Tampere University of Applied Sciences

Connecting International Schools to Nature.

Case Study: Dubai Private Schools

Charlotte Dawson

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ABSTRACT

Tampereen ammattikorkeakoulu
Tampere University of Applied Sciences
Master's Degree in Business Administration
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DAWSON CHARLOTTE:
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The purpose of this study was to explore the positive outcomes of children's connection to nature (CTN), in addition to the reasons why children were not frequently connecting to nature, and how current challenges could be overcome. Research questions aimed to develop a view of best practice and set out recommendations for schools. The researcher's role was to collate information from related studies, educators and environmental organisations in order to develop an accurate and holistic view.

Relevant theory and research were critically synthesised and analysed in order to develop a view of CTN in context. This review considered the background of Dubai, the urgency need for CTN, the contribution towards child and health, innovative approaches to CTN and opportunities in schools.

Data was collected using a mixed method approach. Questionnaires collected information from 50 participants and examined the benefits of encouraging a connection to nature in children, whether educators were aware of these impacts and also, which challenges prevented facilitation in their setting. Following this, three interviews explored the current barriers to nature connectedness and the strategies which different organisations successfully put in place to overcome them. The researcher simultaneously undertook action research, whilst working within a Dubai private school as a teacher-observer. Current practice and procedure was observed within this setting and linked to findings from other sources. Action research embedded theoretical findings in a school context.

Findings indicated 32 different reasons for encouraging a nature connection in children. The most common was to meet children's physical and developmental needs, followed closely by encouraging an appreciation of nature. Nine key barriers to were identified. The most common results were related to curriculum pressure and teacher attitude and capability. A total of seven barriers were linked to preventing children's connection to nature; parent expectations, teacher confidence, resources, curriculum, leadership attitudes, teacher autonomy and policy. Recommendations for schools suggested strategies for overcoming the barriers of parent expectations, teacher confidence, resources and curriculum.

Key words: nature, children, middle east, future, education

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CONTENTS

ABBREVIATIONS AND TERMS

CTN	Connection to Nature
CPD	Continuing Professional Development
CSR	Corporate Social Responsibility
ECA	Extra Curricular Activities
ERB	Environmentally Responsible Behaviour
KHDA	Knowledge and Human Development Authority
MMR	Mixed Methods Research
MLT	Middle Leadership Team
MoE	Ministry of Education
OFSTED	Office for Standards in Education
SLT	Senior Leadership Team

1 INTRODUCTION

Connection to Nature (CTN) is a relatively new concept, when compared to the common themes of the past century, which has gathered interest on an international scale over recent years. It can be said that there has only become an interest in understanding this area of holistic development over the past decade (O'Donnell et al., 2016). Considering the evidence base for CTN is still in its early stages, it is said that there are already many assessment tools that measure CTN or similar concepts (Richardson et al., 2019; Mayer & Frantz, 2004).

Existing research has explored areas such as; the association between local environmental types and CTN (Luck, Davidson, Boxall, & Smallbone, 2011), the relationship between CTN and happiness (Capaldi, Dopko & Zelenski, 2014), CTN similarities in urban and rural youths (Klassen, 2010), the impact of CTN on psychological resilience (Ingulli & Lindbloom 2013), the relationship between CTN and energy consumption levels (Frantz & Mayer, 2014; Sparks, Hinds, Curnock & Pavey, 2014) and contributing factors which cause individuals to develop a CTN (Gifford & Nilsson, 2014). There is however, a clear need for future research to explore CTN in children, as young people become less familiar with natural environments and as environmental awareness becomes necessary to feature in school curricula.

Private schools in the United Arab Emirates have seen many changes over the past two decades, although attitudes towards natural environments have only been assessed since the most recent inspection framework (Ministry of Education, 2017a). This is an observation of concern due to the correspondence between children's CTN, their own developmental needs and that of future conservation efforts. Partnerships between schools and environmental organisations, such as The National Trust, Severn Rivers Trust and RSPCA in the U.K., can facilitate the development of students which, in turn, encourages a lifelong CTN.

CTN can be enhanced through regular outdoor exposure in education settings such as Forest Schools. A typical session involves connecting learners to natural areas, as well as to their own needs and those of other people; 'The woodland space is a blank canvas, full of textures and materials to enrich the senses and

stimulate the learning journeys that we will all undertake' (Forest Schools, 2019). Common good practice in Finland enables students to enjoy the benefits of nature responsibly, by means of holistic development, whilst increasing understanding of environmental issues (Sahlberg, Robinson, Ravitch & Hargreaves, 2015)

To achieve the eventual aim of facilitating CTN in Dubai schools, the research questions in this thesis primarily focused on setting out a view of best practice and recommendations for schools. Questions specifically targeted the areas of; exploring the benefits of CTN, current challenges to enabling CTN and how these could be overcome.

This study was structured by justifying the need for developing CTN in Dubai schools. Literature related to the impact of CTN was then critically discussed, providing a background for the issue in context. Methodology was explained in detail and justified; a mixed methods approach has been adopted for the purpose of this study, which included gathering data by both quantitative and qualitative means. Appropriate data analysis approaches were used, as explained below, depending on the acquisition method.

Quantitative data, acquired via an online questionnaire, used coding to identify common themes amongst respondents. Questions were asked of educators in order to explore perceived benefits and challenges to achieving CTN in their own settings. Three targeted interviews collected qualitative data and interviewees were selected based on their successful experiences of enabling CTN. Interviews took a semi-structured format in order to be guided by individual responses and analysed using coding. Alongside questionnaires and interviews, action research was also carried out simultaneously in a Dubai private school. This ensured that findings were deeply rooted in context. Analysis of the action research narrative relied upon grounded theory.

Empirical research findings were then presented. These were synthesised and a discussion text linked similar themes to that of related studies. Finally, conclusions were drawn in the form of practical recommendations for schools.

2 THEORETICAL FRAMEWORK

> On land and in the sea, our fore-fathers lived and survived in this environment. They were able to do so because they recognised the need to conserve it, to take from it only what they needed to live, and to preserve it for succeeding generations.
>
> Sheikh Zayed bin Sultan Al Nahyan (Bustani, 2013)

2.1. Background of Dubai

The United Arab Emirates is located on the Arabian gulf, in the middle eastern region. The country is well reputed for its achievements in modern architectural innovation and rich Bedouin heritage. Natural environments include; deserts, wadis, oases, marine coastal areas, mangroves and rocky mountains. Temperatures often exceed that of the human body and humidity averages over 90% and rainfall in Dubai only occurs infrequently over the course of a year.

Dubai is the most densely inhabited city in the UAE, with a current population of 3,355,900 in addition to an estimated 1,196,000 temporary residents, comprising of tourists and commuters (Dubai Statistics Center, 2019). As seen in FIGURE 1, the city's largest population density takes up residence along the luxury Marina area. However, due to the success of the city's booming economy, residential communities expand further towards the desert landscape each year.

FIGURE 1. Distribution of Population by Communities (Dubai Statistics Center, 2019a).

As a result of the rapid infrastructural growth of Dubai, since the country's establishment in 1971, it has been found that there continues to be a rudimentary knowledge of biological ecosystems (Gardner & Howarth, 2009). This oversimplified view of nature is common amongst the nation's large expatriate community. Traffic and noise pollution are the only environmental concerns widely noted as being caused by human activity (Clack, 2018). This bares the consequences of many expatriates not considering the damage which the development of artificial islands, marinas and residential areas are continuing to cause, simply claiming that there are no native species to Dubai.

Degradation of marine habitats through pollution and dredging, and the relocation of hares, corals and mature ghaf trees using inappropriate techniques, has been the cause of many wildlife fatalities (Daniel, 2017; Gardner & Howarth, 2009). Loses such as these contribute to the global number of species on Earth being reduced by a rate 1,000 to 10,000 times higher than in pre-human times (Kellert & Wilson, 2013, p.36)

2.2. Urgency of CTN

Without large scale change, the destruction of Dubai's natural environments is assured. The positive impact on cognition and health will be irrelevant if humans continue to display a lack of care for the nature around us (Louv, 2012). 'Our ignorance could be regarded as just one more blank space on the map of academic science, awaiting genius and initiative, except for one important circumstance: the natural environment is disappearing' (Kellert & Wilson, 2013, p.35).

Globally, there are growing concerns regarding a diminished relationship with the non-human life that surrounds us (Louv, 2012). Evidence shows that 21st century complaints repeat sentiments of this disconnect, through phrases such as; "There wasn't time," "It was too hot," "There are too many bugs," or "My parents don't like sand" (Johnson, 2013, p.4). Alarmingly, adults in positions of influence, such as teachers, may also express a disconnection to the natural world, exhibiting a lack of confidence, experience, and knowledge of the outdoors (ibid.). This 'loss of desire to interact with the natural world, resulting in a decreased appreciation for the diversity of life-forms that support human survival, has been cited as a

potential factor contributing to environmental destruction and the rapid rate of species extinction' (Rogers, 2019).

Research consistently shows a relationship between CTN and self-reported environmentally responsible behaviour such as respect, humility and empathy towards nature and also a more conservative approach to energy consumption (O'Donnell et al., 2016; Alansari & Tannock, 2015; Frantz & Mayer, 2014; Bixler et al., 2002). In order to increase empathy and understanding, it also is suggested that construction project developers should not only be required to fund research into biodiversity issues, but also undertake sponsorship of environmental awareness and education campaigns as part of CSR activities (Gardner & Howarth, 2009).

Modern lifestyles require a transformative framework to reconnect humans to nature and it should be recognised that this relationship has always played a key role in our species survival (Louv, 2012). It is believed that it is essential to learn from traditional societies, such as those in which people lived in diverse, wild environments, in order to rekindle a CTN (Nelson, as cited in Kellert & Wilson, 2013). The Bedouin culture has thrived in the Arabian Gulf for centuries, proving that exposure to such temperatures can be tolerated with the possession of appropriate tools, materials and understanding, such as those seen in FIGURE 2 & 3.

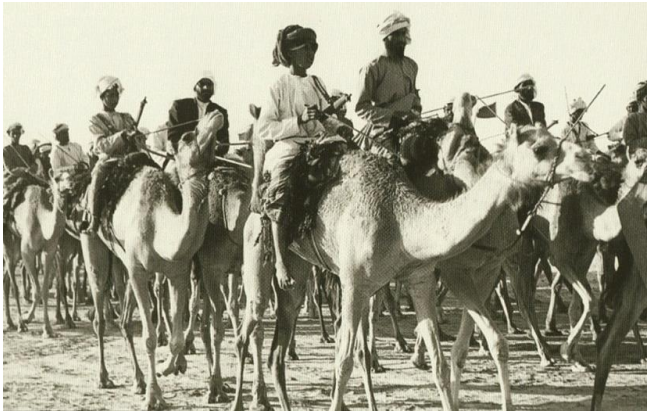

FIGURE 2. A camel caravan ambles through Dubai (Sheikh Mohammed Centre for Cultural Understanding, as cited in McQueeney, 2012).

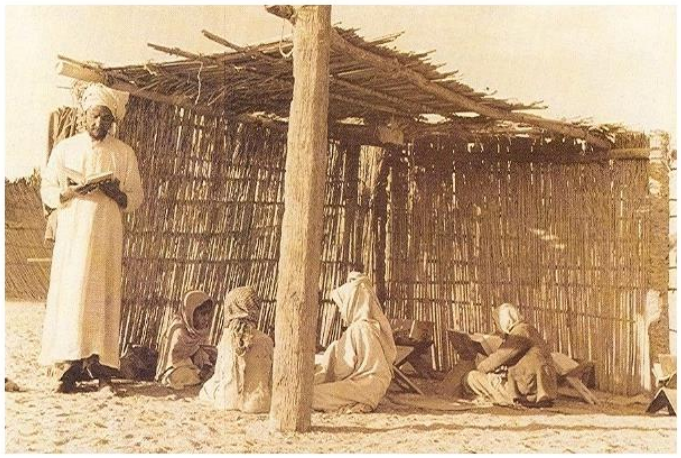

FIGURE 3. A school on Fujairah Beach in 1950 (Juma al Majid Center for Culture and Heritage, as cited in UAE History, 2020).

In the summer, this nomadic civilisation understood how to survive an extreme climate; ‘the back wall of the tent is raised to relieve the heat by allowing the air to circulate. During the winter dirt is thrown back onto the edges of the back and sides that touch the ground, in order to prevent the penetration of water from the hard rains, to keep the cold air out, and to conserve heat’ (Jabbūr, Jabbūr & Conrad, 1995, p.254).

Consistently high temperatures have been suggested as one of the key reasons for children not connecting to nature in this region (Alansari & Tannock, 2015). Although, ancient strategies can be adhered to in order to overcome this challenge, such as; shading the head from sun, wearing loosely-fitted clothing, avoiding exposure during peak sun, building shelters in areas that catch cool winds, remaining hydrated and drinking hot beverages such as coffee to trigger a cooling sweat response (Platinum Heritage, 2013).

A study based in Saudi Arabia found that cultural perspectives regarding the protection of children from low-level risks was an additional barrier to CTN (Alansari & Tannock, 2015). Methods of challenging this issue include; sending home information that introduces the benefits of outdoor activities, holding parent sessions to show why outdoor activities are important and sharing examples from other countries (ibid.). Additional to this could be inviting parents to participate in some active sessions, gaining first-hand experience of how nature can positively

impact their children and finding out where nature can be explored and appreciated as a family.

2.3. Contribution towards child development

The important role which CTN plays, in regards to holistic child development, has been recognised for many years. Holistic development refers to the healthy development of the whole child and takes into consideration; spiritual life, curiosity, imagination, and sense of wonder (Wilson, 2018). Recent studies also concur that natural environments support children's cognitive development (Yuniastuti & Hasibuan, 2019).

The definition of spirituality varies between individuals and can occur when a person feels a sense of unity with others and the world; 'being able to gain a sense of being connected to nature, are important in children's growth and learning' (Adams Woolley & Hyde, 2008, p.116). CTN supports spirituality in children by enabling them to 'gain a sense of being part of something greater than themselves, and can provide insights that affect the ways in which they believe resources and the environment should be treated' (ibid., p.116). Crain (1997) supports this view by suggesting that nature instils a sense of peace along with the feeling of unity.

Similarly, Friedrich Fröbel placed great value on walking through natural locations and these became an essential feature of his educational theory. He believed that in this setting, children would find the true nature of all things and that this formed the basis for their understanding of themselves, revealing their evolving place in the world (Liebschner, 1992; Best, 2016).

The Steiner model of education concurs with this intuitive connection to nature, which helps children feel at home in the world (Richards, 1980). Reggio-Emilia goals also include CTN related aims in developing; 'a respectful relationship between children and nature, encouraging children to feel safe and comfortable in wild places and empowering children through knowledge about ways to protect the natural world' (Omidvar, Wright, Beazley & Seguin, 2019, p.8).

Possibilities for exploration and igniting curiosity have also been highlighted as important reasons for CTN. This is due to the vast amounts of purposeful knowledge children can acquire in a short period of time and also the opportunity to lead their own learning. One analysis found four categories which children chose to explore: ‘nature recreation (playing in nature); observing and studying natural creatures; collecting and making a display of ecological elements (e.g., flowers, acorns, sticks, stones and salamanders) and small-scale cultivation’. (Omidvar et al., 2019, p.9). These findings concur with Froebel’s third great principle; that learning succeeds when approached with an inquisitive mind that engages the world of nature and the senses (Liebschner, 1992).

A recent study found that being outdoors presented a range of learning opportunities, including improving the quality of children and educator’s relationships, (Blanchet-Cohen & Elliot, 2011). It has also been suggested that natural environments support children’s development of interpersonal skills (Yuniastuti & Hasibuan, 2019). These area of development could be facilitated though activities in a Forest Schools context, which nurture children’s sense of collaboration as well as their appreciation for, and connection to, nature (Forest Schools, 2019).

It has been argued that nature awakens observation and creativity skills (Crain, 1997). This idea is supported by the idea that children’s knowledge and skills are the sum of their lived experiences (Alansari & Tannock, 2015). Activities which require an element of imagination, such as writing and painting, first require concrete experiences on which to build creative scenarios; a child who has never experienced the peace and tranquillity of a desert is not likely to know how to begin describing this setting.

In regards to personal development, character education is contemporary term for learning which ‘nurtures and promotes the ethical, intellectual, social and emotional development of individuals. It is a continuous learning process that enables young people and adults to become moral, caring, critical, responsible individuals’ (SOuL, 2020). Forest Schools (2019) aim to target children’s needs in this area though utilising natural, outdoor areas so that children can ‘embrace challenge from a young age, as this leads to the blossoming of character, resilience

and empathy, and for a greater sense of connection, with nature and for our shared future' (Forest Schools, 2019).

2.4. Impact on child health

Maria Montessori advocated that 'immersion in nature is imperative for proper physical and psychological development' (Johnson, 2013, p.4). A recent study supported this view, concluding that frequent exposure to nature can also mean a decrease in; salivary cortisol, cardiovascular mortality, hypertension, asthma, coronary heart disease, HDL cholesterol, type II diabetes and incidence of stroke (Twohig-Bennett & Jones, 2018).

Evidence suggests that CTN contributes to children's health in many ways, with the city-dwelling population, such as those in Dubai, reaping the greatest potential gains from spending longer in nature (Cox, Shanahan, Hudson, Fuller & Gaston, 2018; O'Donnell et al., 2016). This contrasts with research into outdoor air quality in the United Arab Emirates. One study found that participants consistently ranked outdoor and indoor air pollution as the largest health concern locally (Willis et al., 2010). Supporting this, it has been claimed that outdoor air pollution causes the majority of avoidable deaths in the country, as seen in FIGURE 4.

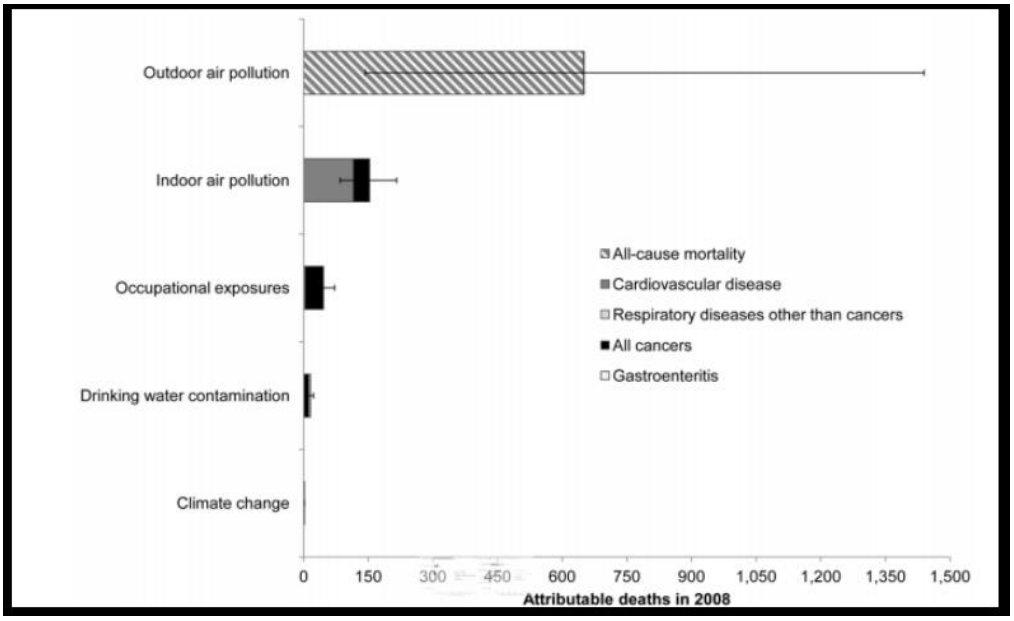

FIGURE 4. Causes of avoidable deaths (Jacqueline et al., 2013, p.7)

Poor outdoor air quality was found to cause approximately 7% of the total deaths occurring in the UAE in 2007 (Li et al., 2010). Cohen et al. (2004, as cited in Li et al., 2010, p.5792) contextualises this, estimating that; 'outdoor air pollution accounts for approximately 1.4% of total mortality in urban areas worldwide'. A percentage difference of 5.6% demands that the impact of poor air quality on local health must be investigated further.

These findings form a bleak view of CTN in the United Arab Emirates. Nevertheless, they should be analysed critically and in a way that considers all related issues. Human factors which may affect the mortality percentage difference between the United Arab Emirates and the global average include; a vast majority of the population being healthy enough to work with an unemployment rate of only 2.35% in 2019 (Plecher, 2020), an exceptionally low annual death rate of around 2,728 in Dubai compared to approximately 48,000 in London (DHA in Dubai Statistics Center, 2019b; Caul, 2020), a continuously changing infrastructure leading to increased sand disturbance, little regulation on motor engine pollution as featured in other parts of the world and densely populated residential areas which require large roads, therefore leading to an increase in traffic fumes.

The natural landscape may also impact the outdoor particle matter (PM) content in Dubai. This is due to the desert environment being substantially influenced by dust storms, which could contribute to background levels being considerably higher than those found in other locations (Yeatts et al., 2012; Li et al., 2010). Additionally, given the absence of rain in desert regions, many fauna species are unable to survive the hot summer months. This lack of air-filtering plants could contribute to poor air quality. It could also lead to increased circulation of sand and dust particles, due to the absence of natural shelter in combination with changeable wind and weather conditions (Yeatts et al., 2012; Li et al., 2010).

Weather also has beneficial impacts on children's health in this region, as conditions related to vitamin D deficiency can be avoided though exposure to sunlight (Al Anouti et al., 2011). This is a particular concern during the summer months in the United Arab Emirates, when daily temperatures reach an annual peak and people spend a limited amount of time outdoors. Studies have found that vitamin

D levels have a strong correlation with that of physical activity. The lower an individual's activity levels are; the less time they are likely to spend outdoors (Ahern et al., 2014). Spending time in natural environments provides an open space and opportunities for exercise, therefore building psychomotor skills which could result in lifelong healthy habits (Yuniastuti & Hasibuan, 2019).

In regards to lifelong heath, a review of studies suggests that there is evidence of associations between CTN and psychological wellbeing in factors such as; life satisfaction, happiness indicators, stress recovery, reduced levels of cognitive anxiety, general sense of well-being, resilience and social cohesion (Twohig-Bennett & Jones, 2018; O'Donnell et al., 2016; Cox et al., 2018; Ingulli & Lindbloom, 2013). The relationship between developing a CTN and Dubai children's mental health should not be overlooked and the impact on their happiness should be made explicit.

2.5. Innovative approaches to CTN

In Dubai, schools are able to follow the UAE ministry curriculum, International Baccalaureate, or that of a chosen country such as the UK or India. Currently, government schools are held accountable to the Ministry of Education whilst private institutions are inspected by the KHDA. During school visits, inspection bodies follow a rigorous framework, with a commitment to high standards at its core (Ministry of Education, 2017a).

UAE schools offer social studies and moral education, regardless of curricula. These new statutory subjects aim to give students a more holistic educational experience, taking into account the culture and heritage of the UAE. In the subject of moral education, students learn about the importance of nature conservation in the topic 'Preserving the Cultural and Natural Heritage' (Ministry of Education, 2017b). The Ministry of Education explain that social studies aims to; 'increase students' awareness about earth and the extent of its connection with human interactions, to reach an understanding of mutual relationships between human societies and the surrounding physical environment' (Ministry of Education, 2017c). The UAE government recognises the importance of both national and

expatriate residents learning about global environmental issues, such as climate change, and the need to preserve natural resources as much as possible.

CTN is encouraged by the current School Inspection Framework, which stipulates that in outstanding schools; ‘Some [students] initiate and many others take part in schemes that contribute effectively to sustainability and conservation in the local and wider world environment’ (Ministry of Education, 2017a, p.45). The National Environmental Education & Awareness Strategy supports this view by including ‘Educate youth to drive the UAE towards a sustainable future’ in their strategic objectives (Ministry of Environment and Water, 2015 p1). In order to achieve this, they aim to encourage private schools to formally integrate environmental education into their curriculum. It is recommended that the initial step towards facilitating exposure to nature in schools is through a discussion of its characteristics, objectives, and potential experiences (Plummer, 2009).

The School Inspection Framework places a high value on innovation, emphasising that it is sparked by a curiosity for learning, risk-taking and confidence in testing assumptions. Innovative teaching and leadership stems from asking questions and challenging the status quo. It is also based on seeking opportunities and looking towards the future. There is now a focus on innovation during school inspections, exploring the school’s vision and how innovation is interpreted; ‘Inspectors will seek to understand how it is defined, designed and expressed in the school’. (Ministry of Education, 2017a, p.12).

Speaking at the Finnish Education Expo Middle East in 2020, Ambassador of Finland to the UAE, H.E. Marianne Nissilä, stated that; 'United Arab Emirates and Dubai are really at the heart of innovation for education' (personal communication, February 24, 2020). Nissilä specifies that 'learning through play, having enough time for the natural curiosity of the child to blossom, understanding the different needs of each child, having enough place and possibilities for physical activity and unsupervised play, as well as rest and a safe environment’ are the vital elements which help children in their first steps of learning, building the basis for their continued education (personal communication, February 24, 2020).

Amongst the many personal and social aspects which have an impact on pro-environmental behaviour ‘childhood experience, knowledge and education’ are considered as highly influential (Gifford & Nilsson, 2014 p2). Nabhan & Trimble (1994) expresses the hope that teachers may be the most suitable adults to support CTN, though the facilitation of regular nature experiences. Therefore, teachers should be encouraged to commit weekly sessions to spending time outdoors, as studies have found mixed evidence as to whether short-term, structured environmental programs for children do actually lead to an increase in CTN (O’Donnell et al., 2016).

One Dubai-based study blamed a ‘rigidity in school structures and scheduling’ for teachers being reluctant to facilitate informal learning opportunities, such as those taking place outdoors (Baker, 2012). Nissilä advocates that 'flexible curriculum, competent teachers as well as trust in the school leadership and teachers' are essential components of quality education. This is in addition to ‘phenomenon based learning’ and the ‘changing role of technology in learning’ (personal communication, February 24, 2020).

Other reasons which prevent nature-based learning include a perceived difficulty in measuring progress and attainment, unlike the traditional, predictable didactic model of delivering academic subjects, which is still overwhelmingly common in schools. This may contribute to time in natural settings being seen as secondary to real learning (Baker, 2012).

However, studies have found that simply being in natural environments can enable an individual's CTN (Bixler et al., 2002) meaning that all which may be necessary is a change in physical location, leadership mind-set or teachers’ pedagogical technique. In agreement with this, Nissilä states that it is; 'key for any teacher to try out and use new and innovative research-based pedagogies, involving parents and other stakeholders, and making sure that everyone at school has a voice’ (personal communication, February 24, 2020). Through an appreciation of future skills and the need to prepare students to succeed as adults, it may be suggested that traditional classroom contexts are reconsidered to incorporate amongst other elements, an opportunity for CTN.

2.6. Opportunities for CTN in Dubai schools

Many would agree that the most effective means of developing a CTN is to spend time in natural environments. However, in areas of extreme climates and outdoor pollution, such as the middle-eastern region, alternative opportunities should be sought in order to engage children's CTN. Under the right circumstances 'The benefits do not even require direct contact with nature: they can be experienced from the passive viewing of posters and slides, as well as window views' (Heerwagen & Orians, as cited in Kellert & Wilson, 2013, p.166).

A separation from the natural world can occur due to a majority of time being spent enclosed in sterile spaces, including schools, which are largely still based on design decisions embedded in a 19th century context (Bates, 2015). This is particularly relevant for those residing in developed countries, such as the United Arab Emirates (Rogers, 2019). As an artificially developed landscape; the attributes of the physical environment have implications for human behaviour that are not adequately understood or utilized by designers and environmental planners' (Heerwagen & Orians, as cited in Kellert & Wilson, 2013, p.168)

In cities such as Dubai, CTN could be enhanced through a concept known as biophillic design. Biophillic design is a concept based on the term 'biophilia', which can be defined as 'the innate tendency to focus on life and lifelike processes' (Wilson, 1984, p1). An example of biophillic design inspired by the desert landscape can be seen in FIGURE 5.

FIGURE 5. An example of Biophillic Design in Saudi Arabia (De51gn, 2020).

The relationship between the middle east and biophillic design is an exciting possibility waiting to be realised. Merieau states; '"I think there is a great opportunity for us to design more meaningful spaces with better awareness," he says, adding that biophilia also means staying true to the location and the context' (Merieau, as cited in Parida, 2018). This would suggest that more architectural designs should be planned in recognition of natural surroundings and location. The X-Architects team concur with the need for adapting to the Arabian landscape, explaining that; 'We go to the desert to become one with nature, experience solitude and ponder about creation' (X-Architects, as cited in De51gn, 2020).

Totten further justifies the principles of biophillic design, stating that-

> When you utilize biophilic design principals in the built environment, you're fostering a strong sense of connection, sense of order and sense of safety. Thinking about Maslow's hierarchy of needs, if you don't feel safe, you're not able to aspire to higher levels of wellbeing. Biophilia allows us to feel safe, supported and present. With these needs met, we can therefore more easily aspire to the higher levels of wellbeing, happiness and achievement
>
> Totten, as cited in Casamassima, 2020.

Biophillic design could enable schools to not only be energy efficient, but also work with increased human energy (Louv, 2012). In educational settings, spaces increased rates of learning 20-25%, improved test results, concentration levels and attendance, and reduced the impacts of ADHD (Oliver Heath Design, 2019). It has been claimed that benefits such as these arise due to the engagement of our senses, which disconnects the brain's autopilot and brings the mind into the present moment (Casamassima, 2020).

Elements which are non-rhythmic but moving, such as water and mobiles can prompt an awareness of the passage of time, supporting a sense of place (ibid.). Celebrating movement and instilling a sense of place are additional recommended features of biophillic design. Evoking a state of 'curiosity, mystery and exploration' are not only aesthetically pleasing (Casamassima, 2020), but are also vital components of learning. In line with this, it is claimed that nature-related

activities can enable CTN in children (Omidvar et al., 2019). Examples of the types of natural objects used in interactive displays are shown in FIGURE 6.

FIGURE 6. Natural Materials (Omidvar et al., 2019, p.14)

Fostering an engaging and sensory experience is also suggested by ‘introducing regional physical elements that encourage us to pause, shift out of autopilot, and visually appreciate the material in that present moment. Examples include local wood grains; carpet of varying pile heights which reflects local natural patterns; exposed brick textures; wall-mounted acoustical tiles and natural fibers reflecting regional textures’ (Casamassima, 2020), such as those seen in FIGURE 7.

FIGURE 7. Regional landscape colours (Ambiente blog team, 2020).

Integrating an ecosystem of diverse space types to support evolving needs including focus, collaboration, learning and socialization is proposed in order to apply the concept of biophillic design to schools (ibid.). Designing for evolutionary human needs of ‘Prospect and Refuge’ provide security and comfort by integrating a range of open and closed spaces. This is in addition to opportunities for observing natural light throughout the day, supporting wellbeing by aligning circadian rhythms (ibid.; Casamassima, 2020; Heerwagen & Orians, as cited in Kellert & Wilson, 2013). A locally-inspired example of these qualities can be seen in FIGURE 8.

FIGURE 8. A Bedouin inspired space which could support learners’ evolving needs (Pinterest, n.d).

3 METHODOLOGY

This chapter will explain the methodological approach behind my research. A methodology is a guiding strategy which includes both methods and philosophical positioning (McChesney & Aldridge, 2019).

3.1. Methodological approach

There are several ways in which researchers go about assessing CTN. This study has been conducted using a MMR approach, which focuses on collecting, analysing and mixing both quantitative and qualitative data (Cohen, Manion, & Morrison, 2017; McChesney & Aldridge, 2019). Quantitative and qualitative approaches, in combination, give a more accurate picture of CTN, as opposed to either approach on its own. It can be said that mixed method approaches provide a better understanding due to the avoidance of shortcomings inherent in entirely qualitative or quantitative approaches (McChesney & Aldridge, 2019).

The explanatory model in particular is conducive to forming a quantitative data 'foundation', on which to build a model of best practice. The explanatory mixed design has been adopted, as shown in FIGURE 9.

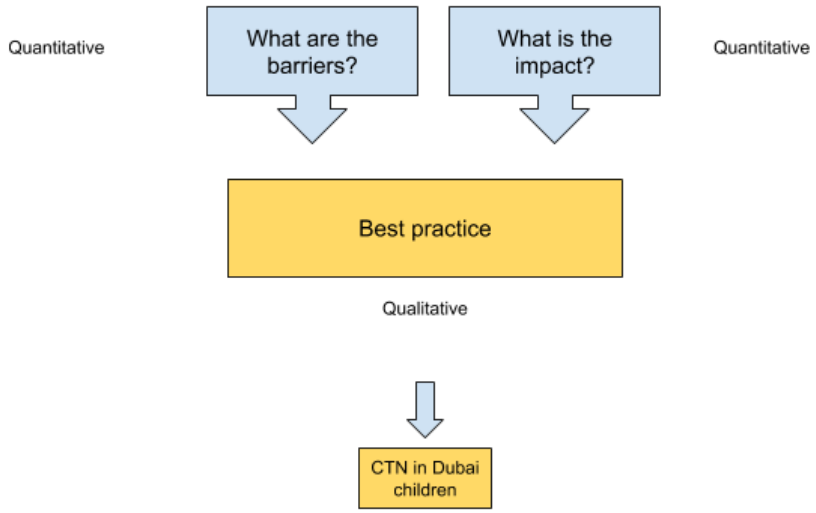

FIGURE 9. Methodological approach (adapted from Cohen et al., 2017)

3.1.1 Ethical considerations

Ethical considerations have been taken into account before research took place. This ensured the protection of both the researcher and those sharing responses.

There were no issues regarding access to findings, but it was a possibility that action research could have been halted for various reasons such as; parental pressures, teacher reluctance, safety concerns involving the outdoor environment or curriculum requirements.

Protecting vulnerable people was highly important throughout the research process. As action research was conducted in a school, the relevant vulnerable group were students. Individual children have been acknowledged as a general group referred to as ‘the students’ throughout memos and have not be named at any point. It was important to retain the anonymity of vulnerable people due to their lack of understanding, in terms of how information was going be used, as well as an inability to express their own consent due to their young age.

Including the views of adults whilst maintaining their confidentiality was difficult when concerning those with specific titles or roles. Omitting identity was most challenging in the case of action research, but was of increased importance when discussing or observing sensitive workplace practices. With this in mind, the balance between confidentiality and disclosure was addressed on a case-by-case basis, ensuring that staff were not named at any point. This issue did not apply to interviews, as it was made clear that interviewees’ names would be published, consideration was also of little relevance to questionnaires, as these were anonymous to all who submitted.

Seeking approval and clearance for the research was important. Questionnaire respondents were provided with an explanation before beginning, mentioning that answers would be used to inform this research project. If participants did not agree, then the option to ‘opt out’ could have been selected by closing the questionnaire. When initially contacting interviewees, I explained the premise of this thesis and eventual aim of developing CTN in children. Before the interviews took place, I again explained what answers would be used for, allowing time to answer

any further questions they may have. In the case of action research, the plan for this study was shared with SLT before beginning. It was agreed that this research may be carried out, taking care to avoid naming individuals

Additionally, due care and consideration was given to retaining commercial confidentiality, as action research took place within one specific school. In order to retain the company image, and prevent unnecessary scrutiny, specific names have been removed, including that of the educational establishment concerned.

3.1.2 Sampling

Three interview respondents were carefully selected based on their experience and capacity to enable CTN in their setting.

Non-probability samples were used when selecting 50 questionnaire respondents as the intention was not to be representative of the general population, only educators. This method of sampling is frequently used in small-scale research (Cohen, et al., 2017). Snowball sampling, or chain referral began with a small number of teachers known on a professional basis. Contacts connected this study to staff in their schools, who then went on to referring others. This was used in order to reach a small number of teachers in a variety of locations.

As seen in FIGURE 10, the ages of questionnaire respondents were fairly spread across all ages. Although not intended to be this way, a wide and evenly spread age range ensures that views are not reliant on one demographic in particular, for example, those nearing retirement. Those aged below 20 would not have been appropriate for the purposes of this research as degree-qualified educators were the target sample.

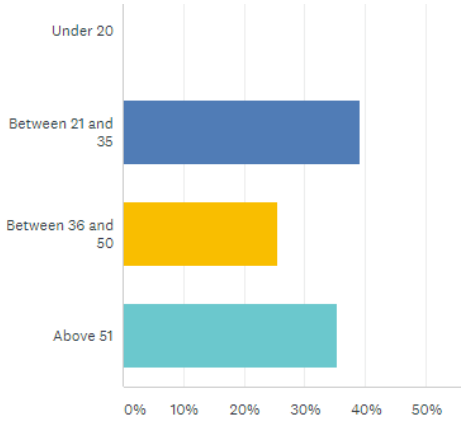

FIGURE 10. Ages of questionnaire respondents

3.1.3 Research philosophy

MMR often does not rely on only one definable paradigm. This is due to there being no specific concepts or beliefs that anchor a mixed methods approach (Newby, 2014). Research conducted within educational settings is commonly assumed to be based on either positivist, interpretive or critical paradigms (Cain, 2011). The definitions of each can be seen below.

Positivism

With this paradigm, the researcher is a neutral analyst who studies objective facts. Positivism strongly relies on evidence and is therefore suited to quantitative data analysis. This research philosophy can be associated with a more scientific approach, with a key feature being the creation of a hypothesis (ibid.).

Critical

Critical theorists are different to positivists in one easily identifiable way, which is the desire to change the status quo as opposed to simply observing it. Critical theorists are not neutral; they come to research already influenced by concerns (ibid.). If research was seen through a critical lens, it would aim to make improvements to current situation, supported by research.

Interpretive

Interpretive paradigms consider that a phenomenon may have multiple interpretations as opposed to a single, measurable truth. A deeper knowledge of the surrounding context and its complexity is gained, instead of generalising observations and moulding them to apply in different settings. Researchers conduct interpretive studies in natural conditions, applying methodologies such as grounded theory and aiming to avoid studying events and people through their own subjective lens (Pham, 2018). 'The interpretivist paradigm can underpin and inform the whole of a mixed methods research study' (McChesney & Aldridge, 2019 p234). It is also suggested that although the principles of this approach are important, mixed methods research should not rely entirely upon them (Cain, 2011).

It was important to be both realistic and critical of findings, acknowledging that action research especially was collected through a subjective lens; 'To achieve a reasonable level of validity, teachers' classroom-based action research cannot rest only on positivist or interpretive or critical paradigms' (ibid., p.10). Therefore, it was most relative to this thesis to adopt a mixture of both interpretive and critical philosophies.

3.2. Data acquisition methods

A mixed methods approach was used for data acquisition. This consisted of both qualitative and quantitative sources as seen below.

3.2.1 Questionnaires

The questionnaire used in this study collected quantitative data in the format of an online survey via the Survey Monkey website. A total of 50 participants were involved. An example can be found in Appendix 1. The primary reason for selecting an online questionnaire for data collection was the ability to reach a range of international educators remotely. The needs of my target sample were understood; speed and convenience of response are just some of the features of online questionnaires (Cohen et al., 2017). The anonymity of this data acquisition

method was another positive aspect, meaning that respondents could freely discuss their workplace or colleagues, knowing that it was untraceable. Online questionnaires are becoming the predominant mode of carrying out surveys, with Survey Monkey being one of the most common formats used (ibid.).

Potential drawbacks of this method include; the impersonal nature of asking questions remotely, computer difficulties and the possible misreporting of data (ibid.). The effect of these was reduced by personally messaging those interested in participating and writing an introductory screen before respondents began, briefly explaining the research purpose. This helped to make the questionnaire less clinical as it was more personable to ask introductory questions, such as those found in Appendix 1 (1).

Printed copies of the questionnaire were provided to a staffroom which has many older teachers, who are not confident in their use of computers, with instructions to return to the team leader once complete. Their results were later directly transferred onto the online questionnaire and it was acknowledged that their opinions were just as valid, but this prevented causing pressure on them to respond online, whilst retaining their anonymity.

Finally, once all data was collected, responses were screened for duplicate results. An example of this was found whereby open questions were answered with identical wording. This may have been caused by a technical issue and as such, the second copy of results were omitted.

3.2.2 Interviews

The three interviews used in this study are qualitative and notes can be found in Appendices 2, 3 and 4. Interviews were used in order to allow the directionality of questions to be guided by respondents answers and also so that they are able to expand freely upon examples. Cohen et al. (2017) suggests the following six stage plan for interviewing:

1. Thematizing

An Interview Guide approach was adopted as each respondent would have a different background and therefore, would require a different line of questions. Their ideas could be explored by taking this flexible method.

2. Designing

There was little design process needed as the respondents guided each interview. Research questions were reflected upon and these formed the initial starting point. Kvale (1996) recommends that interpreting and exploring life worlds, using everyday language, having a deliberate openness and creating a positive, enriching experience should be present when conducting qualitative research interviews. These components formed the basis of the interview draft.

3. Construction of schedules

Prior to each interview, the background of potential respondents and their suitability was explored. Credible and reliable sources were found and each was able to offer a different view of CTN in their setting:

Nursery Director at CreaKids, UAE

http://www.creakids.ae/

CreaKids is a nursery which is located in Dubai but originated in Norway, encouraging exploration, critical thinking, hands-on learning and creativity in children. It strives to nurture well-rounded individuals by; respecting themselves, others, and the world around them, looking at the world that they a part of and going for nature walks. CreaKids understands that parents are a child's primary educator and encourage open communication at every stage of learning. This interview was conducted in person at the nursery.

Head teacher and Educational Consultant, UK

https://www.jnedu.co.uk/

John Newton led his previous school during its journey from Requires Improvement to Outstanding in all areas. His leadership has been described by OFSTED as "dedicated and inspirational". His specialisms include; curriculum design, outdoor education, teaching & learning review and evaluation, educational visioning,

impactful feedback and assessment models and leadership development. This interview was partly conducted at a conference and later followed up online.

Environmental Organisation, Dubai Desert Conservation Reserve, UAE
https://www.ddcr.org/en/index.aspx
DDCR forms the biggest piece of land which Dubai has dedicated to a single project. As the UAE's first national park, it was created for the protection of endangered species and for the conservation of the natural desert habitat and heritage. This interview was conducted in person with the biodiversity and conservation team at the research centre.

4. Question formats

Interviews took a semi-structured format which involved tailoring the wording and sequence of questions around the experiences of each respondent. As two interviews took place in person and one online, different needs had to be accounted for. In person, it was possible to informally talk about the research and its importance. It also allowed an insight into the space in which the interviewee worked. The interview which took partly transposed online began in person during a SOuL conference in 2018, and in an earlier online meeting via Zoom. This enabled the initial pretext to be more authentic than a cold email.

5. Response modes

A range of recording methods can be utilised during interviews, each having its own strengths and drawbacks. It should be acknowledged that there is a trade-off between preserving as much data as possible and avoiding creating a threatening environment which impedes the interview situation (Cohen et al., 2017). Respondents were recorded by taking short notes whilst conducting interviews. This seemed the ideal balance between not having to rely solely on memory, but without the intimidating feel of recording equipment. It meant that interviewees could also review what was recorded. As for the interview of John Newman, which partly took place via email, initial notes were gathered in person, which were later clarified and amended online. Examples of interview notes can be found in Appendix 3, 4 and 5.

6. Conducting the interview

All three interviews had a similar, positive feel. All recognised the importance of the study topic and were happy to support both the thesis process and the greater aim of achieving CTN in children. Ensuring that interviewees had my contact details was also important as it meant that the option was there to review interview notes and share final thesis findings.

3.2.3 Action research

Action research is a qualitative method of gathering data and in an educational setting, involves practitioners investigating a specific phenomenon within their setting (Cain, 2011). The narrative for which is located in Appendix 5. Throughout the course of composing this thesis, action research has been conducted in a private school in Dubai. This supports the eventual aim of instigating real, tangible change. In order to understand the many and complex issues preventing students in developing a CTN, first the issue had to be examined at its source; the school culture and difficulties of teachers working within it.

As seen in FIGURE 11, problem identification is one element of action research. Following this is where the thesis played a key role.

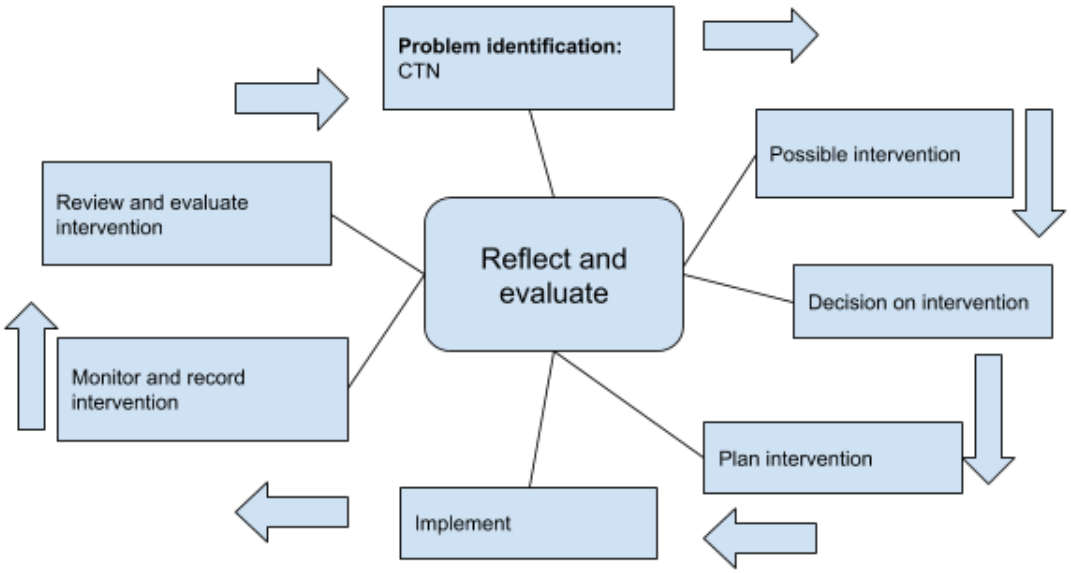

FIGURE 11. A Framework for action research (based on Cohen et al., 2017)

Over a five-month period, small-scale interventions have been implemented to address the issue of Dubai students not achieving CTN, as seen in Appendix 5. The cycle has continued, as seen in Diagram 1, whereby a plan has been implemented and reflections have paved the way to possible solutions.

Action research may be reported in narrative form and must be written with the reader in mind. It is also suggested that reflections of the action researcher, evidence of reflective growth and the criteria used to evaluate should be included in an action research report, which should address (ibid.):

Pre-Intervention

- What problems should the action research address
- What methodology, design and data will be used
- What possible interventions will be considered.

Post-Intervention

- How successful were interventions
- What conclusions were drawn, and how they were valid
- How was practice modified and improved as a consequence

3.3. Analysis methods

It is proposed that researchers influence the phenomena which they are studying in what is can be called the Researcher Effect (Hammersley and Atkinson, 1995 as cited in Cain, 2011). As the researcher takes on the role of participant observation, this involves being a part of the studied phenomenon. The teacher-researcher can be considered as native inhabitant of the context who knows the research site in its richest sense; as a result, teacher researchers should recognise this situation and use interpretive frameworks which ‘are informed by experiences’ (ibid. p.11). In order to analyse mixed method data, the strategies of coding and grounded theory were used.

3.3.1 Coding

Open coding means analysing the data and identifying small sections, for example words or short phrases, with the same code of meanings, feelings, actions or events. (Cohen et al., 2017). Questionnaire responses were collected with the aid of the Survey Monkey website. By selecting ‘analyze results’ when viewing an existing survey, the researcher is able to view all answers. TABLE 1. shows how data was handled for each question, remaining mindful of losing context as suggested by (ibid.). Questions 8 & 9 were open, which allowed respondents to reflect on their own experiences.

TABLE 1. Questionnaire data handling

Question	Responses originally presented as	Responses coded by researcher
Do you value outdoor opportunities in schools and places of learning? Please select the most appropriate response.	Bar chart	Responses not edited.
What are the barriers to getting your children or students outside more often?	List	Key words and phrases open coded. Open codes grouped as axial coding. Presented as a pie chart
Please list as many reasons for getting children outside as you can think of. This can be to any outdoor location e.g. farm, stream, desert, beach etc.	List	Key words and phrases coded. Open codes grouped as axial coding. Presented as a bar chart

Open coding was initially used to analyse questionnaire data, using colours as shown in Appendix 2. Responses were then coded based on key words such as ‘weather’, ‘resources’ and ‘children’. Axial coding was later employed, which is a category or axis around which several connected codes revolve, then compared

to existing theory (ibid.). Keywords such as '[teaching] time', 'timetable' and 'curriculum' were gathered under the same category, because as an educator, the researcher is aware that they hold the same meaning.

Open and axial coding was also used when analysing interview responses. This began by summarising the main findings of each interview, eventually recognising similarities in the challenges which each organisation faced and also different strategies which they had employed to overcome them. Prominent themes were then colour coded as shown in Appendix 6.

3.3.2 Grounded theory

The aim of grounded theory is to create new ideas, rather than test those which are pre-existing. This process begins with data analysis, which is then reviewed to enable the generation of new theory. Cohen et al. (2017) suggests that the following stages should be used as a guide when generating a grounded theory, operating recursively, or even operating several stages in parallel.

1. Decision on whether a grounded theory approach is most suitable.

2. Theoretical sampling. Enough examples were added to the action research memos to describe the context and this satisfied that data saturation was reached.

3. Data collection. Action research reflections can be found in Appendix 8. This is a summary of observational memos.

4. Theoretical codes. Open coding was used initially, then leading on to axial coding. As similar themes emerged to those which occurred during the interviews, the same colour-coding was employed for a consistent and systematic review. Coding for leadership attitudes, teacher autonomy and policies was added as these themes emerged.

5. Categorisation. Coding of memos was carried out on collected memos.

6. Constant comparison. Glaser and Strauss (2009) explain the four step process to achieving constant comparison as set out below.
    a. Comparing incidents and data which are applicable to each category. It is important to note that the seven factors which impact CTN do not exist independently, but instead are interdependent on one another as seen in diagram 3, below. By examining these relationships, it can be seen that the most influential are curriculum, leadership attitudes and policy.

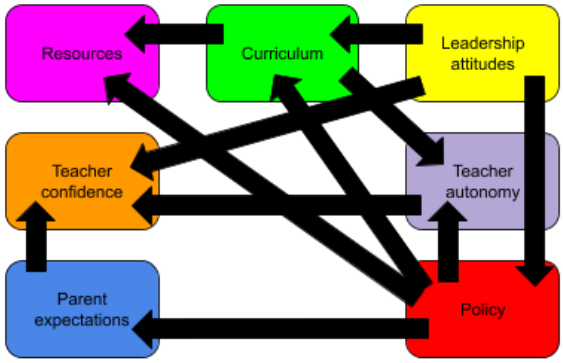

FIGURE 12. Relationships between factors affecting CTN

    b. Integrating these categories and their properties. Leadership attitudes have the biggest influence over the two other factors, as shown in diagram 4. It is the leadership team which drive both curriculum and policy within schools.

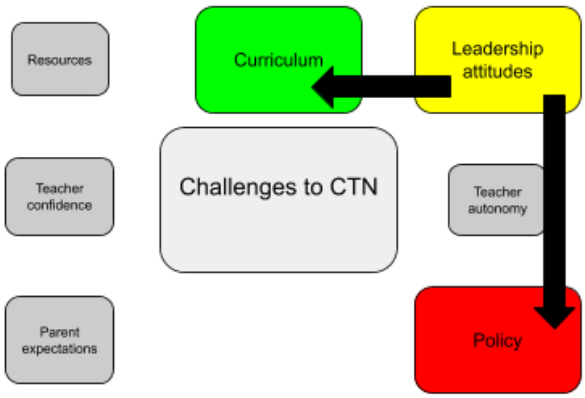

FIGURE 13. Leadership sets curriculum and policy expectations.

c. Bounding the theory. By summarising the recommendations collected from action research memos, it was found that they can be grouped under the three main themes as follows:

Policy:

- Encourage innovative practice by making resource request procedures simple
- Ensure staff and parents have access to policies
- Ensure policies are reviewed regularly to prevent outdated practice
- Review ECA policy
- Risk assessment procedures should be in place
- Sharing learning with parents on an online platform would allow them to connect with school's aims

Leadership:

- Grow an organisational culture whereby staff listen to the advice of peers as well as leadership, avoiding a top-down strategy
- Give staff the tools to evidence learning in a variety of ways within lessons
- Staff should feel valued and invested in the workplace
- Make aims and priorities for the academic year transparent

Curriculum:

- Encourage staff to take pride and ownership of their subject area
- Employ a teaching and learning leader to oversee pedagogy
- Ensure staff know who holds responsibility posts

d. Setting out the theory. Leadership attitudes acts as the driving force behind decisions affecting curriculum and policy. For example, if a Head teacher chooses to adopt a more outdoor approach to learning within the school, encouraging students to spend more time connecting to nature, then SLT are in the position to drive this initiative forward through policy and curriculum.

7. Identification of the core variable. Leadership attitudes have been identified as the driving factor behind all other aspects affecting CTN.

8. Saturation. No new insights, codes or categories have been highlighted.

9. Theory generation/ verification. Theory evaluation can be found in Appendix 7.

10. Writing the report. Research questions guided the format of the report and key findings have been included from the above stages. The report is included in Chapter 4; research results

4 RESEARCH RESULTS

This chapter provides a background to research results before presenting and giving an explanation. Results are then synthesised and discussed.

4.1. Research results

Research questions aimed to develop a view of best practice and set out recommendations for schools. In order to achieve this, questionnaires initially examined the benefits of CTN in children and whether educators were aware of these. Following this, interviews explored the current barriers to CTN and the strategies which different organisations had put in place to overcome them. Action research embedded these findings in the context of a Dubai private school.

4.1.1 Possible outcomes

Educator questionnaire findings indicated 32 different reasons for encouraging a CTN in children. The most common was to meet children's 'physical and developmental needs', mentioned by 74% of respondents, this was followed closely by 'encouraging an appreciation of nature' with 66%. 'Fresh air' and developing an 'awareness of environmental issues' came joint third, each with 40%.

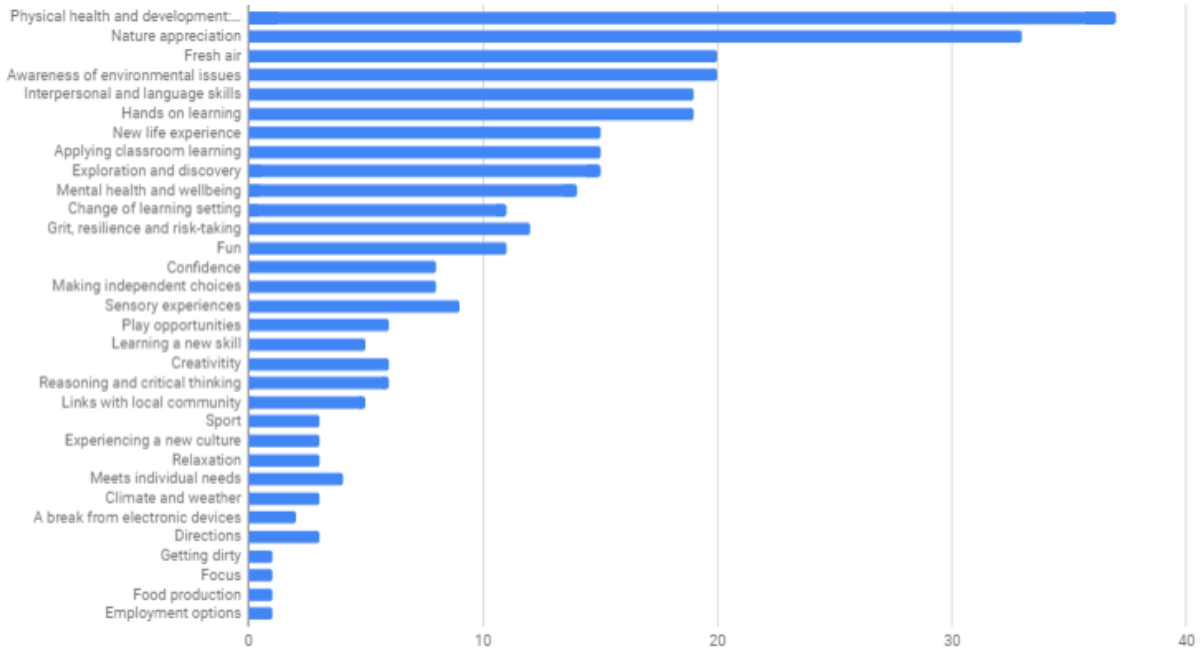

FIGURE 14. Possible outcomes for children

4.1.2 Challenges facing CTN in international schools

The educator questionnaire found that there were nine key barriers to enabling children's CTN; weather, resources, suitable outdoor space, curriculum pressure, student attitude, teacher attitude and capability, risks involved, cost and parent concerns. The most common were curriculum pressure and teacher attitude and capability. Student and parent attitudes did not appear to be a common concern.

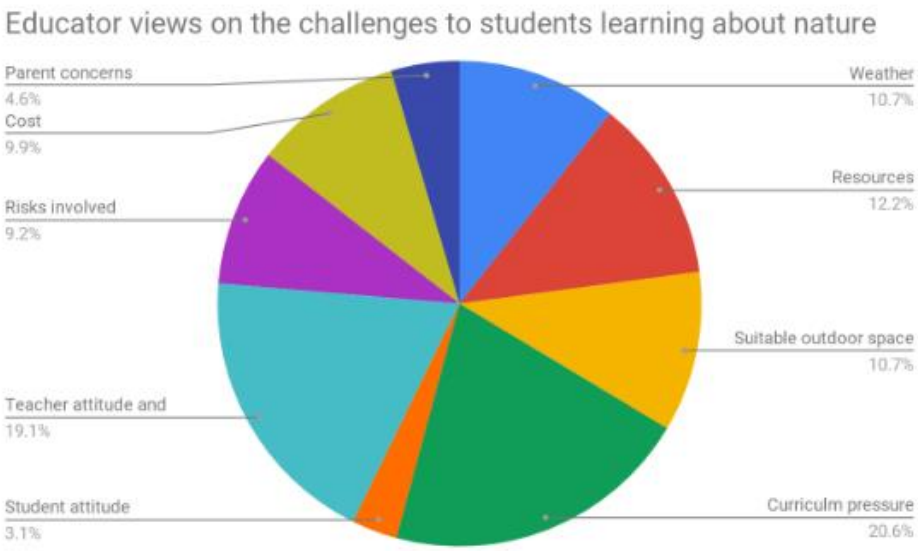

FIGURE 15. Perceived educator barriers to CTN

Interviewees believed that there were four key barriers preventing children's CTN: Teacher confidence, parent expectations, resources and curriculum. Action research findings indicated seven barriers; Parent expectations, teacher confidence, resources, curriculum, leadership attitudes, teacher autonomy and policy.

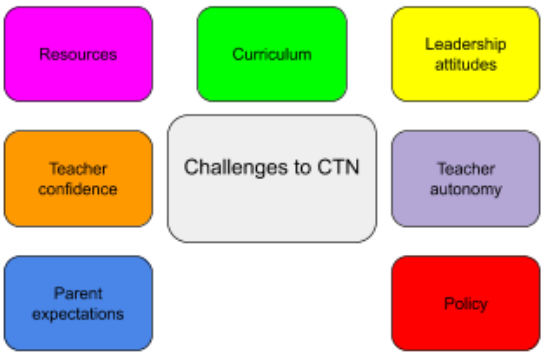

FIGURE 16. Challenges facing CTN

4.1.3 Recommendations for schools

Interviewees recommended four possible strategies for overcoming the barrier of teacher confidence. These were; connecting organisations with teachers, focusing on positive staff, making links between teachers personal and professional lives, and finally, raising the profile of nature in schools by featuring it on lesson observation forms.

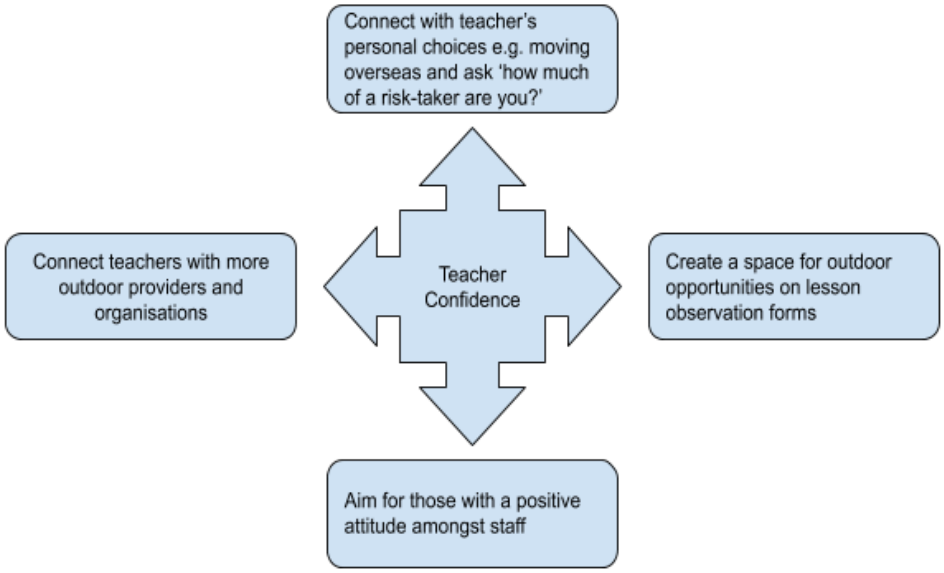

FIGURE 17. Overcoming teacher confidence concerns

Interviewees recommended four possible strategies for overcoming the barrier of parent expectations. These were; establishing boundaries with new parents from the outset, hosting training sessions which benefit the wider school community, holding a launch event to raise awareness and keeping them informed and involved.

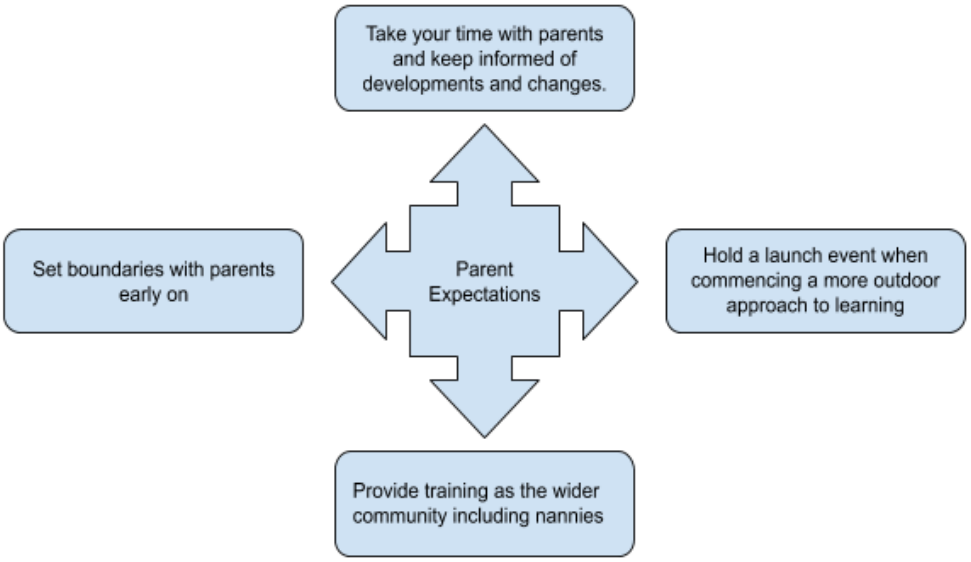

FIGURE 18. Recommendations for managing parent expectations

Interviewees recommended four possible strategies for overcoming the barrier of curriculum pressure. These were; being open to staff taking risks in their planning, consider how appropriate curricula is for international students (such as that of the U.K in the context of this research), or whether further adaptation is needed and finally, encouraging phenomena-based learning and inspiring teaching staff.

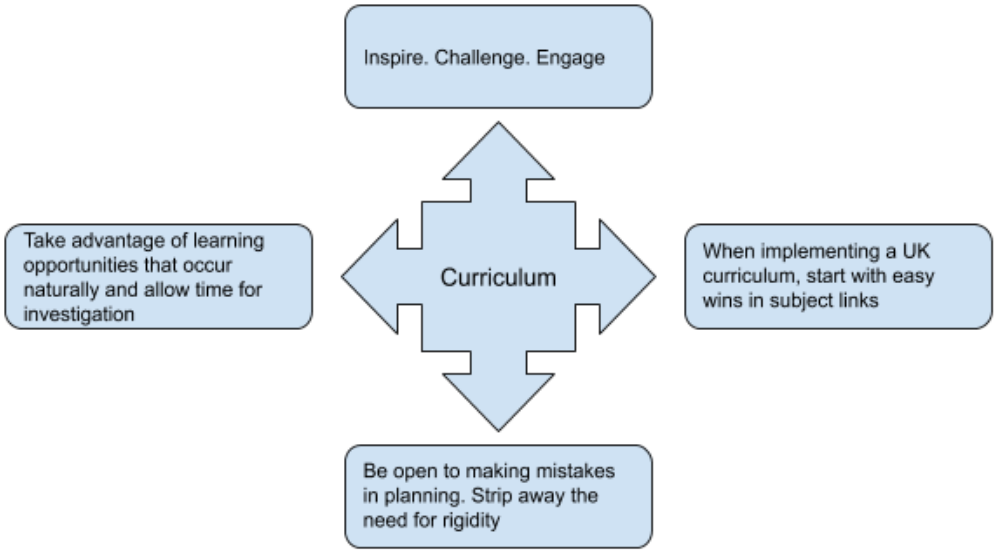

FIGURE 19. Recommendations for overcoming curriculum issues

Interviewees recommended four possible strategies for overcoming the barrier of resourcing. These were: Accepting parent donations of objects and skills, creating a transition between indoor and outdoor spaces and ensuring supporting policy is in place such as; a nurse to monitor temperature regularly and consistent risk assessment forms.

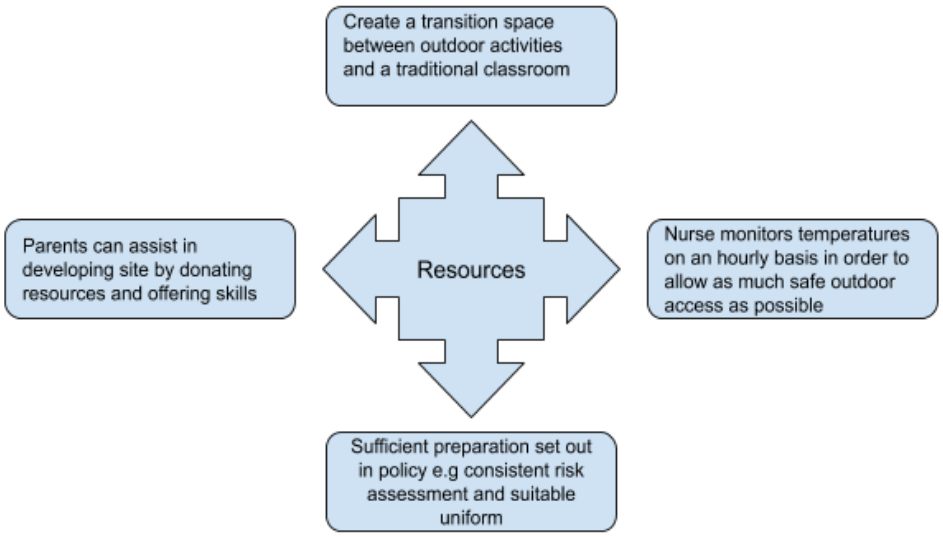

FIGURE 20. Recommendations for overcoming resourcing issues

Action research findings explored the impact of leadership attitude on children's CTN. It was found that contributing factors are driven by the attitudes of leadership. This theory can be tested by hypothetically removing SLT from decisions involving policy and curriculum, therefore entrusting responsibility to others in the team. In doing so, it can be noted that policy and curriculum would not be systematically enforced and could allow for more collaboration and innovation opportunities between teachers. This would lead to improved levels of teacher autonomy and confidence. In successful schools, pedagogical innovation is overseen by a team of classroom-based, lead teachers in order to ensure that initiatives are both relevant and practical.

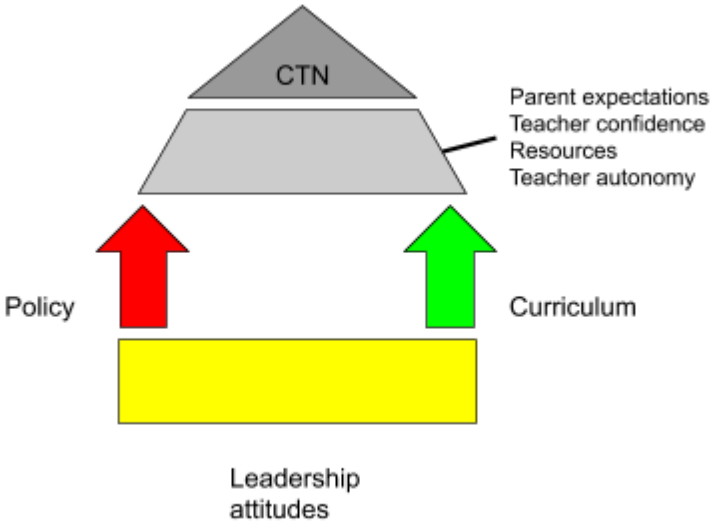

FIGURE 21. Leadership impact on CTN

4.2. Synthesis of results

Over the course of this study, recurrent themes emerged involving; leadership, parents, teachers, resources and the acquisition of future skills.

4.2.1 Background

During an initial exploration of appropriate literature, it became clear that many challenges contributed to a lack on CTN in Dubai schools, these barriers are often complex and interrelated. Educators in general are aware of CTN's benefits to children, so exploring the issues preventing access to this area of learning was deemed worthy of study. Research results from both questionnaires and interviews found that difficulties revolved around several themes including; policy, curriculum, parents, teachers and resources. As action research progressed, it became clear that school leadership influences all of these decisions and it is school SLT which can drive, or hinder, CTN in students.

4.2.2 Leadership

School leadership plays the central role in children's CTN; 'It is often said that major change is impossible unless the head of the organisation is an active supporter' (Kotter, 2009, p.22). A school's SLT directly impacts dependent areas, such as policy and curriculum adaptation, and forms the foundation upon which school vision and aims are built upon.

Schools sometimes risk 'having too many managers and not enough leaders' (Kotter, 2009, p.21), meaning that SLT can focus too readily on managing outcomes as opposed to encouraging and inspiring change. This attitude is reflected by other school leaders; 'in a less successful school, you do not go out on a limb, you can't afford to' (Rutherford, 2005, p.288). Unsuccessful SLTs underestimate the importance of nurturing a coalition; 'Sometimes they have no history of teamwork at the top and therefore undervalue the importance of this type of coalition' (Kotter, 2009, p.23).

Possible strategies for school leadership include; being open to staff taking calculated risks and trialling innovate practice, motivating and inspiring teachers, and encouraging phenomena-based learning which is not necessarily delivered through discrete subjects.

4.2.3 Parents

Parent concerns, specifically in regard to risk taking, can be a barrier to CTN in children. From a parent's perspective, CTN can positively impact children's; physical health and development, interpersonal and language skills, mental health and wellbeing, confidence and creativity. Connecting to nature can also allow children to gain the following life experiences; exploration and discovery, sensory stimulation, exposure to new skills or sports, and opportunities to investigate food origins.

Possible strategies for overcoming misplaced parent expectations were; establishing boundaries with new parents from the outset, hosting training sessions

which benefit the wider school community, holding a launch event to raise awareness and keeping parents informed and involved.

4.2.4 Teachers

Educators may inadvertently cause a barrier to enabling children's CTN. This could be through; their lack of confidence in taking children outdoors, their perception of student attitude whilst outdoors or their own level of autonomy within their role. From a teacher's perspective, CTN in children can provide opportunities for; a hands-on or play-based approach to learning, application of classroom-gained knowledge, a change of setting (leading to a more purposeful context), reasoning and critical thinking skills, encouraging independent choices, developing focus, grit, resilience and risk-taking. Connecting to nature also means that more individual learning needs can be met.

Possible strategies to support teachers include; committing the time to connect with more organisations and visit locations, maintaining a positive attitude to the outdoors, recognising the link between embracing risks in personal and professional lives and finally, raising the profile of nature in schools by featuring it in lesson observations.

4.2.5 Resources

Necessary resources, or a lack of, has been noted as a barrier to enabling children's CTN. This can include a shortage of; funds invested by the school, access to suitable outdoor space and protection for students and staff from all weather conditions. Possible strategies for adapting around resourcing concerns are; accepting donations of objects and skills, creating a transition area between indoor and outdoor spaces and ensuring appropriate policy is in place, such as a nurse to monitor temperature regularly and consistent risk assessment forms. Sometimes, an exhaustive list of equipment is not required, as simple features such as fresh air, a break from electronic devices and the possibility of getting dirty can be a progressive step towards CTN.

4.2.6 Future skills

Although envisioning communities of the future was not a target of this research, the theme of interconnected, holistic global citizens appeared several times. CTN in children can lead to the following long-term benefits; an appreciation of nature and awareness of environmental issues, links with the local community, experience of cultures different from their own, and increased employment options. These are life-long skills and experiences which allow children to adapt through different challenges and careers, enriching their wider community as adults. The concept of child innovation can also be achieved through phenomena-based learning as learners take the initiative to drive their own motivation.

5 DISCUSSION

5.1. Data Collection

Questionnaire respondents were exclusively educators. The vast majority responded incredibly positive to the concept of CTN, giving many suggestions for its benefits. They also gave examples of how achieving CTN in their settings was a challenge, such as curriculum pressure or teacher attitude and capability. Educators themselves did not state as many barriers as interviewees or action research findings. This may have been because they were not exclusively from a leadership background, resulting in interpreting the barriers simply as a result of leadership decisions, under the ‘curriculum’ umbrella. This could have been due to either a lack of individual’s confidence in expressing critical views of SLT, or simply down to a lack of awareness of how leadership views affect their role. The issue of teacher attitude and capability also highlighted the need for CPD in this area.

Interviewees were selected based on their background and experience, as the aim was to sample three diverse individuals who had a strong influence on CTN. In the UK, it was observed how schools and organisations work together, such as partnerships with the National Trust, in order to enable access to nature for all children. This included students of all ages, socio-economic backgrounds and additional needs.

At the time of this study, there were very few schools in Dubai which encouraged a CTN. Therefore, in order to develop practical recommendations from experience, the Head teacher interviewed was located in the UK. This is similar to the reason which a nursery director was selected, as opposed to a member of school leadership; nurseries are more likely to encourage students CTN due to the less rigid curriculums and more holistic views of education. DDCR was chosen due to the success of similar organisations in the UK.

All interviewees responded positively to the idea of CTN, whilst acknowledging that there are currently barriers in their own respective fields, such as the need to educate others beyond their own students. They gave suggestions for how

these have been overcome in their own settings. These included; holding community training events, as well as discussing challenges which they are still making progress towards, for example, making outdoor sites safer.

Action research within a Dubai private school found that, whilst teachers were initially positive in regards to enabling CTN, this view was soon met with an exhaustive list of challenges such as; little flexibility within the curriculum timetable, unpredictable deadlines and leadership priorities. It can be concluded that educators themselves did not pose a barrier to CTN, but SLT can aid its facilitation by; sharing the long-term vision with staff, raising teacher awareness of CTN, listening to and reflecting upon feedback, and also working on solutions collaboratively.

5.1.1 Validity and reliability

This study researched the positive outcomes of CTN in children, in addition to the current challenges and strategies for overcoming them. A range of views from both educators and environmental organisations have been explored with the objective of setting out recommendations for schools.

It is important to acknowledge that action research was collected through a subjective lens as the researcher commenced this thesis already influenced by concerns regarding CTN in Dubai children and the context of one specific school. Therefore, elements of both critical theory and interpretivism have been present throughout. Research outcomes have been affected by the researcher's own interpretation and cultural understanding which may have caused to some degree of bias (Pham, 2018).

Conducting a prior review of literature may have led to determining what was initially found in data, as opposed to following the path of original findings (Cohen et al., 2017). Whilst it is true that questionnaire and interview responses were not influenced by the researcher's prior knowledge, it is possible that coding concepts and themes may have been to some degree. However, it can be argued that as new codes continued to be recognised in research and included in findings, this familiarity with the field was not detrimental.

Another limitation of interpretivism is the aim of gaining a deeper understanding of context, rather than relating results to a broader, more diverse group of people and settings (Pham, 2018). The idea that these findings could have been indicative of other international educational settings was often reflected upon. Employing a mixed-method approach to gathering data enabled external views to be collated and synthesised alongside those of one particular school. Action research was a valuable tool when analysing the typical daily workings of schools. However, external questionnaires and interviews allowed a broader picture to be created.

Too heavy of a focus of the phenomenon within a given context can lead to a separation between validity and research outcomes. This is in regards to a lack of focus on the empowerment of individuals and a failure to address the political and ideological impact on their world view (Pham, 2018). The same may be said of the action research element of this thesis, as those observed were not explicitly questioned on what caused them to have specific views or behave in certain way. This was due to the aim of preserving the existing state of the context in question in order to get as genuine results as possible.

In accordance with this, it has also been stated that; ‘the classroom is not the place to be self-reflexive, collaborative and political’ (Cain, 2011, p.6). With some teachers acknowledging that they find it a challenge to accept self-reflexivity as part of their professional duties, simply arguing that they have no time for it. If teachers work individually, with few opportunities to interact professionally with their colleagues, then the necessity for collaboration is not always obvious. (ibid.). ‘These behaviour patterns are products of the organization or more specifically its members’ deep held norms, beliefs, value-systems, and basic assumptions’ (Kazi, 2009, p.101)

5.1.2 Positive factors

This study achieved the intended aims of; exploring reasons for CTN, identifying challenges to provision in schools and setting out recommendations for good practice. A total of 50 questionnaire respondents participated and stated 32 potential impacts of developing a CTN in children. 7 interdependent key challenges

were identified and a range of strategies were given. Along with the practical conclusions in chapter 5.3, this will allow schools to reflect on their own challenges and take appropriate action.

5.1.3 Challenging factors

The first challenge, experienced from the outset of this research, was identifying the core issue which prevents CTN in Dubai schools. This was initially presented as a tangled network of interrelated factors. As these barriers were examined during action research, a sensitive ethical issue then became apparent.

SLT eventually emerged as the common influence, once the source of all other barriers were explored. However, this leadership team was the same commissionaire who would eventually have to agree to the publication of this research. In order to retain the integrity of study findings, it was eventually decided to continue without a commissionaire, retaining the anonymity of the school concerned.

5.2. Contribution to previous research

The evidence base for CTN is still developing and it has been suggested that there has only recently become an interest in assessing and understanding this area of holistic development (O'Donnell et al., 2016). Existing research has explored areas such as the; association between local environmental types and CTN (Luck et al., 2011), relationship between nature connectedness and happiness (Capaldi et al., 2014) CTN similarities in urban and rural youths (Klassen, 2010), impact of CTN on psychological resilience (Ingulli & Lindbloom 2013), relationship between energy consumption levels (Frantz & Mayer, 2014; Sparks et al., 2014) and contributing factors which cause individuals to develop a CTN (Gifford & Nilsson, 2014).

CTN has the potential to influence mental health aspects such as; life satisfaction, happiness indicators, stress recovery, reduced levels of cognitive anxiety, sense of wellbeing and social cohesion (Twohig-Bennett & Jones, 2018; O'Donnell et al., 2016; Cox et al., 2018). CTN could also mean a decrease in; salivary cortisol, cardiovascular mortality, hypertension, asthma, coronary heart disease, HDL

cholesterol, type II diabetes and incidence of stroke (Twohig-Bennett & Jones, 2018.

5.3. Practical conclusions

Using Kotter's eight-step plan (Kotter, 2009), this final chapter proposes a practical tool to enable CTN in Dubai private schools.

Step one: Establishing urgency
Literature suggests that little importance is currently placed on connecting to nature within the general population (Gardner & Howarth, 2009; Clack, 2018). In order to commence change to a school culture, begin with a whole school CPD event, which could be held in an outdoors or off-site area, ensuring classroom assistants, teachers and leadership attend. Approximately 75% of a school's management must be convinced that the cause is worthwhile to ensure success (Kotter, 2009, p.22). Act at staff level initially, before involving parents and the wider community.

All attending should be addressed equally, as opposed to segregation by subject, year group or title. 'A leader/manager who leads a group can take the first initiative to ensure participation of other group members' (Kazi, 2009, p.119). This would discourage the formation of familiar cliques and encourage interaction and collaboration across all departments.

Begin by sharing images of native plant and animal species and ask staff to identify these in small groups, knowing that this would be a challenging task. When ideas are shared with the whole group, question why only a minority of these could be named. At this point, also quote that 'traffic and noise pollution are the only environmental impacts widely noted as a concern in the UAE' (Clack, 2018).

Communicate examples of natural habitat losses, such as degradation of marine habitats through pollution and dredging, and the relocation of hares, corals and mature ghaf trees using inappropriate techniques (Daniel, 2017; Gardner & Howarth, 2009). Also share of locations in the UAE which feature graffiti, such as

wadis, or habitat destruction, such as desert safari sites. Although shocking, communicating this information broadly and dramatically is essential (Kotter, 2009, p.21). Ask if current practice allows children enough opportunities to appreciate nature, recording responses. Make reference to the research findings of this thesis, such as the perceived barriers to CTN, as links occur.

Share global examples of CTN, Finland in particular, and support with research findings such as the impact of CTN on; physical and mental health (Al Anouti et al., 2011; Cox et al., 2018; O'Donnell et al., 2016; Twohig-Bennett & Jones, 2018) pro-environmental attitudes and behaviours such as respect, humility, and empathy (O'Donnell et al., 2016; Bixler et al., 2002; Alansari & Tannock, 2015) psychomotor, cognitive and interpersonal skills (Yuniastuti & Hasibuan, 2019) and quality of children and educators relationships (Blanchet-Cohen & Elliot, 2011).

Ask staff to discuss how going outdoors impacts them and to also reflect on their own childhood experiences. It is recommended that the initial step towards facilitating exposure to nature in schools is through a discussion of its characteristics, objectives, and potential experiences (Plummer, 2009). Then encourage a growth mind-set, where possibilities are within reach, and ask for feedback on how can we make changes as a school. Address concerns, such as academic impact and be prepared to share evidence such as the case study of interviewee, John Newton (Newton, 2018). Explain that whole staff involvement is encouraged, but that a dedicated task team will drive changes in this area, along with parents at a later point. Those interested in volunteering should report back to a designated contact within school.

Step two: Forming a powerful coalition

Following the CPD event, the whole staff community should understand the benefits of enabling a CTN in children. Task team volunteers will have 'opted in', ensuring that only a passionate and committed group forms the coalition of change agents. A task team must feature a variety of different post holders across the school, including those with respectable titles and members of the SLT team; 'It is often said that major change is impossible unless the head of the organisation is an active supporter' (Kotter, 2009, p.22).

Step three: Creating a future vision

At the initial task team meeting, the agenda should be as follows:

Reflect on whole school CPD

Discuss whole school vision based on feedback from CPD

Encapsulate the vision in a succinct way; if it cannot be communicated in five minutes or less, getting a reaction that signifies both understanding and interest, then the vision is not complete (Kotter, 2009, p.23).

This vision should then be shared with the other SLT members as well as the governing body.

Step four: Communicating the vision

The vision for enabling CTN in schools should be communicated with all staff in a timely manner, this ensures that the hard-hitting urgency of the initial CPD has not diminished. This shared vision will make it possible for others to become active, involved stakeholders; ‘employees will not make sacrifices, even if they are unhappy with the status quo, unless they believe that useful change is possible’ (Kotter, 2009, p.24).

In schools, the next step is to involve the parental community in the form of an open evening. Ensure this is planned for with ample notice. This may take a similar format to that of the staff CPD event and the same presentation could be used and adapted by the task team. Parents should also be informed of the consequences of not connecting children to the surrounding natural environment and should reflect on their own childhood and asked whether we give children the same opportunities. At this point, share the school’s vision for CTN, taking the time to address concerns, such as academic impact and be prepared to share evidence along with research findings. Collect parent responses and invite volunteers to join the community task team.

Step five: Empowering others to take action and removing obstacles

‘To some degree, a guiding coalition empowers others to take action simply by successfully communicating the new direction’ (Kotter, 2009, p.24). However, anticipate that obstacles will be met during the implementation of change. These could take the form of metaphorical barriers such as a fixed mind-set, or being

conditioned to seek security in existing protocol. Obstacles could also take the form of specific people and their non-committal to the change. In both cases, it is important to address the issues with patience and understanding, allowing for open conversation and sound reasoning. This should be achieved by an informal conversation between a member of the task team and those resisting the proposed changes.

Step six: Systematically planning for wins

Action planned by the task team should lead to successful change. Celebrating small contributing victories will help to keep motivation high; 'without short-term wins, too many people give up or actively join the ranks of those people who have been resisting change' (Kotter, 2009, p.26). Highlighting positives, such as; a successful parent event or learning walk focusing on raising the profile of CTN, could be shared by a short video on social media or mention in the weekly staff meeting. The simple use of praise will also go a long way to ensuring staff efforts are recognised and appreciated.

Step seven: Avoiding complacency

Kotter warns against prematurely declaring the change process as complete and that doing so can have catastrophic results; 'Until changes sink deeply into a company's culture, a process that can take five to ten years, new approaches are fragile and subject to regression' (Kotter, 2009, p.26). This means that even small successes should not be taken for granted and, in the case of CTN, must be continually built upon.

For example, after a year of increasing children's exposure to nature, a school's task team may decide to invite educators in the area to give feedback. They could then decide to set up a collaborative group for shared best practice. The key here being the commitment to continuous improvement. Leaders of successful efforts are motivated by short-term wins and use this momentum to 'go after systems and structures that are not consistent with the transformation vision and have not been confronted before (Kotter, 2009, p.28).

Step eight: Anchoring cultural change

Sharing best practice amongst schools whilst being open in regards to the challenges met and strategies employed, will encourage others to take similar action; ‘a conscious attempt to show people how the new approaches, behaviours, and attitudes have helped improve performance’ (Kotter, 2009, p.28). This could also be highlighted on school newsletters and social media output to ensure that parents remain informed. It should be considered, however, that; ‘people’s willingness or ability to work as effective group members is not the same in all societies’ (Kazi, 2009, p.119) and as such, collaborative work amongst wider school networks should be approached with due care and cultural understanding.

As with any development or initiative, to ensure a consistent vision over time and a culture of continuous improvement, great importance must be placed on the recruitment of like-minded leaders; ‘taking sufficient time to make sure that the next generation of top management really does personify the new approach’ (Kotter, 2009, p.28).

5.4. Critical evaluation

The idea that these findings could have been indicative of other educational settings was often reflected upon. Employing a mixed-method approach to gathering data in this study enabled external views to be collated and synthesised alongside those of one particular school. Action research was a valuable tool when analysing the typical daily workings of schools. However, external questionnaires and interviews allowed a broader picture to be created.

Questionnaires were carried out initially, as a form of theoretical groundwork. This allowed for a broad exploration of educator views. One criticism may be that too many questions were asked and not all data was analysed. Alternatively, all questions could have been a precise match to the aims of this thesis. This was a challenge faced at the outset of this study as action research and interviews had not yet influenced decisions regarding directionality.

Once results showed an overwhelming positivity towards connecting children to nature, it became necessary to investigate why this was still failing to happen.

Interviews then examined the views of three prominent stakeholders; a nursery director, an environmental team and a Head teacher.

This thesis could have quantified a measure of CTN amongst Dubai children to support claims. Research could also have focused on leadership attitudes to CTN, as opposed to those of individual teachers. An increased number of school settings may also have been investigated and compared in terms of their provision for CTN. Therefore, it is recommended that future research should explore; measures of CTN in Dubai children, causes of poor air quality in the United Arab Emirates, impact of biophillic design in educational settings, purpose of curricular design and adaptation in local settings, leadership attitudes to CTN and innovation strategies of Dubai school leadership teams.

It is suggested that the existing evidence base is further limited by the lack of potential research co-founders and the use of a-typical or biased samples (O'Donnell et al., 2016). In practical terms, this means that industries such as those involved in construction, ecology, biodiversity or education should be encouraged to commission studies exploring CTN.

It is also important for researchers to examine CTN longitudinally, measuring not only the impact within a given year, but also how this has made lasting changes to lifestyle choices and future business ethos. Finally, the profile of CTN should be raised highly enough to consider conducting research on a larger, international scale.

In conclusion, the success of any CTN programme will also need to consider the location of the school in regards to the natural landscape. As is the case of Dubai schools, local climate and lack of access to suitable outdoor spaces will impact the ease of students' exposure to nature more than other areas and therefore, suitable adjustments should be made. These could include, but are not limited to; transportation, appropriate clothing and shelter, biophillic design features during times when it is not recommended to spend time outdoors and also information on weather conditions such as temperature and pollution index.

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APPENDICES

Appendix 1. Survey Monkey online questionnaire

1 (2)

Academic Research Survey

Hide

Your Impact on the Future of Outdoor Learning

I am hoping to develop outdoor provision and opportunities for young learners. In order to develop a clear picture of current attitudes and the potential impact of these on children, please tell me a bit about yourself and your experiences.

OK

1. How old are you?

- Under 20
- Between 21 and 35
- Between 36 and 50
- Above 51

2. Which country are you living/ working in?

3. Are you a parent?

- No
- Yes (please tell me the age of your children)

5. How much do you enjoy being outdoors?

I don't enjoy being outdoors	I can put up with being outdoors if I need to be there	I am indifferent to the outdoors	I enjoy being outdoors occasionally	I love being outdoors
☆	☆	☆	☆	☆

6. Take a moment to think back to when you were a child yourself. Please describe your favourite outdoor place.

7. Do you value outdoor opportunities in schools and places of learning? Please select the most appropriate response

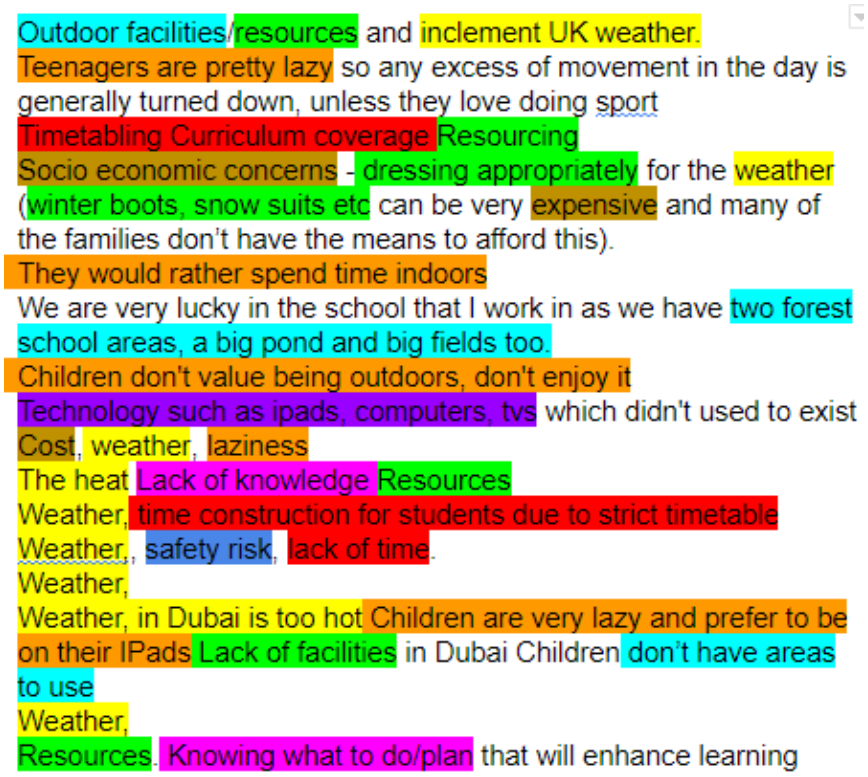
- ○ No. Outdoor learning should only take place in children's free time
- ○ Not really. There are too many other things to learn in school
- ○ I'm not sure of the impact it will have on children's progress- but I'm open to finding out
- ○ Other (please specify)
- ○ Yes. But only if it does not risk progress in Reading, Writing and Maths
- ○ Absolutely! I know that strong foundations are the key to preparing lifelong learners

8. What are the barriers to getting your children or students outside more often?

9. Please list as many reasons for getting children outside as you can think of. This can be to any outdoor location *e.g. farm, stream, desert, beach etc*

10. If you were to ask your students or children about their attitude to being outside, what do you think they would say?

Appendix 2. Questionnaire coding example



Outdoor facilities/resources and inclement UK weather.
Teenagers are pretty lazy so any excess of movement in the day is generally turned down, unless they love doing sport
Timetabling Curriculum coverage Resourcing
Socio economic concerns - dressing appropriately for the weather (winter boots, snow suits etc can be very expensive and many of the families don't have the means to afford this).
They would rather spend time indoors
We are very lucky in the school that I work in as we have two forest school areas, a big pond and big fields too.
Children don't value being outdoors, don't enjoy it
Technology such as ipads, computers, tvs which didn't used to exist
Cost, weather, laziness
The heat Lack of knowledge Resources
Weather, time construction for students due to strict timetable
Weather,, safety risk, lack of time.
Weather,
Weather, in Dubai is too hot Children are very lazy and prefer to be on their IPads Lack of facilities in Dubai Children don't have areas to use
Weather,
Resources. Knowing what to do/plan that will enhance learning

Appendix 3. Head teacher interview

Newton, J.

Head teacher UK school at risk of closure to outstanding in 2 years.

Key barrier is narrowed curriculum

Implementation:

- Take your time with parents
- Parents can assist in developing site by donating resources and skills
- Give parents a tour of site
- Keep parents informed
- Launch event
- Newsletter
- Open days
- Aim for ‘tiggers’ [positive employees] amongst staff
- Start with easy wins in subject links
- Space for outdoor opportunities on lesson observations

Appendix 4. Conservation team interview

Khafaga, T. and Shah, M.

Conservation team at Dubai Desert Conservation Reserve

- Arabian gazelle, sand gazelle, Arabian Oryx and native plants
- 3 staff, reduced from 4: Zoologist, botanist, protected area management
- Resources a key issue- no student transport or community engagement leader
- Visitor centre under development
- 5% of Dubai, fenced perimeter
- Government controlled
- Al Marmoom, Ghaf Nazwa, Nazwa Mountain, Al Workosh, Hatta Mountain, Ras al Khor, EMEG Jebel Ali
- Al Maha originally sponsored by Emirates. Opened in 1999. Expanded in 2013.
- Oryx first- numbers increased from 70 to 700. Now unmanageable so male female split.
- Biosphere expedition. Secondary students?
- Site safety concerns

Appendix 5. Nursery director interview

Hudson, L.

Director at CreaKids, Sustainable City, Dubai

Why the Norwegian curriculum/ outdoor provision?
Child's interests (investigation)
Stripped away the need for expectations and rigidity- are we pushing our thoughts and ideas of learning on to children?
Open to making mistakes in planning
Be ready to adapt. Only music, movement, language is structured

What have been the biggest challenges to facilitating outdoors access?
Parent expectations
Set boundaries early on
Nanny culture- give training

What advice would you give to schools?
Take advantage of opportunities that occur naturally
Home/school consistency esp. Behaviour
Outdoor activities - Transition space - Classroom
Ask teachers 'how much of a risk-taker are you?' Connect with personal choices e.g. moving overseas
Inspire. Challenge. Engage
Nurse monitors temp hourly

Appendix 6. Interview coding example

Dubai Nursery Director	• Provide training as the wider community including nannies • Set boundaries with parents early on • Create a transition space between outdoor activities and a traditional classroom • Connect with teacher's personal choices e.g. moving overseas and ask 'how much of a risk-taker are you?' • Inspire. Challenge. Engage (children, parents and staff) • Ensure that the nurse monitors temperatures on an hourly basis in order to allow as much safe outdoor access as possible • Norweigen curriculum stripped away the need for expectations and rigidity and is open to making mistakes in planning and only music, movement, language is structured • Take advantage of learning opportunities that occur naturally and allow time for investigation • Be ready to adapt.

Appendix 7. Action research theory 1 (2)

Strauss and Corbin (1990) indicate that the grounded theory generated should be judged against the criteria as follows-

Criteria	Strengths	Weaknesses
Reliability, validity and credibility of the data	Action researchers will always have some background knowledge of the topic in question, moreover, it is this same background knowledge that likely sparked an initial interest in the subject. Throughout my action research I remained mindful of my prior knowledge and made a conscious effort to allow the data to lead.	It is suggested that conducting prior literature reviews may lead to determining what is seen in data, as opposed to following the path of original findings (Cohen, Louis, et al. 2017).
Adequacy of the research process	Action research process was conducted over a 5-month period. The same themes continued to appear throughout this time.	Could have carried out action research over a longer period of time.
Empirical grounding of the research findings	Research findings were based directly on memos.	No hard statistics or quantifiable data
Sampling procedures	Spoke to a range of staff throughout the school.	Small key stage one department compared to average Dubai sizes. Research only conducted by one teacher in one school. Results may vary largely depending on the school.
Major categories that emerged	Resources Teacher autonomy Leadership attitudes Parent expectations Curriculum Teacher confidence Policy	Could there have been themes which emerged which I did not notice?
Adequacy of the evidence base for the categories that emerged	All themes were recurrent and emerged a number of times	More evidence for leadership, curriculum, policy than other themes
Adequacy of the basis in the categories that led to the theoretical sampling	More evidence for leadership, curriculum, policy than other themes	Could there have been themes which emerged which I did not notice?

Formulation and testing of hypotheses and their relationship to the conceptual relations among the categories	Once I had decided on the hypothesis I tried to think of examples against it but this was not possible	One-off events omitted to ensure themes are truly relevant
Adequacy of the way in which discrepant data were handled	Secure knowledge of context.	Data omitted from emergent themes if context meant that events were out of the ordinary
Adequacy of the basis on which the core category was selected	Once I had decided on the hypothesis I tried to think of examples against it but this was not possible	Leadership attitudes drive all schools, this impacts core components: Curriculum and policy.
Generation of the concepts		Based directly on memos taken whilst submersed in context
Quality of the concepts and the extent to which they are systematically related; their conceptual density, leading to their explanatory power	All identified and explained in chapter 3 and 4	Concepts are linked by their ability to impact CTN in schools. They are all interlinked. For example, teacher confidence is impacted by teacher autonomy, leadership attitudes and parent expectations.
Extent of variation that is built into the theory;	Should be the same across all schools	Perhaps in other schools, more teachers have more input into curriculum
Extent to which the explanations take account of the broader conditions that affected the phenomenon being studied	Many contributing factors affect children's CTN in schools. These were included in findings	Leadership attitudes drive all schools, no matter what other factors contribute
Account taken of emergent processes over time in the research; the significance of the theoretical findings.	Similar themes emerged to interview findings, possibly because I already knew to look for them. However new themes became relevant over time	Perhaps with more time, new themes would have emerged

Appendix 8. Action research reflections

	September 2019	January 2020
Teacher attitudes	Difficult to tell	• Open but hesitant • Private school culture is focused on achieving academic, measurable results • Feel that they must hold a coordinator title to make changes in any given area
Challenges faced	New school New staff School culture	• High parent autonomy • Broad scale of parent views in regards to CTN • Schools are afraid to make bold decisions and be seen to get it wrong • No budget • No time allowance to work with staff • Low profile of CTN and nature in general
Positives	Small school SLT positivity	• Experienced staff • Teacher positivity towards CTN • Small steps of progress • SLT encourage peer coaching • SLT recognition of CTN
Next steps/ inter-vention	Staff training Begin Eco Club ECA Social studies links	• Parent workshops • Wider curriculum links • Inspire teachers in taking risks through role as educational visits coordinator • Teacher training - open door observations • Organise and support others in organising visits with support CTN • Teach within foundation stage • Take on a leadership position