

Children's Access to Urban Gardens in Norway, India and the United Kingdom

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ABSTRACT

Background: This study investigates access to gardens for children in Norway, India and the United Kingdom and their respective potentials for sustainability learning. The focus is set upon the significant variations concerning garden access within these three countries, within the specific context of urban gardening at a city scale. The article explores three case study cities: Stavanger, Norway; Mumbai, India; and Cardiff, UK. Previous research has shown that nature and garden experiences can provide play opportunities, skills and sensuous perceptions that may lead to the permanent retention of knowledge, and may awaken and unfold the child's interests.

Material and methods: Conceptualized in theories of situated learning and place-based learning, each researcher - native and/or living in Norway, UK and India, respectively - has gathered qualitative data and focused on the phenomena she found to be appropriate for the study of each respective city. The findings, based on literature studies and the author's own experiences and observations, are presented in form of narratives. A phenomenological and hermeneutical framework and critical inquiry is used to give relevance to the complex interrelations between the three researcher's different backgrounds and perspectives.

Results: The narratives elucidate rather different characteristics, practices, activities and values related to gardens in the three cities, where children interact in multiple ways with various kinds of garden spaces. Children are typically close to nature in Stavanger, while very small 'windowsills' characterize the many childhood interactions with gardens in Mumbai and in Cardiff, children may have access to both private and public gardens, depending upon their circumstances.

Conclusions: The three perspectives give inspirations for promoting children's ecology, sustainability, and intergenerational learning in urban garden spaces.

Keywords: children's access to gardens, environmental learning, education for sustainability, citizen science, intergenerational learning

INTRODUCTION

Gardens bring nature and culture together, and have been an important part of people's livelihoods across cultures. The English philosopher David Cooper (2006: p. 12) states:

"[everybody] possess the knowledge that enables us to [distinguish gardens] from those bits of the world that are not gardens. Gardens is a familiar term..."

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Conceptualized in place-based and situated learning, and by means of narratives, this study will present the characteristics, practices and values related to children and gardens in the cities of Stavanger (Norway) Mumbai (India) and Cardiff (United Kingdom), and investigate the potentials of the different kinds of garden spaces for children's interactions with their ecologies and for sustainability learning. Given that children's experiences and practices at home and within their day institutions are not entirely separate, this study considers formal, informal and non-formal practices. This study understands children as those below the age of eighteen years (UNCRC, 1989).

The Three Cities: Stavanger, Mumbai and Cardiff

While recognizing great variations within the three countries, the study focuses upon urban garden spaces in Stavanger, Mumbai and Cardiff. Stavanger is Norway's fourth biggest city with approximately 130,000 inhabitants. Historically, the industry of the region was based on fishery and shipping until the early 20th-century. Today, engineering is the main industry, mostly related to the offshore petroleum industry, established in the 1970s. Mumbai (formerly Bombay) is India's most-populous city, with one of the highest population densities on the planet (Vazhacharickal et al., 2013; UN, 2010). Many of the 22 million people are migrants, seeking the work opportunities of the city, and living on streets and in undocumented slums (World Population Review, 2018). Cardiff, the capital city of Wales in the United Kingdom, has a population of 346,000 (Office of National Statistics, 2012). The city grew exponentially throughout the early 20th-century, mainly due to the centrality of Cardiff docklands within the coal mining industry.

Garden-based Learning for Children - Contextual Background

Epicurus (341-270 BC) established the first school in a garden, and saw the interrelationship between gardens and physical and psychological well-being (Stokke, 2011). The idea of using the natural outdoors as an integral part of children's education was later formulated by Comenius (1592-1670), Rousseau (1712-1771), Pestalozzi (1746-1827), Froebel (1782-1852), and Gandhi (1869-1948). Gardens can provide play opportunities, skills and sensuous perception that may lead to the permanent retention of knowledge, and may awaken and unfold the child's interests (Subramaniam, 2002; Desmond et al., 2004; Polito, 1995: 225; Cole, 1990). Multiple research studies have shown a connection between early experiences in nature, and the development of interest, motivation, skills and competences later in school and in adult life (Aasen Grindheim, & Waters 2009; Clements, 2004; Fjørtoft, 2001).

Today, garden-based learning is associated with innumerable (international) programs, activities, and research, in both formal, as well as informal education (Desmond et al., 2004), and has been related to science education and early childhood education for sustainability (Bell et al., 2009; Hedefalk et al., 2015). Yet, in some parts of the world, gardens are attributed with negative connotations, including child labour, which limits access to play, education and free development. Today, the ideas of naturalistic and environmental education, nutritional awareness and agricultural literacy, have found a new context in the garden (Subramaniam, 2002). To this end, Blair (2009: 17) states:

"Gardens ground children in growth and decay, predator-prey relations, pollination, carbon cycles, soil morphology, and microbial life: the simple and the complex simultaneously. ... Gardens are intensely local..."

Conceptual Framework

Sociocultural learning theories explain that practical activities and social contexts are essential to promoting learning processes for young children (Lave & Wenger, 1991; Rogoff, 2003; Vygotsky, 1986), including learning for sustainability transitions (Barth & Michelsen, 2013). 'Situated learning theory' underlines the idea of apprenticeship that includes authentic, formal or informal and often unintended contextual learning in social contexts whereby meaningful relationships between people and place are sought, while making connections to their prior knowledge (Lave & Wenger, 1991, p. 31). Garden spaces do offer authentic and complex learning spaces that challenge children to think critically and appeal to visual, kinesthetic, sensual and creative learning in formal and informal settings (Blair, 2009).

Place-based learning introduces children and young people to the skills and dispositions needed to understand local phenomena and the processes that underlie the health of natural and social systems essential to human welfare (Grunewald & Smith, 2008, p. xvi). Place-based education acknowledges the unique

characteristics of particular places, and can in this way better connect learning to children's and young people's lives (Smith, 2005).

METHODOLOGY AND METHODS

This is a qualitative study within a phenomenological and hermeneutical framework (Cole et al., 2015; Cresswell & Poth, 2017; Ödman, 2007; Yin, 2003). Phenomenology is a multi-dimensional term that describes how researchers through reflection can bring insight to the structure of their research experience and analysis (Cole et al., 2015: 153). Within a hermeneutical process, we always have a preunderstanding rooted in our complex and potentially distorted experiences and points of view, which influences our understanding and interpretation (Cole et al., 2015: 153; Grønmo, 2004: 236, 373; Ödman, 2007: 26, 102).

The three researchers were native and/or live in Norway, the UK and India, respectively, and found each other through their common interest in children and gardens. With the aim to elucidate the characteristics, practices, activities and values related to gardens and alternative garden spaces, accessible to children in the three cities, the following research questions were chosen: 1.) What kind of garden spaces – especially 'alternate spaces' are available to children in the three cities? And; 2.) What is the potential these spaces hold in terms of offering environmental learning opportunities and promote sustainable living? Private and public gardens were taken as the focus of the study, while school gardens are not considered, given the plethora of contemporary studies that consider this context.

As a theoretical framework for the study, critical inquiry was used, as this method gives relevance to and consideration of context related to critical thinking (Boylan, 2009). Critical inquiry is a dialectical process involving the comparative weighing of a variety of positions and arguments, while argumentation is seen as a way of arriving at reasoned judgements on complex issues (Battersby & Bailin, 2011). In line with the guidelines of Battersby and Bailin (2011) and Cresswell and Poth (2017: 59), the three authors had initial research conversations around the issue. These conversations revealed complex interrelations between the three researcher's different backgrounds and their perspectives. Therefore, each researcher has gathered data and focused on the phenomena she found to be most appropriate for the study of each respective city, based on literature studies and the author's own experiences and observations. In an attempt to include the author's reflective interpretations, and the reconstructions of their main arguments through analyses of their data, the findings are presented in form of narratives (Chase, 2013). These narratives cannot provide complete pictures. They are selective approaches to give a composite description of the investigated phenomena (Cresswell & Poth, 2017: 62). The narratives are also parts of the entire interpretive process, which reveals what is significant about the various available garden spaces and their potentials for offering children opportunities for sustainable learning and living. In adopting a critical inquiry stance, the research sought to understand the cultural, historical, social and educational contexts in which the three perspectives are embedded, with the awareness of the three researcher's own beliefs and biases (Battersby & Bailin, 2011; Cresswell & Poth, 2017).

Stavanger, Norway: Plentiful Nature Spaces - Untapped Potentials for Children's Access to Gardens

Norway has a mainly rural population, and as such, the people of Norway may associate gardening with agriculture and farm life (Francis & Hill, 1989). Especially in the northern regions of the country, aesthetic gardening, for instance, planting flower beds, is not a longstanding tradition in Norway, which can be attributed to the short length of the growing season. In Norway, outdoor education is an established tradition (Fjørtoft, 2001; Sageidet, 2016), illustrated by the existence of over 450 outdoor kindergartens (Lysklett, 2013). Yet, a recent survey showed that children's time spent outdoors has decreased (Skår et al., 2014). Undisturbed nature spaces are still close to most of Stavanger's inhabitants, even if the distances to such areas are growing due to urbanization since the development of the oil industry.

The central city park of Stavanger surrounds a small lake. Outside of the city center, a bigger park surrounds the Mosvatnet lake (covering 0.46 square kilometers). This park is used by surrounding schools for physical education. Another park around the Store Stokkavatnet lake (which covers 2,19 square kilometers) supplies facilities like canoeing, swimming, and outdoor arrangements for children. The Bjergsted park, north of Stavanger Old Town, is often used for festivals and concerts. Stavanger also has a recreation area around the Ullandhaug communication tower, placed at the highest peak of the Stavanger region (138 m.a.s.l.). It has been covered by heathland, pastures and moorland for hundred years ago. Between 1910 and 1970, the area

was planted with trees by children through annual school projects. The Ullandhaug area includes an ecological farm, through which a public foundation supplies various activities for different target groups in the school, health, and social sector (Stokke, 2011). It also includes the Stavanger Botanic garden, established in 1978. In the south-eastern part of Norway, which includes Stavanger, the wild flora and also traditional plants are under threat due to increased urbanization (Henriksen & Hilmo, 2015).

In 2002, Stavanger became a “green children’s city” according to the government’s ‘green’ city concept (established in 1996). Within green cities, kindergartens can become ‘green kindergartens’, when they work on projects focused upon sustainable development and environmental protection as part of everyday life. Gardening in kindergartens and schools is a rather slow upcoming trend in Norway (Haavie, 2013). Sageidet, Davis and Christensen (forthcoming) interviewed 20 five-year-old kindergarten children from Stavanger about their understandings of sustainability related issues. Only thirteen of these participants were aware of their kindergarten’s gardens. Two of the children reported that they had no access to a residential garden. All but one of the children said that they liked to be in a garden.

Many Norwegian families have traditionally produces their own food like fruits and berries in their home gardens. This is no longer common, but Stavanger has four community gardens. ‘Alternate spaces’ used for gardening would include the garden division into one to four square metres, which people can buy in the eastern urban old part of the city. These ‘neighborhood gardens’ were established in 2015 by a non-profit limited company of ground owners, which also is promoting large-scale collaboration with the public in this part of the city (Bjørno, 2011).

What is the potential of Stavanger’s garden spaces in terms of offering learning opportunities and promote sustainable living?

Most children in Stavanger have access to various and extensive, natural and more urban areas and gardens that provide plenty of possibilities for exploring. Children can get acquainted with local and foreign species through walking in the city, the public gardens, and the surrounding landscapes. They may also learn about unsustainable foreign species that disturb the natural local biodiversity (Gederaas, Moen, Skjelseth, & Larsen 2012). Most of Stavanger’s kindergartens and schools have at least occasional collaborations with the public offers of garden related activities and events. According to Sageidet (2016), sixty present of Norwegian kindergarten teachers had an interest in gardening, but only a quarter of them initiated garden activities with their children in the kindergarten.

Mumbai, India: ‘Alternate Garden Spaces’: Children’s Access to Gardens in Highly Urbanised Mega-cities

In 2005, over 90% of the children in India were attending a school, but this equated to only 54.5% of the children in the slums of Delhi. Free and compulsory basic education for children aged 6-14 years became a legislated fundamental right in 2009, thereby increasing school enrolments and reducing drop outs (Tsujita, 2009). However basic education is still lacking for many children, and research in educational disparities is very limited (Govinda & Sedwal, 2017).

In rapidly growing mega-cities, open spaces or garden spaces where children can play and romp freely are often scarce and not accessible to most children. While the WHO recommends an open space ratio of 12.5% of the entire space needed for each individual, Mumbai has only 0.003% open parks and play areas per inhabitant (Godbole, 1998). Only 10 of Mumbai’s 30 square kilometres of open space are accessible to the people. This equates to only 0.88 square meters per person, and is one of the lowest open space ratios for a major urban city in the world (Indiak, 2012).

Space is all the more limited for the approximately 62% of Mumbai’s population who live in slums, with houses often being one room structures shared by entire families. Mumbai does, however, have some innovative and exciting opportunities to experience natural surroundings and gardens. For example, the Sanjay Gandhi National Forest, which consists of 103 square kilometers of forested land in the suburbs. This was originally a forest lying on the outskirts that has slowly shifted to being a central part of Mumbai today. There have been major conflicts between wildlife and humans in this forest, in particular the leopard population has often resorted to attacking the humans living there, when faced with encroachment of its natural habitat. Another example is the Maharashtra Nature Park (MNP), which is a large open natural park right in the centre of Dharavi, one of the world’s biggest slums. The park is built on land reclaimed from the largest garbage dumps in the city. It offers a home to many native plants, mammals, reptiles and birds.



Figure 1. A young person sitting on the windowsill to tend to the ‘window sill’ garden in Mumbai

However, it is not open to the public, nor unstructured play opportunities available, rather activities are limited to structured educational tours for schools or organized groups. The MNP is closed after 4pm and this is when the park belongs to nature, as mentioned by the director ‘it’s their place and they take over’. This offers a novel, more than human approach to managing natural woodlands and gardens where nature is not commoditized, but what kind of nature experiences are available for children on an everyday basis?

What is the potential of Mumbai garden spaces in terms of offering learning opportunities and promote sustainable living?

What opportunities for children are afforded in these constricted built-up concrete jungles for to ‘touch’ and get connected with nature? This questions stem from my own life experiences growing up in Mumbai. A series of photographs was taken during one of my trips back to Mumbai in recent times. **Figure 1** shows a person climbing over the windowsill, hanging quite precariously on the ledge to tend to the ‘window sill garden’. A deeper analysis of the photograph offers insight into the following three things:

1. Many of the plants appear to be herbs, medicinal plants. Having a firsthand understanding of the native flora, I can, with some authority, conclude that this garden is more of a ‘utility’ garden rather than a ‘show’ or ‘admire’ garden. The person in the photograph seems to attach value to the benefits arising from these plants.
2. There appeared to be a ritual to the way this person was tending to the garden – in a systematic and regular fashion.
3. Most of the materials used in this garden were recycled – from old buckets and paint pots acting as planters to old plastic bottles being utilized instead of watering cans.

The next two photographs (**Figure 2**) depict another kind of ‘on the sewer’ garden – this one being next to an open flowing sewer. A closer analysis of these photographs offers insight into the following three things:

1. Places like ‘sewers’ could still hold opportunities to be developed as green spaces and gardens.
2. These places then have the power to negate the filth and stench that emanates from these sewers – at least for the people engaged in the gardening process.
3. These places therefore hold a potential for ‘escape’ from the everyday cluttered homes and lives.



Figure 2. An “on the sewer” garden in Mumbai



Figure 3. A “roadside garden” in Mumbai

The final photographs (Figure 3) are of a ‘roadside’ garden – it has been created on the sliver of space available just outside the hutment on a busy road.

Another closer look at this garden highlights the following:

1. The plants grown here, too, point towards a utility aspect rather than having a show garden, cultivated for medicinal or nutrition purposes.
2. The risk in taking care of these plants given that they were on the side of a really busy road.
3. For creating this garden, again recycled materials from the household were used like buckets, sticks and canisters.

Based on people’s situation of living in these parts of Mumbai, we can associate these pictures with learning related to social engagement of whole families. Parents and grandparents would be the initial cultivators of these gardens. The potential of these ‘alternate’ garden spaces hold for children and young people is clearly immense, but still unexplored. For many poor urban households, home gardens are a crucial day-to-day survival strategy. Yet, there is little research on home gardening in India (Raj et al. 2017). Such home gardens need continuous management and care, which, in most cases, is done by woman. Some slums have community-based or non-governmental organized child-care services that provide health, nutrition and non-formal education for pre-school aged children (Tsujita, 2009).

Mediated Nature Encounters - A Narrative from Cardiff, UK

City gardens and parks within the United Kingdom often have more in common with “encapsulated countryside” (Goode, 2014), composed of ancient woodlands, hills, marshes, meadows and heathland, than they do with a traditional town or city-scape. Gardens and their counterparts in the UK hold an important place within the natural imaginary, and have done since at least the Victorian era, when botanic gardens, glasshouses, public gardens and squares and even small bell jars displayed in town houses, showcased “botanical wonders” from around the globe, drawing the large numbers of people living in towns and cities to these spaces (Mabey, 2015: p. 23). Within the present day, every city and town within the UK has benefited from this legacy, with gardens, parks, squares become increasingly significant spaces that “provide links with nature within the town environment” (Goode, 2014: p. 158), in the face of accelerated urbanism. These spaces vary from Victorian municipal parks, established during the industrial revolution for the health and wellbeing of the public, to formal gardens first established within fashionable residential districts in the 18th-century, to private gardens, which are “by far the most extensive of any single category of urban land use”, where in some towns “they cover up to 50%” of the urban area, while 87% of UK households have domestic gardens (Goode, 2014: p. 175).

The city of Cardiff is considered a particularly green city by UK Standards and private gardens make up 25% of the urban area (Goode, 2014: p. 175). Alike to the rest of the UK, such gardens are larger for older homes, whereas houses built within the past 30 years often possess far smaller gardens (Goode, 2014). More suburban areas in the North of the city tend to have large gardens, while apartment blocks surrounding the cities traditional Docklands have significantly smaller gardens and in many cases, they are non-existent. Within such spaces, green space initiatives have evolved (see, for instance, <http://www.cardiff.ac.uk/community-gateway>), allotments and an associated farmers market.

In terms of access to public green space, there are currently 58 formal parks in the city. Aligned with many cities in the UK, open space, including green and blue space are increasingly valued in terms of their multiple social and ecological benefits. Another instance of informal environmental learning within the city of Cardiff includes foraging activities that are organised by individuals and not-for-profit groups. For example, “wildfood foraging workshops” occur across the city (see: <http://www.wildfooduk.com/foraging-trips/cardiff/>), while “farm Cardiff” (eggseeds.com/) maps coincidental underused area of the cityscape that could be used for food growing.

Local councils and local environmental groups have somewhat recognized the need for interconnections between the human and the non-human world as actions on the environmental crisis (Latour, 2013), and attempts have been made to move away from city parks and gardens functioning as spaces that merely showcase the more spectacular features of the natural world, towards providing increasingly diverse habitats for a wider range of species. This includes the creation of hay meadows, wetlands and native woodlands (Goode, 2014). Such spaces have been used by educationists for many purposes, including as field studies for nearby schools, as was the case for Battersea Park in the 1980s (Goode, 2014). Botanic gardens within the UK have recently begun to develop outreach learning programs that increase the visibility of the links between young people’s everyday lives and plant ecology, as part of sustainability education (Dunkley, 2016). Nevertheless, the educational potential for domestic gardens and so called ‘edgeland’ spaces (Farley & Roberts, 2012), such as canals and grass verges, in terms of environmental education requires further exploration.

Potential garden spaces in Cardiff - offering environmental learning opportunities through citizen science

Garden ecology has largely been “ignored by ecologists” (Goode, 2014: p. 176), and its potentials for environmental learning have been under addressed. Environmental citizen science, which involves the collection of scientific data, offers a methodology by which to engage large numbers of people within a closer observation of residential ecosystems (Cooper, Dickinson, Phillips, & Bonney, 2007). The benefits of citizen science in terms of environmental learning are increasingly acknowledged (Oberhauser & LeBuhn, 2012; Paige et al., 2015; Vitone et al., 2016; Wals et al., 2014). To demonstrate the potentiality of citizen science as a means of engaging children with gardens through processes of social learning, this section focuses upon a bee-monitoring citizen science initiative, known as Spot-a-Bee (<http://spotabee.buzz/>), run by academics at the *Cardiff University*. The project was developed by the School of Pharmacy and the Sustainable Places Research Institute, both at Cardiff University and built upon existing research within the School of Pharmacy, which examined the food sources of bees in rural areas, leading to the discovery of a honey with particularly beneficial microbial properties. Less is currently known about the food sources of urban bees, this citizen science project

therefore aimed to gain an insight into the flowering plants within people's gardens and surroundings that bees were feeding off. The project used crowd-sourcing of bee-feeding images to identify popular plants for bees during the spring and summer months. These images were then uploaded by participants to an online portal and from these results a map of city bee sightings is created for all participants to view (<http://spotabee.buzz/results>).

Beyond the scientific insights that this citizen science project enables, there are also opportunities in terms of social learning (cf. Barth & Michelsen, 2013; Dickinson et al., 2012; Lave & Wenger, 1991; Vygotsky, 1986). Spot-a-bee stimulates close-encounters between children, their families and their gardens or nearby green spaces, as such it enables ecological learning to occur within a context that ensures that learning is grounded within the everyday situated existence of these individuals. Moreover, in focusing in upon the minutia of bee-plant interactions within nearby green spaces, children gain a knowledge of pollination processes, a key factor within global food security, which enables the acquisition of a knowledge that can be transferred into other learning contexts, at different life stages. The social component of the learning experience is also extended by the process of needing to identify the plants that the bee is feeding off, as well as the bee itself, a process that involves fielding responses from peers, adults, social media and the academics who run the *Spot-a-bee* website. Though insights into the effects of participation upon children from the perspective of young people and their parents are yet to be gathered, it is argued here that citizen science initiatives that attempt to enhance the visibility of connections between the human and natural for the young people growing-up within urban environments thus constitutes a means by which to sensitise children and their families to the ecology of the gardens that surround them.

DISCUSSION

The presented narratives show significant variations concerning children's garden access and urban gardening in Stavanger, Mumbai, and Cardiff. In Stavanger, which is rather representative for Norway, nature is not far from anywhere, and outdoor recreation and education are established traditions, while parks have only become valued for recreation since more recent times. In the city of Cardiff, there are a range of both public and private garden spaces that are available for children's use, which is largely a legacy of industrialization processes, through which the importance of access to green space was highlighted. While education for all is taken for granted in Norway and UK, in India, about 17% of children aged 5 to 14 are out of school. Children's access to gardens and green spaces in cities has globally decreased (Markevych et al., 2014), but there is arguably no shortage of gardens and affinity spaces in the rather small cities of Cardiff and Stavanger. In spite of some outdoor opportunities in two huge parks, the availability of green spaces for children is very scarce in Mumbai, especially for the majority that live in slums and/or in very small housings. For these children, informal learning independent on school or community efforts may be crucial, and their access to gardens is strongly dependent of their families' access to gardens and their families regard to alternative garden spaces like 'window sill' gardens, 'on the sewer' gardens, and 'roadside' gardens. The children may experience meaning, creativity and learning opportunities when their families use these gardens for food production (Ruby et al., 2007). According to Keatinge et al. (2012), home gardening can give an important contribution to attain the Millennium Development Goals or the newly formed Sustainable Development Goals to overcome global undernutrition, and to improve health (United Nations, 2015). The production and consumption of locally grown food has been an important part of urban sustainability. Ecologically and socially just urban environments are dependent on the ability of economically marginalized urban populations to produce, access and consume healthy and cultural appropriate foods (Agyeman & Simons, 2012: 85). Such home gardens can be adapted to culturally specific diets, and can give children knowledge passed through generations, both about ecological and medicinal properties of plants and of their own culture.

Domestic gardens are very common in UK, including in Cardiff (Goode, 2014) and also rather common in Norway and Stavanger. Formal educational efforts like green space initiatives in Cardiff and community gardens in Stavanger provide activities related to food growing and foraging that have been neglected during recent decades. This is in line with a more recent awareness of both local environments, gardening, and place (Gruenewald & Smith, 2008, p. xxi). In this respect, we should be better aware of the learning potential of home gardens for children in mega-cities like Mumbai. Community or non-governmentally organized centers could support families and/ or mothers and children with garden related knowledge and offer opportunities for sharing this through organized groups. This kind of learning in engaging groups, could inspire both adults and children to expand their interest to garden ecology and to develop a holistic view of the natural

environment and foreground the deep learning opportunities their 'windowsill' gardens provide. For every child in the world it is meaningful to learn about interrelations between gardening, plant species, food production, health and culture.

Today's children lack experience with natural ecosystem complexity, and television, video games and organized sports have replaced environmental explorations (Blair, 2009; Moore, 1995). Like rural children, city children also search out the natural elements in their surroundings, for example dirt, trees, and water, but urban sprawl and environmental degradation reduce the frequency of these city children's positive experiences with natural elements in their environment (Blair, 2009).

In face of rapid global urbanization with more than 50% of the human population living in urban environments since 2008 (Cohen, 2006; UNFPA, 2007), nature related experiences for a majority of the world's children and youth will consequently occur in cities, and it will be important not to give them the impression that their urban surroundings are unnatural or "separated from the otherwise integrated functioning of the planet" (Tidball & Krasny, 2010). In Norway, the dominating rural population is rather proud of their living close to nature, and they consider their own lifestyles as more sustainable than that of the urban population, even if Light (2003) and Cohen (2006) have demonstrated that densely populated human communities are probably more environmentally sustainable than non-densely populated human communities, if all other conditions are equal. Nevertheless, Stavanger, Cardiff and Mumbai are places where economic wealth is accumulating, and the dynamic between traditional and emerging economic, environmental and social conditions may make people and also children vulnerable (Dooling & Simon, 2012). The Mumbai garden pictures show the potential of tiny garden spaces to enable a child to regularly seek an escape from everyday life. Children all over the world seem to appreciate such garden spaces to 'escape' and to get repeated sensory contact and interaction with a particular intimately known space that provides confidence in the process of nature that some researchers believe is necessary for healthy human development (Blair, 2009; Stokke, 2011; Thorp & Townsend, 2001. p. 349).

Thorp and Townsend (2001) argue that gardens have the power to reverse the continuing processes for children like loss of time, loss of control and loss of place in their lives. Children can experience that "a plot of earth cannot be segmented, fragmented, or disconnected [...] In the garden children experience comfort, security, belonging, pleasure, and wonder associated with our experience of a living cosmos" (Thorp and Townsend (2001: 357). The Norwegian people's traditional and rather normative view on what they consider to be 'real' nature, and real nature affordances for children, is reflected in the numerous nature kindergartens. Even if there are opportunities for garden related activities like ecological farm gardening, tree planting or garden basins in kindergartens, in addition to a special recognitions of sustainability in the Norwegian kindergarten curriculum (Ministry of Education and Research, 2017), there is an untapped potential to develop children's access to gardens, for example by intensifying children's active participation in the use of kindergarten's own garden basins, or by encouraging schools, after school activity groups and families to make better use of the botanical garden, the community gardens or the 'neighborhood' gardens.

Cardiff has perhaps come closer to an acknowledgement of urban surroundings as un-separated part of our natural planet, and has promoted learning programs to connect children's everyday lives and garden ecology (Dunkley, 2016; Goode, 2014). An increasing number of cities in the UK, and also worldwide, have started with strategies for raising awareness about biodiversity and the public understanding of science. This 'citizen science' movement underlines the importance of gardens to produce cumulative positive impacts on biodiversity (Goddard, Dougill, & Benton 2009). In all the three countries, industry and population and city growth have threatened the native wild flora and also traditional domestic plants. In Cardiff, they have built upon the traditional concept of 'encapsulated countryside' (Goode, 2014), and there is a focus on providing diverse habitats for various species and on giving children access to these places and to related learning opportunities. In Stavanger, similar efforts related to botanical gardens and community gardens give children formal place-based and situated learning opportunities. In Mumbai, only some children have occasional access to the species diversity of the city's two parks. The alternative green and garden spaces that actually are accessible for most children, needs to be acknowledged by formal or informal educators. They should try to give children an understanding that these local green spaces are parts of green space networks that contribute to the conversation of biodiversity in the urban landscape at a higher spatial scale (Goddard, Dougill, & Benton, 2009). The plants or other species of these places may not be native, but these immigrant flora and fauna are as locally adapted as the children themselves (Blair, 2009). Even if many children in Mumbai or other mega-cities do not have access to formal learning about values and ecology of such green spaces, their informal experiences with alternative garden spaces like 'window sill', 'sewer', and 'roadside' gardens, may

connect them with nature within the town environment (Goode, 2014: p. 158). Through personal interactions with those garden spaces, actually available to children in their own cultural and natural settings, they can get insights into ecological, economic and social interrelationships (Subramaniam, 2002).

Even if children in Cardiff and Stavanger may get a better theoretical understanding through the formal learning of scientific terms or scientific methods (categorization, counting, mapping etc.), the children in Mumbai may probably better understand the essential meaning of interdependency and interrelations, or for example of reuse or recycling of materials. The potential for environmental, science and garden learning in families or other informal or non-school settings is often underestimated, and it is necessary, not to adopt purely academic learning goals (Bell et al., 2009). Among other outcomes, children may come to generate, understand, remember and use concepts, explanations, arguments and facts related to science, even if adult caregivers play a critical role in supporting their learning (Bell et al., 2009).

Citizen science education, as it is realized in Cardiff, or outdoor learning as practiced in Stavanger, also engage groups of children and adults in social and place-based learning situations, but they may provide a stronger potential for participation in scientific activities, for using scientific language and tools, and for developing each child's identity as someone who knows about, uses, and sometimes contributes to science (Bell et al., 2009: 4; Cooper et al., 2007; Light, 2003; Wals et al., 2014). Even though children may not entirely understand the scientific, environmental and sustainability related ideas behind the use of (alternative) garden spaces, they can gain benefit from their participation together with peers and adults (Lave & Wenger, 1991, Vygotsky, 1986).

As the narratives of this study may give insight and inspire researchers and educators, children might gain similar inspirations and insights by hearing from the lifeworld of peers in other cities or countries. They may also become curious about these other children's garden spaces and how those were used. They may acquire awareness of subjective contexts and world views, including their own (Bennett, 2009). Metacognitive learning in general and garden learning in particular, offer learning strategies that may help children to improve their learning motivations and capacities, and their retention of knowledge (Desmond et al., 2004; Ruby et al., 2007; Stokke 2011; Subramaniam, 2002). By learning about and appreciating places, children begin to understand and to question and they may develop a readiness for social action, and, with the appropriate adult guidance, they may develop the skills needed for democratic participation (Gruenewald & Smith, 2008). In this connection, intercultural learning may even contribute to the prevention of school dropout of mega-city children, if schools, community-based or non-governmental centers would place a focus upon it (Tsujita, 2009). Such intercultural learning through metacognitive perspectives may give all city children a basis for understanding the interrelationships between garden spaces in the local environment and the earth as a global environmental system, and between their family or peer group and the world family or global citizenship (cf. www.earthcharter.org; Corcoran, 2004; Johansson, 2009; Pope Francis, 2015; Sund & Öhman, 2011; UNESCO, 2012). A utopian idea would be to give children access to each other's (alternative) garden spaces, through providing opportunities for direct digital exchange, where children could give each other practical garden advices or discuss species, local soils, or food growing, for example, by personal e-mails to each other.

CONCLUSION

Gardens are associated with differing practices in Stavanger, Mumbai and Cardiff. While children in Stavanger have access to large gardens and nature near spaces, in Mumbai, a majority of children's access is restricted to alternative garden spaces that appear to be very small, for example, at the 'windowsill' scale, while in Cardiff, the numerous city gardens are both traditionally and multiply used, with a focus on giving children access.

Even very small alternative garden spaces in India have a potential for urban home-garden food production, acknowledging health, cultural specificity and a sustainable living. They can give children knowledge on plant species and ecological interrelationships through intergenerational learning. Citizen science projects, such as that as demonstrated through the case of Cardiff, and outdoor learning, such as those occurring in Stavanger, have a stronger potential for academic learning and using scientific language and tools. The specific garden spaces in all of the three cities provide place-based learning situations, which have the potential to enhance conceptual understanding related to science, environment, nature, culture, and society, and for a sustainable living. The comparison of these three perspectives may offer mutual inspiration

for the role of gardens in promoting learning, and may contribute with sharing of learning opportunities that will be valid in a global scenario for education for sustainability.

To develop children's access to gardens, and the educational potential of garden activities, may contribute to the promotion of children's attention, respect and care for both their home place and other places (Gruenewald & Smith 2008). Children's learning about sustainability related issues should include insights into their peer's living conditions. Narratives and individual histories may, in this respect, be easier to understand than, for example, pure factual knowledge, especially for small children, and may promote children's interest to a closer learning inquiry into global interrelationships in general, and gardens and sustainability issues in particular. Further research is needed to explore what various (alternative) garden spaces actually mean to children, and what kind of learning actually may happen in these places, for example by means of action research or interviews with children.

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REFERENCES

- Aasen, W., Grindheim, L. T., & Waters, J. (2009). The outdoor environment as a site for children's participation, meaning-making and democratic learning: Examples from Norwegian kindergartens. *Education 3-13: International Journal of Primary, Elementary and Early years education*, 37(1), 5–13.
- Agyeman, J., & Simons, B.L. (2012). Re-imagining the Local: Scale, Race, Culture, and the Production of Food Vulnerabilities. Chapter 5. In S. Dooling & G. Simon (eds.), *Cities, nature and development. The politics and production of urban vulnerabilities*. Taylor and Francis, pp. 85-100.
- Barth, M., & Michelsen, G., (2013). Learning for change: an educational contribution to sustainability science. *Sustainability Science*, 8(1), 103-119. <https://doi.org/10.1007/s11625-012-0181-5>
- Battersby, M., & Bailin, S. (2011). Critical Inquiry: Considering the context. *Argumentation*, 25, 243-253. <https://doi.org/10.1007/s10503-011-9205-z>
- Bell, P., Lewenstein, B., Shouse, A. W., & Feder, M. A. (eds.) (2009). *Learning Science in Informal Environments – People, Places and Pursuits*. Washington: The National Academies Press, 348 p.
- Bjørno, L. (2011). *The concept of urban scale area efficiency, with a case study of Urban Sjøfront, Stavanger, Norway* (Master thesis), University of Stavanger, <http://hdl.handle.net/11250/182039>
- Blair, D. (2009). The Child in the Garden. An Evaluative Review of the Benefits of School Gardening. *The Journal of Environmental Education*, 40(2), 15-38. <https://doi.org/10.3200/JOEE.40.2.15-38>
- Boylan, M. (2009). *Critical inquiry: the process of argument*. Westview: Perseus, 224 p.
- Chase, S. E. (2013). Narrative inquiry: still a field in the making. Kapittel 2. In N.K. Denzin & Y.S. Lincoln (eds.), *Collecting and Interpreting Qualitative Materials*. Fourth Edition. SAGE publications, 656 p.
- Clements, R. (2004). An Investigation of the status of outdoor play. *Contemporary Issues in Early Childhood* 5(1), 68-80. <https://doi.org/10.2304/ciec.2004.5.1.10>
- Cohen, B. (2006). Urbanizing in developing countries: Current trends, future projections, and key challenges for sustainability. *Technology in Society*, 28(2006), 63-80. <https://doi.org/10.1016/j.techsoc.2005.10.005>

- Cole, C., Couch, O., Chase, S., & Clark, M. (2015). Hermeneutic Exploration, Analysis and Authority: Phenomenology of Researcher's Emotions and Organizational Trust. In Vincent Cassar & Frank Bezzina (eds.), *ECRM2015-Proceedings of the 14th European Conference on Research Methods for Business and Management studies 2015*, pp. 153-159. Reading: Academic Conferences and Publishing International Limited.
- Cole, E. S. (1990). An experience in Froebel's garden. *Childhood education*, 67, 18-21. <https://doi.org/10.1080/00094056.1990.10521569>
- Cooper, C., Dickinson, J., Phillips, T., & Bonney, R. (2007). Citizen science as a tool for conservation in residential ecosystems. *Ecology and Society*, 12(2), 1-11. <https://doi.org/10.5751/ES-02197-120211>
- Creswell, J. W., & Poth, C. N. (2017). *Qualitative Inquiry and Research Design: Choosing Among Five Approaches*. Fourth Edition. SAGE publications, Inc., 488 p.
- Desmond, D., Grieshop, J., & Subramaniam, A. (2004). *Revisiting garden-based learning in basic education*. Roma, Paris: FAO (Food and Agriculture Organization of the United Nations) and UNESCO International Institute for Educational Planning, 88 p.
- Dickinson, J. L., Shirk, J., Bonter, D., Bonney, R., Crain, R. L., Martin, J., Phillips, T., & Purcell, K. (2012). The current state of citizen science as a tool for ecological research and public engagement. *Frontiers in Ecology and the Environment*, 10(6), 291-297. <https://doi.org/10.1890/110236>
- Dooling, S., & Simon, G. (2012). Cities, Nature and Development: The Politics and Productions of urban vulnerabilities. Chapter 1. In S. Dooling & G. Simon (eds.), *Cities, nature and development. The politics and production of urban vulnerabilities*. Taylor and Francis, pp. 3-22.
- Farley, P., & Roberts, M. S. (2012). *Edgelands: journeys into England's true wilderness*. London: Random House.
- Fjørtoft, I. (2001). The natural environment as a playground for children: the impact of outdoor play activities in pre-primary school children. *Early Childhood Education Journal*, 29(2), 111-117. <https://doi.org/10.1023/A:1012576913074>
- Francis, M., & Hill, M. (1989). *Hager i hjerte og sinn – hva hager betyr for Nordmen*. Working papers from Rogaland University Center 104, Stavanger, 76 p.
- Gederaas, L., Moen, T. L., Skjelseth, S., & Larsen, L.-K. (eds.) (2012). *Fremmede arter i Norge – med norsk svarteliste*, Trondheim: Artsdatabanken.
- Godbole, N. (1998). Public open spaces and growth: Bombay/Mumbai. In H. Dandekar (ed.), *City, Space+ Globalization: An International Perspective: Proceedings of an International Symposium, February 26-28, 1998*, College of Architecture and Urban Planning, University of Michigan, p. 54-56.
- Goddard, M. A., Dougill, A. J., & Benton, T. G. (2009). Scaling up from gardens: biodiversity conservation in urban environments. *Trends in Ecology and Evolution*, 25(2), 90-98. <https://doi.org/10.1016/j.tree.2009.07.016>
- Goode, D. (2014). *Nature in towns and cities*. London: Harper Collins.
- Govinda, R., & Sedwal, M. (eds.). (2017). *India Education Report*, New Delhi: Oxford University Press.
- Grønmo, S. (2004). *Samfunnsvitenskapelige metoder*. Fagbokforlaget. 452 p.
- Gruenewald, D. A., & Smith, G. A. (eds.) (2008). *Place-based education in the Global Age – Local Diversity*. New York: Routledge, 377 p.
- Haavie, S. (2013). Skolehagen – visjoner og realiteter. *Plan*, 45(2), 22-26.
- Hedefalk, M., Almquist, J., & Östman, L. (2015). Education for sustainable development in early childhood education: a review of the research literature. *Environmental Education Research*, 21(7), 975-990. <https://doi.org/10.1080/13504622.2014.971716>
- Henriksen, S., & Hilmo, O. (2015). *Norwegian Red List of Species 2015 – methods and results*. Norwegian Biodiversity Information Centre, Norway.
- Indiaink. (2012). In Mumbai open spaces are rare, and rarely open. *The New York Times*. Retrieved on Jan 15, 2018 from <https://india.blogs.nytimes.com/2012/09/03/in-mumbai-open-spaces-are-rare-and-rarely-open/>
- Keatinge, J. D. H., Chadha, M. L., Hughes, J. d'A., Easdown, W. J., Holmer, R. J., Tenkouano, A., ... Lin, L. J. (2012). Vegetable gardens and their impact on the attainment of the Millennium Development Goals. *Biological Agriculture & Horticulture*, 28(2), 71-85. <https://doi.org/10.1080/01448765.2012.681344>
- Latour, B. (2013). *An inquiry into modes of existence*. Harvard University Press.

- Lave, J., & Wenger, E. (1991). *Situated learning: Legitimate peripheral participation*. Cambridge, England: Cambridge University Press, 138 p. <https://doi.org/10.1017/CBO9780511815355>
- Light, A. (2003). Urban Ecological Citizenship. *Journal of Social Philosophy*, 34(1), 44-63. <https://doi.org/10.1111/1467-9833.00164>
- Lysklett, O. B. (2013). *Ute hele uka*. Universitetsforlaget, 208 p.
- Mabey, R. (2015). *The Cabaret of Plants: Botany and the Imagination*. London: Profile Books.
- Markevych, I., Tiesler, C. M. T., Fuertes, E., Romanos, M., Dadvand, P., Nieuwenhuijsen, M. J., ... Heinrich, J. (2014). Access to urban green green spaces and behavioural problems in children: Results from the GINIplus and LISApplus studies. *Environment International*, 71, 29-35. <https://doi.org/10.1016/j.envint.2014.06.002>
- Moore, R. (1995). Growing foods for growing minds: Integrating gardening and nutrition education into the total curriculum. *Children's Environments*, 12(2), 134-142.
- Oberhauser, K., & LeBuhn, G. (2012). Insects and plants: engaging undergraduates in authentic research through citizen science. *Frontiers in Ecology and the Environment*, 10(6), 318-320. <https://doi.org/10.1890/110274>
- Ödman, P.-J. (2007). *Tolkning, förståelse, vetande – Hermeneutikk i teori og praksis*. Norstedts Akademiska Förlag, 254 p.
- Office of National Statistics. (2012). Census shows population of Wales is more than three million, Retrieved on 21 September 2017 from <http://webarchive.nationalarchives.gov.uk/20160108124934/http://www.ons.gov.uk/ons/rel/mro/news-release/census-shows-population-of-wales-is-more-than-three-million/censuswalesnr0712.html>
- Pope Francis (2015). *Laudato Si – On care of our common home. Encyclical letter*. Roma: Vatican Press. http://w2.vatican.va/content/francesco/en/encyclicals/documents/papa-francesco_20150524_enciclica-laudato-si.html
- Paige, K., Hattam, R., & Daniels, C. B. (2015). Two models for implementing Citizen Science projects in middle school. *The Journal of Educational Enquiry*, 14(2), 4-17.
- Polito, T. (1995). Frederick Froebel's illuminations on kindergarten children's relatedness to nature. *Education*, 116(2), 223-228.
- Raj, R., King, E. D. I. O., Raghini, B., Siddick, S. A., Gurumoorthy, V., & Kaleeswari, G. (2017). India: Reviving and strengthening women's position and agency in ensuring household food security – the role of home gardens. Chapter 8. In A.J. Fletcher & W. Kubik (eds.), *Women in agriculture worldwide – key issues and practical approaches*. Routledge.
- Rogoff, B. (2003). *The cultural nature of human development*. New York: Oxford University Press.
- Ruby, M., Kenner, C., Jessel, J., Gregory, E., & Arju, T. (2007). Gardening with grandparents: an early engagement with the science curriculum. *Early Years*, 27(2), 131-144. <https://doi.org/10.1080/09575140701425266>
- Sageidet, B. M. (2016). Norwegian early childhood teachers' stated use of subject related activities with children, and their focus on science, technology, environmental issues and sustainability, *NORDINA*, 12(2), 1-139. <https://doi.org/10.5617/nordina.955>
- Sageidet, B. M., Christensen, M., & Davis, J. M. (in preparation). Norwegian kindergarten children's understandings of sustainability related issues in comparison to their peers' understandings in Australia.
- Skår, M., Gundersen, V., Bischoff, A., Follo, G. Pareliussen, I., Stordahl, G., & Tordsson, B. (2014). *Barn og natur*. Nasjonal spørreundersøkelse om barn og natur. *Temahefte*, 54. 21 p.
- Smith, G. A. (2005). Place-based education: learning to be where you are. *Phi Delta Kappan*, 83(8), 584-594. <https://doi.org/10.1177/003172170208300806>
- Stokke, F.-H. (2011). *Grønn omsorg - Om effekten ved bruk av natur, hage og dyr i terapeutisk sammenheng*. En kunnskapsoversikt gjennom en litteraturstudie. Master theses. Department of health studies, Faculty of social sciences, University of Stavanger, 62 p.
- Subramaniam, A. (2002). *Garden-based learning in basic education: A historical review*. (Center for youth development) MONOGRAPH, Davis: University of California, p. 1-11. <http://4h.ucanr.edu/files/1229.pdf>

- Sund, L., & Öhman, J. (2011). Cosmopolitan perspectives on education and sustainable development. Between universal ideals and particular values. *Utbildning & Demokrati*, 20(1), 13-34.
- Thorp, L., & Townsend, C. (2001, December, 12). Agricultural education in an elementary school: An ethnographic study of a school garden. *Proceedings of the 28th Annual National Agricultural Research Conference in New Orleans, LA*, pp. 347-360. <http://www.ea.gr/ep/organic/academic%20biblio/Agricultural%20Education%20in%20an%20Elementary%20School.pdf>
- Tidball, K.G. & Krasny, M.E. (2010). Urban Environmental Education From a Social-Ecological Perspective: Conceptual Framework for Civic Ecology Education. *Cities and the Environment*, 3(1), article 11. <http://escholarship.bc.edu/cate/vol3/iss1/11> 20 p.
- Tsujita, Y. (2009). *Deprivation of education: A study of slum children in Delhi, India*. Background paper prepared for the education for all global monitoring report 2010. UNESCO. <http://unesdoc.unesco.org/images/0018/001865/186592e.pdf>
- UN. (2010). *World Urbanization Prospects – The 2009 Revision*. United Nations (UN), New York, USA.
- UNCRC. (1989). United Nations General Assembly 44, resolution 25, November, 20th, 1989. Convention on the Right of the Child. Resolution 44/25. Retrieved on July 26nd, 2017 from <http://www.ohchr.org/Documents/ProfessionalInterest/crc.pdf>
- UNFPA. (2007). *State of the World Population 2007: Unleashing the Potential of Urban Growth, United Nations Population Fund*. Retrieved from <https://www.unfpa.org/publications/state-world-population-2007>
- United Nations (UN). (2015). *Transforming our world: the 2030 Agenda for sustainable development*. New York: United Nations.
- Vazhacharickal, P. J., Predotova, M., Chandrasekharam, D., Bhowmik, S., & Buerkert, A. (2013). Urban and peri-urban agricultural production along railway tracks: a case study from the Mumbai Metropolitan Region. *Journal of Agricultural and Rural Development in the Tropics and Subtropics*, 114(2), 145-157.
- Vitone, T., Stofer, K. A., Steininger, M. S., Hulcr, J., Dunn, R., & Lucky, A. (2016). School of ants goes to college: integrating citizen science into the general education classroom increases engagement with science. *Journal of Science Communication*, 15(01), 1-24.
- Vygotsky, L. S. (1986). *Thought and Language*. Cambridge, MA: Harvard University Press.
- Wals, A. E., Brody, M., Dillon, J., & Stevenson, R. B. (2014). Convergence between science and environmental education. *Science*, 344(6184), 583-584. <https://doi.org/10.1177/003172170208300806>
- World Population Review. (2018). Retrived on 15 Jan, 2018 from <http://worldpopulationreview.com/world-cities/mumbai-population/>
- Yin, R. K. (2003). *Case study research: Design and methods* (3rd ed.). Thousand Oaks, CA: Sage.

