropocentric ontology, views humans as inseparable from the cosmos, with the supernatural exerting control over the living. This perspective shapes how individuals perceive, define, and attribute meaning to the biological and psycho-social processes of sexuality. Embedded in a worldview that dichotomizes the natural and the supernatural, mythologies and taboos become integral to the understanding of sexuality. This provides a distinct psychological frame of reference from that informing CSE, resulting in a dissonance of knowledge and values (Manguvo & Nyanungo, 2018).

In most ethnicities in SSA, the vernacular translation of the term 'sexuality' itself can be considered a taboo. Consequently, many countries have renamed CSE using more culturally acceptable terminologies. For instance, the curriculum is known as "*The World Starts with Me*" in Ghana, Malawi, Burundi, Zambia, and Kenya, while Senegal and Nigeria refer to it as "*Family Life and HIV Education*" (Wekesah et al., 2019). Various taboos surrounding sexuality exist, such as the belief among the Shona people in Zimbabwe that masturbation leads to hair growth on the masturbating hand. Challenging these beliefs is often discouraged as they are embedded within cultural and religious practices, serving as sources of moral guidance. Despite the outliving of some of the taboos and mysticisms around sexuality, a considerable number persist, thus, posing serious impediments to the implementation of CSE.

The subject matter of sexuality in SSA is often shrouded in concealing silence, with limited open discussion (Matswetu & Bhana, 2023). For example, among the Zulu people of South Africa, discussing human sexuality with young people is avoided at all costs. When discussions do occur, usually conducted by aunts and uncles, the discussions are often veiled in metaphors, gestures, and symbolism due to the taboo on using proper terminology (Francis, D. 2016). This hidden language can lead to misconceptions. A study conducted in Zimbabwe revealed that both teachers and students expressed reluctance to participate in CSE due to perceiving some content as humiliating and embarrassing (Munyai et al., 2023). A lot more research across SSA has shown that teachers, parents, and students exhibit strong tendencies toward preserving concealing silence and avoidance when it comes to sexuality, primarily driven by the taboo surrounding the subject.

Formal and Social Media

Another macro-level component impacting CSE directly and indirectly is the media. Despite empirical-based evidence of effectiveness, CSE has faced distortions and misconceptions, leading to implementation setbacks. Common distortions, often disseminated through the media, include claims that the curriculum promotes early sexual activity and non-binary sexual orientations (Ngabaza, 2022). Social media has also become a prominent platform for resistance to CSE worldwide. Pressure groups on social media platform such as Facebook advocating for banning CSE are rampant in several countries, including Ghana, Nigeria, Kenya, and South Africa (Nkoy, Venketsamy, & Sing, 2022). The power of these movements lies in their ability to network, connect people, and shape public discourse.

Mitigating distortions and misconceptions about CSE requires widespread publishing of accurate and evidence-based information in both formal and social media to counter the negativity. This is crucial for building positive public perceptions of the curriculum and instilling confidence and trust. Both formal campaigns and the use of social media can serve as effective platforms for raising awareness. Leveraging social media celebrities to disseminate information and dispel distortions can also promote a positive conceptualization of CSE.

The Chronosystem

Situated at the pinnacle of Bronfenbrenner's (1979) ecological model is the chronosystem, which acknowledges the influence of time and the ever-changing nature of the environment. Indeed, as previously discussed, certain

philosophical worldviews, cultural practices, traditions, taboos, mysticisms, and indigenous models of sexuality education have demonstrated resilience. Despite their enduring nature, the impact of historical trajectories such as the advent of Christianity and Islam, colonialism, the HIV/AIDS pandemic, the surge of information technology and social media, and, more recently, the COVID-19 pandemic, have continually and relentlessly introduced new social dynamics in SSA. Adaptation to contemporary times by custodians at all levels of ecological systems becomes imperative in light of these changes.

Conclusion

The need for evidence-based and culturally appropriate sexuality education within school curricula in SSA is unequivocal, especially given the region's stark statistics on HIV/AIDS. While CSE has been empirically proven to be effective in multiple domains, a standardized "one size fits all" curriculum falls short in providing African youth with the tailored information they require to make informed choices. The deeply ingrained religious and cultural practices, coupled with the resilience of traditional modes of sex education and taboos, pose formidable resistance across all levels of ecological systems. A collaborative engagement strategy, inclusive of the microsystem, mesosystem, exosystem, macrosystem, and chronosystem ecological levels, as advocated by Bronfenbrenner (1979), emerges as a crucial approach to mitigate resistance to CSE.

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Research Article

The effect of nature on the learning rate of elementary school students in cities with dry climate from the perspective of teachers and their parents

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Abstract

Unfortunately, in today's world, along with the expansion of cities around the world, children are separated from daily experiences in the natural world. Changes in homes, streets, and the advent of technology that take away children's free time instead of being outdoors have made children's free time increasingly full of predetermined and monitored moments. They limit their lives more than before. Schools are one of the important spaces where children spend many hours of their day in the most important ages of modelling and learning, and it is one of the most important spaces to re-establish this relationship. Schools are one of the important spaces where children spend many hours of their day. They spend their day there in the most important ages of being exemplary and teachable, and it is one of the most important spaces to re-establish this relationship. The presence of nature in educational spaces is often very limited, and this limited presence is also done without considering the special needs of children and the high capabilities of natural environments in meeting these needs. It is necessary to design natural environments in schools with the aim of meeting the different needs of children in growth, education and learning. This research was conducted with the aim of investigating the role of nature in children's learning from the perspective of teachers and parents. This research is of a hybrid type and field methods, indirect observation and library data collection have been used. In indirect observation, two types of questionnaires related to parents of students and teachers were prepared and randomly distributed among 580 parents of students and 50 elementary school teachers. The reliability of the test was obtained using Cronbach's alpha of 0.890. The results of this research indicate that physical location as one of the factors of children's learning has the greatest effect on children's education and learning.

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Introducton

Changes in lifestyle and technological advances in the cities, especially in large cities have changed human life. Nowadays the advances caused humans prefer landscaped and nature built environment (Van den Berg, Hartig & Staats, 2007).This reflects the separation of the human from the real nature while his strong need to it where the children have less daily experiences among these people. (Mozaffar, et al., 2009: 44)

Studies concentrating on children find that environments predominated by natural features are valued most (Elsley, 2004; Korpela, 2002; Loukaitou-Sideris, 2003) Furthermore, outdoor public spaces providing trees and vegetation are

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used more frequently by adults and adolescents than are spaces without those features (Coley, Kuo, & Sullivan, 1997). Findings on humans' general preference for nature and greenery imply that exposure to green environments has beneficial effects on humans' restoration, well-being, and health (Wells & Evans, 2003), given that the potential of environments probably depends on people liking the environment (Christina Kelz& Gary William &Evans, Kathrin Röderer, 2013). With regard to the above materials, we can say that nature has an important role in human life, especially children, who have been disconnected from the nature in todays' world and this connection is necessary to be re-established. Schools are one of the important areas where children spend many hours of their daily life at important ages of modelling, educability and learning and one of the places to re-establish this relationship. Based on the results of a Scottish study about the training program, learning is a chaotic matter for children and hardly put a simple issue in the way of a pre-determined result. And it seems that they understand the world through linking a part of their information to other parts and comparing them with each other and become dependent on events which are felt through rational, physical, emotional, aesthetic and spiritual ways. (School Curriculum & Assessment Authority SCAA, 1996).One of the most important factors affecting children's learning is the environment. Learning environment is a cultural, social and physical context where learning takes place. Understand how a learning environment becomes effective, is necessary to design an architectural environment. Effective learning environment is an environment which along with the other effective factors in children's education such as curriculum, teachers and ...has an important impact on education. Although the physical environment of the school is only one of the factors affecting learning; but we can say that it is considered as the most important component in an active learning environment (De Gregori A, 2007).

This study focuses on the importance of the nature on children's learning in schools. The study of educational theories indicates the children's educators' interest in the education out of the classroom environment along with the education inside the classroom and the nature as a learning tool has been focused. The nature has a great deal of potential to improve skills in children and can be a proper substrate to foster various aspects of child development and learning. The existence of natural places also leads to spiritual relief, freshness and the sense of belonging to the school environment.

Literature Review

The importance of educational environments to improve the quality of learning and teaching is obvious nowadays. Many researchers have investigated the importance of designing the educational environment on children's learning in recent years. Researchers such as Tanner also emphasize the need of outdoor places including green areas and its positive effect on learning (Tanner, 2007:309-330). Recently, school architects and planners have focused on the importance of involving users (children) in the designing process. Bjorklid writes Piaget believes that: "Children should be able to conduct an experiment and a research themselves and gain experience that these issues will be effective in children's learning" (Bjorklid, 2003).This caused the use of innovative approaches in children's education at times. This issue was first developed by one of the educational activists such as Lawrence Sarmin in America, which was developed through combining Steiner's educational model in many parts of the world. Many educators in America have defended the need to abandon traditional practices not only in education, but also in the design of educational facilities (Derek Bland, Vinathe Sharma-Brymer, 2012).

Theoretical Framework

Nature impact on children

Many children in urban environments do not have access to nature. Many parents prohibit their children from exploring wild natural areas because parents and children have little familiarity with nature, parents have concerns about children's safety, and children experience academic pressures and other demands on their time (Louv, 2005). This reduced contact with nature may influence children's development. Empirical research has demonstrated that experiences with nature have a positive influence on children. Davis, Rea, and Waite (2006) suggested that spending time outdoors may help children develop positive values about nature, whereas Wells (2000) suggested that children whose home environments improved the most with regard to greenness after relocation were more likely to have higher levels of cognitive functioning after relocation. Wells and Evans (2003) indicated that natural environments can increase children's

psychological well-being. Children whose homes had more nearby nature coped better with life stress than those whose homes lacked nearby natural areas (Judith Chen-Hsuan Cheng, Martha C. Monroe, 2012).

Environmental Based Education

Environmental Based- Education (EBE) focuses on the natural environment, but this emphasis is a vehicle for improving students' learning and skills through the interdisciplinary integration of subject matter and a local, place-based, community focus (NAAEE & NEETF, 2001). EBE is typically implemented in middle schools or high schools and often takes a problem-based approach to investigating an issue or phenomena that is important to the students and the community. EBE is characterized by integrated learning across curricular domains, problem solving, decision making, independent and collaborative learning, and the taking of multiple perspectives (NEETF, 2000). Lieberman and Hoody (1998) examined 40 programs using the environment as an integrating context, a term sometimes used interchangeably with EBE, and reported that students demonstrated better performance on standardized assessments of math, science, social studies, reading, and writing; fewer discipline problems; and increased engagement and enthusiasm for learning (Torquati, Cutler, Gilkerson & Sarver 2013) .A focus on nature in education has historical roots in the nature study movement of the late 19th and early 20th centuries, which emerged in part in response to urbanization and concern that a lack of contact with nature compromised children's health and well-being (Knight, 2009). Nature study sometimes included a formal focus on natural sciences but often was a more holistic approach to education, encompassing aesthetic, spiritual, and physical components (Laaksoharju and Rappe, 2010). Both Montessori and Waldorf educational approaches incorporated authentic experiences in nature and developing reverence for nature (Hutchison, 1998; Petrash, 2002). Nature study and outdoor education were marginalized during the mid- and late 20th century, as educational priorities variously shifted to the space race and international competitiveness, vocational education, information technology, and standards-based education. Although most of the research on the influence of nature on children's development and on EBE has focused on elementary-age children and adolescents, there is increasing interest in nature-focused education in early childhood (Hazreena Hussein, 2012). Interest in nature as a focus and medium for education. There is increasing evidence of the importance of natural environments for children's development and well-being (e.g., Taylor & Kuo, 2009; Wells, 2010). In addition, evidence is accumulating that educational initiatives that are characterized by EBE, environment as integrating context for education, and education for sustainability show promise both for student academic achievement as well as for accomplishing objectives related to environmental literacy and citizenship (North American Association for Environmental Education [NAAEE] & National Environmental Education and Training Foundation [NEETF], 2001; Office for Standards in Education [OFSTED], 2009; Stone, 2009). The role of nature in children's development and education is gaining prominence in cultural contexts and policy as well. Richard Louv's (2006=2008) Last Child in the Woods: Saving Our Children From Nature-Deficit Disorder galvanized a movement that is becoming institutionalized through organizations such as the Children & Nature Network.) Chawla, L., & Cushing, D,2007)The contemporary interest in nature is becoming systemic, reflected in policies such as the No Child Left Inside act in the United States and the inclusion of education for sustainable development in the national curriculum of the United Kingdom (OFSTED, 2003) and position statements such as the Re-Connecting the World's Children to Nature: A Call to Action (World Forum Foundation Nature Action Collaborative for Children, 2008).

Learning Beyond the Classroom

The concepts related to this issue can be as follow: learning out of a confined space, outer space training, training outside indoors, environmental education, learning outside the classroom in terms of education which also bring different results that stem mostly by different training taking place in a context (Mozafar et al., 1388: 39). Education in urban schools may be done inside school yards. However, teachers in some environments may have access to urban parks and several schools simultaneously benefit from a city park (Dewey, 1963). Certainly these areas in big and small city schools and schools located in urban and rural areas will be different. What is common in all these thoughts in mind is that education happens outside the classroom indoors. However, this method does not believe that training and education beyond the classroom is better than classroom-based training, but demonstrates that some teachings should be offered outside the classroom and in the more general meaning, the training into the classroom should combine with teaching outside the

classroom with traditional holistic education. These type of general thinking is very common. (Chawla and Cushing, 2007).This educational approach that has its roots in theorists such as Johann Pestalozy, John Dewey, Paolo Freire and Patrick Geddes can be found, who have been conducted the relationship between external training by people, places, and activities in their views (Higgins, 2012). In addition to the studies done in designing educational spaces that have mentioned above, we mention Parkash studies that provide templates for the design of educational spaces. Among the models presented in this book is the importance of the need for internal and external communications and internal and external perspectives as an important principle in the design of educational spaces which have been emphasized. Parkash writes about the importance of communication within and outside the educational space that: "people are naturally created in a way that need to communicate with the outside world, and this need is evident, especially at an early age. So we have to take advantage of the opportunity to connect the inside and outside space. He also discusses the importance of internal and external perspectives in schools and says: "For this reason, most of the learning happens in restricted spaces in schools is essential to students' horizons by creating visible lines to the extent that it may be extended beyond the classroom. The landscape of 15 meters or more gives us an opportunity of view change that is important for eye health and comfort (Parkash, 2012). Research indicates that the presence of children in the natural environment reduces stress in them. Also, children who spend their time in green areas have fewer illness symptoms (Taylor and Sullivan, 2012). Green area at schools also increases academic performance of children. (Sullivan, Taylor, Kuo, 2004) The involvement of children can also be used in the development of natural places at schools. This method causes positive emotions in children. The physical participation of the children in architectural compounds and elements of landscape architecture will lead to a sense of satisfaction in children and the retention of experience in their mind (Sebba, 2005:42-69).

Problem of Study

The main hypothesis of this study is the presence of nature and natural places, as one of the major factors influencing the growth of knowledge, and children are learning. The subgroups of this hypothesis include the following items:

- The natural places have a lot of abilities in educating children and the proper design of natural places at schools can improve a part of children's education.
- The proper designing of natural places at schools could be effective on children's feelings regarding the school environment and their sense of belonging to the school environment.

Method

Research Model

The main areas of research include the design of educational spaces, and child psychologist. The design of appropriate learning environments and courses in nature are the main purpose of this study. the method of this research study is not in the usual way as the way children perceive and express is different of the adults' understanding, perception and expression , because personality and age characteristics of children caused the use of practices such as test-image (painting) to express their favourite class and school. The use of this type of test is because the children create well mental picture in their favourite spaces, and it increases their learning. Barraza, in relation to children writing from observations surroundings, states that "Children schemes are a powerful tool in providing useful information for evaluating the observations of the surrounding environment ". Research method is that math and science classes have been held outside of the school environment, 580 students (as the toughest courses) in 3 chosen schools and each school individually had 6 classes in 5 courses outside the school and in nature. Children reactions and learning in the natural environment and the typical classroom environment have been observed and recorded. And then the students were asked to draw their interesting and effective learning class they have ever had during their education according to their experiments. All plans and drawings received in time and stretched and obtained in the class under supervision of the teacher. Official approval to participate in this research and to use the images has been issued by the school principal and parents. And no other information than the children school year was collected about their background. Then questionnaires completed by 50 teachers and 580 students (280 boys and 300 girls) according to learn and holding classes in nature and the data analysed by using statistical methods and SPSS 20 software.

As described above, two methods have been used in this study in order to obtain more favourable results. First Method: Children's illustration from their own desired and favourite class they had during their course of study. Second Method: Distributing a questionnaire among 50 teachers and 580 students, and then analysing it.

Participants

Students at grades 3, 4 and 5 (9-10-11 years) in 3 elementary schools (near the park) in Shiraz were studied. The selected age group was recognized as appropriate for the study, because the studies indicate that the symbolic representation usually occurs during the last period of childhood and is distinguished from "knowledge, insight and ingenuity". Also at the age of 7-9 years, "Children have a graphical language that contains special symbols and the three-dimensional understanding (three-dimensional organization) and at the age of 9-11 they attempt to be more precise.

Data Analysis

Analysing the mental images of children

There were wide variations in the participants' artistic abilities, but this was not a concern about children's analysis because by observing their behaviour and talking to them about the content of the image, enough descriptions and information were collected. Each design and the interview along with it was encoded by the content in order to determine the common characteristics among the 100 received samples and obtain a through this process. Keywords explored in these images are: place, the school and the desired class, environmental considerations and any special feature including the green area and gardens.

Results

Stating children's designs

In this part of the study we express and explore some designs from the children

My favourite place for learning is where the breeze is blowing in my face and trees sway gently from side to side. I sit on warm and cozy sand I look at the sun. Every morning I wake up and I look at the rising sun. This is where I think I like to study in and I think it is better than the sealed and shut class (male, grade4).

My design of the learning Environment is a rain forest (uninhabited) and intact. I like to study in a relaxing place, away from the noise. I like that I can walk out with a book, to sit on a bed of flowers and read a book ... I think the classroom is too shut. Being outside makes you feels better (male, grade 5).Instead of studying at home, I like traveling in my nature. It's such a joy (male, grade 5).

I like to study around a lake ... where you can take your head in the water and watch the fish closely. (Such a learning environment is ideal for the children or any student who studies aquatic animals and birds.) You can even camp out for the night and observe nocturnal animals (male, grade 3).

Why not having a school outside? We can also study, play and do sports outside. The idea I previously had about the school was changed after this experience. It is better to study in a good environment. It is better for us because oxygen is everywhere and there is no need to use electricity because the sun shines (male, grade 5).

I like to study in a relaxing place where you can hear the sound of birds. I also like to work alone so that I can concentrate. And there should be a waterfall in that environment because its sound is relaxing (female, grade 6).

My future school is near the beach ... I think it is a quiet place and a great place to work in (female, grade 3).

I like to study in a field of grass instead of the couch and be happy with all the kids and study Mathematics (female, grade 4).

I like to study in a place that is quiet and the birds always sing there, where my dreams are realized.

I like my class to be a place where you can lie down, rest and a cool breeze caress your skin (female, grade 4).

I like to study somewhere full of beautiful trees and read books and play with my friends in their shadow. (male, grade 5).

I like to study in a classroom full of colourful flowers and their ubiquitous smell. (male, grade 3).

Concerns about the environments with an external nature, joined the ideas about technology, along with awareness of environmental protection.

This is a good place to study, where solar panels can provide electricity for the fans and lamps. The passing water has a soothing sound, with electric window on the roof just lets in the required light to (male, grade 5).

In my ideal school, the first thing that comes to mind is an environment-friendly school ... learning animal diseases and their treatment methods (female, grade 3).

I like my class to be in a large area full of fruit trees. (female, grade 3).

I like to learn my new lessons near a water-filled waterfall and be away from these horrible classes (male, grade 5).

I like to study on the grass and under the trees through which the sun shines, I like the studying method of the nomadic (male, grade 5).

I like to study in a place where large birds are flying over my head (female, grade 4).

I like my class to be on a lush and tall tree, so tall that I could touch the clouds. (male, grade 3).

These children's imaginations about their favourite and effective learning place can be observed in a way that AS Neill's Summerhil School has been made: "the classes are inside but the enclosure of trees is as an area of learning such as a class. The school is considered as a beautiful and energetic place for the staff and the students. The area is open to students and they are allowed to climb trees." Illich proposed the complete removal of school boundaries. Illich suggested the community facilities to be served as places for education; this project is "decentralization of schools". When Holt was asked that “what message do you have to teachers of the developing countries? He replied "To have a school there is no need to have a building ... there is no need to have a have a school to educate ...”. In children's designs, most features include natural environment. Many participants think of studying in a rainforest, beach, or in rural areas with a green area to have a direct experience with the nature. And such an environment provides a quiet relaxing place to learn for many of the participants.

Interpreting students’ designs with regard to their talk

Designing the main instrument for children to express their ideas of the best classes they have had in their entire education; talking with the children, along with their drawings provided important information about what they had drawn, which helped a lot to understand and analyze the figurative data. A problem in the figurative content analysis was the interpretation of the contents on the position of the viewer that his history, social and cultural relationships may vary with the artist (student) that this could cause incorrect assumptions and misperceptions. It has been tried not have such an interpretation.

Interpreting students’ designs reveals that they want studying to be mostly fun and in a place that is environment friendly. Their imaginations are involved in colorful and exciting places; and also insist on where they can learn something and be in contact with real life. Some quotations as below:

I think of a happy and colorful school where students enjoy attending the class (male, grade 5).

It would be nice if the class is full of colorful flowers (like rainbow) that cause happiness in everyone (male, grade 3).

More than 83 percent of students were considering these features in open and natural places. It is clear that students do not like boring classes. Boringness in their schools would eliminate or reduce the interest for learning. The children also preferred to have schools with trees, grass, water and outdoor garden instead of brown, dark and dusty classrooms.

These results are consistent with findings of similar researches (Birkett, 2011; Burke & Grosvenor, 2003; Doherty, 2005; Pointon, 2000) about children who experience their need to space, light and clour in the open space. The key features of an ideal and effective classroom learning of the children include: Playground with framework for climbing, tree houses for classes in the quiet space with water sound, musical sound of nature instead of bells, colourful place for painting, reading and outdoor games, greenhouses for growing fruit and vegetables for consumption and selling them to make money, creative environment full of colourful flowers and large green spaces, oxygen-rich atmosphere. These listed issues are parallel with different climatic conditions of Shiraz. According to the students' experience of the class as well as natural environment, they imagine their favorite learning environment in outdoors which is active and full of trees and relaxing. This reflects the desire for children to learn outside of the boring and frustrating classroom. This has been promoted in other countries by educational fans such as the Experiential Learning Centre of John Dewey in America, Neil summer hill school in England, Ivan Illich's de schooling movement (anti School Ivan Illich's movement).

Table 1. Children's Illustration of their favorite class during their course of study

Analysis research topics

A wide range of participants (children) in this study held their favorite class and effective learning outside today's close classroom as well as in environmental in nature with direct and palpable education and portrayed as large, happy, exciting and colourful environments and have stressed holding classes in nature- due to having experience in this field as their expectations from their favorite custom class space is limited in nature.

Questionnaire data analysis

In this study, two types of questionnaires prepared and distributed between educators and students in four elementary schools, two girls' and two boys' schools and Factors affecting children's learning are investigated in both the questionnaire and the nature of learning, anxiety, fond of children to school, working children. Among students and educators from four schools, 580 students (280 boys and 300 girls) in the third, fourth and fifth grade and 50 teachers (25 in the girls 'schools and 25 in the boys' school) have been randomly selected as the study population. The following table shows the number and percentage of students' gender in the chosen levels.

Table 2. Number and percentage of participants

Educational level	Gender	Number of classes	Number of students	%
Grade 3	girls	6	120	20.68
	Boys	6	120	20.68
	Total	12	240	41.36
Grade 4	girls	3	60	10.34
	Boys	4	80	13.79
	Total	7	140	24.13
Grade 5	girls	6	120	20.68
	Boys	4	80	13.79
	Total	10	200	34.47

Schools that have been selected as the sample in this study have been allocated a range as nature in their yard (trees and plants). Following table analyses the relationship of children and nature outdoor in their school and information have collected by field observations and interviews with students.

Table 3. Children connection with nature with open space in the school

The performance of students in nature	f	%
Use nature to study	313	53.96
The nature of the game	267	46.03

The above table indicates that 53.96% of children use their environment within school yard with trees and flowers and plants to study. Table 3 is to review and study better outcomes for children by segregation and we came to the conclusion that most of the boys (53.57%) use the courtyard of their school with more trees and plants for game and most of the girls (61%) use their school yard with more trees and flowers for their study.

Table 4. Children connection with nature in the school open air, differentiated by gender

Gender	The performance of students in nature	f	%
Boys	Use nature to study	130	46.42
	The nature of the game	150	53.57
Girls	Use nature to study	183	61.00
	The nature of the game	117	39.00

Analyzing the data related to students in nature

This part of the study demonstrates the average weight (the students use of nature to play and study), Single-sample T-test (a test that the average of a community is distribution based on T and analyses that how much an average of a society is more or less than a fixed amount) shows the relationship of students with outdoor nature, that average amount are 4.1947 and 3.8947 for studying and games, respectively. The results were obtained according to the whole 5-item Likert scale (very high = 5, high = 4, mean = 3, low=2, very low = 1). Number 3 in one-sample T-test was selected as mean for school students' relationship with nature in school open space. The results indicate that the average used of nature by students in the study (4.1947) was higher than this value and this represents a significant impact of the nature on the teaching and learning of students.

Table 5. Quantitative table of children connection with nature in the school open air Source: The authors 2023

The performance of students in nature	Number	Mean	Standard deviation
Use nature to study	313	4.1947	.19876

The nature of the game	267	3.8947	.29876

Table 6. Single-sample T-test quantitative table of children connection with nature in the school open air

The performance of students in nature	T	df	SIg	Mean difference	95% confidence interval of the difference
-	-	-	-	-	Lower Upper
Use nature to study	313	4.1947	.19876		.7196 .8726
The nature of the game	267	3.8947	.29876		.5083 .7135

The aim of the study is to examine the role of nature in teaching and learning of children. Questionnaire assessed factors affecting children's learning at school by using analytical model of study. The following tables reflect the opinions expressed by teachers in the questionnaire.

Table 7. Factors Influencing Children learning at school

Row	Factors	Mean	Standard deviation	Total
1	Physical space class	4.1525	.84718	50
2	Children interact and collaborate with each other	4.1356	.81912	50
3	Children's sense of attachment to class	4.0000	.85096	50
4	Anxiety	3.9661	.92785	50
5	Children communicate with teachers	3.7966	.82587	50

According to the table above, we came into the conclusion that physical space and physical classes have the highest effect than other factors with an average of 4.1525. Then the interaction and cooperation of children with each other, a sense of belonging for children to class, anxiety, relationship between children and the secretary are the other factors that affect student learning.

Analysis questions related to the questionnaire, holding classes in nature in 5 periods

It was concluded by above investigation that physical space of class is effective on children's learning. So keeping in mind the purpose of this study (the role of nature in learning and education), classes in science and mathematics (as the most difficult courses) were held in nature (on 5 second semester of students). We analysed the effect of nature on factors affecting children's learning. According to teachers, an interest in challenging courses among students is more with their presence in nature and outside of the boring and dull classroom. In order to a more favourable result among students, we separated the questionnaire between girls' teachers and boys' teachers and the top result was true among girls and boys, separately.

Table 8. The role of the nature of the factors influencing children's learning

Row	Factors	Mean	Standard deviation	Total
1	Anxiety	4.1000	.86944	50
2	Distractions	3.7831	.85066	50
3	Interest in the lessons	4.2186	.89266	50
4	Cooperation children	4.1317	.81493	50

Table 9. The role of the nature on the factors influencing girls' learning

Row	Factors	Mean	Standard deviation	Total
1	Anxiety	4.0000	1.05045	25

2	Distractions	3.9831	.88066	25
3	Interest in the lessons	4.1186	.87266	25
4	Cooperation children	4.1017	.86493	25

Table10. The role of the nature of the factors influencing boys' learning

Row	Factors	Mean	Standard deviation	Total
1	Anxiety	3.4068	1.05240	25
2	Distractions	3.4576	1.13445	25
3	Interest in the lessons	3.5862	1.02657	25
4	Cooperation children	3.7797	1.14572	25

The survey indicates that the nature has significant relationship with students' interest in teaching and learning. For further proof, single-sample T-test was used in this context and number 3 is selected as the middle of factors affecting children's learning in nature. Calculations show that each of the factors influencing children's learning in nature was higher than this amount.

Table 11. One sample T-test results for the role of nature in the factors affecting learning in boys and girls

Row	t	df	Sig.	95% confidence interval of the difference
Girls	-	-	-	Upper Lower
1	10.450	25	.000	1.3733 .9318
2	8.442	25	.000	1.1226 .6063
3	6.703	25	.000	1.1532 .7112
4	6.367	25	.001	1.0470 .5462
Boys	-	-	-	Upper Lower
1	10.649	25	.000	1.3733 .9310
2	4.392	25	.000	1.1226 .6063
3	3.227	25	.000	.1532 .71121
4	4.205	25	.001	.5462 .8256

To prove the hypothesis by citing the questionnaires, by using the chi-square test, we should find a significant relationship between the role of nature and children learning concepts and emotions and a sense of peace and belonging towards the school environment. The results of the test between two variables of nature and interest to teach the students shows the correlation coefficient as 0.683 and a significance level of .000. as the significance level is less than 0.05 level, we have enough evidence to reject the null hypothesis and conclude a significant positive relationship between nature and the students' interest in learning and in fact the presence of students in nature makes them to find an interest in challenging courses, followed by increased learning and thus the first hypothesis is accepted. Maximum correlations, based on the role of nature on anxiety, distraction, information exchange and cooperation, were 0.676, 0.657 and 0.528, respectively, with significant levels of 0.000, 0.000 and 0.001. It can be said that the significance level is less than 0.05 as sufficient level, therefore the null hypothesis is rejected, and it can be concluded that there is a positive and significant relationship between nature and anxiety, distraction, exchange of information and children cooperation. And the second hypothesis will be accepted as concerning the effects of nature on a sense of peace and belonging to the school among children.

Table 12. Evaluation of the correlation coefficient and significant level of the impact of the nature on learning factors

Row	Factors	r	Sig
1	Nature impact on anxiety	.676	.000
2	Nature impact on distraction	528.	.000

3	The effect of the nature of the interest to lessons	.683	.000
4	Nature impact on cooperation children	.657	.001

The following table generally is using a correlation coefficient of 0.772 and a significance level of 0.000 (significance level less than 0.05 level) which shows the relationship and the role of nature in children's learning.

Table 13: Correlation coefficient and significant of the impact of nature on learning Source: The authors 2023

Table 14. Analysing Factors in the environment and effective on school children learning

Row	Factors	Mean	r	Total
1	Light	3.8644	.99060	50
2	Color	3.9322	.80653	50
3	The materials used in class	4.0000	.85096	50
4	Class size	4.1356	.81912	50

By separating the questionnaires between girls and boys we concluded that boys' school believe the extent of space, as one of the factors in the nature, has the greatest impact of their learning. Girls' schools believe that light, as one of the factors in the nature, is the most effective factor on their learning.

Table 15. Analysing the factors in the environment and effective on boy students' learning

Row	Factors	Mean	r	Total
1	Light	3.4915	1.04011	280
2	Color	3.5593	1.02168	280
3	The materials used in class	3.6271	1.04878	280
4	Class size	3.7119	1.14547	280

Table 16. Analysing the factors in the environment and effective on girl students' learning

Row	Factors	Mean	r	Total
1	Light	3.6102	1.06701	300
2	Color	3.3559	.96065	300
3	The materials used in class	1.25060	3.5254	300
4	Class size	1.04011	3.5085	300

Discussion and Conclusion

According to the obtained results and analysis, it can be concluded that the presence of students in nature increase their interest in studying as one of the factors affecting learning in comparison with other factors (anxiety, distraction, cooperation and information exchange students, student liaison with the players). This can be a very important factor in learning and education. Natural light and space in the class as natural factors will cause students to be interested in challenging courses and their learning, compared to boring and dull and small classes, will increase in nature.

Information obtained in this study lead us to conclude that physical space of class has the greatest impact on children education as one of the factors affecting student learning. So by creating an outdoor classroom we can see tremendous impact of nature as a suitable space for classes as well, because the nature is one of the most important factors in generating interest among students and therefore increases the lessons they are learning. Studies have shown that features found in nature, such as the expansion of space, and natural light enhance the students' learning. Holding classes in nature or creating natural spaces in the class and school, in addition to a positive impact on children's learning, will be able to meet the needs of specific groups of children. These needs include: the needs of educational, social and psychological development. Emotional needs and physical growth. Meeting the needs, will change physical environment of class into effective environmental for education of children.

In the first group, the natural spaces should be suitable to children's cognitive development with the aim of increasing knowledge and learning. In the second group, the space should be natural for social and physical growth of children. Social spaces are designed in natural environments, offers interaction and communication and a platform for students to deal with each other and creates collective and individual children's playgrounds which cause noticeable social and physical growth. In the third group, the natural spaces are designed in combination with artificial spaces and create visual elegance with the aim of creating a beautiful surroundings to create a sense of belonging for children. By analysing the questionnaires, it can be said that two research hypothesis include: natural spaces has many capabilities for the

teaching and learning of children, and proper designing of natural spaces in schools can improve part of children training. The proper design of natural spaces in schools could make children feel a sense of peace and belonging to the school environment which has been approved and indicates that the nature has an important role in teaching and learning of children

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Review Article

Hyperlexia from a personal point of view: some counselor's insights

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Abstract

In this article, I discussed my experiences and opinions as a gifted counsellor, on Hyperlixia, an important exceptionality that remains mysterious, within the framework of the opinions of experts in this field. First of all, I explained that Hyperlexia and Hypercalculi also occur in gifted people and the approach of families. Then, I reviewed the course of Hyperlexia and Hypercalculia research. Here, I explained the lack of definitive and angular diagnostic criteria, as well as the possibilities of determining the existing signs of these two exceptionaities. Then, I included the definitions of experts in the last 30-40 years on the definition of hyperlexia and hypercalculia, as well as the discussion at what age this diagnosis should be made. I gained insight from research on the prevalence of hyperlexia in society and its distribution by gender. In this study I have presented a personal point of view, that of a counselor, on hyperlexia, a phenomenon not very well known among education and mental health professionals, and much less among the public. In my opinion, this knowledge can serve very many children who are either not identified for autism or identified much later had they not have hyperlexia, which, in many cases, serves as a mask, covering the poor or even non-existence of the child's social abilities, and serves as a "reason", "explanation" for his or her repetitive behavior. I have concentrated in five aspects of hyperlexia – not necessarily those perceived as "the most important" but those which help the potential reader "make sense" of the seemingly contradictions characterizing it: very high reading ability at a very young age, perceived as a characteristic – even as a "proof" of precocity or giftedness, along with social disability and repetitive behaviors, typical to autist which are perceived as having low intelligence level.

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Introduction

The phenomenon of children reading at a very young age has been intriguing me for six decades – even before children who could read at age 3, 4 or 5 were named "hyperlexic" or "having hyperlexia". It had probably to do with my Ultra-Orthodox background, where 3-year olds – or, at least – toilet-trained 3-year old boys – started going to the cheder, literally: "room"; a traditional primary school teaching the basics of Judaism and the Hebrew language. Both my brothers did not attend such a traditional cheder; my older brother started attending the preparatory class attached to his Talmud Torah school at age 4; my younger brother did attend a sort of a cheder a month before his 3rd birthday – he was born at the end of the month of September, and the Ultra-Orthodox school year starts on the first day of the month of Elul – the last month of the Jewish year, still in August. However, this place for 3-6-year olds, though also called "cheder", had both a male tutor, in charge on the Jewish and literacy materials, and a female kindergarten teacher, for teaching music, art, social issues and everything else a pre-school child has to lean and experience.

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Both my brothers started reading shortly after being exposed to systematic learning. At age 5 my older brother was reading fluently and started formal school; at age 4 my younger brother enjoyed reading children's books. He was very happy in his cheder and continued his education there for additional two years. A month before he was 6 he started school, but on the third school day my mother was told that her son had to skip to grade 2. The headmistress explained her that "everybody was just learning the letters, and the teacher could not satisfy the needs of a child who had already been reading for 3 years".

As for myself: I was exposed to reading at age 6, when starting school. Within a few days I was reading fluently. As a result, my headmistress called my mother to her office, and scolded her for "teaching me to read". For me this event was quite dramatic, and I refused to go to school. I had been staying at home from September 4 1956 until after the Passover vacation, in April 1957, when many of my peers has also acquired the skill of reading.

But soon enough I had learnt that some children, though exposed to letters, words, sentences, had difficulties combining letters to words, and words to sentences. Many who did manage to read each separate word could not summarize a whole paragraph, and certainly not grasp the meaning of a whole story. In my time dyslectics were considered "dumb" (see Deacon et al., 2020): 'deficit' perspective, i.e. lacking intellectual ability; 'stupid', 'thick' or ' not academic'; (see: Carawan et al., 2015): 'lazy'; different, stupid, lazy, inferior, and ashamed). This negative self-perception still exists in the third millennium, both among educators and laypersons (e.g. Ingesson, 2007, 'different' and 'stupid', 'inferior'; Nalavany et al., 2011: 'stupid'). I could not accept this attitude toward those occasionally intelligent children, who had reading difficulties; I knew it was "something else" rather than stupidity or laziness.

But it took me many more years to understand the still not very recognized phenomena of hyperlexia and hypernumeracy, I had become familiar with both only when practicing interventions as a counselor of families with gifted and talented children. This work describes the first steps I have done in my ~20-years track of investigating these phenomena.

Why hyperlexia and hypercalculia?

Hyperlexia and hypercalculia has been a special challenge for me as a counselor of gifted children and adolescent and their families. I had to "put together" my "old" knowledge" about reading in general, and my observations of children and adolescents who had mastered reading at a very young age, without instruction, or could calculate at age two or three, but could not correlate to others, and did not seem to improve their repetitive behaviors. I met quite a number of parents of such children, who either refused to have their children diagnosed for autism or rejected the autism diagnosis, not believing that their "super-reader" or "math-genius" child was autistic. In some cases, they believed that lack of social interest and repetitive behaviors could be compensated by early reading or calculating. In others they were convinced that their children were "too smart" for others, or "were not interested in foolish games". Quite often I have heard from such parents that "my child has not friends because he or she is gifted" (David, 2020b, 2021)

Many parents of hyperlexic or hypercalculic children began their first counseling session by admitting that they were hoping there was some mistake. In some cases, after meeting both child and parents on a regular basis for a while, the parents abruptly terminated the intervention when I said the "D word" – suggested they took the child for diagnosis. These parents had no knowledge about hyperlexia or hypercalculia, so they were not aware of the fact that most hyperlexic or hypercalculic children are autistic. Martos-Pérez & Ayuda-Pascual (2003) stated that hyperlexia was more common among autistic children than in the general population; according to Ostrolenk et al. (2017), for example, 84% of hyperlexics and hypercalculics were autistic.

A long time after brain sciences opened their gates to me, I had first applied my new knowledge in the service of learning disabled children (see David, 2009, 2010, 2011a, 2011b, 2013, 2014a, b, 2015a, b, 2016a, b, 2017, 2020a). But only after psychology and education were simultaneously studied by an increasing number of scientists, and the neurological basis for psycho-educational phenomena was well developed, I published my first work about neurodiversity gifted children and adolescents (David & Gyarmathy, 2023). The publication of this work had whetted my appetite to explore in depth some less-known phenomenon I have been encountered with for decades. Both hyperlexia and hypernumercy had been the two I have found most challenging. This article begins with hyperlexia.

The stage of hyperlexia- versus that of hypercalculia studies

Both hyperlexia and hypercalculia are diagnosed, in most cases, at a young age, and the study of them is at its first stage; their main knowledge body is mostly based on case studied. A google search of "hyperlexia" resulted in about 430,000 results; of "hypernumeracy" – in about 19,200, and in "hypercalculia" – just about 1820 results (on November 4, 2023). This should be surprising, as, according to Wei et al. (2015), 9% of the 6-9-year old autistics in their sample were hyperlextic, while more than double, 20%, had hypercalculia. Maybe the reason for it is that "supercaculatrors" had been descried in the literature as savants (e.g. Corrigan et al., 2012; Goldberg, 1987; Gyarmathy & David, 2023; Mottron et al., 2009, 2013; O'Connor, & Hermelin, 1994; Patti, & Lupinetti, 1993, Treffert, 2011), and until recently there had no distinction made between these two phenomena. In addition, here are some of my insights about this discrepancy of research between hyperlexia and hypercalculia:

- There are many more tests for diagnosing verbal disabilities than for identifying mathematical disabilities.
- The ceiling in many verbal tests are higher in comparison to those testing mat abilities.
- Practically everybody in the western world is expected to be literal, but many are "bad in math" or manifest t symptoms of math anxiety, and thus social scientists and educators prefer to explore hyperlexia, dealing with words, and thus seem less mysterious and less frightening for them.
- Inability to interpret a written after reading it correctly while fascination with number, recognizing series of numbers and being able to memorize them – including long, complicated ones – does not necessarily interfere with social connections or relationships.
- At a young age, when hyperlexia is usually identified, there is a substantial gap between children who are able to read and their age-matched peers, who do not read at all. This fact causes expectations of high level of understanding – both of written and oral materials. When these expectations are not materialized it is obvious that the child faces a problem, which intrigues kindergarten- and school teachers, parents, and researchers.
- Though there are exceptions (e.g. Patti & Lupinetti, 1993 describe a 22-year-old woman with autism who exhibited hyperlexia), most hyperlexic children have been labeled as autistic, even when at age plus-minus 3. This has to do with two of the main characteristics of autism: social difficulties, and repetitive behaviors, easy to notice even when very young. When a child who already starts reading at age 18month, and generally before age 4, but does not use oral language properly for social interactions, caretakers and teachers pay attention to this phenomenon. But when a loner child is very good at math while still as young as 2, 3, 4 or 5, it does not always seem so exceptional, as people who are interested in math are usually perceived and "nerds" (e.g. Hall, & Suurtamm, 2020; Schoffer, 2002).
- 6Not only parents, kindergarten- and school teachers, but also many mental health professionals, with whom a hyperlexic or a hyperclaculic child meets, feel much better when having to figure out, assume or diagnose hyperlexia than hypercalculia. That might have to do with the lack of clear criteria according to which such identifications are made. Furthermore, according to The Diagnostic and Statistical Manual of Mental Disorders (5th ed.; DSM–5; American Psychiatric Association, 2013), the criteria for identification of autism are far from being absolute, and heavily depend on the opinion.

Definitions of hyperlexia and hypernumeracy

The term "hyperlexia" has been used for over 50 years, in the (Silberberg & Silberberg (1967) study of 28 early reader children. According to them, hyperlexic children have a higher ability level to recognize printed words than to comprehend what they have read or their verbal functioning in general.

But referring to hyperlexic children without using the term "hyperlexia" is documented in studies conducted over a century ago. For example, Parker (1917) wrote about "A pseudo-talent for words", describing an autistic student with special reading ability, but as Gordon, the described child, was already 10, we cannot be sure he was "truly hyperlexic", namely, reading awhile still in kindergarten. Obadiah, described also by Parker (2018), was hypercalculic. He had "numerical obsession. He was perpetually counting, translating everything into number" (p. 248). The doctor that had

observed him noticed that "this six year old prodigy solved problems in multiplication, division and fractions to an extent that was nothing short of phenomenal (p. 249). On the same year Hollingworth (2016 [1918]) published her work stating that some children were "generally stupid", but they had an innate gift of reading.

In his work describing 11 children with "autistic disturbances" Kanner (1943) introduces us to a hyperlexic girl (case no. 5, pp. 229-230). As the term "hyperlexic" was not known in the 40ites, we can only conclude that Barbara, the child described, was indeed hypelexic. In addition to her lack of relating herself to others, the fact that Barbara was initially admitted to the clinic for autism and did improve in time is an additional evidence that she was hyperlexic. Burd et al. (1987) had shown that unlike "simple" autistics, it is quite common among hyperlexic that improvement can be observed in social abilities. In the Burd et al. (ibid) study, that included just 4 hyperlexic children with autism, the average IQ in the first evaluation, when they were 2-4-years old, was 43, and in the last, when they were 8-25-year old – 94.7. Like Burd et al. (ibid), I have also noticed in my work with hyperlexic kindergartners that stronger reading skills in early childhood predicted, quite often, higher intelligence later.

Age of hyperlexia identification

There is no dispute about the minimal age of identification of hypelexia, but as to the maximal – there have been many opinions, many ideas and many definitions. According to Hopper (2004), the skill of reading without being taught can be defined as hyperlexia when the child is under 5, but sometimes it appears even among 2-year olds. For Coburn (2022) hyperlexic children were those developing reading skills before the age of 3.

Macdonald et al. (2022) included in their hyperlexia study children aged 36-70-months old. Healy (1982) included in his hyperlexia study 5-11-year old children. On the other hand, Grigorenko et al. (2002) state, that age does not matter in the diagnosing of hyperlexia.

But as there is no accepted definition of hyperlexia (e.g. Davidson, 2021), and one of the disputes that prevents an agreement on a common term is that between scholars who use "hyperlexia" for describing under 3 children who can read and the others who use it for all children with excellent reading skills, I fail to see the need to aspire towards an "absolute" definition.

Patterns of reading and math ability vary substantially among children with autism (e.g. Bullen et al., 2022). Thus it has been necessary to draw a line between "children with autism" and "hyperlexics". For kindergarten children, some have drawn it as "reading before age 5"' "recognizing letters and words at age 3-4" (e.g. Rabiee & Shahrivar, 2012), or, mainly for elementary school children "reading 2 years ahead of the expected level according to the mental age". In all these definitions the common ground for these children is having difficulties with social interactions and reading at a much higher level than comprehending the read texts.

Peter Huttenlocher who was considered one of the fathers of developmental cognitive neuroscience studied was one of the pioneering in studying children with hyperlexia for a few years, while identifying the youngest at age 1. Three boys aged 1-4 with hyperlexia were included in the Huttenlocher & Huttenlocher (1973) study. They were going through neurological and psychological examinations at age 4-6. In addition to their apraxis they all could complete just half of a set of 2- and 3-part commands, given usually in a spoken or written form to children aged 4.5. Their four basic speech functions, namely statement, offer, question, and command as well as verbal memory were intact; they could repeat 10-word sentences, and they often learned long passages verbatim.

Kennedy (2003) had observed, that some hyperlexics demonstrated an improvement both in their reading comprehension and their other autistic symptoms. He found that the improvement was directly related to the child's IQ level.

Definitions and criteria for hyperlexia

Until nowadays there is no general agreement about the definition of hyperlexia. The origin of this disagreement stems, in my opinion, in the difficulty of finding clear-cut criteria on which professionals would rely. Macdonald (2022) who had cited two of the most well-known scholars in the field of neurodivesities (Ostrolenk et al. 2017; Zhang & Joshi 2019) had recently stated that: "Currently, no consensual criteria are available to define hyperlexia across studies" (p. 1598). Zhang & Yoshi (2019) state that:

> *no clear understanding of the following aspects of hyperlexia: a) population criteria (e.g., typically vs. atypically developing children), b) specific criteria (e.g., precocity, definition of "good decoding") on their associations with reading, and c) the applicability of reading theories to hyperlexia (e.g., phonemic awareness is critical in decoding; both decoding and listening comprehension contribute to reading comprehension (ibid, from the abstract, p. 1).*

Whitehouse & Harris (1984) included, in their hyperlexia study, 20 children. But according to Hopper (2004), only five of them were "really described as hyperlexic" (p. 16).

A simple definition of hyperlexia has been that of Rispens & van Berckelaer (1991): "Hyperlexia refers to a condition in which developmentally disordered children have advanced word recognition skills but show little reading comprehension" (p. 141).

There are many more definitions. For example, Elliott & Needleman (1976) define hyperlexia as "a remarkably accelerated ability to recognize written words, which may or may not occur along with truly pathological conditions" (p. 340). However, the fact that there is no accepted-by-all definition for hyperlexia, and the changes that autism has gone through the last decades – especially the enormous increase in the number of children identified as gifted (Goldberg & Rothermel, 1984), can explain a part of these very different rates of hyperlexia suggested by the mentioned scholars, as well as by others.

Frequency of hyperlexia

The study of prevalence of hyperlexics among autistic children has been estimated in a variety of rates. Ostrolenk et al. (2017) had stated, there are a few kinds of hyperlexia; many other scholars have discussed the variety frames of autism; thus the fact that hyperlexia is more common among autistics than in the general population dos not necessarily mean that all hyperlexic are autistic.

Though both hypelexia and hypercalculia are not very common, there are substantial differences of opinion among health professionals, educators and researchers regarding they actual rate among pre-school- and school age children. These differences have consequences on the ways chosen for treating them, on the extra financial investment needed, on the manpower which has to be educated and hired to give optimal answers to children whose complexities are currently far beyond those that school resources are ready for. It must not be forgotten or ignored that while education systems in modern countries have acknowledged the special needs of "regular" autists, even though there are still many parents who struggle for more resources in order to fill their children's needs, the very first steps that might substantially help both hyperlexics and hyercalculic have not been done. Even in the US which is no. 1 in the world in the research of hyperlexia and hypercalculia many parents with hyperlexic or hypercalculic children prefer homeschooling over free public- or even private education – as in both cases the support their children would get is not satisfactory.

The prevalence of hyperlexics among autistic children has been estimated by many professionals in the last four decades. For example: while Burd, & Kerbeshian (1985) and Burd et al. (1985) inquired into the incidence of hyperlexia in a statewide population of children with pervasive developmental disorder. Their estimation was that the rate of hyperlexics was 6.0%. According to Wei et al. (2015) 9.2% of the children with autism showed early hyperlexic traits. Solazzo (2021) found that 9% of children with ASD showed early hyperlexic traits. Grigorenko et al. (2002) found the highest rate: according to them, 20.7% of children identified as autistic are

These are just some of the findings; a longer list is not going to change the picture of many children who need proper education and treatment with good prospects to change their life in time rather than live with the gifted of hyperlexia as if it was just a disability.

Gender distribution of hyperlexia

As there is no reliable up-to-date data about the male/female rate among autistics, and as most hyperlexics are also autistic, we can only conclude that there are more hyperlexic boys than girls. However, there are many estimations – based mainly on several case studies or small samples.

Fontenelle (1982) stated, that hyperlexia is seen predominantly in boys rather than girls. According to Burd et al. (1985), the male/female rate among hyperlexics is 4:1. Lin (2014) found, in their sample of 15 hyperlexic 4-, 5-, and 6-year olds,

that the girl/boy ratio was 2:15. According to Goldberg (1987), The male-female ration of hyperlexia was approximately 10:1. Huttenlocher & Huttenlocher (1973) had found that the male:female ratio among hyperlexic children is 14:1. A similar rate was found in the Solazzo et al. (2021) study of the 155 examined Autistics, 13 boys were hyperlexic and one girl. The study of Mehegan & Dreifuss (1972) Included 11 boys and just one girl aged 5.5-9. In the study of Richman & Kitchell (1981), 10 hyperlexic children participated, aged 5 years, 9 months to 9 years, 7 months (X = 7-6 years); 8 were boys and 2 – girls.

Summary

In this work I have presented a personal point of view, that of a counselor, on hyperlexia, a phenomenon not very well known among education and mental health professionals, and much less among the public. In my opinion, this knowledge can serve very many children who are either not identified for autism or identified much later had they not have hyperlexia, which, in many cases, serves as a mask, covering the poor or even non-existence of the child's social abilities, and serves as a "reason", "explanation" for his or her repetitive behavior.

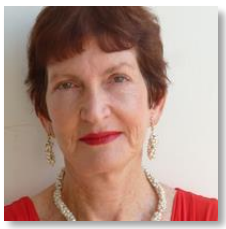
We have concentrated in five aspects of hyperlexia – not necessarily those perceived as "the most important" but those which help the potential reader "make sense" of the seemingly contradictions characterizing it: very high reading ability at a very young age, perceived as a characteristic – even as a "proof" of precocity or giftedness, along with social disability and repetitive behaviors, typical to autist which are perceived as having low intelligence level.

Limitations of Study

This work has many limitations that I know about, and I guess many that I am not aware of. To the first group belong mainly two: the case stories I have mentioned should have been elaborated in order to help professionals recognize hyperlexia among as young as possible autistic children, and thus make them able to have access to suitable treatment as soon as possible. /the second main limitation is the Leaving out five of the main issues of the highest importance both in research and practice of autism in general, and autism with hyperlexia or hypercalculia in particular. Due to space limitation I will only mention these seven of the missing subjects:

- Concentarting only on hyperlexia and "leaving out" hypercalculatia"
- Lack of description of the neuropsychological aspects of hyperlexia (e.g. Temple & Carney, 1996; Mammarella et al., 2022; Solazzo et al., 2021)
- No description of comorbidity of hyperlexia with other disabilities, emotional problems (e.g. Burd, & Kerbeshian, 1988)
- Omitting the findings and discussion about connections between intelligence and hyperlexia (e.g. Burd et al., 1987; Kennedy, 2003; Lin, 2014; Silberman & Silberman, 1967)
- No elaboration of the genetic aspects of hyperlexia (e.g. Temple & Carney, 1996)
- No case studies from my clinics
- No description of potential treatment (e.g. Abnett, 2013; Lin et al., 2013; Oberschneider,2003).

Biodata of Authors



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Research Article

Mental health outcomes of a creative artmaking community-based support group in the post-COVID-19 pandemic era

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Abstract

This art-based participatory action research study sought to uncover how creative artmaking enhances young people's mental well-being in the aftermath of the COVID-19 pandemic. A community-based artmaking support group was founded to help create a brave space for young people to talk about mental health. Twelve artmaking sessions were conducted, one every month from August 2022 to July 2023. A facilitator provided general guidance and structure to the artmaking activities; however, participants had some flexibility and autonomy. Each meeting lasted about three hours. In addition to observations, debriefings were conducted at the conclusion of each session where participants discussed their artwork with peers. Participants also reflected on their cumulative twelve-month experience at the conclusion of the initiative. Findings revealed that the support group provided a safe space for young people to self-distract and vent. It was also a platform for emotion-processing and self-expression. Lastly, artmaking propelled the youth to develop positive self-perspectives.

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Introduction

In this exploration, we embarked on a multifaceted journey delving into the intricate intersectionality of creative artmaking and youth mental health. Our primary objective was to elucidate the profound impact that engaging in creative artmaking activities can have on the mental well-being of young individuals. By examining this symbiotic relationship, we aimed to uncover novel insights and strategies that can be instrumental in promoting and nurturing mental wellness among youth populations. The insights gleaned from our study, bolstered by an extensive review of existing literature and empirical research, hold immense potential to significantly contribute to ongoing endeavors aimed at enhancing youth mental health within communities. Moreover, our findings may serve as a catalyst for broader discussions and initiatives focused on integrating creative expression into mental health care practices and community-based support systems.

Youth and Mental Health

Youth have a unique susceptibility to mental health challenges. Epidemiological studies indicate that lifelong depression typically originates in adolescence, with symptoms escalating after age twelve (Bertha, 2013). Rapid hormonal

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fluctuations are a given physiological factor and are often associated with internal emotional stress (Ramirez, 2003). External stressors, including physical self-dissatisfaction (Cruz-Sáez, 2020), interpersonal conflicts (Flynn & Rudolph, 2011), and academic pressure (Quach et al., 2013) are prevalent during this developmental stage and are also linked to increased rates of depression. Oftentimes, youth struggle to express themselves, let alone locate their own feelings, emotions, and struggles. Positive, high-quality relationships with others and a well-established sense of identity have been associated with improved mental health and psychological well-being of youth (Dumas et al., 2009). Conversely, deficits in strong relationships, frequent social comparisons, and an underdeveloped or dissatisfactory sense of identity can result in adverse mental health outcomes (Dumas et al., 2009).

Youth's heightened susceptibility is manifested in a number of startling statistics. According to the US Centers for Disease Control and Prevention (2020), suicide was the second leading cause of death among individuals aged 10-34 in the United States in 2019. Additionally, the World Health Organization (2021) notes that globally, about 14% of youth aged 10-19 experience untreated mental health disorders. Similar trends were reported by the US National Institute of Mental Health (2020). These statistics underscore the vulnerability of youth; hence, it is essential to consider the interplay of multiple factors when considering initiatives that impact positively on young people's mental health.

Effects of COVID-19 on Youth Mental Health

Calls to address youth mental health gained renewed urgency in the wake of the COVID-19 pandemic. From the outset, psychologists and scholars were eager to understand how the pandemic's circumstances impacted adolescents, given their inherent vulnerability. Liang et al. (2020) assessed the pandemic's psychological ramifications on 584 Chinese youth a mere two weeks after the onset of COVID-19 in China. The findings unveiled a sobering reality: roughly 40% of the youth were susceptible to psychological issues, with 14% exhibiting symptoms indicative of post-traumatic stress disorder. The absence of self-care surfaced as a prominent concern, disrupting individuals' regular routines and impeding access to activities known to enhance mental well-being, such as physical exercise and social interaction. These disruptions frequently compelled young people to turn to less healthy coping mechanisms.

Research conducted worldwide has revealed several negative impact themes, including social isolation characterized by reduced social interactions, emotional detachment from loved ones, and a prevailing sense of disconnection from the world (Breed, 2022; Howard, 2022). Additionally, interpersonal tensions have escalated due to prolonged periods spent with family or housemates, resulting in conflicts, increased irritability, emotional distance, and strained relationships. Consequently, emotional symptoms such as depression and anxiety have become more prevalent.

In the aftermath of COVID-19, scholars have continued to analyze the pandemic's impact with greater retrospection and perspective. For example, Bell et al. (2023) conducted a study with a cohort of 593 Australian youth, some with confirmed mental health care needs and others without. Findings showed that approximately 48% of the participants met the criteria for depression, while 51% did so for anxiety. Participants uniformly perceived the impact of COVID-19 as overwhelmingly having far-reaching negative impact across multiple domains, spanning from work, education, personal life, and mental well-being. Moreover, youth receiving care from primary mental health services reported markedly higher levels of loneliness, with those self-reporting mental health conditions experiencing even more profound loneliness.

Creative Artmaking and Its Effects on Mental Health

While an examination of the prevalence of mental health challenges among youth offers crucial insights, it is even more important to explore avenues that can help alleviate the challenges. Creative artmaking has long been acknowledged as a valuable adjunct treatment of mental health. Grounded in the belief that artistic expression can support recovery journeys and foster a sense of well-being, artmaking encourages youth to share their emotions, viewpoints, and experiences (Apoorva et al., 2022). Youth are often drawn to this form of communication due to its use of symbols and imagery, which can be more comfortable than verbal communication (Howard, 2022). Community-based creative artmaking, in particular, holds significant potential for enhancing mental well-being as it offers opportunities to connect with one another (Hannox, 2022). A previous study by Easwaran et al. (2021), who used a multi-modal art program with a group of 18 youth showed that arts-based initiatives had predominantly positive effects on mental health and

significantly reduced depression and anxiety symptoms. It can, thus, be concluded from these studies that art serves as a liberating form of expression, devoid of societal expectations and pressures.

Despite the extensive research highlighting the susceptibility of youth to mental health challenges, particularly exacerbated by the COVID-19 pandemic, there is a noticeable gap in understanding the potential of creative artmaking as an effective program to alleviate these challenges. While existing literature has emphasized the negative impacts and elevated rates of depression and anxiety among youth, there is limited exploration of the positive effects of community-based creative artmaking initiatives on their mental well-being. The current research aims to bridge this gap by delving into the intersection of creative artmaking and youth mental health, examining how artistic expression can serve as a potential avenue for emotional expression, connection, and improved mental health outcomes.

Research Questions

This study sought to uncover how creative artmaking enhances the mental well-being of young people who subscribed to a community-based mental health support group. Specifically, we sought to answer the following research questions:

- What are the mental health challenges of youth in this community-based mental health support group?
- How does creative artmaking mitigate the mental health challenges in this community-based mental health support group?
- How does creative artmaking enhance the mental well-being in this community-based mental health support group?

Methodology

Research Design

We employed a qualitative Youth Participatory Action Research (YPAR) design, which is an extension of Participatory Action Research (PAR). According to Lind (2008), PAR is a transformative qualitative framework aimed at fostering change, benefiting both the participants and wider society. YPAR positions youth as legitimate experts in their own experiences and as agentic decision makers in social transformation on issues that matter to them. YPAR is valuable and emancipatory in that it empowers youth to critically analyze, reflect, co-construct meaning, and identify actionable solutions to their own existing problems. Additionally, YPAR is valuable and emancipatory, as it enables youth to develop coping skills and opportunities for empowerment (Lind, 2008).

We combined YPAR with Art-based Research (ABR) design to create a more comprehensive and multi-dimensional approach and obtain more nuanced perspectives. Nathan et al. (2023) regards ABR as an invaluable approach in the realm of youth mental health research. One advantage of ABR lies in its capacity to provide a non-verbal avenue for self-expression, allowing youth to communicate their thoughts, feelings, and struggles in a manner that may be more comfortable and less intimidating than traditional forms of research. The process fosters a sense of agency and control over one's narrative, thus, empowering youth in their exploration and articulation of mental health issues (Nathan, 2023). Not surprisingly, ABR has, in recent years, received increasing attention in health and social sciences because of its potential to elicit deeper and richer insights from participants. Nonetheless, ABR is not without its challenges. One limitation is its resource-intensiveness. This presents logistical and financial obstacles, which can potentially limit the scalability of the research initiative).

The Researchers

Embracing a participatory approach, qualitative researchers play an integral role in the research process, moving beyond the confines of objective observers. This underscores the significance of openly acknowledging researcher's positionality (Bott, 2010). The first author for this study is a high school student and founder of the community-based mental health support group. The impetus for establishing the youth support group stemmed from her personal struggles with mental health, transforming her investment into both a driving force and a wellspring of empathy. Sharing her mental health story shattered stigmas and fostered an environment where participants felt at ease to share their narratives. The established trust and reciprocity served as a bridge, playing a pivotal role in creating a safe space for open dialogue. The

peer status of the first author also facilitated an immediate and genuine connection between the researcher and the participants, overcoming typical barriers associated with adult-led research.

Involving young people as researchers challenges conventional research norms by underscoring the importance of the dynamic interplay between the researcher's identity and the research context. Moreso, it elevates young participants from passive roles to active contributors and co-researchers, emphasizing their agency in shaping the research agenda (Kellet, 2011). This enriches research processes with authentic and nuanced insights that may be inaccessible when using traditional research methods.

The second author is an academic with experience in conducting qualitative research. She provided research-focused guidance throughout what would otherwise be a naturally progressing creative artmaking mental health support group. The second author attended some but not all the artmaking sessions as a participant observer. The synergy between a peer and an academic promoted a balanced research perspective. While the academic brought research expertise, the peer ensured that the research remained grounded in the practical realities of youth mental health. This collaborative approach mitigated potential biases and ensured that the research was both academically rigorous and resonant with the lived experiences of the target population.

Indisputably, our positionality would potentially pose some bias, especially given that the first author was the founder of the support group. Reflexivity helps researchers to be attentive to and conscious of own biases (Peddle, 2022). That said, we adopted a phenomenological approach, which recommends bracketing of pre-conceptions (Neubauer et al., 2019). We made deliberate efforts to engage in ongoing self-reflection, actively acknowledging our blind spots, and consciously bracketing our own perceptions, beliefs, and expectations. Our goal was to maintain a high level of openness to the stories and perspectives shared by the participants.

Participants and Setting

The community-based youth support group initiative was part of a larger mental health community network in the county. We obtained permission from the leaders and from individual participants to utilize the artmaking sessions for research purposes. Participants were assured that their identities would remain confidential, and data collected were anonymized to protect privacy. Recruitment of the youth participants was conducted through distribution of flyers on the youth mental health support group's website and on social media platforms. To mitigate barriers to participation, we provided complimentary food during all artmaking sessions. Between ten and twenty youth of ages 12-17 showed up for each session. Some attended constantly, others intermittently. Accompanying adults sometimes participated in the artmaking activities, however, their data were excluded because the study was delimited to youth. All participants were minority youth of color, which represented the predominant ethnicity in the neighborhood.

Creative Artmaking Sessions

We secured space at a local business center for our group meetings, which could comfortably accommodate up to 40 people. We provided all necessary materials for the sessions, including paint, wooden easels, boards, canvas, masks, and cleaning supplies. Over the course of twelve sessions, held on the third Saturday of every month from August 2022 to July 2023, the facilitator, who is also the first author, provided guidance and structure for certain activities. However, participants had the freedom to express themselves through their artwork within a flexible and autonomous framework. Each meeting spanned approximately three hours, allowing ample time for participants to create, process, and reflect on their artwork while engaging with one another. At the end of each session, we conducted debriefing sessions where participants discussed their artwork with the rest of the group. These discussions were often guided by prompts, and all debriefings were recorded and transcribed for further analysis. Table 1 outlines some of the structured activities along with corresponding prompts used during the post-session debriefings.

Table 1. Artmaking activities guidelines and end-of-session debriefings prompts

Artwork Creation Guide	After-session Debriefing Questions
Make any artwork of your choice	What did you make? How does it relate to you? Which aspects of your artwork are you most satisfied with? Which ones would you do differently next time?
Make an artwork that represents a significant life experience	What does your artwork have to tell? What were your thought process when making your artwork?
Decorate the outside of the mask to represent how you think the outside world sees you. Decorate the inside of the mask to represent how you see yourself	What does the inside and the outside have to tell? How similar and different are they? How do they relate with each other? What have you learned about yourself through this mask project?
Paint an image that represents your envisioned self in 5 years	Tell us more about the artwork
Draw an image that you would consider a safe space	Tell us more about the artwork

Data Collection Procedures and Analyses

While numerous images were produced throughout the initiative, we refrained from interpreting participants' artwork to avoid imposing our own perspectives onto their artwork. Moreover, analyzing visual data poses significant complexities beyond the expertise of many researchers (Wilson, 2015). Therefore, we opted for a collaborative approach where participants discussed their own artwork during end-of-session debriefings. Our primary data, therefore, consisted of transcriptions from these reflective debriefings. Subsequently, additional data were gathered upon the completion of the entire project, with participants reflecting on their twelve-month journey. We also collected data through purposeful observation of participants during the creative artmaking sessions. While the first author participated in and observed all twelve sessions, the second author observed and participated in four sessions. Both authors maintained reflexive journals, documenting personal thoughts, insights, and potential interpretations of the proceedings. Ultimately, triangulating data collection methods served to augment the richness of our data and, consequently, strengthened the corroboration of our findings.

We employed Interpretative Phenomenological Analysis (IPA) to analyze data collected from all three sources. IPA entails an ongoing exploration of connections within and between themes, with the goal of revealing overarching patterns. The culmination of this process involves crafting a narrative that encapsulated the essence of participants' experiences (Eatough & Smith, 2017). Maintaining reflexivity was paramount throughout this endeavor, necessitating awareness and mitigation of our own biases in interpreting the data. That said, we retained specific phrases to honor the authenticity of participants' experiences, thereby allowing themes to emerge from the comprehensive dataset.

Results and Discussion

Three overarching themes emerged from our data analysis showing that the artmaking initiative provided a platform for fostering a sense of community, promoted self-awareness and communication, as well as enhancement of positive self-perspectives. Table 2 summarizes the identified overarching themes and the corresponding subthemes.

Table 2. Overarching themes and corresponding subthemes

Overarching Themes	Corresponding Subthemes
Sense of community	Full engagement Sense of connectedness and belonging A safe space and a positive distraction Peer support and camaraderie
Self-awareness and communication	Personal exploration, self-discovery, and self-awareness Emotional outlet, self-expression, and communication
Positive self-perspectives and hope	Sense of confidence and self-worth Sense of purpose and productivity Sense of control and hope

Theme 1: Sense of Community

One prominent overarching theme that emerged from the data was the profound development of a sense of community among participants. This was vividly illustrated by what we observed as wholehearted engagement in the activities, deep sense of connectedness, and peer support and camaraderie that blossomed throughout the sessions.

Subtheme 1: Full Engagement

According to our observations, participants consistently demonstrated a keen interest in both the youth support group and the diverse range of art-making activities offered. Attendance was consistently robust, with between ten and twenty participants attending each session. Moreover, participants eagerly engaged in observing and discussing each other's artwork, demonstrating a curiosity about the meanings and interpretations attributed to them.

Subtheme 2: A Safe Space and a Positive Distraction

The majority of young individuals in the support group disclosed experiencing various mental health challenges, such as depression, anxiety, heightened fear and uncertainty, feelings of rejection, and social isolation. Particularly impactful individual experiences emerged during a session when a seventeen-year-old female participant shared her profound struggles:

> *I definitely wasn't in the best place. My parents were in the middle of a divorce, I felt anxious and on edge every day. My grades went down the drain, 'cause I was battling depression. I lost most of my friends, 'cause I wasn't that cheerful person anymore.*

Previous research concurs with findings disclosed in this study, highlighting a high prevalence of mental health challenges among youth (Breed, 2022; Howard, 2022), which can have profound cognitive and affective impact. According to Bell et al. (2020), mental health challenges can lead to a significant decrease in one's self-esteem and self-worthy, poor academic performance, as well as stigmatization and discrimination.

In the backdrop of the mental health challenges shared and the subsequent consequences unearthed in the literature, it was noteworthy that some participants perceived the support group as a 'safe space' where they felt accepted and unjudged when talking about their mental health. The opportunity, a first of its own kind for most participants, helped them overcome feelings of being 'out of place,' as can be depicted from this excerpt:

> *I always tried to keep the craziness hidden. I just didn't feel like reaching out to anyone. It felt like my best bet was just making it through each day, and even that was a struggle. Those pieces of canvas, they were like an imaginary somebody, a psychologist or even someone you have, whom I could tell, without thinking about anything. That's what I liked the most much about this (male participant, age 17).*

Helm (2013) defines a 'safe space' as a specific place, whether physical or virtual, where individuals feel comfortable, respected, and free to express themselves openly, share their thoughts and experiences, and engage in dialogue without fear of judgment or reprisal. Prior research has shown how perceived safe spaces foster increased communication, self-expression, full engagement, and reduction of feelings of isolation and stigma (Becker et al. 2022). On the contrary, spaces perceived as unsafe are inhibitory.

The artmaking initiative was also a valuable mitigatory and positive distraction from ongoing mental health issues and personal daily struggles. This is what one fourteen-year-old male participant said:

> *Obviously, with all the crazy stuff going on, everything around seems so crazy. So, when you come here, get some food, grab some paints, talk to some friends, and start [painting], it takes you away from, I mean, it gets you into another world, yes. [When] you come back to your issues, you realize it wasn't actually much big of a deal, yeah.*

Research has found distraction to be positive and effective multidimensional copying mechanism for managing negative thoughts and emotions (Gómez-Restrepo et al. 2022). As Carlos Gómez-Restrepo attests, distraction encompasses multiple psychological aspects ranging from having a more active mind, momentarily 'getting away from reality,' and/or

'feeling in another world.' Research has also shown how community-based support groups can pose as a positive distraction that helps keep youth busy and away from criminal activities and drug use (Obuaku-Igwe 2020).

Subtheme 3: Sense of Connectedness and Belonging

The significance of the artmaking sessions became apparent in nurturing a sense of connection and inclusion, which held particular significance for the youth experiencing isolation and feelings of rejection. Through our observations, it was evident that the youth engaged in laughter, humor, and smiles, especially during the debriefing sessions. This sense of connection and belonging was further reinforced by the sentiments expressed by a sixteen-year-old female participant at the end of the program:

> *This was really a great community. There were lots of familiar faces that you would see every month that you would bond with, and then there are also a lot of new faces too you'd meet and get to know. The common thread though was that everyone wanted to just have fun, and maybe learn something from others. We all had our own stories, and we all cared about listening to each other's stories.*

Artmaking has long been recognized as a means of fostering connections among individuals, groups, and communities. In the study by Silverman et al. (2013), individuals from diverse backgrounds came together to create artwork that reflected their unique yet shared experiences with suicide. Through collaborative artmaking, they found the confidence to initiate discussions about the sensitive topic of suicide. Likewise, participants in this research emphasized the development of new connections and heightened social interaction. Many underscored the importance of discovering a supportive community where they felt understood and accepted by peers who shared similar backgrounds and empathized with their challenges. This aspect was particularly significant as the support group exclusively comprised adolescents from racial minority groups, rendering it a uniquely valuable environment for nurturing feelings of connection and belonging.

Subtheme 4: Peer Support and Camaraderie

As mentioned previously, participants disclosed a range of mental health issues they had faced. The substantial peer support demonstrated during the artmaking sessions proved to be a mitigating factor. For instance, there was a moment when a participant grappling with feelings of rejection became emotional during the debriefings. The outpouring of support she received from her peers was truly heartening. The camaraderie among the youth was further affirmed both during the debriefings and in the concluding reflections at the end of the program. Here is a reflection shared by a twelve-year-old female participant:

> "*Listening to people's stories and the stuff they've been through, seeing them put in the effort to make things better was kind of contagious. I felt like, I was not alone in this journey*."

The peer support witnessed in this initiative was to be expected given the pronounced similarities in the mental health struggles shared by the participants. Through their shared experiences, the youth had forged a strong bond, enabling them to extend a distinct form of support to one another as they empathized with and understood each other's struggles and emotions. As Obuaku-Igwe (2020) argues, validating peers' feelings and challenges positively diminishes feelings of self-stigma. Furthermore, peers who had effectively dealt with mental health challenges served as role models, inspiring others through the sharing of their stories.

Theme 2: Self-awareness and Communication

The second major theme identified in this study revolved around the augmentation of self-awareness and communication skills. Self-awareness forms the bedrock of effective and meaningful communication, as highlighted by Obuaku-Igwe (2020). Through artmaking, many of the youth engaged in personal exploration and self-discovery, thereby facilitating self-expression and improved communication abilities.

Subtheme 1: Personal Exploration, Self-discovery, and Self-awareness

Some of the artmaking activities were a powerful tool for reminiscing. Reminiscence involves recalling and reflecting on past experiences, memories, and life events. For example, in one session, the facilitator asked participants to make an

artwork that portrayed a significant life experience. This activity triggered this twelve-year-old male participant to reminisce:

> *I made a portrait about the day we left our apartment to move in with my mother's boyfriend, I think I was, maybe seven? Or eight, I think. And my younger sister. My mom had lost her job, and I dint like him, I mean her boyfriend. It felt like my whole life got flipped upside down. The memory of it still hits me hard. It was pretty intense.*

The act of reminiscence, particularly when combined with artmaking, can yield both positive and negative outcomes, contingent upon the circumstances and the nature of the memories being recalled. Positive reminiscence has the capacity to uplift mood, foster the acknowledgment of strengths, and consequently, promote overall well-being (Hallford, 2019). Conversely, negative reminiscence, as observed in this instance, while it may have the potential to evoke or worsen mental health challenges, can also serve as a means to delve into the origins of such struggles and, in turn, facilitate the development of coping mechanisms (Marshall & Reese, 2022).

Engaging in creative artmaking stimulated intuition and spontaneity among participants, enabling them to tap into subconscious thoughts and emotions they were not consciously aware of. This phenomenon became particularly pronounced when the youth were given the freedom to create artwork of their choosing without any specific guidance:

> *I just dived in, no plan in mind, not even sure. It almost always ends up being related to something that's been going on in my life. Yeah, you don't always have to be extra imaginative, you can just draw or paint, that's what I usually do (male participant, age 13).*

Artmaking serves as a pathway to self-discovery, as highlighted by Jones et al. (2017). The example provided illustrates how the youth inadvertently delved into his inner world, uncovering unexpected insights about himself. This aligns with the perspective of Knill et al. (2005), who suggest that engaging in art stimulates imaginative thinking, leading to the expression of emotions and self-discovery. The end-of-session debriefings, where participants engaged in dialogues with their own artwork facilitated further exploration of their inner selves. Ultimately, this process of personal exploration and self-discovery contributed to heightened self-awareness, which, as emphasized by Corin (2023), is a crucial component of mental well-being.

Subtheme 2: Emotional Outlet and Self-expression

Several participants found that engaging in creative artmaking offered them a means to express and release their worries, fears, struggles, traumas, frustrations, adverse experiences, and negative thoughts. Artmaking served as a cathartic outlet, allowing them to unload stress and tension, as observed in numerous debriefing sessions. For instance, a fifteen-year-old female participant articulated her experience:

> *I am a very quiet person, sometimes [I get into] a lot of trouble. But then, from that, you can vent on a piece of canvas. So, this has helped me a lot with that, you know what I mean? To vent. I mean, it's my life, the way I feel and make sense of it all, on a canvas, you've just got to let your mind paint.*

Gómez-Restrepo et al. (2022) emphasize that engaging in artmaking can serve as a therapeutic outlet for expressing negative emotions, particularly when verbal expression proves challenging. While venting may offer temporary relief, research indicates that it can be a beneficial coping mechanism for managing stress and emotional distress. This is especially crucial for youth who feel marginalized and constrained by their own mental health challenges and societal stigma (Smolarski, 2015). Venting suggests that these youth were able to identify and address their stressors, a crucial initial step in seeking solutions, as highlighted by Gómez-Restrepo et al. (2022).

It's worth noting that some youth did not just vent; they also exhibited signs of emotional regulation and management through artmaking. This was evident when a thirteen-year-old male participant explained what appeared to be an incomprehensible piece of artwork to most of us:

> *At first, I wanted to paint things as dark as I sometimes feel. Like, I feel angry with myself, sometimes sad, then that's how I react. At that moment, I start painting, a few minutes. After that moment, ...I don't know how to explain this... as if I've let go the tension, taken off the pressure, you know what I mean?*

The interpretation given to the painting not only conveyed the participant's negative emotional state but also reflected the process of reconstructing and transforming the situation. Studies have highlighted artmaking as a valuable tool for coping with negatively perceived emotions like stress, anxiety, depression, and sadness (Gómez-Restrepo et al., 2022). Managing these emotions can take various forms, including transforming them, venting them, expressing them, or distracting oneself, as previously discussed.

Consistent with previous research findings, artmaking offered a non-verbal visual platform for not only venting but also for self-expression. This insight comes from a thirteen-year-old male participant:

> *Yeah, I mean you've just got to let your mind paint freely. Just paint. The first image that comes to mind, that's your true thought, how you truly feel even if the exact words don't come to mind.*

The artmaking initiative offered youth a chance to express their inner world using color, texture, form, and composition. Creative artmaking prioritizes non-verbal communication, fostering a connection that relies less on words (Hartley, 2023). This approach allows for varied interpretations and connections, making it a nuanced form of communication.

Theme 3: Positive Self-perspectives and Hope

The last overarching theme that emerged in this study was the cultivation of positive self-perspectives and hope among participants. These positive self-perspectives encompassed individuals' perceptions of themselves, their capabilities, and their potential for growth and resilience. Furthermore, the presence of hope fostered a sense of optimism, belief in future possibilities, and an outlook that transcended current challenges.

Subtheme 1: Sense of Confidence and Productivity

The artmaking initiative served as a platform for certain youth to push their boundaries and explore unfamiliar territory. For these individuals, completing their artworks symbolized a profound sense of achievement and creativity, instilling in them a deep sense of pride and satisfaction:

> *I think my favorite, in this whole thing, is how everyone would hype up your pieces. Like, maybe you thought it didn't look that great or wasn't what you were going for, but everyone is like 'hey, look at that, wow, nice' (female participant, age 18).*

> *There's something weirdly so fun about being able to put your all in this. Take some energy and put it on the canvas, huh? In front of you. Yeah 'cause like you obviously feel proud, doing like this one. It's like prove to yourself that you can do it (male participant, age 16).*

As illustrated by the excerpts above, participants clearly experienced a profound sense of accomplishment as they actively contributed at both personal and community levels through their deep engagement and involvement. Witnessing their own skills in artmaking flourish, participants gained confidence, a factor that, as highlighted by Johnson et al. (2022), significantly boosts self-esteem.

Subtheme 2: Sense of Control and Hope

The artmaking initiative cultivated a heightened sense of hope by offering participants a reason to "get out of bed," a sentiment far more uplifting than experiencing a lack of motivation and having little to anticipate:

> *It's definitely something I really looked forward to. It's nice having something that gets me excited for the weekend and to see certain people. There's not much else I'd get out of bed early for, but there is definitely something to look forward to (male participant, age 17).*

Participants not only demonstrated short-term hope by anticipating something in the present, but they also projected future-oriented hope through the artworks they created. For instance, during one activity, the facilitator instructed the

youth to create an image depicting their envisioned selves five years from now. One seventeen-year-old female participant expressed her thoughts with sincerity and optimism evident on her face:

> *I drew a picture of my mom with me at my graduation, I don't mean high school. College graduation. I want to hand over my graduation cap and gown to my mom. She never had the chance to go to college herself, but she is always like 'I want you to go to college.' She says that every day.*

The image and its associated meaning encapsulated the youths' dreams, aspirations, and visions for a brighter future. It represented a pure expression of hope, optimism, and positivity, serving as a tangible symbol of attainable goals. As Brockes (2019) suggests, this futuristic hope can be infectious, spreading from one youth to another. Furthermore, research has demonstrated that artmaking enhances levels of empowerment among youth by bolstering feelings of control over their lives and fostering strategic thinking (Gentle, Linsley, & Hurley, 2020).

Reflections and Challenges

Upon reflecting on the yearlong initiative, several noteworthy hurdles and limitations emerged. The initiative demanded considerable intensity, requiring meticulous planning and facilitation to ensure that the artmaking activities remained meaningful and engaging for the youth involved. Additionally, funding presented a significant challenge, as the initiative relied primarily on self-funding. However, this challenge was somewhat alleviated when the broader mental health network in the county assisted with rental fees for the meeting space. Despite the challenges and intensity, the initiative proved to be not only visibly beneficial to the participants but also emancipatory for the youth founder and first author. Like her peers, she also required a safe space to process and express her mental health struggles.

Another significant challenge that emerged as we delved into the art-making sessions: the profound nature of the mental health issues disclosed by participants. Recognizing the gravity of this issue, I proactively collaborated with leaders from the wider mental health community within the county. Through collective efforts, we established a framework for volunteer counseling services to provide one-on-one meetings with counselors, offering individualized assistance and guidance to those in need. This collaborative approach ensured that participants received the necessary support to navigate their mental health challenges effectively.

Conclusion

In addressing the mental health challenges faced by youth within the community-based mental health support group, it is evident that creative artmaking serves as a powerful and multifaceted tool for mitigation and enhancement of mental well-being. Identified challenges, including a lack of connectedness, struggles with self-expression, and a need for positive outlets, found meaningful resolution through the overarching themes that emerged from the creative artmaking process. This study, therefore, underscores the transformative potential of creative artmaking as an empowering invitation for youth grappling with mental health challenges in a community setting. The partnership between a peer and an academic fostered a holistic research perspective. Amalgamating the academic's expertise in research methods and data analysis, along with the peer's dedication to practical aspects of youth mental health, ensured that the research maintained both academic rigor and relevance to the lived experiences of the target population.

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Review Article

Use of language learning strategies in the comprehension of Turkish as a foreign language in gifted individuals

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Abstract

Language is a systematic and human-oriented skill that is activated through reading, writing, listening, and speaking, accompanied by structural units made up of sounds, meanings and forms constructed by the consensus of individuals and formed in the brain, which is a highly complex mechanism. Hence, for these strategies to be effective, it is critical that foreign language learners are able to methodically understand texts produced in the target language. Language learning strategies are certain acts, behaviors, procedures, or approaches that people typically employ on a conscious basis to accelerate their acquisition of a second language. In this study, the use of vocabulary and language learning strategies by gifted individuals in making sense of Turkish as a foreign language was investigated. The study reveals that the use of language learning strategies by gifted individuals in making sense of Turkish as a foreign language is important. It is predicted that the information in the study will contribute to the knowledge background on language learning strategies in gifted individuals.

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Introduction

In the process of learning Turkish as a foreign language, the effective use of vocabulary and language learning strategies for individuals with special abilities can significantly facilitate and accelerate the learning process (Manning, 2006; Özüdoğru et al., 2021). The learning styles and strategies of gifted individuals often differ from traditional methods. Gifted individuals often have individual learning profiles and preferences. Therefore, it is crucial to adapt learning materials and methods based on individual characteristics. In the process of language learning, gifted individuals can use various methods such as establishing meaning relationships, learning words in sentences, or using repetition and reinforcement to better comprehend the usage and meaning of words (Okan & Ispinar, 2009).

Some individuals favor a top-down pedagogical approach, wherein the overarching concept is introduced initially, allowing learners to extract knowledge from that broader context. Others may like a bottom-up strategy, in which the student gradually gets to the larger picture by using the teacher's building blocks as a guide. Similar to this, some students approach challenges head-on and figure things out as they go, while others take a more deliberate strategy and plan in advance (Renzuli ,1998; Passet, 2015).

The use of language learning strategies by gifted individuals greatly affects their educational development and achievement. Gifted individuals are generally able to access information quickly and understand it in depth (Diezmann & Watters, 2006). Language learning strategies for gifted individuals can be specifically designed for them to quickly grasp complex language structures and vocabulary. Therefore, the learning process of gifted individuals shows a different

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pace and depth than other individuals. For this reason, gifted individuals need special strategies in their language learning process (Passet, 2015).

The process of learning Turkish as a foreign language for gifted individuals may differ from general language learning approaches (Innalı, 2017; Kırcı & Ceylan, 2023)) and some special strategies and methods need to be developed considering the special abilities of such individuals. There are numerous studies demonstrating that the creativity and problem-solving abilities of gifted individuals provide a great advantage in the language learning process (Clark & Zimmerman, 2002; Demirekin, 2017; Gross, 2004; Okan & 2009).

Gifted individuals are generally able to better self-manage their personal learning processes (Sak, 2017). Manning (2006) states that gifted individuals are able to develop metacognitive strategies, have a high level of skills in analyzing, planning, and evaluating their own learning processes, and are also able to make progress in language learning by setting learning objectives. Moreover, gifted individuals are highly motivated to access enriched advanced contents (Seokhee & Doehee, 2003). Gifted individuals tend to access advanced resources (in-depth study of books, articles, and other language materials) (Tortop, 2015). In addition, since learning about culture and history can add insight to the language learning process, gifted individuals are more participatory in accessing information related to culture and history (Sak, 2017). Encouraging gifted individuals to interact with Turkish-speaking environments, to practice the language, to improve their language skills through movies, music, cultural events, and social activities can enhance their language learning skills while accessing the information they are curious about (Yewchuk, 1999).

The utilization of vocabulary and language learning strategies is crucial for gifted persons studying Turkish as a foreign language. The employment of vocabulary and language strategies for acquisition is essential for gifted individuals learning Turkish as a foreign language (Demirekin, 2017).

According to Oxford (1990), effective language learning strategies allow students to become more autonomous while achieving success in their studies. Furthermore, Macaro (2001) notes that strategic language use can significantly increase cognitive processing, which will aid children with exceptional abilities in studying new languages. When learning Turkish as a foreign language, gifted persons should focus on vocabulary and language acquisition methodologies. Such strategies are critical for improving language acquisition, allowing gifted students to maximize their learning processes and reach higher levels of competence (Demirekin, 2017).

Language Learning Strategies of Gifted Individuals

Children with unusual talents have distinct traits and process information in various manners. They typically speak more languages proficiently. They may efficiently acquire, understand and transmit information through language thanks to their abilities (Chanderan & Hashim, 2022). Gifted individuals tend to enjoy language games, writing and speaking. They are sensitive to language structures, have a large vocabulary, can write with accuracy, and can memorize and learn various foreign languages (Seokhee & Doehee, 2003). The learning skills, personality traits and other demographic characteristics of gifted individuals may affect the strategies they use when learning a new language and their learning levels (Tortop, 2015). In addition, the cognitive levels of gifted individuals and their ability to cope with problems in language learning also affect their language performances (Sak, 2017).

In the context of education for gifted individuals, there have been few studies on language learning strategies (Zeidner & Matthews, 2017). Hattie's (2009) investigation into strategy adoption and retention in gifted persons emphasizes that gifted individuals comprehend the practicality of strategies and utilize them spontaneously to carry out tasks without explicit instruction. In a study conducted by Hsieh (2009), the relationship between self-efficacy, language learning strategies and achievement levels of individuals evaluating foreign language courses was examined, and it was found that those who could use language learning strategies well had higher levels of self-efficacy. Generally, gifted children have remarkable abilities and learning speed at an earlier age; nevertheless, not all gifted children follow the same level of progress. In particular, some gifted individuals may follow a slower pace in developing their conversational skills (Okan & Ispinar, 2009). Tuncer (2009) emphasizes that delayed speech in gifted individuals may reflect unique aspects of the way gifted individuals perceive and process the world. Studies conducted to find learning preferences among academically gifted individuals indicate that academically gifted individuals develop their own learning strategies

independently, that some gifted individuals do not like music or theater and need to be supported to be more creative, and that they may need ideas about appropriate ways to create a suitable environment for learning to take place (Gross, 2004; Sarıcaoğlu & Arıkan, 2009).

Each gifted individual has different characteristics. In terms of language learning strategies, each gifted individual has varying skills; their special abilities cannot be generalized because every individual has a unique developmental pattern (Chen, 2014). Yewchuk (1999) states that if gifted individuals' language learning efforts are not matched, they may experience frustration, loss of self-esteem, display boredom behaviors, and lead to laziness or academic failure. Therefore, it can be argued that gifted individuals have special learning needs related to language learning.

Language Learning Strategies

Language is formed in the brain, which is an extremely complex mechanism, accompanied by structural units made up of sounds, meanings and forms created by the consensus of individuals; in fact it is a systematic and human-oriented ability that is activated through reading, writing, listening and speaking (Onan, 2011, p.7). For this reason, in order to make these competencies effective, it is critical how learners of a foreign language can systematically make sense of the texts of the target language. Research on learning strategies used for better language comprehension is applied in the teaching and learning process of many languages (Macaro, 2001) . At this point, it becomes important to conduct studies on how Turkish can be taught to a foreigner and what strategies foreign students learning this language should follow (Demirekin, 2017).

Understanding language learning strategies is essential to understanding how people acquire other languages. By offering structured procedures and tactics adapted to the needs of the learner, these strategies significantly influence the learning process and improve language acquisition (Seokhee & Doehee, 2003). In the language learning process, it is of great importance to know how gifted individuals master the language and how the language learning strategies they use affect their level of achievement (Özüdoğru et al., 2021).

Oxford (1990) defined language learning strategies as specific reactions, tasks, activities, or tactics that people typically employ to advance their development of second language skills. The internalization, storing, retrieval, and application of new language can all be facilitated by these strategies. Learning a language using different strategies allows the individual to monitor his/her own progress in language learning; it also promotes the individual's autonomy as he/she can control what strategy suits him/her best (Nation, 1990). In the Oxford (1990) inventory, strategies are divided into direct and indirect strategies in terms of their contribution to language learning. This inventory consists of a large number of interrelated questionnaire items on which language learners are asked to evaluate themselves. There are two sections of this inventory: direct and indirect strategies. Direct strategies are practices in which language learners give feedback on the extent to which they have assimilated the instruction given directly to them. Indirect strategies, on the other hand, involve strategies that go beyond the instruction provided to the extent to which learners consciously engage in activities that can indirectly facilitate their own language learning processes. Both strategy categories consist of three sub-strategies (Griffiths, C. 2003; Chamot, 2005).

Direct learning strategies consist of memory tactics that involve the extent to which students can store in their minds the direct teaching they receive in their own language learning procedures; cognitive strategies that enable them to question the extent to which they can use the learning processes in their own minds; and compensatory strategies that they use to complete their learning processes by identifying the missing points in their learning processes (Seokhee & Doehee, 2003). Indirect strategies, on the other hand, involve metacognitive tactics that students use to support this cognitive process beyond the cognitive learning situations in the language teaching process that they are directly involved in; affective strategies that aim to control their own emotional states that may affect their language learning processes; and social strategies that test the extent to which students use the social environment and environments of the target language to improve their language learning processes (Demirekin, 2017). The strategies used directly and indirectly in language learning are summarized in Figure 1.

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Table 1. Direct and indirect strategies of SILL (Oxford, 1990, p. 17)

Type	Primary Strategies	Secondary Strategies
Direct Strategies	**Memory strategies**	Creating metal linkages Applying images and sounds Reviewing well Employing action
	Cognitive strategies	Practicing Receiving and sending messages Analyzing and reasoning Creating structure for input and output
	Compensation strategies	Guessing intelligently Overcoming limitations in speaking and writing
Indirect Strategies	**Metacognitive strategies**	Centering your learning Arranging and planning your learning Evaluating your learning
	Affective strategies	Lowering your anxiety Encouraging yourself Taking your emotional temperature
	Social strategies	Asking questions Cooperating with others Empathizing with others

As indicated in Table 1, direct and indirect learning strategies in language learning can offer different approaches to improve language skills. Both direct and indirect strategies are vital in developing language skills and, in general, function better when employed concurrently. Research shows that many individuals make word sense by using direct and indirect strategies. During listening and speaking skills, vocabulary learning strategies are needed more. However, the strategies used by individuals generally remain basic and at a limited level (Demirekin, 2017). In the background of this, it can be claimed that it would be more effective to teach grammar rules rather than wasting time with words.

Proposed to be used while learning a language, cognitive strategies consist of six elements: employing the senses for comprehension and retention; engaging with knowledge; deducing; interpreting nuances; grasping the entirety; and transcending the given content (Oxford, 1990). There are studies indicating that direct strategies are widely used by language learners (Anderson & Freebody, 1981; Kocaman & Kızılkaya Cumaoğlu, 2014; Zheng & Zhang, 2017). Figure 2 summarizes the systematics of cognitive strategies.

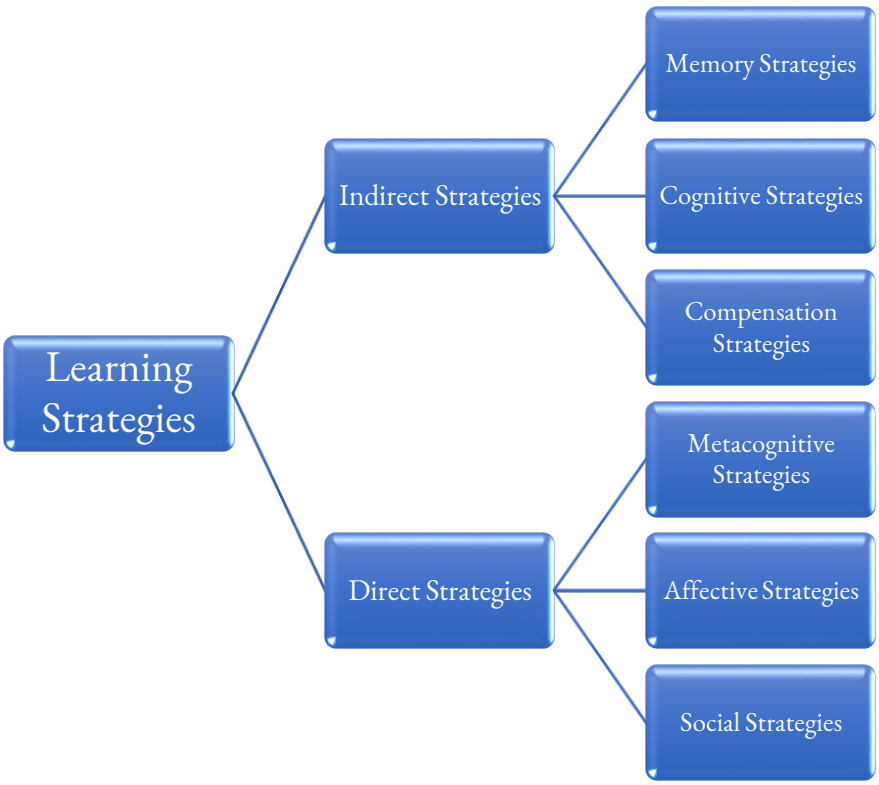

Figure 1. Classification of learning strategies (Oxford: 1990)

Direct strategies: This consists of 3 sub-strategies aimed at retaining the information directly learned in the formal language learning process in memory, passing it through mental processing and making up for any deficiencies (Oxford, 1990; Demirekin, 2017).

Memory strategies are learning strategies that help learners organize the information needed for language learning, store it in their minds and recall it when needed.

Cognitive strategies are active learning strategies that encourage learners to reflect on how they interpret and process information in the target language in their minds.

Learners use compensation strategies to identify and correct points they have not understood.

Indirect strategies: These are the tactics that enable learners to organize their own learning outside of the official language learning process are known as indirect strategies to regulate their emotions, and to interact in social settings where the language is widely spoken(Oxford, 1990; Alhaisoni, 2012; Demirekin, 2017).

Metacognitive strategies are indirect learning activities that learners use to foster their cognitive development in addition to the cognitive learning processes they are directly involved in when learning a new language.

Affective strategies allow learners to deal with their own sentiments and emotions, such as anxiety or which might impair their ability to learning.

Social strategies are indirect learning strategies that involve learners interacting in the social conditions and settings of the language they are learning(*Uğurluel, 2010;* Bölükbaş, 2013; Yeşilçınar, 2014).

On the other hand, many research studies have revealed that language learning strategies, which are presented in various classifications as above, can provide more effective results when they are integrated with an array of variables, including learners' attributes, educational history, background in society, and level of language proficiency (Kunasaraphan, 2015).

Boosting student achievement requires integrating language learning tools into the teaching process. It is essential to comprehend how these strategies affect how successful language acquisition is. Instructors may identify which approaches are most helpful by investigating the relationship between different language learning tactics and the learning outcomes attained during the process. This grasp make it possible to optimize teaching strategies, which in turn allows students develop the language with greater effectiveness and become more proficient speakers of languages (Navaro Saydı, 2007; Lee, 2010; Demirezen, 2020).

As can be clearly perceived, individuals who are intensively exposed to cognitive strategies and who use these strategies by making sense of them can be more successful in gaining the language skills taught. While individuals who are able to use cognitive strategies effectively acquire receptive language skills more effectively, they also make faster progress in acquiring speaking and writing skills, which comprise productive language skills (Demirekin, 2017).

Factors Affecting Language Learning Strategies of Gifted Individuals

Numerous factors influence the choice and applicability of language learning strategies in gifted individuals (Vandergrift, 2003). Personal variations constitute one of the variables. The diversity of gifted individuals from different cultural and linguistic backgrounds affects how they learn a language. This situation is more evident in second language learning (Okan & Ispinar, 2009). Many studies have been conducted on the language learning strategies used by individuals affected by different demographic variables (Bölükbaş, 2013; Chanderan & Hashim, 2022; Chen, 2014; Kocaman & Kızılkaya Cumaoğlu, 2014; Seokhee & Doehee, 2003; Uzun, 2004). Nevertheless, it has been demonstrated that little investigation has been undertaken about learning foreign languages among gifted persons.

There are many factors that affect language learning for gifted individuals, such as motivation, support at home and school, previous grammar experience, learning environment, use of teaching strategies, comprehensible input, student personality, age, and attitudes that support language learning (Diezmann & Watters, 2006). When there is interest in learning a language and when language learning is seen as necessary for life, faster learning strategies are developed. Since gifted individuals have a desire to research and discover, they feel the need to learn a language in order to obtain data. Therefore, gifted individuals are aware that language learning is necessary for life, and accordingly, they frequently utilize language learning strategies (Ilıman-Güllühalı, 2019). Language learning also benefits greatly from the

usage of a new language in the home setting. Motivating gifted individuals to use language learning strategies is facilitated by emphasizing the value of learning a second language and encouraging them to use it at home (Seokhee & Doehee, 2003). The prior language knowledge and experiences of gifted individuals play a critical role in the development of language acquisition processes. Their capacity to understand a language's rules and patterns allows them to quickly acquire the ability to translate between languages, even if their vocabulary in the new language is different (Gross, 2004). Furthermore, the setting of instruction is one of the most significant aspects influencing the language learning processes of gifted people. When gifted persons are at ease in their language learning environment, it profoundly influences their drive to acquire and articulate the language (Manning, 2006).

Yewchuk (1999) underlines the significance of offering gifted individuals' additional chances to study languages on their own. To facilitate more in-depth learning for these students through individualized learning, a range of blended learning models should be used (Okan & Ispinar, 2009). Gifted people who are motivated and have good digital technology skills can gain from well-known internet applications. Participating in simulations might augment their understanding and be advantageous in formulating strategies for learning a new language (Kaplan-Sayı, 2013). Furthermore, giving gifted individuals the chance to share their research can help them develop better strategies for learning languages since it can give all students access to more information and a better learning experience without requiring them to spend more time on the same material (Gregory, 2020).

Gifted people's language learning practices are often influenced by their learning preferences. Like their peers who are typically developing, they learn best when the syllabus suits their hobbies and interests (Kaplan-Sayı, 2013). Gifted students who get satisfaction in answering open-ended questions put out more effort to learn a new language when they are given more open-ended assignments to do after finishing standard course subjects. Their incentive to create novel ways to learn a language is further increased when they are encouraged to consider several options (Gollif, 2008).

Most gifted individuals are eager to learn new information, even if it is complex (Tortop, 2014). Being taught complex information and going through detailed learning processes is quite motivating for gifted individuals (Manning, 2006).

Language learning is significantly impacted by the strategies used by language teachers. Multiple approaches to learning are addressed through activities like writing and performing plays in the target language as well as watching movies in that language. Furthermore, one of the most effective approaches to learn a target language is to use coding strategies for unfamiliar terms (Tuncer, 2009). To keep brilliant people motivated, it is imperative to make sure they believe they can advance to the next level of learning (Vandergrift, 2003). Individuals that are introverted typically hesitate to make mistakes. As has been noted that gifted but introverted persons who tend to withdraw from social situations require longer to pick up a new language (Gollif, 2008; Sarıcaoğlu & Arıkan, 2009). In the same manner, gifted people frequently exhibit perfectionism (Sak, 2017). As a result, it's critical to foster an atmosphere where they recognize that making mistakes is a necessary part of learning and that communication is more important than perfection.

Research on language learning techniques place a strong emphasis on figuring out the factors that lead to these difficulties in addition to identifying the learner's shortcomings in particular domains. Individuals and instructional strategists should both consider these factors, create a plan for resolving them, and offer feedback once the objectives are achieved. For gifted people who wish to learn strategies for learning a language which enable them to comprehend the language holistically, this method is crucial. As a result, it enables individuals to get the most out of using effective strategies for learning.

Conclusion

The application of strategies for language learning to help gifted people comprehend Turkish as a foreign language is an essential element that raises the efficiency of the process of learning a new language. In a scientific context, the cognitive traits and learning capacities of gifted people need to be considered in addition to discussing the significance of these strategies. Deep comprehension skills, quick learning speed, and excellent cognitive capacities are characteristic traits of gifted people. By incorporating efficient techniques into their language learning procedures, learners can enhance their

language proficiency more quickly and acquire a language more thoroughly. Examining how and why direct and indirect learning processes are so crucial for these people is essential from a scientific standpoint.

Direct strategies for learning encompass specific approaches including vocabulary development, grammar rules, and hands-on tasks. These strategies help gifted people quickly grasp grammatical principles and the structural components of language. They can swiftly understand complicated grammatical rules and structures thanks to their cognitive ability. Conversely, indirect learning strategies emphasize learning a language in context and the development of language skills through natural interactions. These strategies include things like cross-cultural exchanges, situational education, and innovative methods. Gifted individuals show a strong ability to adjust when learning a language through social interactions and involvement with cultural aspects.

Indirect strategies for learning encourage natural language use and provide opportunity for students to use their language skills in real-world settings. This way of teaching enables students to get a better knowledge of the meaning and application of language. Metacognitive methods must also be implemented by gifted individuals as part of their language acquisition process. These individuals are frequently better at understanding and managing their own learning processes. Metacognitive strategies enable students to plan, monitor, and assess their language acquisition processes. The proper application of such strategies helps talented persons achieve their language learning objectives and improves their overall learning experience.

Finally, gifted persons who employ language learning strategies to comprehend Turkish as a foreign language benefit from faster and more effective language skill development. The combination of direct and indirect strategies for learning delivers a language instruction environment adapted to their cognitive capacities while broadening the breadth of the language development process. Applying these strategies with a scientifically informed approach enhances the quality of the language learning process and allows individuals to develop their language skills to their full potential. As a result, this study emphasizes the need of adopting language learning methodologies to assist gifted persons in comprehending Turkish as a foreign language.

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Review Article

Pattern skills and computational thinking in early childhood education

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Abstract

This article examines the relationship between pattern skills and Computational Thinking (CT) in early childhood education, emphasizing their significance. Pattern skills enable children to recognize repetitive sequences and structures in their environment, laying the foundation for mathematical thinking. Computational Thinking, a strategic approach to problem-solving, consists of four core components: decomposition, pattern recognition, abstraction, and algorithm development. CT supports problem-solving and cognitive flexibility in early childhood. The article highlights the role of digital games and unplugged (non-digital) activities in developing these skills. Tools like ScratchJr enhance children's algorithmic thinking, while physical activities with tangible materials strengthen pattern recognition skills. In conclusion, developing pattern skills and CT together improves children's analytical thinking, problem-solving, and logical reasoning abilities.

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Introduction

The preschool period is a critical phase for children's cognitive, social, and linguistic development. Skills acquired during this time have a significant impact on children's future academic success. Pattern skills, in particular, allow children to recognize repetitive sequences and regularities in their surroundings and develop reasoning abilities based on these sequences. This skill is a cognitive process that forms the foundation for not only mathematical and linguistic development but also problem-solving abilities (Clements & Sarama, 2007; Papadakis et al., 2016).

Pattern recognition is an important component of mathematical thinking and supports the development of advanced mathematical thinking skills in preschool children. Clements and Sarama (2007) found that the ability to recognize and create patterns plays a fundamental role in helping children learn more complex mathematical concepts they will encounter in the future. For example, early mathematical skills such as number sequences, geometric shapes, and rhythmic counting are closely related to the development of pattern skills (Clements & Sarama, 2007).

In recent years, the concept of Computational Thinking (CT) has also gained importance in this process. Wing (2006) defines CT as a thinking skill that integrates problem-solving processes used in computer science into education. The four main components of CT—decomposition, pattern recognition, abstraction, and algorithm development—are particularly closely related to pattern skills in early childhood (Bers, 2018; Wing, 2006). CT skills help children gain cognitive flexibility in their analytical thinking, logical reasoning, and problem-solving processes (Papadakis et al., 2016).

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Research shows that pattern skills and CT can be strengthened in early childhood through digital games, physical materials, and everyday activities (Bers et al., 2014). For example, programming tools such as ScratchJr support children's algorithmic thinking and pattern recognition skills, contributing to both cognitive and creative thinking processes (Bers et al., 2014; Papadakis et al., 2016).

In this study, two closely related and mutually supportive cognitive skills, CT and pattern skills, will be introduced in the context of early childhood education, and strategies and approaches for their development will be discussed.

Definition and importance of pattern skills

Pattern skills are defined as the ability to notice repetitive structures and regularities in the environment, as well as to identify and make sense of similarities in objects and ideas. This skill plays a significant role in children's cognitive development and intensifies particularly during early childhood. The development of pattern recognition skills in preschool helps children understand mathematical concepts. This skill facilitates the comprehension of fundamental mathematical concepts such as number sequences, shapes, and geometric relationships. During early childhood, children perceive the regularities in their environment, which helps improve their problem-solving and mathematical thinking skills (Clements & Sarama, 2007).

Pattern recognition skills not only form the basis of mathematical thinking but are also strongly related to language development. Rittle-Johnson et al. (2019) state that pattern recognition plays an important role in learning linguistic patterns. Repetitive language structures, such as rhymes, songs, and rhythmic games, are particularly effective in the language learning process. Through these types of structures, children internalize grammatical rules and develop greater linguistic awareness, which in turn helps expand their vocabulary and improve their understanding of grammar (Rittle-Johnson, Zippert, & Boice, 2019; Papadakis et al., 2016). Additionally, pattern recognition is not only limited to cognitive and language development but also contributes to social-emotional growth. Sarama and Clements (2009) note that pattern recognition activities enhance problem-solving and teamwork skills in children. Pattern-making activities encourage collaborative learning, thereby contributing to the development of social skills and supporting children's self-regulation abilities.

In summary, pattern recognition is a fundamental cognitive process acquired during early childhood, supporting both mathematical and linguistic development. According to Papadakis et al. (2016), educational materials provided to children should enable them to identify patterns in order to foster the development of these skills. For example, digital tools and games allow children to experience patterns in a more concrete way, thereby strengthening their cognitive processes. Children's understanding of patterns follows a developmental trajectory. Table 1 shows the developmental stages of pattern skills (adapted from Sarama & Clements, 2009, as cited in Gök Çolak, 2020).

Table 1. Developmental Stages of Pattern Skills (Sarama & Clements, 2009; adapted from Gök Çolak, 2020)

Age Range	Developmental Progress	Associated Pattern Skills
Around 2 years	Pre-patterning	Indirectly discovers patterns but does not recognize them as such.
3 years	Pattern Identifier	Verbally describes and identifies simple patterns.
4 years	Pattern Repairer/Extender	Completes or extends missing elements in a pattern.
5 years	Pattern Extender	Continues simple repeating patterns.
6 years	Pattern Unit Identifier	Identifies the smallest repeating unit and articulates the pattern rule.
7 years	Number Pattern Identifier	Transforms patterns displayed in different forms into numerical patterns.

Types of Patterns

When the literature is examined, it is seen that there are pattern types such as repetitive patterns, expanding patterns, number-shape patterns, linear patterns (Warren & Cooper, 2006, Blanton & Kaput, 2004, Palabıyık & Akkuş İspir, 2011). Jackman (2005) stated that for preschool children, stringing beads and placing nails according to a special pattern such as blue, red, green and yellow is an example of a visual pattern, and repeating or saying sounds (such as soft, loud, soft, loud, soft) over and over again and then having children repeat this sequence is an example of a verbal pattern. The

teacher reading the template using simple words: circle, square, circle, square, circle, square, circle, square or a,b,a,b,a,b,a,b. In parallel with this information, Copley (2002) includes repeating the features of the pattern such as number, color, object, shape and movement in the same order. For this purpose, he stated that activities such as recognizing, defining and extending the pattern according to the rule can be done with children (Kesicioğlu, 2013).

While some researchers divide patterns into two groups as recurrent and changing (Olkun & Toluk-Uçar, 2014: 94), some publications divide them into three groups as recurrent, expanding and relational (Sperry-Smith, 2012). While there is a literature (Sperry-Smith, 2012) that defines repetitive patterns as a single group, there is also a literature that divides them into three as linear, cyclical and hopscotch patterns (Papic, 2007). Changing patterns are defined as a single type of pattern that increases or decreases depending on a certain rule (Olkun & Toluk-Uçar, 2014: 94), as well as studies that divide them into two as increasing and decreasing (Mulligan & Mitchelmore, 2009). In relational patterns, there is a relational regularity. As a result, when the literature was examined, it was seen that there are different definitions of pattern types and that pattern types contain some differences, even if they are inclusive of each other (Gök Çolak, 2020). Examples of some of the pattern types are presented below.

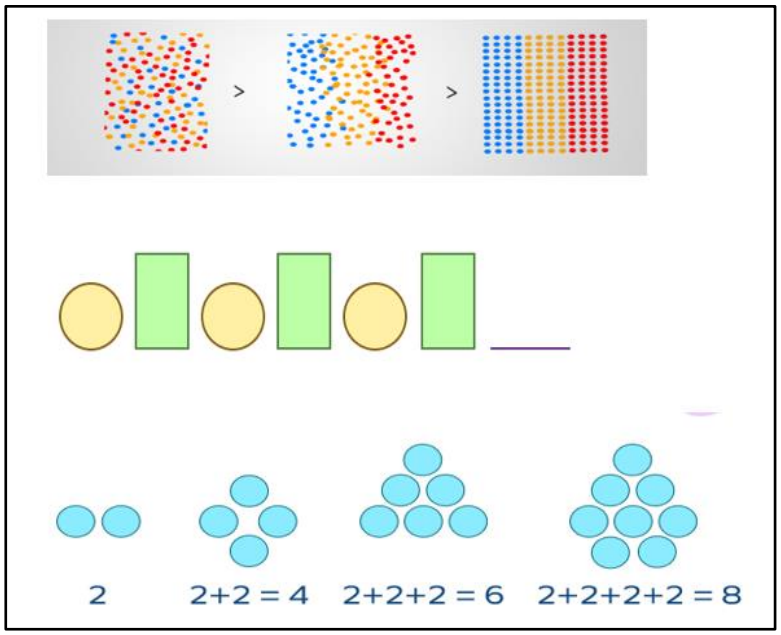

Figure 1. Some examples of pattern types

Computational Thinking

Computational Thinking (CT) is a way of thinking that utilizes problem-solving processes from computer science to develop individuals' ability to break down and solve complex problems. CT is not limited to computer science; it can also be applied to everyday life and across various disciplines. Wing (2006) defined CT as a fundamental approach aimed at enhancing individuals' capacity to think systematically and solve problems. This model consists of four core components that can be applied in different disciplines:

Decomposition: The process of breaking down a complex problem into smaller, more manageable parts. This step helps improve understanding of the problem and facilitates finding a solution. Shute et al. (2017) highlighted that the ability to break down problems is particularly effective in developing problem-solving strategies among young students. Decomposition helps children handle complex information in smaller segments and address each part separately to form an overall solution.

Pattern Recognition: The ability to identify similarities and repetitive structures. Pattern recognition allows children to establish relationships between problems and use previous experiences to tackle new problems. Bers (2018) emphasized that pattern recognition is one of the key components of CT, enabling children to improve their problem-solving abilities by connecting with repeating structures. Pattern recognition helps children solve new situations based on prior experiences. For example, recognizing repeating structures in a math problem can accelerate the problem-solving process (Papadakis et al., 2016).

Abstraction: The ability to focus only on the important aspects of a problem while avoiding unnecessary details. This process involves identifying the most critical information within large data sets or information groups. Lu and Fletcher (2009) noted that abstraction helps students grasp the essence of complex problems. This skill allows students to solve both mathematical and scientific problems more efficiently. Abstraction directs children's focus to the necessary information, making the problem-solving process more effective (Wing, 2006).

Algorithm Development: The process of defining a sequence of steps to solve a specific problem. This step plays a critical role, especially in programming and computer science, but is also highly useful in solving everyday problems. Brennan and Resnick (2012) stated that algorithmic thinking helps children systematize the problem-solving process and achieve more effective results. Algorithms allow children to create a roadmap for solving a problem, and this process is particularly important for mathematical and technical problems.

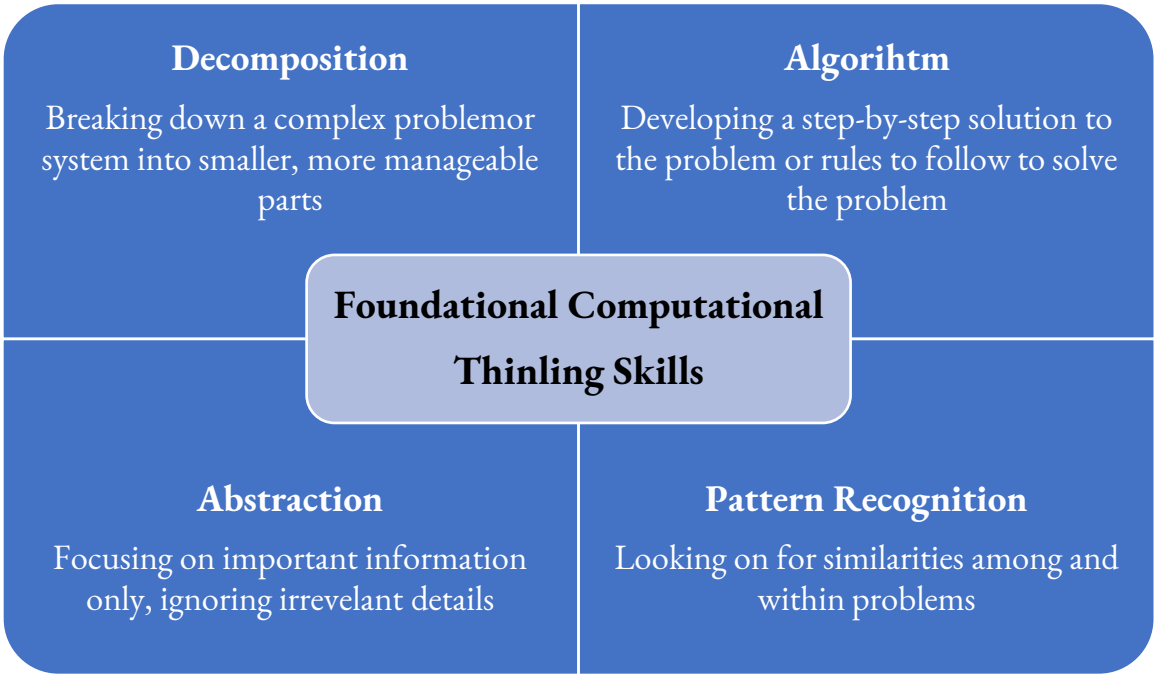

Figure 2. Steps of Computational Thinking (ISTE, 2016)

These four components are critical in developing children's analytical thinking and problem-solving abilities. The components of CT enrich children's cognitive processes and enable them to tackle more complex problems. Since computational thinking helps improve problem-solving and critical thinking skills, it is highly beneficial for children. By following the process of breaking down a problem to create an algorithm, children learn to approach problems logically and systematically. Computational thinking also helps children develop creativity and innovation skills as they are encouraged to think outside the box and come up with creative solutions to problems. Additionally, computational thinking promotes communication and collaboration skills as children work with others to solve problems and share their solutions and ideas.

The components of CT are closely related to pattern skills. Pattern recognition helps children notice repeating structures in the problem-solving process and establish connections between them. Bers (2018) emphasized that pattern recognition is one of the most fundamental components of CT, allowing children to make logical inferences in their cognitive processes. Pattern recognition is particularly noted as an effective tool in the development of algorithms (Wing, 2006). Papadakis et al. (2016) suggested that CT skills can be strengthened in early childhood through digital games and activities. These activities play an important role, especially in supporting algorithm development and pattern recognition skills.

The Relationship Between Computational Thinking (CT) and Pattern Skills in Early Childhood Education

Computational Thinking (CT) and pattern skills are two closely related and mutually supportive cognitive skill sets in early childhood education. During this period, children develop their problem-solving abilities through processes of

recognizing and solving patterns. Wing (2006) and Bers (2018) specifically argue that pattern recognition is one of the core components of CT, reinforcing children's cognitive processes such as logical reasoning and problem-solving. Research has shown that developing pattern recognition skills in early childhood contributes to children's success in more complex problem-solving processes in later years.

Pattern recognition skills are not limited to mathematical abilities but are also related to language development and general cognitive processes. Rittle-Johnson and Saylor (2013) state that children learn sentence structures and grammar rules more easily by recognizing linguistic patterns. This demonstrates that pattern recognition contributes to children's broader cognitive development. Repetitive language activities, such as rhymes, songs, and rhythmic games, strengthen children's pattern skills and help them better understand linguistic structures (Papadakis et al., 2016).

Digital programming tools also contribute to the development of these skills. Tools such as ScratchJr teach children problem-solving and algorithmic thinking processes, allowing them to recognize and work with patterns. Brennan and Resnick (2012) highlighted that programming tools like ScratchJr create a multidimensional impact on children's cognitive development, supporting not only mathematical thinking but also analytical and creative thinking skills. Activities related to pattern recognition through digital tools also help children structure their problem-solving processes while supporting their algorithmic thinking skills (Kazakaoff et al., 2013; Bers, 2018).

Unplugged activities, or non-digital activities using physical materials, also play an important role in this process. Papadakis and Zaranis (2016) noted that pattern-creation games with tangible materials strengthen children's cognitive processes and particularly contribute to their mathematical thinking skills. These types of activities help children understand abstract concepts by making them more concrete, allowing for greater flexibility in problem-solving processes. Sorting and patterning games using blocks, shapes, and beads contribute to the development of pattern recognition skills through concrete experiences (Lee et al., 2019).

More broadly, Brennan and Resnick (2012) emphasized the multidimensional impact of programming education on children's cognitive development. Such educational approaches not only support children's algorithmic thinking skills but also strengthen their pattern recognition and problem-solving processes. Research shows that introducing these skills in early childhood enhances children's mathematical and scientific thinking abilities in later years (Papadakis et al., 2016).

Pattern recognition is entirely dependent on a child's ability to analyze objects and images. A child can recognize what is the same and what is different. This ability significantly influences a child's capacity to combine different patterns and predict the next outcome. Pattern recognition greatly assists in making specific decisions, making it easier to handle different situations.

Strategies for Developing Pattern Skills and Computational Thinking

Developing Computational Thinking (CT) and pattern skills in early childhood significantly contributes to children's analytical thinking, problem-solving, and cognitive flexibility. These skills can be supported through digital and physical tools, various games, and activities, promoting both cognitive and socio-emotional development. Below are some strategies that contribute to the development of these skills:

Digital Games and Programming Activities

Digital games and programming activities are highly effective in developing CT and pattern skills in young children. Programming tools like ScratchJr provide children with opportunities to develop algorithmic thinking and pattern recognition skills. ScratchJr enables children to identify repeating sequences and create algorithms based on these sequences. Papadakis et al., (2016) emphasized that ScratchJr greatly contributes to children's cognitive development, enhancing their creative thinking and problem-solving skills. Additionally, the use of digital programming tools allows children to create algorithms and make their problem-solving processes more systematic (Bers et al., 2014).

Figure 3. An example from the ScratchJr program

Not only do digital games promote cognitive development, but they also make learning enjoyable for children. As Brennan and Resnick (2012) pointed out, introducing programming to children at an early age lays a strong foundation for developing their algorithmic thinking abilities. During this process, children gain the skills to recognize repeating patterns and manipulate these patterns. Kazakaoff et al., (2013) noted that digital game-based programming tools are effective in helping children develop cognitive flexibility.

Unplugged (Non-Digital) Activities

In addition to digital tools, unplugged activities—games and activities using physical materials—are also effective in developing CT and pattern skills. These activities support children's cognitive processes by engaging them in games with tangible materials. Lee et al. (2019) emphasized that sorting and pattern-making games using colorful blocks, shapes, and beads help children learn abstract concepts through concrete experiences. Tangible materials allow children to recognize patterns, create algorithms, and apply these algorithms in a hands-on way.

Figure 4. Unplugged Activities example pattern generation

Shute et al. (2017) found that children's problem-solving skills are enhanced through non-digital activities, improving their cognitive flexibility and creative thinking capacities. These activities also encourage collaboration and problem-solving through social interaction, especially in group settings.

Rhythmic Activities and Songs

Rhythmic activities and songs play a key role in children's linguistic and cognitive development. Clements and Sarama (2007) noted that rhythmic patterns not only improve children's language skills but also support their pattern recognition and mathematical thinking abilities. Rhymes, songs, and clapping games help children notice repeating

structures and reflect on them. Rittle-Johnson and Saylor (2013) emphasized that learning linguistic patterns helps children better grasp grammar and sentence structures.

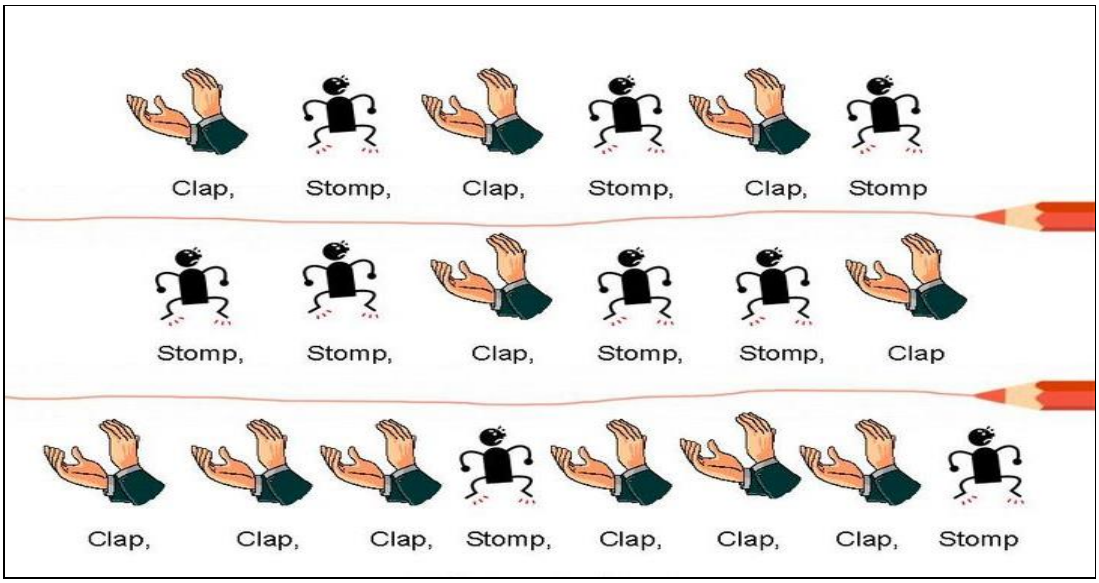

Figure 5. Rhythmic activities and songs pattern example

Rhythmic activities not only strengthen linguistic awareness but also enhance children's cognitive processes. For example, by identifying repeating sound patterns through songs and rhymes, children improve their understanding of both language and mathematical concepts. These activities develop children's ability to recognize patterns and make inferences based on those patterns.

Educational Policies and Curriculum Development

Integrating CT and pattern skills into early childhood education is a critical step in supporting children's cognitive, social, and academic development. Introducing these skills early allows students to develop problem-solving, analytical thinking, and logical reasoning abilities at a young age (Wing, 2006). Education policies and curricula should be structured to support the development of these skills, as this will directly impact future academic success.

CT should be integrated into curricula as an interdisciplinary approach, not just limited to computer science. Brennan and Resnick (2012) argued that integrating CT with other disciplines enhances students' ability to think multidimensionally and that introducing this skill as part of the curriculum at an early age is crucial. Similarly, Papadakis and Zaranis (2016b) highlighted that integrating CT into education through digital tools strengthens children's pattern recognition skills. Therefore, educational policies should be designed to place special emphasis on these areas.

The curriculum should be enriched with both digital tools and physical materials. Shute et al. (2017) found that enriching curricula with digital technologies encourages students to collaborate both in individual and group activities. Therefore, developing policies that increase access to digital programs and technology in schools is important for ensuring equal educational opportunities.

Supporting curricula with unplugged (non-digital) methods is also recommended. Lee et al. (2019) found that unplugged activities help children develop pattern and algorithmic skills with tangible materials, allowing them to build cognitive processes that succeed even in non-digital environments. Integrating such activities into the curriculum would enable the spread of CT even in regions with limited access to digital technologies. Increasing professional development opportunities for educators to contribute to the development of these skills is essential. Bers et al. (2014) pointed out that teachers' familiarity with digital tools supporting CT and pattern skills enhances the success of classroom applications. In this regard, curriculum developers should create policies that support teacher education and the integration of technological tools.

Finally, incorporating CT and pattern skills into education from an early age plays a critical role in helping children acquire 21st-century skills. The studies of Papadakis and Zaranis (2016) show that these skills improve children's collaboration, creative thinking, and problem-solving abilities in both individual learning and group-based activities.

Conclusion

Pattern skills and Computational Thinking (CT) are two critical skills that support children's cognitive, social, and academic development during the preschool period. These skills strengthen children's problem-solving, logical thinking, and algorithmic thinking processes. Specifically, Clements and Sarama (2007) emphasized the impact of pattern skills on mathematical and language development, while Wing (2006) and Brennan and Resnick (2012) presented important findings on how CT enhances children's interdisciplinary thinking abilities.

Educators planning activities that encourage these skills through both digital and physical tools will make significant contributions to children's future academic success. Papadakis et al. (2016) noted that programming activities supported by digital tools help children develop both pattern recognition skills and algorithmic thinking abilities. Meanwhile, Lee et al. (2019) demonstrated that unplugged activities can be successfully implemented even in regions with limited access to digital tools.

In conclusion, CT and pattern skills are two important cognitive processes that complement and develop together during early childhood. Activities supported by digital tools and tangible materials contribute to the development of these skills, strengthening children's problem-solving, analytical thinking, and logical reasoning abilities. These processes also support children's cognitive as well as socio-emotional development (Bers, 2018).

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