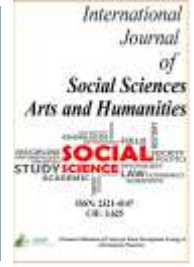


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Full Length Research Paper

Green Spaces: Nurturing School Children's Mental Health and Well-Being

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ABSTRACT

Green spaces, comprising parks, playgrounds, and natural environments, are pivotal in enhancing the mental well-being of school children. This paper examines the manifold ways in which exposure to green spaces positively influences children's mental health. Drawing from a synthesis of existing literature and empirical findings, we elucidate how interaction with green spaces facilitates stress reduction, mood enhancement, cognitive augmentation, and social bonding among school children. Studies indicate that green spaces provide an avenue for stress alleviation, offering children a tranquil environment conducive to relaxation and rejuvenation. Additionally, spending time in green spaces correlates with improved mood regulation, fostering greater happiness and diminished irritability in children. Furthermore, engagement with nature stimulates cognitive faculties, bolstering attention, problem-solving abilities, and memory retention in school-aged children. Moreover, green spaces serve as vital arenas for social interaction and connection among children. Through outdoor play and communal activities, children cultivate essential social skills, including teamwork, cooperation, and communication, thereby nurturing a sense of belonging and community. Recognizing the profound impact of green spaces on children's mental well-being, this paper underscores the importance of integrating such environments into school settings and urban planning initiatives. Practical strategies discussed include embedding nature-based learning activities into the curriculum, designing nature-inclusive school environments with green schoolyards and outdoor classrooms, and advocating for the preservation and enhancement of green spaces in communities. However, while substantial evidence supports the benefits of green spaces for children's mental health, further research is warranted to elucidate the underlying mechanisms and optimize the efficacy of green space interventions in educational settings. By prioritizing the incorporation of green spaces into schools and communities, we can foster environments that nurture the mental well-being of school children, ultimately contributing to their overall health and happiness.

1. Introduction: The significance of green spaces in relation to the mental well-being of school children cannot be overstated (Vanaken & Danckaerts, 2018). Green spaces, such as parks, gardens, and playgrounds, provide a natural and serene

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environment that has been proven to have a positive impact on the mental health of children (Russo & Andreucci, 2023). Exposure to green spaces can reduce stress, anxiety, and symptoms of attention deficit hyperactivity disorder (ADHD) in children (McCormick, 2017). Green spaces offer a break from the structured and often demanding school environment, allowing children to engage in unstructured play and connect with nature (Parrott & Cohen, 2020). This connection with nature has been linked to improved cognitive function, creativity, and overall psychological well-being (Leavell *et al.*, 2019). Furthermore, green spaces provide opportunities for physical activity, which is essential for the healthy development of children (Jennings & Bamkole, 2019). Regular physical activity has been shown to improve mood, reduce symptoms of depression, and enhance self-esteem in children (Biddle *et al.*, 2019). In addition to the direct benefits on mental well-being, green spaces also contribute to the overall quality of life in schools (Zhang *et al.*, 2020). They create a sense of community, provide a space for social interaction, and promote a sense of belonging among students (Thompson *et al.*, 2023). The presence of green spaces in schools plays a vital role in promoting the mental well-being of school children (Van Dijk-Wesselius *et al.*, 2018). It not only provides a peaceful and natural environment for relaxation and play but also contributes to their overall cognitive and physical development (Vella-Brodrick & Gilowska, 2020). Schools should prioritize the inclusion of green spaces in their design and ensure that children have access to these spaces for their well-being (Baro *et al.*, 2021).

2. Benefits of Green Spaces for School Children's Mental Health:

1. Stress Reduction: Green spaces provide a respite from the demands of school and daily life, allowing children to relax and unwind in natural surroundings. Exposure to greenery can lower levels of cortisol, the stress hormone, and promote feelings of calm and relaxation (Barton & Rogerson, 2017).

Studies have demonstrated the stress-reducing effects of exposure to greenery on individuals of all ages, including children. One of the key mechanisms behind this phenomenon is the ability of green spaces to lower levels of cortisol, the primary stress hormone in the body. Cortisol is released in response to stressors, triggering the body's "fight or flight" response (Ennis, 2018). However, prolonged elevation of cortisol levels can have detrimental effects on health, including increased anxiety, impaired immune function, and disrupted sleep patterns (Knezevic *et al.*, 2023).

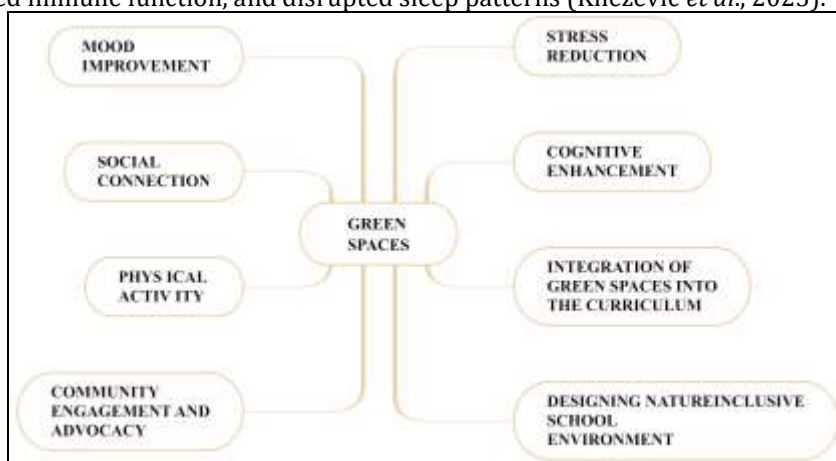


Fig. 1 Benefits of Green Spaces for School Children's Mental Health

Green spaces serve as sanctuaries where children can escape from the demands of school and daily life, offering them a tranquil environment to relax and unwind in natural surroundings. These spaces, often filled with lush vegetation, trees, and open grassy areas, provide a stark contrast to the hustle and bustle of urban environments, offering a sense of peace and tranquility (Dixit, 2021). When children spend time in green spaces, whether it's a park, playground, or nature reserve, they are surrounded by natural elements that evoke a sense of calmness and relaxation (Chawla, 2021). The sights, sounds, and smells of nature have a soothing effect on the mind and body, helping to alleviate stress and tension. The gentle rustling of leaves, the chirping of birds and the scent of flowers can all contribute to a sense of well-being and contentment (Bloom, 2018).

Moreover, green spaces provide opportunities for children to engage in activities that promote relaxation and mindfulness. Whether it's sitting quietly on a bench, taking a leisurely stroll along a nature trail, or simply lying on the grass and gazing up at the sky, these activities allow children to slow down, quiet their minds, and connect with the natural world around them (Van Dijk-Wesselius *et al.*, 2018). In doing so, they can experience a sense of inner peace and tranquility that helps to recharge their batteries and rejuvenate their spirits.

In addition to lowering cortisol levels, exposure to greenery has been shown to have other physiological and psychological benefits (Jones *et al.*, 2021). Studies have found that spending time in nature can reduce blood pressure, heart rate, and muscle tension, all of which are indicators of stress (Shuda *et al.*, 2020). Furthermore, green spaces promote positive emotions such as happiness, joy, and awe, while reducing negative emotions such as anger, sadness, and anxiety (Di Pompeo *et al.*, 2023).

Overall, green spaces provide a much-needed respite from the demands of school and daily life, offering children a peaceful retreat where they can relax, recharge, and reconnect with nature. By lowering stress levels and promoting feelings of calm and relaxation, these natural environments play a vital role in supporting children's mental health and well-being. As such, efforts to preserve and enhance green spaces in urban areas are essential for ensuring the health and happiness of future generations.

3. Mood Improvement:

Spending time in green spaces, such as parks, gardens, forests, and natural landscapes, has been consistently linked to significant improvements in mood and emotional well-being, particularly among children (Reyes-Riveros *et al.*, 2021). The natural environment offers a unique setting that has a profound impact on children's mood, fostering feelings of happiness, contentment, and relaxation while reducing irritability and stress (Di Pompeo *et al.*, 2023). Here's a detailed exploration of how exposure to green environments positively impacts children's mental health:

- i. **Enhanced Happiness:** Interacting with nature is known to evoke feelings of happiness and joy in children. The tranquil and visually appealing aspects of green spaces, including lush vegetation, colorful flowers, and diverse wildlife, create a sensory-rich experience that promotes positive emotions (Ghorab *et al.*, 2023). Children often express delight and excitement when exploring natural environments, whether it's playing in the grass, chasing butterflies, or climbing trees. These joyful experiences contribute to a sense of happiness and well-being that can have lasting effects on children's overall mood (Koch, 2018).
- ii. **Increased Contentment:** Green spaces provide children with opportunities for relaxation, contemplation, and reflection, fostering a sense of contentment and inner peace (Mata-McMahon *et al.*, 2020). The serene and calming qualities of nature have a soothing effect on the mind and body, helping children feel more at ease and satisfied with their surroundings. Whether sitting quietly by a pond, listening to the rustle of leaves, or watching clouds drift across the sky, children often find solace and comfort in the tranquility of green environments, which contributes to a heightened sense of contentment and emotional well-being (Griffiths *et al.*, 2020).
- iii. **Reduced Irritability:** Exposure to greenery has been shown to alleviate feelings of irritability, agitation, and restlessness in children. The restorative properties of nature help children unwind and decompress from the stresses and pressures of daily life, allowing them to release tension and frustration in a peaceful setting (Efstratopoulou *et al.*, 2022). Whether it's taking a leisurely walk in the park, engaging in outdoor play, or simply breathing in the fresh air, children often experience a sense of relief and relaxation when immersed in green spaces, leading to reduced irritability and improved emotional regulation (Harper *et al.*, 2019).
- iv. **Connection with Nature:** Spending time outdoors fosters a deeper connection with the natural world, which is essential for children's mental and emotional development. Engaging with nature stimulates the senses, stimulates curiosity, and encourages exploration, fostering a sense of wonder and appreciation for the environment. Children who have regular exposure to green spaces are more likely to develop a sense of empathy, respect, and stewardship towards nature, which enhances their overall sense of well-being and belonging in the world (Chawla *et al.*, 2021).
- v. **Promotion of Mindfulness:** Green spaces provide an ideal environment for practicing mindfulness and being present in the moment (Nisbet *et al.*, 2019; Van Gordon *et al.*, 2018). Children can engage in activities such as nature walks, guided meditation, or outdoor yoga, which promote relaxation, focus, and awareness of their surroundings (Rashedi *et al.*, 2019). By immersing themselves in the sights, sounds, and sensations of nature, children learn to cultivate a greater sense of mindfulness and self-awareness, which can help reduce stress, anxiety, and negative thinking patterns (Loland, 2022).

The natural environment offers a unique setting that has a profound impact on children's mood, fostering feelings of happiness, contentment, and relaxation while reducing irritability and stress. The Spending time in green spaces offers numerous benefits for children's mood and emotional well-being, including enhanced happiness, increased contentment, reduced irritability, a deeper connection with nature, and promotion of mindfulness. By prioritizing access to green environments and incorporating nature-based activities into children's daily routines, parents, educators, and policymakers can support the mental health and happiness of children and foster environments that nurture their overall well-being.

4. Cognitive Enhancement:

Green spaces provide invaluable opportunities for children to engage in exploration, creativity, and sensory stimulation, all of which contribute to enhancing cognitive function and academic performance (Ernst & Burcak, 2019). Exposure to green environments positively impacts cognitive abilities and educational outcomes in school children.

- i. **Opportunities for Exploration:** Green spaces offer vast and diverse landscapes for children to explore, ranging from wooded areas and meadows to botanical gardens and nature trails (Breuste, 2023). These environments provide endless opportunities for discovery, allowing children to observe and interact with various plants, animals, and natural phenomena. Through hands-on exploration, children develop important cognitive skills such as observation, classification, and spatial reasoning. They learn to identify different species of plants and animals, recognize patterns in nature, and make connections between their observations and scientific concepts, fostering a deeper understanding of the natural world (Kohout & Kopp, 2020).
- ii. **Stimulation of Creativity:** Natural environments stimulate children's imagination and creativity, providing an endless array of materials and stimuli for open-ended play and artistic expression. Whether building forts out of branches, creating nature-inspired artwork, or inventing games based on outdoor surroundings, children engage in imaginative play that promotes creative thinking and problem-solving skills. Green spaces encourage children to think outside the box, experiment with novel ideas, and express themselves freely, fostering a sense of innovation and originality that is conducive to academic success (Akyıldız & Çelik, 2020).
- iii. **Sensory Stimulation:** Nature engages all the senses, providing rich sensory experiences that stimulate cognitive development and learning (Beery & Jorgensen, 2018). Children can feel the texture of leaves, smell the fragrance of flowers, listen to the sounds of birds chirping, taste wild berries, and see the vibrant colors of the natural landscape (Spence, 2020). These multisensory experiences activate different regions of the brain and help children make meaningful connections between sensory input and cognitive processing (Seidl *et al.*, 2024; Denervaud *et al.*, 2020). Exposure to natural stimuli enhances sensory integration, attentional focus, and perceptual-motor skills, laying the foundation for academic readiness and achievement (Labuschagne, 2022; Cameron, 2018).
- iv. **Improvements in Attention and Concentration:** Spending time in green spaces has been shown to improve attention and concentration in school children (Vanaken & Danckaerts, 2018; Kondo *et al.*, 2018). Natural environments offer a respite from the constant distractions and stimuli of modern life, allowing children to focus their attention on specific tasks and activities. The restorative qualities of nature, including its calming effects and lack of technological distractions, help children regulate their attentional resources more effectively and sustain focus for longer periods of time (Di Carmine & Berto, 2020). As a result, children who have regular access to green spaces demonstrate improved attentional control, task persistence, and academic engagement in classroom settings (Van den Bogerd *et al.*, 2020).
- v. **Enhanced Problem-Solving Skills:** Green spaces provide a dynamic and ever-changing environment that presents children with a variety of challenges and problems to solve (Ernst & Burcak, 2019). Whether navigating a winding trail, building a dam in a stream, or identifying animal tracks, children engage in problem-solving activities that require critical thinking, decision-making, and creative problem-solving skills (Sell, 2021). By confronting and overcoming obstacles in nature, children develop resilience, adaptability, and confidence in their ability to tackle academic challenges both inside and outside the classroom (Twum-Antwi *et al.*, 2020).
- vi. **Memory Retention and Learning:** Exposure to natural environments has been associated with improvements in memory retention and learning outcomes among school children (Mason *et al.*, 2022; Vella-Brodrick & Gilowska, 2022). The multisensory experiences and immersive nature of green spaces enhance information processing and memory consolidation, making learning more memorable and impactful (Cosentino & Giannakos, 2023). Children who participate in outdoor learning activities, such as nature walks, field trips, and environmental education programs, demonstrate better retention of academic content and higher levels of academic achievement compared to their counterparts who learn in indoor or urban settings (Kuo *et al.*, 2018).

The green spaces offer unparalleled opportunities for exploration, creativity, and sensory stimulation, which play a crucial role in enhancing cognitive function and academic performance among school children. By providing access to nature-rich environments and incorporating outdoor learning experiences into educational curricula, educators, policymakers, and parents can support children's cognitive development, foster a love of learning, and cultivate the skills needed for academic success.

5. Social Connection:

Green spaces play a pivotal role in facilitating social interaction and fostering meaningful relationships among school children (Jennings & Bamkole, 2019). Here's a detailed exploration of how green spaces serve as vibrant social hubs that promote socialization, teamwork, and community-building:

- i. **Opportunities for Social Interaction:** Green spaces provide a conducive environment for children to interact with peers in a relaxed and natural setting (Amicone *et al.*, 2018). Whether it's a neighborhood park, playground, or school garden,

these outdoor environments offer ample space for children to engage in spontaneous social interactions, initiate conversations, and form friendships (Csanyi, 2018). The open layout and diverse features of green spaces encourage children to explore, play, and collaborate with one another, leading to frequent and meaningful social exchanges (Vidal & Castro Seixas, 2022).

- ii. **Promotion of Outdoor Play:** Outdoor play in green spaces promotes socialization by encouraging children to engage in cooperative and imaginative play activities (Larrea *et al.*, 2019). From games of tag and hide-and-seek to building forts and staging pretend adventures, outdoor environments provide endless opportunities for collaborative play and social bonding. Children learn to negotiate rules, take turns, and resolve conflicts while participating in group activities, fostering essential social skills such as communication, empathy, and perspective-taking (Albers & Beute, 2022).
- iii. **Facilitation of Teamwork and Cooperation:** Green spaces offer a dynamic backdrop for team-based activities and group projects that require collaboration and cooperation (Kay *et al.*, 2018). Whether participating in sports games, nature scavenger hunts, or environmental clean-up activities, children work together to achieve common goals and overcome challenges. Through shared experiences and collective problem-solving, children learn to trust one another, communicate effectively, and appreciate the value of teamwork, laying the foundation for positive social relationships both inside and outside the classroom (Ghavifekr, 2020).
- iv. **Creation of Shared Spaces:** Green spaces serve as inclusive and accessible environments where children from diverse backgrounds can come together to play, learn, and socialize (Lynch *et al.*, 2020). Regardless of socioeconomic status, ethnicity, or cultural background, children have equal access to public parks, playgrounds, and recreational facilities, promoting social equity and inclusivity. By creating shared spaces that foster a sense of belonging and community, green environments contribute to the social integration of children from different walks of life, reducing social isolation and promoting cross-cultural understanding and acceptance (Sundevall & Jansson, 2020).
- v. **Encouragement of Environmental Stewardship:** Engaging with green spaces instills in children a sense of responsibility and stewardship for the natural world, fostering a shared commitment to environmental conservation and sustainability (Hahn, 2021). Through hands-on experiences such as planting trees, tending to community gardens, and participating in habitat restoration projects, children develop an appreciation for nature and an understanding of the interconnectedness between humans and the environment. By working together to protect and preserve green spaces, children learn the importance of collective action and civic engagement, promoting a sense of environmental responsibility and social cohesion within their communities (Gallay *et al.*, 2020).
- vi. **Support for Positive Peer Relationships:** Green spaces provide a supportive context for building positive peer relationships and social networks that contribute to children's overall well-being and social-emotional development (Scott *et al.*, 2018). Spending time outdoors with peers strengthens bonds, fosters trust, and cultivates a sense of camaraderie among children, creating a supportive network of friends and allies. These positive peer relationships serve as a source of emotional support, encouragement, and companionship, buffering against stress, loneliness, and social isolation, and promoting resilience and mental health (Bikomeye *et al.*, 2021).

The green spaces serve as dynamic social hubs that facilitate socialization, teamwork, and community-building among school children. By providing opportunities for outdoor play, collaborative activities, and shared experiences, green environments promote the development of essential social skills, foster positive peer relationships, and create inclusive and supportive communities where children can thrive socially, emotionally, and academically.

6. Physical Activity:

Green spaces play a crucial role in promoting physical activity among children, contributing significantly to their physical health and overall well-being (Nath *et al.*, 2018). Here's a detailed exploration of how green spaces support physical activity and its positive impact on children's health:

- i. **Promotion of Outdoor Play:** Green spaces offer a natural and open environment that encourages children to engage in unstructured outdoor play and physical activities (Holt *et al.*, 2019). Unlike indoor settings, green areas provide ample space for running, jumping, climbing, and exploring, allowing children to unleash their energy and creativity in a safe and natural setting. Outdoor play in green spaces promotes gross motor skills development, balance, coordination, and spatial awareness, contributing to overall physical literacy (Johnstone *et al.*, 2022).
- ii. **Opportunities for Active Recreation:** Green spaces provide a variety of recreational facilities and amenities that cater to children's diverse interests and preferences (Breuste *et al.*, 2020). Parks, playgrounds, sports fields, and nature trails offer opportunities for organized sports, games, and recreational activities such as soccer, basketball, cycling, hiking, and nature walks (Rivera *et al.*, 2022). These activities not only promote physical fitness but also foster social interaction, teamwork, and cooperation among children, enhancing their overall well-being (Christiansen *et al.*, 2018).
- iii. **Encouragement of Spontaneous Physical Activity:** Green spaces offer a natural and stimulating environment that motivates children to engage in spontaneous physical activity and outdoor exploration (Martens *et al.*, 2020). Whether it's climbing trees, rolling down hills, or playing tag with friends, green environments provide endless opportunities for

children to move their bodies, stimulate their senses, and experience the joy of outdoor play. Unlike structured sports or organized activities, spontaneous physical activity allows children to play at their own pace, follow their interests, and enjoy the freedom of outdoor play (Padiar-Ruz *et al.*, 2021).

- iv. **Reduction of Sedentary Behavior:** Access to green spaces encourages children to spend less time in sedentary activities such as screen time, video games, and indoor entertainment (Akpınar, 2020). Instead of being glued to electronic devices or confined to indoor spaces, children are drawn to the outdoors where they can engage in active play and physical exercise. Regular participation in outdoor activities helps reduce sedentary behavior, promote healthy habits, and prevent childhood obesity, diabetes, and other sedentary-related health issues (Sigmundova & Sigmund, 2021).
- v. **Improvement of Cardiovascular Fitness:** Regular exercise in green spaces contributes to improvements in cardiovascular fitness and overall physical health outcomes among children (Mnich *et al.*, 2019). Activities such as running, cycling, and playing sports increase heart rate, improve circulation, and strengthen the heart and lungs, leading to better cardiovascular endurance and fitness (Mileva & Zaidell, 2022). The varied terrain and natural obstacles in green environments provide opportunities for children to engage in both aerobic and anaerobic exercises, promoting overall physical conditioning and well-being (Lahart *et al.*, 2019).
- vi. **Enhancement of Mental Health:** In addition to its physical benefits, physical activity in green spaces has been linked to improvements in mental health and well-being among children (Zhang *et al.*, 2020). Spending time in nature, breathing fresh air, and engaging in outdoor play can reduce stress, anxiety, and depression, promoting positive mood and emotional resilience. The natural sights, sounds, and textures of green environments have a calming and restorative effect on the mind, helping children relax, unwind, and recharge their mental batteries (Bernardo *et al.*, 2021).

The green spaces provide an ideal setting for physical activity and outdoor play, offering children opportunities to engage in a variety of recreational activities, promote physical fitness, and enjoy the benefits of nature. By encouraging active lifestyles, reducing sedentary behavior, and supporting cardiovascular health, green environments play a vital role in promoting children's physical health and overall well-being.

7. Integration of green spaces into the school curriculum

Integration of green spaces into the school curriculum is a multifaceted approach that involves incorporating nature-based learning activities and outdoor experiences into various subjects and educational programs (Ruiz-Mallen *et al.*, 2023). Here's how educators can effectively integrate green spaces into the curriculum:

- i. **Outdoor Classrooms:** Schools can create designated outdoor learning spaces, such as gardens, nature trails, and wildlife habitats, where students can engage in hands-on learning activities (Chandler Bird, 2022). Outdoor classrooms provide opportunities for interdisciplinary learning across subjects like science, math, language arts, and social studies (Prasetya *et al.*, 2020). Teachers can conduct lessons, experiments, and group discussions outdoors, allowing students to connect with nature while exploring academic concepts (Zainuddin & Perera, 2019).
- ii. **Nature-Based Lessons:** Educators can develop lesson plans and educational resources that integrate nature-based themes and concepts into the curriculum (Kelley, 2022). For example, science classes can explore topics like ecosystems, biodiversity, and environmental conservation through outdoor observations, field trips, and hands-on experiments. Language arts classes can incorporate nature writing, poetry, and storytelling to inspire creativity and literary expression (Zengin *et al.*, 2019).
- iii. **Environmental Education:** Schools can implement environmental education programs that focus on sustainability, ecological literacy, and environmental stewardship (Goldman *et al.*, 2018). These programs can include outdoor field trips to parks, nature reserves, and botanical gardens, as well as hands-on activities like tree planting, composting, and recycling. Environmental education initiatives raise awareness about environmental issues and empower students to become responsible stewards of the planet (Nurwidodo *et al.*, 2022).
- iv. **Project-Based Learning:** Project-based learning (PBL) provides opportunities for students to investigate real-world problems and issues related to green spaces and environmental sustainability (Bramwell-Lalor *et al.*, 2020). Teachers can design PBL units that challenge students to design and implement solutions to local environmental challenges, such as habitat restoration projects, community garden initiatives, or waste reduction campaigns. PBL encourages critical thinking, collaboration, and problem-solving skills while fostering a sense of environmental responsibility (Kricsfalusy *et al.*, 2018).
- v. **Outdoor Recreation and Physical Education:** Green spaces can serve as venues for outdoor recreation and physical education activities that promote health, fitness, and well-being (Pasek *et al.*, 2020). Schools can organize outdoor sports, games, and fitness classes in parks, playgrounds, and sports fields to encourage physical activity and active play. Outdoor recreational activities, such as hiking, biking, and nature walks, provide opportunities for students to connect with nature while engaging in fun and healthy activities (Romagosa, 2018).
- vi. **Experiential Learning:** Experiential learning experiences in green spaces allow students to engage all their senses and learn through direct observation, exploration, and discovery (Beard & Wilson, 2018). Teachers can facilitate outdoor

learning experiences that stimulate curiosity, creativity, and wonder, such as nature scavenger hunts, outdoor art projects, and sensory exploration activities. Experiential learning fosters a deep connection to the natural world and enhances students' overall learning experiences (Budhai, 2021).

The integrating green space into the school curriculum offers numerous benefits for students, including enhanced learning experiences, environmental awareness, and physical well-being. By incorporating nature-based learning activities, environmental education initiatives, and outdoor recreation opportunities, educators can inspire students to develop a deeper appreciation for the natural world and become responsible stewards of the environment.

8. Designing Nature-Inclusive School Environments:

Designing nature-inclusive school environments involves prioritizing the incorporation of green spaces, outdoor amenities, and natural elements into school campuses to enhance the well-being and learning experiences of students (Edwards-Jones *et al.*, 2022). Here are several strategies for creating nature-inclusive school environments:

- i. **Green Schoolyards:** School administrators can transform traditional asphalt playgrounds into vibrant green schoolyards by adding trees, shrubs, grassy areas, and native plants (Mantei, 2020). Green schoolyards provide students with opportunities for outdoor play, exploration, and interaction with nature during recess and breaks. Features such as climbing structures, sensory gardens, and nature play areas can encourage imaginative play and physical activity while fostering a connection to the natural world (Cengiz & Boz, 2019).
- ii. **Outdoor Classrooms:** Designating outdoor classroom spaces within school grounds allows teachers to conduct lessons, group activities, and experiential learning experiences in natural settings (Dennis *et al.*, 2019). Outdoor classrooms can include seating areas, shade structures, and whiteboards or chalkboards for instructional purposes (Farhat, 2021). These spaces provide students with a stimulating learning environment that promotes creativity, concentration, and engagement with academic content while enjoying the benefits of fresh air and natural surroundings (Kariippanon *et al.*, 2018).
- iii. **Nature Trails and Gardens:** Creating nature trails and gardens on school campuses provides opportunities for students to explore and learn about local ecosystems, biodiversity, and environmental science (Dushkova & Haase, 2020). Nature trails can feature interpretive signage, wildlife observation stations, and educational stations that encourage students to engage in self-guided exploration and discovery. School gardens, including vegetable gardens, pollinator gardens, and rain gardens, offer hands-on learning experiences related to horticulture, ecology, and sustainable agriculture (Yahampath, 2023).
- iv. **Wildlife Habitats:** Schools can create wildlife habitats such as birdhouses, butterfly gardens, and pond habitats to attract and support local wildlife species (Burnett, 2021). Wildlife habitats provide students with opportunities for wildlife observation, ecological research, and environmental stewardship. By observing and interacting with wildlife in their natural habitats, students develop an appreciation for biodiversity and learn about the importance of habitat conservation and species protection (Kamudu *et al.*, 2022).
- v. **Natural Play Areas:** Integrating natural play elements such as logs, boulders, sand pits, and water features into school grounds encourages unstructured outdoor play and creative exploration (Koleilat, 2019). Natural play areas provide opportunities for sensory stimulation, gross motor skill development, and social interaction among students. These spaces foster a sense of wonder and curiosity while promoting physical activity and imaginative play in natural settings (Honig, 2019).
- vi. **Environmental Features:** Incorporating environmentally sustainable features into school buildings and landscapes, such as rainwater harvesting systems, green roofs, and solar panels, demonstrates a commitment to environmental stewardship and sustainability (Cole & Altenburger, 2019). These features provide educational opportunities for students to learn about renewable energy, water conservation, and sustainable design practices while reducing the ecological footprint of the school campus (Adjei *et al.*, 2021).
- vii. **Community Engagement:** Engaging students, parents, teachers, and community members in the planning, design, and maintenance of nature-inclusive school environments fosters a sense of ownership and pride in the school community. Collaborative efforts to create and maintain green spaces promote environmental awareness, social cohesion, and community well-being while enhancing the quality of the learning environment for all stakeholders (Yuniastuti & Hasibuan, 2019).

The designing nature-inclusive school environments involves creating green schoolyards, outdoor classrooms, nature trails, wildlife habitats, natural play areas, and environmentally sustainable features that provide students with access to nature and opportunities for outdoor learning, play, and exploration. By prioritizing the integration of green spaces and natural elements into school campuses, educators and school administrators can promote student well-being, environmental literacy, and a deeper connection to the natural world.

9. Community Engagement and Advocacy:

Community engagement and advocacy play a crucial role in promoting the preservation and enhancement of green spaces in school districts and urban areas, ensuring that all children have equitable access to nature (Barclay & Klotz, 2019). Here are some strategies for community engagement and advocacy:

- i. **Parental Involvement:** Parents can actively participate in school committees, parent-teacher associations (PTAs), and advocacy groups focused on green initiatives and outdoor education (Simasiku, 2022). By voicing their support for green spaces and nature-based learning opportunities, parents can influence school policies, funding decisions, and curriculum development to prioritize the integration of nature into educational settings (Haslip & Gullo, 2018).
- ii. **Teacher Collaboration:** Teachers can collaborate with colleagues, school administrators, and community partners to develop nature-based learning activities, outdoor classroom experiences, and environmental education programs (Greenawald, 2023). By sharing best practices, resources, and lesson plans, educators can expand the implementation of nature-based pedagogies and outdoor learning opportunities across grade levels and subject areas (Vinces, 2021).
- iii. **Community Partnerships:** Schools can form partnerships with local environmental organizations, parks departments, nature centers, and conservation groups to access resources, expertise, and funding for green space initiatives (Stevenson *et al.*, 2020). Community partnerships can facilitate the development of outdoor learning spaces, nature trails, and environmental education programs that benefit students, teachers, and the broader community (Wheeler *et al.*, 2018).
- iv. **Public Awareness Campaigns:** Community members can raise awareness about the importance of green spaces for children's health, well-being, and academic success through public awareness campaigns, social media outreach, and community events. By sharing information about the benefits of nature, the value of outdoor play, and the need for equitable access to green spaces, advocates can mobilize support for policies and investments that prioritize nature in urban planning and school development (Hilger-Kolb *et al.*, 2019).
- v. **Policy Advocacy:** Parents, teachers, and community leaders can advocate for policies at the local, state, and national levels that support the preservation, enhancement, and equitable distribution of green spaces in urban areas and school environments. This may include advocating for funding for park development, green infrastructure projects, school garden programs, and environmental education initiatives that prioritize access to nature for all children, regardless of socioeconomic status or geographic location (Klawinski, 2022).
- vi. **School Gardens and Greening Projects:** Community members can volunteer their time and resources to support school garden programs, greening projects, and habitat restoration efforts that enhance green spaces on school campuses (Coyle, 2020). By engaging in hands-on activities such as planting trees, maintaining gardens, and organizing outdoor events, volunteers can contribute to the beautification and ecological sustainability of school environments while promoting environmental literacy and stewardship among students (Mnyagani, 2022).
- vii. **Youth Empowerment:** Empowering students to become environmental leaders and advocates for green spaces can inspire positive change in their schools and communities. Schools can establish environmental clubs, youth councils, and service-learning opportunities that enable students to take action on environmental issues, participate in advocacy campaigns, and lead initiatives to improve green spaces and promote sustainability (Davis & Elliott, 2023).

By engaging parents, teachers, students, and community members in advocacy efforts and collaborative partnerships, communities can work together to ensure that all children have access to safe, inclusive, and vibrant green spaces that support their health, well-being, and learning outcomes. Through collective action and commitment to environmental stewardship, communities can create a legacy of green spaces that enrich the lives of current and future generations.

10. Conclusion

Green spaces play a vital role in promoting the mental well-being of school children by offering a multifaceted approach to support their mental health. These natural environments provide various benefits such as relaxation, socialization, physical activity, and cognitive engagement, contributing to overall mental wellness. It is crucial for educators, policymakers, and urban planners to acknowledge the significance of green spaces and prioritize their integration into school environments and community planning initiatives. The relaxation provided by green spaces allows children to unwind and alleviate stress, reducing the risk of mental health issues. Additionally, green spaces serve as social hubs where children can interact, play, and build relationships with peers, fostering a sense of belonging and community. Engaging in outdoor activities promotes physical activity, which is essential for maintaining mental well-being and preventing conditions such as obesity and depression. Moreover, green spaces offer opportunities for exploration, creativity, and sensory stimulation, enhancing cognitive function and academic performance among school children. Moving forward, future research endeavors should continue to delve into the specific mechanisms that underlie the relationship between green spaces and mental health outcomes in children. Additionally, studies should aim to identify the most effective strategies for maximizing the benefits of nature-based interventions in educational settings. By recognizing the importance of green spaces and investing in their

development and maintenance, communities can create environments that nurture the mental well-being of school children, thereby contributing to healthier and happier communities as a whole.

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