

Do We know Enough About the Benefits of Bikes in Nurseries to Justify Developing a Children's Bicycle Lending Scheme ?



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Abstract

This paper examines how a group of eight London nurseries undertook a short pilot study to review the role of bikes in the nursery. The participating nurseries are members of a social enterprise organisation that gives at least one third of the 4500 nursery places to children from poor and disadvantaged families/communities as identified by the Income Deprivation Affecting Children Index (IDACI). The organisation implements a specific social pedagogy in which the health and wellbeing of children is central. Many of the children are considered to be at high risk of child obesity owing to a range of factors.

In the UK All Party Parliamentary Group on a Fit and Healthy Childhood report 'Physical Activity in Early Childhood' 2015, the urgent need to ensure that young children's physical activity is given priority status is reiterated throughout. A UK study of 500 mothers and their four year olds is cited that suggests only 1 in 10 2-4 year olds meet the Chief Medical Officer's guidelines for young children's physical activity. This concerning statistic implies that not only is there significant room for improvement in increasing the amount of quality physical activity in the early years but also that parents and carers have a crucial role to play in developing children's healthy habits early on in life.

(<http://www.bhfactive.org.uk/beststart/index.html>).

The organisation participating in this study has adopted an action research model to support continuous improvement in practice and encourage staff to initiate and lead small scale studies that may deepen their understanding of challenging situations. In this project, it meant reviewing where and how bikes are used by children and if there are any wider implications for their overall growth and development. This paper records the process and progress of the internal action research project that investigated how children use bikes, the views of parents about their children's engagement with bikes and how these findings may influence the implementation of a bike lending scheme.

The paper concludes that staff observe many benefits to the use of bikes in children's physical and sociolinguistic developmental domains. They note some barriers to usage including an unsupportive cycling surface and the poor state of bike repairs. Parents also see benefits to their children's physical skills from learning to ride bikes. They see bikes as a key part of their children's nursery life and are divided almost evenly as to whether they could use a bike lending scheme. There was a mismatch in what parents said about the frequency they used the bikes. Parents stated they used their bikes weekly but when asked

about taking the bikes outside the number differed and was much lower with the main reasons for the lower frequency of using bikes outside as the weather and limited time.

Key Words

Social Enterprise, Social Pedagogy, Child Obesity, Physical Development, Bicycles

Introduction

This paper examines how a group of 8 London nurseries undertook a [six week](#) pilot study to [determine](#) how children used bikes in the nurseries and [how parental attitudes towards](#) the benefit of bikes [may affect their use](#). The research was prompted by staff at the nurseries who were [increasingly](#) concerned about the growing rate of obesity among children under 5 especially those from poor and disadvantaged communities. [A workshop summary 'Obesity in the Early Childhood Years' from the USA](#) National Academies of Sciences, Engineering and Medicine (2016), [suggests that](#) the rise in child obesity is [not yet slowing down](#). In 1990 thirty-two million children aged nought to five were obese but by 2014 this figure had risen to 41 million and the predicted figure for 20 40 is 75 million. Recent statistics for the UK showed that 13% of children aged between two and four years old are obese and a further 16% are overweight.

The [nursery staff](#) wanted to better understand what they could do to [promote](#) a positive attitude [towards](#) a healthy lifestyle [in their settings](#). They began by testing their views as to whether using bikes would [support](#) this healthy attitude and [if](#) this view was supported by parents. As many of the families could not afford [to buy](#) bikes, they wanted to use [these](#) findings to decide whether a bike lending scheme [would be an appropriate option](#).

The pilot nurseries are part of a social enterprise in London providing early childhood education and care to 4500 children aged 0-5 years. Social enterprises are revenue-generating businesses with two goals: to support social, cultural, community economic and/or environmental outcomes and to earn revenue. There is no single, legal definition for a social enterprise, however, regardless of its legal form, the constitution of a social enterprise includes the requirement that profits are re-invested in the business or in the beneficiary community - and not redistributed to owners, shareholders or investors.

The purpose of the organisation was influenced by the Universal Declaration of Human Rights (United Nations, 1948) and the United Nations Educational Scientific Cultural Organisation (UNESCO) Global Monitoring Report (2010 p. 135) which describes the 'clear remediable

injustice' when disadvantaged children are not provided with educational opportunities that may benefit individuals and societies. This social enterprise uses a subsidised sustainable fee structure which enables it to fund both nursery places for disadvantaged families as well as run nurseries in deprived neighbourhoods. It has a specifically designed social pedagogy to ensure that every level of the business (financial, pedagogical and environmental) combines to create social capital and social impact.

The adoption of social pedagogy recognises that early childhood education is a combination of social, pedagogical and political practices and the boundaries between these disciplines must be crossed to provide useful services to children and adults. It is a pedagogy which fits within the concept of regular activities and organisational behaviour. Cameron and Moss (2011) suggest that 'Social pedagogical methods and approaches are constructed in a specific context of the everyday organisation and relational work which takes place with the children' (p.88). Petrie (2009) confirmed that social pedagogy is practical and operates with people through the power of establishing and nurturing relationships. This fits with the ethos of the pilot nurseries' holistic child-centred approach which means never disconnecting pedagogical practices from the social context and functions of education. It is as Stephen's (2009) says, a helpful model in such contexts.

It was from this perspective that staff became so concerned about the growing levels of obesity they observed in their own nurseries and locally in their communities. According to the Greater London Authority, 'Unhealthy Weight in London's Children - What We Know' London's Child Obesity Taskforce, 2019 nearly 40 per cent of children across London are overweight or obese.

Childhood obesity can lead to debilitating and challenging health conditions [including](#) type 2 diabetes, high blood pressure, breathing problems, fatty liver disease and high cholesterol. According to Cheng, J et al.: (2016) obesity [may have a significant impact on children's early motor skill acquisition and proficiency. Lack of physical competence affects the confidence of children to engage positively in physical activities - and the cycle of inactivity and weight gain continues - often informing their health and wellbeing status over a lifetime.](#)

The Role of Physical [Activity](#) in Reducing Child Obesity

Globally, obesity is affecting an increasing proportion of children. Physical activity plays an important role in the prevention of obesity in childhood and adolescence and [may](#) reduce

the risk of obesity in adulthood. Puberty and adolescence are acknowledged as particularly vulnerable times for the development of obesity due to sexual maturation and, in many individuals, a concomitant reduction in physical activity. In many Western settings, a large proportion of children and adolescents do not meet recommended physical activity guidelines and, typically, those who are more physically active have lower levels of body fat than those who are less active. Active behaviours have been displaced by more sedentary pursuits **that** have contributed to reductions in physical activity **and** energy expenditure.

Without appropriate engagement **in physical activity** there is an increased likelihood that children will live less healthy lives than their parents. Owing to the high risk of overweight adolescents becoming obese adults, the engagement of children and adolescents in physical activity and sport is a fundamental **element of** obesity prevention **initiatives**. According to García-Hermoso et al. **physical activity does not play a significant role in preventing weight gain in pre-schoolers but is an important element in embedding lifelong healthy habits and behaviours.**

(2019) physical exercise whether combined or not with additional intervention has a small effect on both body weight and physical fitness in preschoolers and they recommended that interventions to prevent obesity should be directed towards improving physical fitness of preschoolers. Not sure what this means?!

According to the cycling charity Sustrans, <https://www.sustrans.org.uk/about-us/> cycling can help **Primary age** children **experience** the recommended 60 minutes of physical activity per day, **that** one-third of children do not currently achieve. They list the benefits of cycling on their website and highlight how many children find it enjoyable and fun. **Teachers also** noted that children who walk and cycle to school are more alert and ready to learn than those who arrive by car.

Environment and opportunity play **a** significant role in **supporting the development of children's gross motor and locomotor skills eg. rolling, crawling, walking, running. These early movement skills form the building blocks for later more complex manipulative skills eg writing.** Such large movements **require** strength, balance, coordination **and** agility to perform. **Continual practise and repetition ensures that children's physical foundations are reliable, sound, strong and stable.**

In response to the WHO 2017 obesity report, David Morley suggests that young children's innate need to move and be physically confident and competent is often undervalued or ignored by policy-makers. The consequences of not being able to join in, keep up and contribute may lead to a lifetime of weight status issues. Ninety-one per cent of girls and 70% of boys considered overweight or obese at age 9 had gained their excess weight by the age of five.

The *Play on Pedals* report (2017) found that playing on bicycles increased physical activity and improved children's balance, coordination, strength and overall body control. It also increased parents' physical activity as cycling together built their self-confidence and enhanced family relationships as they all gained a new life skill together. The report noted that riding bikes improved children's behaviour and increased their levels of concentration, listening, perseverance and sociability as well as fostering a sense of responsibility, ownership and awareness of bike safety.

Zamani (2016) noted that when children used their bikes outside they engaged in functional play, followed by constructive play, exploratory play and then dramatic play. Therefore, how children used the bikes in the very varied outdoor spaces of the pilot nurseries was of significant interest to the nursery staff. Dymont and O'Connell (2013) and Smith et al. (2014) suggest that the way children use their tricycles, bicycles and trolleys on pathways and open areas of gravel, concrete or asphalt often promote functional play, in contrast to the more active and challenging play observed when they engage with more natural, uneven, grassy or stony surfaces. This has interesting implications for playground designers who may be more sensitive to the natural resources children already enjoy and not to reimagine their spaces unnecessarily. Jansson 2015 Ward 2018. While building new playspaces was not part of the study - the project may provide useful information that informs changes in the environment that support greater bike engagement.

O' Connor (2016) suggests that a high level of physical activity in the early years is positively associated with greater levels of psycho-social wellbeing. She noted that children who enjoyed physical play as they used their bodies to create activities both indoors and outside, increased their sense of wellbeing. A study carried out with 4- to 6-year-olds regarding their well-being suggests that the physical environment, available materials, common activities, and the opportunity to influence their day were of crucial importance for children's well-being in ECEC institutions.

Given the undecided relationship between obesity prevention and physical activity that is reflected in continuing debate at policy level, Manners (2019) argues that the critical role physical activity plays in supporting children's overall health and wellbeing should not be left to chance. All EY settings should have a physical activity and outdoor play policy that is current, relevant and accepted and implemented by children, staff and parents/carers.

She also reflects on a comment made by Weaver (2015) who challenges us in the UK to stop trying to compete with the Scandinavian approach to outdoor learning and begin to recognise the benefits of using home-grown resources and materials. He calls for us to return to the 'poetry of the back garden.' This aligns with the views of our staff who sparked the project and often talked about how our urban outdoors could be better used to benefit children's ability to become confident cyclists.

This has also been noted in the US, where they face the same challenges of obesity. A research review completed by the Robert Wood Johnson Foundation in 2011 examined the impact of health and safety regulations for childcare settings in many states across the US. The review was based on a selected set of guidelines relating to infant feeding, nutrition, physical activities and screening childhood obesity results. The outcome of the review demonstrated considerable room for improvement even among those states that had the strongest regulations - especially in increasing the nutritional quality of food served to children and an extended time afforded for them to engage in physical activity.

They also recognised that staff needed more support to promote healthy behaviours and that opportunities for parent education and involvement were limited. The review concluded that interventions in childcare settings had the potential to positively impact nutrition and physical activity outcomes in response to obesity prevention initiatives. The UK All Party Parliamentary Group on a Fit and Healthy Childhood also continues to advocate for accessible and sustainable physical activity initiatives to be created and implemented as essential components of all child health and wellbeing policies.

The Context of The Pilot Study

There is general agreement that the issues of child obesity are complex and that many elements need to be explored to address the increase. According to Georgia Bailey in her report '*Can the Government's Obesity Strategy Tackle the UK's Weight Crisis?*' (Posted 25th February 2021 www.politicshome.com) there have been 14 Government Obesity Strategies

since 1992 leading to the introduction of 689 policies and yet obesity rates have continued to increase.

The London Mayor's Child Obesity Taskforce was set up in 2018 to bring about a transformation in London so that every child has every chance to grow up eating healthily, drinking plenty of water and being physically active. Set out in the *Every Child a Healthy Weight :Ten Ambitions*

https://www.london.gov.uk/sites/default/files/every_child_a_healthy_weight.pdf



According to the Trust for London Report (<https://www.trustforlondon.org.uk/data/child-obesity/>) childhood obesity is more prevalent in London than England generally. In 2018/19, some 23.2% of children in Year 6 were considered obese in London, compared to 20.2% in England.. The majority of boroughs had a higher prevalence of childhood obesity than England overall in both 2008/09 and 2018/19. Barking and Dagenham has the highest proportion of childhood obesity out of all London boroughs at 29.6%. The borough also had the largest rise in childhood obesity since 2008/09 (a 5.5 percentage point increase). At the other end of the scale, 10.7% of Year 6 children in Richmond upon Thames are obese, and this rate has fallen by nearly a percentage point since 2008/09. Others have experienced a slight or no change at all; for example, the rate of childhood obesity in Westminster remained at 24.2%. Given that information we chose to include nurseries in all three of

these boroughs in the project. [This paragraph is repeated on page 11 - think best to keep it here.](#)

Research conducted by the University of Bristol for Fit for Sport (2019) found that 78% of Primary school pupils across the UK [who have been](#) measured through their Healthy Active Schools System (HASS) are failing to meet the recommended fitness levels for their age group. They monitored the behaviour of more than 2,000 [Primary age](#) children from 57 schools across the [South West](#) of England and found [they](#) became 17 minutes less active per week each year. [Two hours of variable quality](#) PE lessons a week [\(that are no longer mandatory\)](#) are not enough to [effectively support children's health](#), considering the Government guidelines state that 30 minutes of daily physical activity [should be the absolute minimum](#).

[Informed by this](#) evidence, [LEYF \(you have called it 'the organisation' up to this point !\)](#) began a partnership with Bikeworks in 2018. Bikeworks, based in the Queen Elizabeth Olympic Park, is a non-profit social enterprise set up in 2006 to provide cycling opportunities to those most likely to be excluded. Since 2018 Bikeworks has donated over 200 brand new bikes across [LEYF](#) nurseries. Nurseries wanted to make best use of these bikes - not [just to](#) use them as part of [standard](#) nursery provision but [also to](#) consider how they could be used as part of the home learning approach [\(the sixth strand of the LEYF / 'the organisation??](#) pedagogy). Parental engagement in children's physical activity is an essential component of a healthy household environment. We believe that if we can secure this engagement at an early age, physical activity schemes [may have a greater impact on lifestyle and behaviour changes](#).

The idea of a Bike Lending Scheme' began to emerge through conversations with parents and children. Staff noticed how few children had a bike at home. They noticed that parents commented on the expense of a bike and the storage issues in small flats. The nurseries decided to lend children the bicycles as we had enough [of them](#) to do this [owing to](#) the Bike Works donations. The overall aim [of the scheme](#) was to support the reduction of childhood obesity [by](#) using bikes to encourage physical activity [and support additional healthy behaviours](#)..

To [determine if bike use could have a positive impact on children's physical skills and overall health](#), the nurseries had started a small-scale lending scheme [that](#) enabled [children to](#)

access an appropriate bike they could later exchange for another model as they became stronger and more confident.

The lending scheme also enables nurseries to reuse the bicycles, creating environmental benefits by reducing landfill waste. A report [that](#) examined a bike sharing project called ‘Cycles for Change’ in Minnesota [USA](#) <https://bit.ly/3ezZghe> [described the varied benefits the scheme promoted](#); broader [social](#) engagement [by residents in](#) communities; new or strengthened relationships between organizations; improved approaches for working with the community; greater advocacy focused on health equity; strengthened connections among community members; broader health impacts; shifting perceptions of bikers and biking and residents taking on greater leadership roles.

In 2017, Scottish Transport [created a similar bike project in Glasgow](#) called ‘Play Together on Pedals.’ This programme [involved](#) distributing bikes to children and organising cycling sessions in nurseries.

[The positive outcomes included the following:](#)

- [An increase in the levels of](#) physical activity of parents and children - 95% of [the](#) participants [reported an increase in their level of](#) physical [activity due to](#) the scheme.
- Improved motor skills, balance, co-ordination, strength and general control.
- Increased [levels of](#) confidence and self-esteem in both children and adults.

[One unexpected outcome that emerged from](#) the ‘Pedals for Play’ report (2017) was the positive effect [engaging with a bike scheme had on the](#) behavioural [issues of](#) children with additional needs and disabilities [including those on the autism spectrum or who experience hearing difficulties](#). [This report also suggests](#) that parents and grandparents who have [little cycling experience may not be as supportive to children as those who have more](#).

[These findings suggest that the more knowledgeable](#) nursery staff [are about how](#) bikes [can support](#) children’s all-round development, the more they can inform parents. Also, [they can](#) provide parents with [basic](#) practical advice on bicycle maintenance, helmet fitting, [information on use of](#) stabilizers and how to turn the bike into a balance bike. It was also noted that the more staff are informed about bikes and cycling the more they [can use these resources](#) to extend children’s development [in other areas](#); for example maths and problem-solving [and social/communication skills](#).

The Purpose of the Study

Do We know Enough About the Benefits of Bikes in Nurseries to Justify Developing a Children's Bicycle Lending Scheme ?

Staff from the London nurseries were concerned about the growing rate of obesity among children under 5 and wanted to explore whether bikes could be used more effectively as part of a child's healthy lifestyle. To explore this, they agreed to observe how the children use the bikes in 8 pilot nurseries as well as seeking parents' views as to their perspectives about benefits of bikes. The intention was to use the information to consider whether it was worth developing a bike lending scheme across the whole organisation.

The Study Participants

Recruitment to the pilot was by identifying three specific boroughs (Barking & Dagenham) which has a significant issue with child obesity, the more mixed borough of Westminster and Richmond on Thames where there are much lower levels of child obesity. In total, eight 50 place nurseries were invited to become part of the pilot. Those who joined expressed an interest in the research process and the use of bikes as a means of addressing the complex issue of child obesity.

As a social enterprise, we work with children from local communities and target families who live in poor areas or who are themselves experiencing issues causing obesity. The majority of London boroughs have a higher prevalence of childhood obesity than in England and Barking and Dagenham has the highest proportion of childhood obesity out of all London boroughs at 29.6%. The borough also had the largest rise in childhood obesity since 2008/09 (a 5.5 percentage point increase). At the other end of the scale, 10.7% of Year 6 children in Richmond upon Thames are obese, and this rate has fallen by nearly a percentage point since 2008/09. Others have experienced slight or no change at all; for example, the rate of childhood obesity in Westminster remained at 24.2% still above the rate across England. Given that information we chose to include nurseries in all three of these boroughs in the project. [Repeated on p. 8 - I would take out here.](#)

For consistency and ease of operation, each of the 8 nurseries identified 1 or 2 staff who were called “Bike Champions”. The organisation uses the term champion to communicate a lead role in any research project so that all the other staff know who to approach about the research project. To prepare the Bike Champions they were invited to attend a Zoom workshop on the pilot. This was to explain the rationale for the research including providing support materials including a PowerPoint presentation to help ensure consistency of message.

In line with the views of Pascal and Bertram (2012b) the organisation uses action research to ensure that [satisfying](#) learning opportunities are not missed. The aim is to use action research to develop a culture of professional inquiry involving staff as research partners. This approach also supports the development of learning communities (DuFour et al. [2008](#)) where the champions can come together at the end of the project to share their learning and consider the wider implications from the project. The process itself is designed to drive a professional cycle of learning, action and reflection in order to deepen professional confidence and drive pedagogical leadership across the organisation. In terms of management, the usual process is that the manager oversees the delivery of the project and the Area Manager responsible for each pilot nursery is required to add the Bike Research to their monthly audit and to pro-actively monitor the Bike research progress.

Ethical issues and Consent

This study was conducted in line with the research ethics guidelines provided by the British Educational Research Association, Ethical Guidelines for Educational Research fourth edition (BERA 2018) (<https://bit.ly/2lnso0c>)

Voluntary consent was obtained from the staff in the nurseries. Managers spoke informally to each parent explaining the research and the rationale, making sure they understood why we were conducting this project. As children using bikes was part of their existing experience and there were no changes to their access to bikes, we did not formally seek their permission. However, we discussed the research with the children at their children’s planning meetings. We sought their views about how they used the bikes in the nurseries. Children have planning meetings weekly where they discuss what is of interest to them or their views are sought about new equipment or resources they want to have in their nurseries. There will always be variation in the meetings given the different children

however, the process is that the actions are agreed at the end of the session and read back to the children to gain their consent. This is a process with which they are very familiar, led by two staff members they know and trust and using language which is clear and understandable.

The research process began from the point when the consent had been agreed with the identified staff. It was agreed that the pilot would need at least six weeks. It was agreed that the parents and staff details would remain anonymous. Informed consent from parents was gathered through their signature after presenting them with written information about the project and how data was to be handled and disseminated. The data would be shared with consent with the lead researcher who would scan and log it.

We used a mixed method approach to collecting data. We decided on observations because Manners (2019) [suggests that](#) observations are effective mechanisms for collecting data about physical development/[activity](#) especially audio and visual recordings. She notes that visual materials provide evidence about the child as an individual and also how they operate physically within a group, where they hover and what they do, how they do it and where and why they do it. Collecting and collating data gives the adult time to reflect and share observations with colleagues and can be the source of conversations and discussions within a learning community. This was exactly the plan for the bike project.

The research methods also included questionnaires, [semi-structured interviews and focus group conversations](#) -[clarify if on Zoom/telephone/in person??](#) Cross sectional questionnaires were provided to gain a snapshot of staff understanding about the training programme but also how they would use their new learning. The questionnaires were distributed via Survey Monkey to both parents and nursery staff to better understand the use and availability of wheeled toys outside the nursery setting and inside the nursery setting, respectively. The questionnaires were anonymised (no identifying information, such as name or nursery, was requested) in order to encourage respondents who may otherwise be hesitant and to reduce social desirability bias. The questionnaires consisted of both closed questions (where possible) and open-ended questions. Open-ended questions encouraged respondents to divulge more detail and thus enable us to gain a deeper understanding of their perspectives on children's use of wheeled toys.

The exploratory nature of the background questionnaires helped gain 'knowledge of organisational and parent behaviour' and is used as a common data source in qualitative

early childhood education and care (ECEC) research (Jarvie, 2012; Johnston, 2008; Boudreau, 2005; Meier & Lemmer, 2015). Both the staff questionnaire and the parents' questionnaire were coded *inductively* using a content analysis approach. Content analysis was deemed appropriate for the questionnaires, when applied to open-ended questions, it enables us to "code those answers into a meaningful set of categories that lend themselves to further quantitative statistical analysis" (Lavrakas, 2003). Two types of codes were generated: in vivo codes and constructed codes. The conciseness of some questionnaire answers enabled the generation of in vivo codes (based on words the respondents use), examples of this include the codes 'motor skills', 'coordination', 'balance' (Staff Questionnaire, q.4). Where appropriate, constructed codes were generated (based on data that reflects the same concept) (Bradley et al., 2007). For example, question 6 of the staff questionnaire (Are the children able to pedal, push, pull, brake, turn the handlebars, reverse on the bikes?) had responses which included qualifying language, such as 'Some yes', 'Mostly', and 'Some of them', these were coded as 'Variation in ability'.

The brevity of respondents' answers and the analytic procedure of constant comparison (Glaser & Strauss, 1967) resulted in some in vivo codes becoming themes themselves, e.g. 'too cold', a response to *'What, if any, are the obstacles preventing your child from cycling more frequently?'*, was coded to the existing in vivo code 'Weather', which becomes a theme. Similarly, for the same question, responses such as 'live in flat', 'no space for bike', and 'small garden' are coded/themed as 'Lack of Space'. Other themes emerged after organising codes into categories, taking into consideration the collocation of language within the responses. For example, the high collocation of words 'helps', 'build', 'develop(ment)', 'physical', 'skills' in proximity with specific skills such as 'coordination', 'motor', 'balance', 'spatial awareness', demonstrated how respondents grouped, and therefore thought of, these skills together and as part of 'Physical development'. Similarly, the theme 'Sociolinguistic skills' emerged after grouping codes which stressed - either implicitly or explicitly - use of language and its sensitivity to social conventions. Thus codes 'Behaving', 'Communication', 'Problem solving', 'Teamwork', and 'Turn taking' were grouped together as they all reflect sociolinguistic competence.

Evaluation of the action research project was achieved through the use of individual interviews with all teachers involved in the 8 nurseries. Interviews were undertaken both pre and post the action research project. Interviews were approximately one hour long and were conducted by the author in each teacher's school. Following Maxwell (2005), the

interviews were interactive and conversational in style. Interviews were transcribed verbatim, and copies of transcripts were provided to the teachers for checking.

The observations were transcribed and coded using a hybrid thematic approach, following Xu & Zammit (2020), and informed by Obee et al. (2020). Initially the observations were coded *deductively*, using the categories of observations outlined in the Observation Prompt List to guide the semantic coding process, in which codes summarise the data's surface meaning. The coding process involves iterative cycles, therefore, after the initial semantic coding, latent data-driven codes were generated to detect implicit meanings, this involved analysing initial codes in relation to each other and themes that explained the relationships between categories was identified. Attempts were made to detect longitudinal changes within nurseries using Saldaña's (2003) framing, descriptive, and interpretative questions, however the brevity of some observations, often focusing on the behaviour of one or few children as opposed to the whole sample, restricted the ability to detect patterns and progressions in behaviour.

How do children use the bikes?

The observations suggest that children mostly use the bikes in collaborative activities rather than solitary play. The observations contained many references to child-led racing games, involving groups ranging from as small as two children to larger groups, as well as chasing games. In LY, the children are observed using other tools in creative ways alongside the bikes, such as tying or hooking a ribbon, standing cup, or walking stick to the bike. One child even connected a scooter to a bike:

one boy has tied a small wire from the standing cups from the double bike to the scooter, one child held on as the girl riding the double bike manoeuvred round the garden pulling the boy on the scooter along (LY, Obs. 4).

Non-traditional uses of the bicycles were rare. Non-traditional uses of bikes are defined as those in which the bikes are used for purposes other than cycling. Such observations occurred once in Rside and EBY each, while two non-traditional uses were observed in LY in observation sessions 1 and 3. All of these five observations seem to suggest independent play, three of which occurring in the first observation sessions of the respective nurseries. Three of the five observations specify that the child engaged in the activity is a girl; these activities include a girl playing with the pedals watching them go round, using the push bike

as a seat in the sand tray while collecting objects, and banging her bike constantly behind another bike.

Observations of a child or children dominating the play are rare, however, when they do occur, the dominant children are always boys. LY (Obs. 1) and Rside (Obs. 3) both contain observations of a singular boy dominating play by leading the others; in LY, the child ‘tells his friends when to sit with him and when to get off’, while in Rside, the boy started “using the traffic light system and directing his friends to go, stop, and change direction around the climbing frame”, and the children involved in this activity subsequently took turns “really really well” to play that directing role. In BTs (Obs. 3), a pair of male twins “lead play” in the bike assault provocation, and they are described as “hav[ing] each other to lean on” and that “children seem to follow their plan.”

The observations do not include sufficient data regarding differences and dynamics between boys and girls to reach conclusions about the gender dynamics in each respective nursery, however a few observations are worth noting. In LY (Obs. 4), when the boys “approached each bike, the girls got off the bikes and the bikes became more occupied with boys”. In MG (Obs. 6), during a child-led session with minimal adult involvement, the “majority of the children were boys with only one girl during this activity. The other children (who were all girls and one boy) were sitting with a teacher at a creative activity sticking sequins to make a card and did not show any interest in the bikes”. Nonetheless, there are multiple references to child-led games involving both boys and girls.

In FZ, it appears that there are more girls playing with the bikes over time, as the first observation notes that:

...the same children on the bikes. These were all boys on the bikes. [...] The girls do not go over to the boys and ask if they could have a turn on the bike.

While in the second observation, initially, there are three boys and one girl on the bikes, and another girl “came over to a member of staff and asked if she could have a turn on the bike”, prompting the adult to take out the sand timers and explain how they were going to use them. The FZ nursery adds that in this session, “with adult intervention children showed more confidence and understanding in turn taking with their peers”. In FZ’s fourth and sixth observations, the children who managed to get on to a bike at the beginning of the session are equally split: two boys and two girls. The third observation offers no information of the

gender makeup, and the fifth observation is dominated by boys *because* the snow superseded the remaining children's (three girls, one boy) interest in the bikes.

Do you think it may be useful to list the 'provocations' here? - There is a table on p 18 - but it's a long time to wait! - or reposition 'playing with the bikes encourages.....'

AFTER the 'provocations' para - so it runs together better?

The children respond well to **provocations**, displaying high interest, especially when these provocations are set up with their input. In both BTs and Rside, children showed high engagement with the bike fixing station or 'bike mechanic activity' set up; in Rside, this was after the children's planning meeting, and the children used a variety of tools including spirit levels, hammers, screwdrivers, and spanners to fix and clean the bikes, focusing well on the activity "really enjoy[ing] exploring how we fix bikes and how we make them better" (Rside, Obs. 2), whereas in BTs, the children added their own props in addition to the tools provided (Obs. 1). Similarly, children engage well in car washing provocations (Rside, Obs. 4; BTs, Obs. 4).

Playing with the bikes encourages learning of bike mechanics and bike safety

In SH, similar to Rside and BTs, one provocation activity set up involved placing a wheel pump in the nursery setting and telling the children that it is used to pump the wheels with air, the children subsequently worked together to figure out how to use it (Sh, Obs. 2). The children of Sh display a curiosity towards the bikes again in Observation 5, when they turn the bike upside down, discuss where the brakes are, and moved the handlebars to understand the mechanics of the bike. The children are observed

talking to each other about how we need brakes to stop the bike moving if it is going too fast.

The observations also demonstrate the children's awareness of bike safety when someone calls out:

"we need a helmet". They say if they fall of the bike going too fast, we are going to bang our heads. Someone else says we need to slow down so we don't fall down. [speech marks added for clarity] (Sh, Obs. 4).

Provocations encourage children to share experiences and reinforce roleplay Put this at the top of this section?

While observations detailing moments where children shared experiences are restricted to FR, BTs and MG, it is notable that they always coincide with provocations, all these observations relate to the provocations of the respective sessions. In FR and BTs, children relate the traffic light and physical road games to other relevant experiences, noting that:

“My daddy has a car” (FR, Obs. 1)

“Yeah but my mommy goes all over the road” (BTs, Obs. 6)

And upon having the traffic light rules explained by an adult - despite the adult not explaining that it is the traffic light system - a child says:

“It’s like mommy in her car” (BTs, Obs. 2)

Similarly, both FR and BTs have bike cleaning provocations where children relate the activity to other experience. As the FR activity is styled as a “car wash”, children accordingly spoke about their experiences at the car wash (Obs. 4). In BTs, during the bike cleaning activity, one girl began

[...] to talk about how her own health and self-care. She said that “we clean the things to make sure we get the virus off of it, and also to make sure that we don’t get ill” (BTs, Obs. 4).

Some form of child-initiated roleplay was observed in 7 out of the 8 nurseries. Most of these roleplay activities involved using the bikes to simulate being in traffic. This included three observations across three different nurseries (Rside, MG and FR) in which a child asked for or pretended to give tickets to those on bikes. Children also used the bikes to roleplay being in traffic where they pretended to be other vehicles such as an ambulance, or ice cream truck, or in one instance, a traffic warden. In Rside, SH, MG and FZ, the roleplay activities are often closely related to the provocations that have been set up, revealing the children’s strong interest in the provocations. The table below showcases the children’s responsiveness, detailing the provocations and the corresponding roleplay:

Nursery	Provocation	Roleplay
MG	• Road with bus top and zebra crossing • Tunnel	• Bus conductor asking for tickets • Ambulance

	• Tyre shop	• Pretending to fix tyres
Rside	• Fuel station with watering cans	• Two boys pretended to fill up each other's bikes with fuel.
Sh	• Obstacle course	• The children used the obstacle course as a traffic light game, as well as to roleplay travelling on the road, including as a delivery man.
Fz	• Mud kitchen	• Used mud to clean bikes as a car wash activity

In LY and FZ, roleplay activities also included more fantastic elements, where bikes were used in roleplaying superheroes (Ly Obs. 2 and 4) and monsters and dragons (FZ Obs. 4).

Most of the observations regarding the children's use of language occur when the children are engaged in roleplay and provocation activities, in which the children use "a wide range of vocabulary" (BTs, Obs. 1), relating to the activities:

They're also using a range of vocabulary, such as "scrubbing" and "cleaning". Also using rhythm and rhyme. [...] More extended vocabulary "shiny" "sparkly" and "very clean" was used. One child has come from the vegetable garden with a paintbrush, and he said, "I can use this to clean" and "this is a good idea".
(BTs, Obs. 4)

Use of bikes promotes knowledge of roads and traffic

Traffic light and physical road games using the bikes appear to be effective at teaching the children the rules of the road in FR, BTs and LY nurseries. As previously mentioned, the children relate the game to other relevant experiences. It is unclear whether the traffic light game in FR is child-led or a teacher-led provocation. Regardless, children show an understanding of traffic light colours, saying:

"It's red, STOP!"

"Green, let's go" (FR, Obs. 1)

“You stop at red, get ready on yellow, or we also call it amber, and go on green” (BTs, Obs. 6)

In the case of BTs, there is a noticeable development from the first instance of the activity and the second and third instances. Initially, some children did not abide by the rules, and they need to be repeated; additionally, the yellow ‘light’ (represented by a bat) confused the children (Obs. 2). When the game is repeated (and explained) more than a month later (Obs. 5), the children, already familiar, found it easy to follow rules, and some were able to instruct others to follow the game. In the third instance of the game (Obs. 6), which also begins with an explanation of the rules, all children show an awareness of the traffic light system and collaborate together:

One of the children, shouts, “red light, everybody stops”, and they all stopped, and participated, then they all shout “it’s green”, and they all move in the same direction. They repeated this on five other occasions. Again they stopped at a red light. But this time, all the children begin to chant “Stop stop stop”.

In Ly, the game is played once, and the observation reveals the children quickly learned the rules and obeyed the signals (Obs. 3):

They waited for the green light and then went on. They stopped at the crossing when they saw children walking across before continuing to move around the garden. [...] They listened to the stop and go signal as they rode around.

In BTs, some children show further knowledge of road rules, often resulting in **cautious behaviour**, such as moving slowly in response to “an accident”, reminding others of staying within the lines, or moving a tyre (which was meant to be a roundabout) because “it will cause an accident” (Obs. 6). However, on occasion, this results in **conflict**, as some children are more cautious than others, and those more cautious get upset at the others:

However, one of the boys reminds the others that the rules are saying “you need to stay in the lines”. He then repeats this phrase over and over to another child, and then begins to get upset. A teacher then intervenes and reminds the children there are many different lanes on a motorway, so slow, fast, and the middle lane, and they are able to

overtake each other. However, one of the boys then says, “but you need to follow the rules, or else you're going to jail”.

“You're not respecting me or the rules of the game”. (BTs, Obs. 6)

Conflict is sporadic, and conflict over sharing bikes is the most common form of conflict

Conflict was observed at five nurseries: SH, MG, BTs, LY and FR. No conflict was observed at EBY, Rside, and FZ. The observations of conflict are sporadic across the six-week period, often occurring only in one or two out of the six periods of observation in each respective nursery, except MG, in which conflict is observed in observation sessions 1,2,3, and 6. In the case of MG, the source of conflict is inconsistent across the six-week period.

The most common source of conflict is sharing and turn taking, which garners varying responses from the children. In certain situations, children appear capable of resolving this conflict without adult intervention through conversation and negotiation. In Sh, such conflict occurs once in the first week and appears to be resolved by the children independently, as the observation explicitly states that there was no adult intervention. While there were “some short bursts of getting upset” conflict resolution was achieved “through conversations of acknowledgement that it was time for another child’s turn” and the children showed a “positive attitude in resolving conflict” (Sh, Obs. 1). Similarly, in MG,

conflict over sharing and turn taking is resolved by the children in the first observation, in which a child gets upset that there is no space for them on the bike they are using to roleplay as a bus. The other two respond by telling them, “You have to wait for your turn” And “When the timer is finished it’s your turn”, and the child went to get the timer and sat at the bus stop waiting (MG, Obs. 1). Again, in the last observation, when a child is upset because they wanted the scooter that was already occupied, the child:

independently went to get the timer and put it on, they then told the other child “when the timer is finished it’s my turn”. The [other] child agreed and carried on playing. (MG, Obs. 6).

However, conflict in which a child attempts or is successful in taking another’s bike, even when not in use, are not resolved easily, and often require adult intervention to explain to the children that they must wait their turn (MG, Obs. 2; FR, Obs. 3). In these instances, the children often articulate their possession over the bike saying, “That’s my bike”, “But I had it first” (MG, Obs. 2) “I had the bike first he trying to sit on it.” (LY, Obs. 5). Only one instance is recorded in which the children resolve such an issue themselves, in LY (Obs. 5), where:

Another child went over and tried pushing someone else off so he could have a turn. The other child kept saying no and pushing back before the other child went and asked for the timer.

LY has the highest number of conflict observations recorded, in which six instances of conflict are made in two observation periods, three of which arise from a child sitting on the back of another’s bike. In all three instances, the child at the front of the bike gets upset and gets off the bike.

Despite incidents of occasional conflict, children are able to share and take turns

Notwithstanding the incidents of conflict over sharing and turn-taking, many observations contained positive references to children sharing and taking turns without conflict. Despite the one aforementioned reference to conflict over sharing in SH (Obs. 1), the children in SH are described as “able to take turns” (Obs. 1), and they “become confident in allowing each other to take turns with the bikes” (Obs. 4). In FZ, over the time period, more sharing and turn-taking is observed. Initially, in the first observation, no sharing is observed, and as previously mentioned, the bikes are dominated by the boys. However, after an adult’s

encouragement and explanation of how to use timers in the second observation, children are observed sharing and using timers consistently in the subsequent weeks when the number of children interested in bikes exceed the number of bikes - seemingly without adult support.

Similarly, in BTs, when the number of children (8) exceeds the number of bikes (6), upon the adult's suggestion to use switch bikes after two loops:

The children then had a go at regulating this themselves however they did need some adult intervention to do so. After a few turns of doing this, they then began to regulate themselves (Obs. 3).

And in MG, instead of following an adult's advice of asking another child for a turn on the scooter:

The child independently went to get the timer and put it on, they then told the other child "when the timer is finished it's my turn". The child agreed and carried on playing (Obs. 6).

Even in LY, which reported the most conflicts over sharing and turn-taking, albeit these are confined to two observation sessions, reported multiple occasions in which children shared bikes and took turns without conflict, noting that "girls share the bikes well with each other without any conflict" (Obs. 1), and one child "happily shared the bike for another child to have a turn with a little prompting from an adult" (Obs. 3). However, adult prompting is not always necessary, in fact, children are able of sharing independently: after the adults stepped back, "three children changed bikes over and three asked for the blue timer" (Obs. 6). Similar sharing is noted in Rside, where boys are observed sharing well in their child-led games (Obs. 3, 6).

Observations about physical skills are few and far between

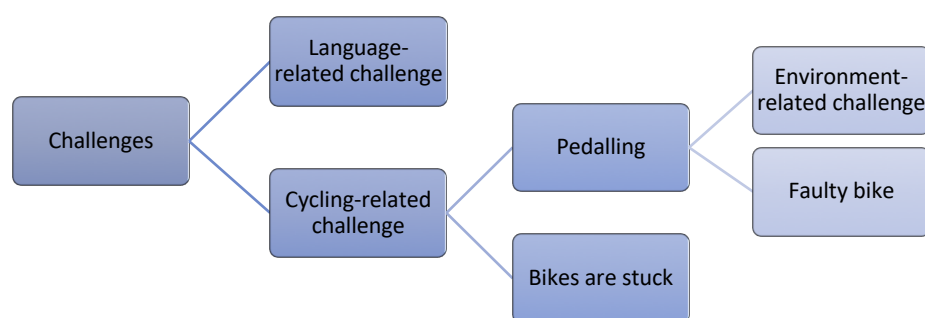
Observations contained few references to physical skills, and when found, are often few and far between to detect any physical skills development over the six-week period. Six out of the eight participating nurseries made observations on physical skills. Neither FZ nor EBY made reference to particular physical skills.

Most references to physical skills are related to spatial awareness and coordination, often in the case of steering to “negotiate space” (FR, Obs. 6) or to avoid obstacles (MG, Obs. 2; Rside, Obs. 1; SH, Obs. 5). The children are described as possessing “good spatial awareness” (BTs, Obs. 6); and can steer the bikes in narrow spaces (SH, Obs. 6), to turn corners (FR, Obs. 6), and to avoid icy paths (Rside, Obs. 3).

While in FR, it is only in the penultimate session that we find a reference to “some learning how to pedal” (Obs. 5), some other nurseries report strong pedalling abilities: Rside notes “good control in using the pedals” (Obs. 1), with one child being confident to pedal “at a high speed” (Obs. 6). Similarly, the children’s pedalling ability is described as “great” in LY (Obs. 2), and children can reportedly pedal backwards in SH (Obs. 5).

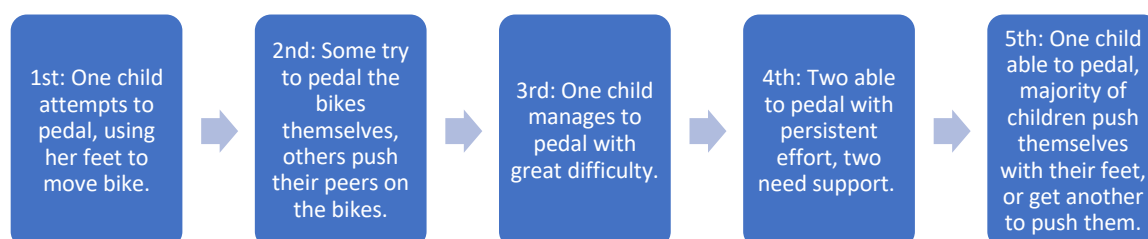
Few challenges are observed but children often cooperate to solve them together

Challenges are observed in seven out of the eight nurseries (all but Rside), and occur sporadically in all seven, except for EBY. The majority of the challenges are related to pedalling the bike. When this occurs in SH (Obs. 1 and 3) this is explained by the faulty bikes, such as the wheels starting to flatten.



In EBY, this challenge of moving using the pedals is a persistent theme throughout the six weeks, which initially leads all children who initially showed interest in the bikes to “move on quickly to other activities”. This difficulty is attributed to the thickness of the nursery’s grass in EBY. The difficulty in moving the pedals results in negative responses, either fading interest and subsequent change in activity or frustration. However, over the time period, a trend emerges where more effort is made to move the bikes, and consequently, children either learn to push themselves

with their feet, or cooperate by pushing their peers on their bikes, and some become able to pedal. Interestingly, the girls are described as more persistent in trying to pedal than the boys.



While the children of FZ nursery do not experience this difficulty to the same extent, the children do resort to the same alternatives when the ice makes it difficult to pedal, the children use one child who offers to push another's bike, and ultimately, the children use their feet to push the bike along. A similar incident (albeit where the cause is the weight of multiple children on a bike) is observed in MG.

Similar to the cooperation observed to overcome difficulties in pedalling, other challenges are tackled through cooperative problem solving. When two bikes are stuck under a bench in LY, two boys "worked together to pulling it out from under bench" (LY, Obs. 1), Similarly, in MG (Obs. 3), when a child find his bike stuck and calls out for help, "another child helps them to pull the bikes apart". In SH, when one child finds that their bike is broken, another child offers them their own bike, saying: "Don't worry we can both share it" and they proceed to take turns with the bike (SH, Obs. 3).

In addition to cooperation, sharing, and problem-solving, children show empathy and apologise when bike crashes occur, although these crashes are rare (SH, Obs. 5). For example:

Another bike crashes into the 'ambulance' and the child riding the other bike says "Oh no. Its crashed". The child at the back of the 'ambulance' hurts their elbow and starts crying. The child who was riding the other bike comes of the bike and says "sorry!" while rubbing the child's elbow. The child stops crying ... (MG, Obs. 3).

Seven nurseries (all but FR) organised children's planning meetings, with EBY, MG and SH organising multiple planning meetings over the six-week period. The planning meetings are regular activities in the nurseries and aimed as one way of giving children a say in what they are interested in learning. It is also part of how the organisation better understands how the children think, communicate and act as part of their learning process. At all seven nurseries, the children spoke about what they wanted to do with the bikes and/or what they like to do on the bikes, these answers have been combined to give a clear indication of the children's interests. The children proposed a variety of activities, the most common of which were roleplay (4 mentions), games of tag (4 mentions), and riding bikes outside the nursery (3 mentions). The top nine answers are listed below:

Activity of interest	Number of mentions
Roleplay: dragon/car, bear hunt, superheroes, police chasing robbers	4
Catch me if you can/tag	4
Ride bikes outside the nursery: to the shop, in the park, on the road	3
Drawing with/pictures of the bikes	3
Riding on/down a hill	3
Racing	2
Going fast	2
Fixing bikes	2
Exercises	2

At MG and SH, children were asked if they have bikes at home. All the children involved in SH's planning meeting on the 5th of March said that they had bikes at home and described their bikes in detail, and all explained that they wore helmets and rode their bikes to the park. At MG, two children out of the eight asked across two planning meetings (14 January and 19 February) didn't have bikes, but both expressed that they liked playing with the bikes at the nursery, one of whom said they would like a bike at home.



Nursery Staff Questionnaires

Teachers were asked to complete the questionnaires to elicit some initial information to establish the situations within the nurseries. The risk of complete validity in how questionnaires were completed was considered a dependent variable. The bicycle champions in the 8 nurseries were invited to complete questionnaires with the following questions. There is always a risk that questionnaires can lack depth and have some bias but for the purpose of the pilot it was deemed the most effective means of collecting data.

Nursery Staff Questionnaires	
1.	How many bikes does your nursery have?
2.	What kind of bikes does your nursery have?
3.	Is the available space conducive to bikes?
4.	How do you think bikes help children's learning and development?
5.	How do the children use the bikes?
6.	Are the children able to pedal, push, pull, brake, turn the handlebars, reverse on the bikes?
7.	Does the nursery operate a lending scheme?

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Data Findings and Analysis

Data were collected over six weeks. Data in each category were examined allowing for the identification of key events and commonalities across the datasets. This process was key to the interpretation of the accounts of practice and identifying outcomes arising from the research, as well as outcomes that could not be directly contributed to research.

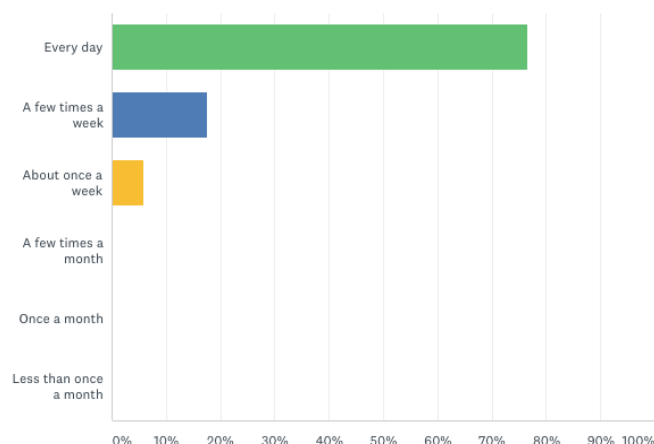
Seventeen staff completed the staff questionnaires, and their responses were as follows.

Q1/2 How many bikes and what kind of bikes does your nursery have?

In responses to question 1 some respondents' answers to the question revealed that the number they provided referred to their respective nursery's number of wheeled vehicles, rather than two-wheeled vehicles in particular. Not all respondents indicated how many were tricycles and how many were bicycles. On reflection, the interpretation of "bikes" means that we remain uncertain as to the average number of wheeled vehicles in a LEYF nursery, although some nurseries have both tricycles and bicycles. Bicycles have been described as 'pedal [bikes]', 'push [bikes]', 'community play', 'children's [bikes]' and 'two-wheeled [...] with stabilizers', 'with a basket' and 'with passengers at the back'. Tricycles have been described as 'single' or 'double'. Our findings show that bikes are used very frequently in nursery settings, as 76.5% of respondents said bikes are used in their nursery settings every day.

How often are the bikes used?

Answered: 17 Skipped: 0



3. Is the available space conducive to bikes?

When asked if the available space is conducive to bikes, 16 out of 17 respondents (94.1%) responded 'yes', two of whom stated that there was 'plenty of space'. However, some qualified their answer with references to the difficulty of the grass (3 respondents) – which has been described as 'new' and/or 'artificial – and the presence of a gazebo (1 respondent). Furthermore, one person who responded in the affirmative qualified their answer by stating, 'currently we are split into separate bubbles and preschool are using a small outdoor space which caters for tricycles outdoors'.

4. How do you think bikes help children's learning and development?

15 out of 17 respondents (88.2%) cited physical development as an area improved by bikes with the most common physical skills mentioned as coordination (41.2%) and motor skills (35.3%), with fewer mentions of other skills such as spatial awareness, balance and stamina. 8 out of 17 respondents (47.1%) cited sociolinguistic skills, with 6 respondents (35.3%) mentioning turn-taking as a skill gained from using bikes. Other benefits included keeping fit and healthy (17.6%), the ability to concentrate (11.8%), knowledge of the external world (11.8%), emotional wellbeing (5.9%) and all areas of learning (5.9%).

Theme	17 Respondents [Question 4 Staff Questionnaire]
Physical development	15
Coordination	7
Motor skills	6
Spatial awareness	3
Balance	2
Strength	0
Stamina	1
Keeping fit and healthy	3
Concentration	2
Knowledge of external world	2
Road safety	1
Rules	1
Awareness of environment (traffic lights, zebra crossings, road signs)	0

Sociolinguistic skills	8
Turn taking	6
Communication	2
Vocabulary/Speech	1
Teamwork	1
Problem-solving	1
Behaving	1
Enjoyment	1

Two out of seventeen respondents mentioned that using the bikes involves children who are otherwise hesitant to participate in activities. The table below lists the social learning and skills associated with using bikes, in descending order.

Skill	17 Respondents {Question 4 Staff Questionnaire}
Sociolinguistic Skills	16
Turn taking	13
Teamwork	3
Negotiating	2
Roleplay	4
Physical Skills	4
Spatial awareness	3
Bike-Specific Skills (pedals, pushing, speed, stopping)	2
Involving children who are otherwise hesitant	2
Awareness of environment (obstacles, traffic)	1



6. How do the children use the bikes?

Nursery staff were also asked how children used the bikes in the nursery settings, their answers demonstrate the variety of ways bicycles were used in the nursery setting. The table below lists the different ways the children use and interact with the bikes in descending order. It is also worth noting that two respondents made reference to the children's enjoyment/excitement when using bicycles, one respondent stated the children used the bikes 'appropriately' and another response noted how the bikes are used both independently by children and 'as part of provocations such as a road set up with traffic lights.

Action	17 Respondents [Question 6 Staff Questionnaire]
Riding	7

Pushing	7
With their feet	3
With their peers	3
Pedalling	6
Sharing (incl. Turn taking)	3
Roleplay	2
Racing	2
Pulling	2
Getting around	1

7. Are the children able to pedal, push, pull, brake, turn the handlebars, reverse on the bikes?

Our findings also suggest that, within each nursery, there is a variation in cycling ability. When asked ‘Are the children able to pedal, push, pull, brake, turn the handlebars, reverse on the bikes?’, 10 out of 17 nursery staff respondents (58.8%) referenced this variation, 6 answered wholly in the affirmative, i.e. ‘yes’ – one of whom answered specifically about tricycle usage – and 1 answered ‘no’. The main difficulty cited was the use of brakes (2 respondents), one respondent noted that ‘fewer children understand the concept of braking and will instead stop pedalling to stop the bike.’ Another difficulty cited by one respondent was the nursery’s artificial grass.

8. Does the nursery operate a lending scheme?

The nursery staff were asked ‘Does the nursery operate a lending scheme?’; 5 out of 17 respondents (29.4%) answered yes, 4 (23.5%) answered no, another 4 (23.5%) were unsure and 3 (17.6%) specified that they did not operate a lending scheme at the moment, one of whom cited COVID as the reason behind the initiative’s postponement.

Two of the respondents who answered yes qualified their answers, one of whom stated ‘the bikes we have to lend all need repairing’ and the other: ‘not many parents feel they can take the responsibility for taking the bikes home as they have said they do not have a safe place to store the bikes. “

Parent Questionnaires

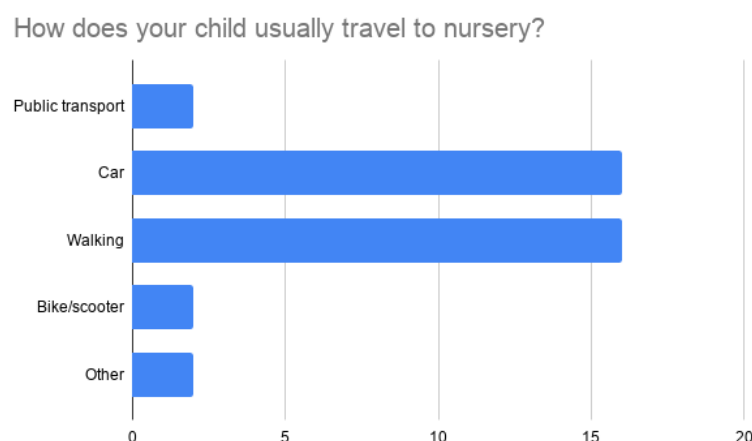
The Robert Wood Johnson Foundation in 2011 found that opportunities for parent education and involvement may be limited in many childcare settings and only a few studies have examined parent perceptions relevant to nutrition and physical activity and therefore we were keen to get parent's views. 38 Questionnaires were completed by parents from the eight nurseries.

Nursery	Number of parents/guardians sent the questionnaire	Number of staff in preschool room
Rside	Unsure	4
BTs	12	4
EBY	26	3
FR	28	4
FZ	18	4
LY	43	3
MG	19	3
SH	7	4

Parent Questionnaire	
1.	How does your child usually travel to nursery?
2.	Does your child have access to a bicycle at home? Please tell us more?
3.	How often does your child ride a bike at home if they have one?
4.	How do you think your child's learning and development is helped by having a bike?
5	How many times has your child cycled in the last 7 days?
6.	What, if any, are the obstacles preventing your child from cycling more frequently?
	'If a bike lending scheme was available at your nursery, would you use it?'
7.	Are there any bike skills your child finds difficult to master - e.g. turning/ stopping/steering/peddalling/pushing backwards -
8.	Are they happy to keep trying?

1.How does your child usually travel to nursery?

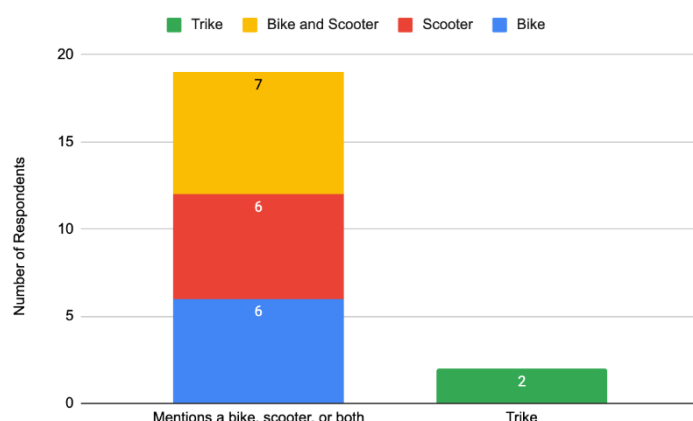
Our findings show that ***bikes and scooters are not a popular mode of travel to the nursery***. When parents were asked, ‘How does your child usually travel to nursery?’, the most popular answers were by car and walking, collectively representing 84.2% of all answers. The remaining answers were equally split between public transport, bike/scooter, and buggy (other).



2.Does your child have access to a bicycle at home?

Our findings also show that ***the majority of children in our sample have a wheeled toy at home***. The majority of respondents (92.1%) answered affirmatively, only 3 out of 38 respondents answered no, one of whom said their child had ‘a scooter at one of her granny’ homes and a bike at the other’, stating that, at home, there was ‘nowhere to keep it if we had one’.

Out of the 21 respondents who specified what kind of wheeled toy their child had at home, 19 respondents mentioned either a bike, a scooter, or both. 10 respondents mentioned multiple wheeled toys, the most popular combination was a bike and scooter (7 respondents). Only 2 respondents specified that their child had a trike at home.

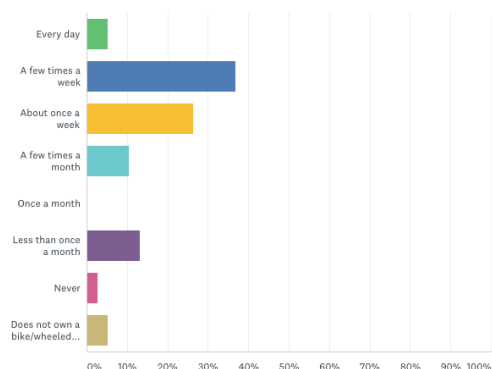


3. How often does your child ride a bike at home if they have one?

Furthermore, the data suggests *wheeled toys are used frequently in the home*: when asked, ‘How often does your child ride a bike/wheeled toy at home if they have one?’, the most popular answer was ‘a few times a week’ (36.8%), followed by ‘about once a week’ (26.3%), and ‘less than once a month’ (13.2%).

How often does your child ride a bike/wheeled toy at home if they have one?

Answered: 38 Skipped: 0



4. How do you think your child's learning is developed by having access to a bike?’

16 out of 38 respondents (42.1%) cited physical development, the most common skills mentioned were coordination (26.3%) and balance (15.8%), with fewer mentions of motor skills and spatial awareness. The table below shows the common perceived benefits of bikes to learning and development by parents. Unlike the nursery staff, some of the responses received in the parents’ questionnaire were not wholly positive. 6 out of 38 respondents (10.5%) were unsure what the benefits of bikes were or didn’t provide an answer (i.e. ‘N/A’; ‘Not used often to notice’) and one respondent said their child didn’t enjoy riding their bike.

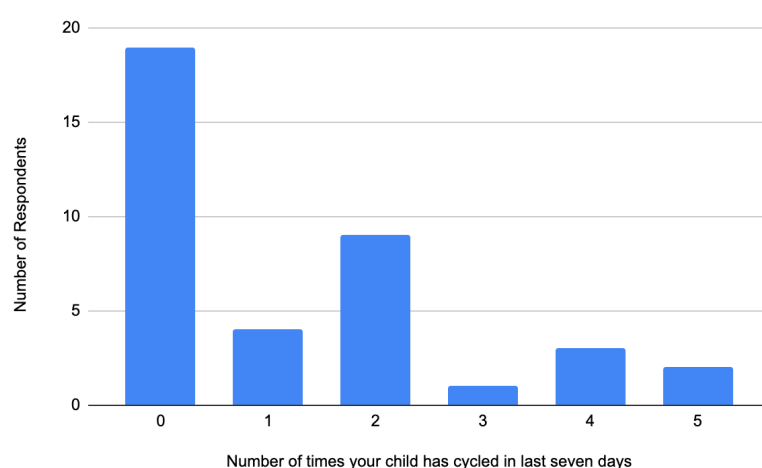
Theme	Parents (n) [Question 4]	Nursery staff (n) [Question 4]
Physical development	16	15
Coordination	10	7
Motor skills	2	6
Spatial awareness	3	3
Balance	6	2
Strength	1	0
Stamina	0	1
Keeping fit and healthy	3	3
Concentration	1	2
Knowledge of external world	4	2
Road safety	3	1
Rules	0	1
Awareness of environment (traffic lights, zebra crossings, road signs)	1	0
Sociolinguistic skills	1	8
Turn taking	0	6
Communication	0	2
Vocabulary/Speech	1	1
Teamwork	0	1
Problem-solving	0	1
Behaving	0	1
Enjoyment	2	1

5. How many times has your child cycled in the last 7 days?

When asked ‘How many times has your child cycled in the last 7 days?’, ***the majority of respondents (50%) said their child had cycled 0 times in the past week.*** The answers to question six may explain the discrepancy.

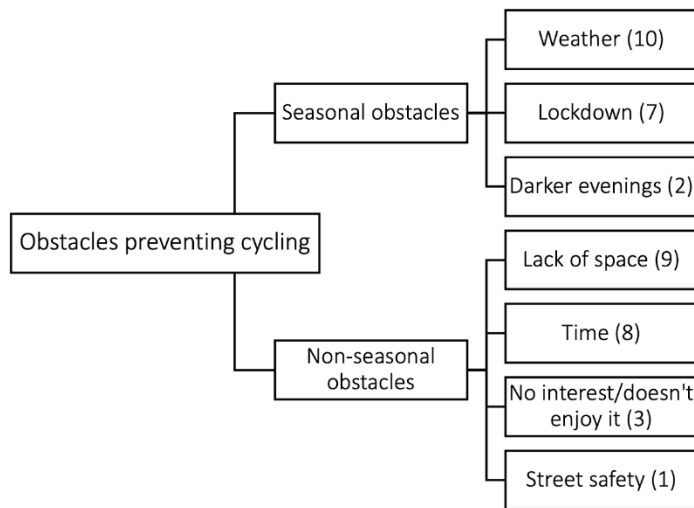
6. What, if any, are the obstacles preventing your child from cycling more frequently?

‘What, if any, are the obstacles preventing your child from cycling more frequently?’ may elucidate on this discrepancy, as the obstacle cited the most was the weather (27%), followed by a lack of space (24.3%), time (e.g., due to work, newborn baby, etc.) (21.6%) and the lockdown (18.9%). Other reasons cited included the child not enjoying/interested in cycling (8.1%), darker evenings (5.4%) and a concern about street safety (2.7%). One respondent skipped this question.



Most respondents cited multiple obstacles preventing their child from cycling more frequently, including a mixture of seasonal and non-seasonal obstacles. The figure below shows the typology of obstacles. One response, ‘Isolation’, was excluded from the figure as, without further information, it could be classified as either seasonal (i.e. resulting from COVID-19, the lockdown, etc.) or non-seasonal. For each obstacle, the number of respondents is provided in parentheses. Seasonal obstacles were cited a total of 19 times, while non-seasonal obstacles were cited a total of 21 times.

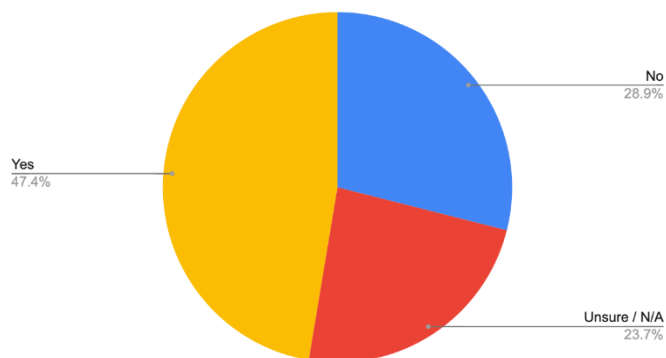
The majority of respondents had submitted their responses by 13 January 2021, which may explain the prevalence of seasonal obstacles. This typology is only indicative, as non-seasonal obstacles may have seasonal causes, for example, ‘Living in a flat’ (i.e. lack of space) has been cited as an obstacle, however, this obstacle may be exacerbated by poor weather and the lockdown, which may discourage use of public spaces.



6. Are there any bike skills your child finds difficult to master?

Eighteen out of thirty-eight respondents (47.4%) answered yes. The table below lists the skills cited as difficult to master in descending order. 5 out of 38 parents (13.2%) mentioned specific bike skills which they considered their child is acquiring at nursery. This included the ability to stop, start, steer, navigate, control speed and predict danger. Two out of thirty-eight parents also mentioned that cycling helps to develop confidence.

Are there any bike skills your child finds difficult to master?





Skill	38 Respondents [Question 6 Parents' Questionnaire]
Pedalling	7
Stopping	7
Turning	4
Steering	3
Don't know how to ride/All skills difficult	2
Going backwards	2
Riding uphill	1

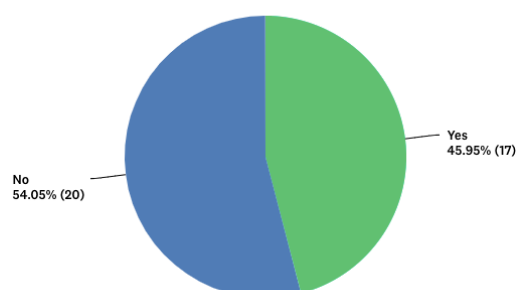
7. If a bike lending scheme was available at your nursery, would you use it?'

20 out of 37 parent respondents (54.1%) answered no, the most common explanation provided was because their child already had a bike (14 out of 20 respondents), followed by the long distance between home and the nursery (3 respondents), and a lack of room for storage (2 respondents). Out of the 17 respondents who answered affirmatively, only 8 provided an explanation, the most common of which was that their child enjoys it (2

respondents) and that they want their child to learn how to ride a bike (2 respondents). One respondent skipped this question.

If a bike lending scheme was available at your nursery, would you use it?

Answered: 37 Skipped: 1



Action Research Overview

High engagement with bikes

The reflections of nursery practitioners revealed the children's high engagement with the bikes and provided detail on what activities children particularly engaged in and enjoyed (EBY, MG, SH, LY & Rside).

Both SH, LY and FZ cited **roleplay** as an activity the children engaged in and enjoyed. In SH, the roleplay mentioned is child-initiated, as they like to “make up scenarios”. In FZ, the engagement in roleplay is intimately linked to the alternative activity of the mud kitchen set up by the practitioners, as the children use roleplay to link the bikes to the mud kitchen, as the soil is applied to the wheels and washed off, and so subsumed into a “car-wash” activity.

LY included three observations worth noting: that children enjoyed the bikes more when there was adult involvement; and that the children enjoyed traffic light games; and that “boys really engaged more when there was (sic) props involved”. Similarly, EBY noted that the children

tend to play with other resources that are set up in the garden, with the climbing frame or would play with the wheelbarrows with the other children pushing them around the garden

so it could be worth exploring introducing more props alongside bikes to increase engagement. Both MG and SH cited the children’s **interest in taking bikes home**, to ride them to nursery (MG) or at the weekend (SH).

Both SH and FZ noted the **gender difference in engagement with the bikes**, as more boys than girls played with the bikes at SH, and more boys “wanted to ride the bikes first” at FZ. Yet, this may be because FZ is “boy heavy”, and despite boys outnumbering girls in bike usage in SH, the girls that were involved were “more active and came up with more elaborate play scenarios”.

Variation in bike skills

With reference to cycling ability, MG noted that the children “are learning how to ride a bike quicker [and] avoid obstacles”. Contrastingly, EBY observed that the children “find it too difficult to use them effectively” due to the thick grass, consequently, only a couple of children could pedal.

Social skills development

Both SH and FZ’s reflections made note of the children’s **communication**; in FZ, while at the beginning of a session, children would use the bikes in solitary play, after ten minutes more collaborative play, and consequently, more conversation between children would be

observed. SH notes that while playing with the bikes, the children are “able to communicate their thoughts and feelings with each other, discussing and extending, through trial and error” as well as “independent learners” who have the confidence to lead their own play. When it comes to conflict, LY and FZ noted the *variation in confidence to resolve conflicts*, as some children needed adult support. In LY, this falls across gender lines, as noting that:

When there would be conflict boys would look to adults to resolve it, but the girls were trying to figure out what they can do to overcome it.

Actions that Need to be Taken

Need for bike repair

There is a clear need for regular bike repair, as SH, EBY and MG all cite issues with their bikes, reducing the number of bikes available for children.

Adapt the nursery setting for ease of cycling

Both EBY and SH noted the need for more space for the children to manoeuvre the bikes, particularly in EBY, where the grass is too thick to cycle on. Consequently, EBY recommended installing a paving area or track to support independent use of the bikes.

Adapt the nursery setting to enrich learning opportunities

Both FZ and LY recommended strategies to “incorporate multi-layered learning” and FZ and LY suggesting using *more props* to “build a story around the bikes” and support roleplay activities (e.g. hose pipes, watering cans for a car wash). FZ made further recommendations such as “rich vocabulary printed around the area of play so children can look at words” and “visual prompts such as a colour coded flash cards red to stop” - presumably for traffic light games. LY recommended more adult involvement in bike activities such as roleplay as they found that “When there was adult involvement all children enjoyed it more” and more use of *sand timers* to encourage sharing and turn taking was recommended by both nurseries as well.

Continue bike lending scheme

Both Rside and MG advocate continuing or restarting the bike lending scheme and discussing with parents and guardians the benefits of riding a bike.

Conclusion and Implications

This research project was conducted during the Covid -19 pandemic. The imposition of lockdown may impact on some of the results we received particularly from parents and how and when they allowed their children to cycle. For example, for two months, the parks were closed. There were two changes to the nurseries from the original group. Two of the original nurseries were closed due to lockdown and replaced by two other nurseries of similar size and demographics. The other nurseries remained open although the groups operated in bubbles which meant they remained within their own specific space. In one nursery the bubbles extended outside because of the design of the building which limited the space available for the children to use their bikes. It is also worth noting that staff tended to describe all wheeled toys as bikes. They did not separate tricycles from two wheeled bikes therefore their responses reflected a bike group.

According to staff, bikes were used frequently and supported many elements of learning including building confidence. The children had a variety of abilities in using the bikes but learning to brake was considered the biggest challenge. While most staff thought they had sufficient space to enable the children to use their bikes, there were some issues regarding the type of ground for cycling with grass both 'new' and/or 'artificial' noted as problematic by just under a third of respondents.

"We thought the boys would persevere with trying to pedal in the grass for longer but they gave up and favoured playing with the sticks, while the girls tried for longer."

One nursery noted that after Covid they were going to take the children outside to cycle around the neighbourhood on pathways. Other nurseries made plans to manage their space differently eg. changing the outside around by moving a shed and using a previous rather under-used courtyard for the bikes. They all agreed that the research had made staff carefully observe how bikes were used to support children's learning and they may have not delved so deeply into the suitability of the space otherwise.

"Staff had to hard about ??how to use the bikes, so they turned the bikes over and explored the mechanics of the bikes and also supported the children's interest in spinning."

One staff member also commented about the bikes needing to be repaired. Most parents said their child had a wheeled toy at home mentioning bikes and scooters most often. There was a mismatch in what parents said about the frequency they used the bikes. Parents

stated they used their bikes weekly but when asked about taking the bikes outside the number differed and was much lower with the main reasons for the lower frequency of using bikes outside as the weather and limited time. That said, the staff also noted from conversations with parents that they did not go outside if it was cold, not just in relation to using bikes. There were examples from the nurseries about parents ringing to cancel nursery attendance because of weather also. Reasons such as the child not interested in cycling, darker evenings and a concern about street safety were also mentioned but by very few respondents. Interestingly, this aligned with parental feedback from the Glasgow project, Pedals for Play (2017) where parents also commented on the lack of safe cycling infrastructure in the city as a barrier for families being able to implement cycling skills as well as the lack of safe and secure to park and store bikes.

In terms of the types of learning children gain from bikes the staff responses were broad. While physical development was cited as the dominant support provided by bikes, coordination, motor skills and spatial awareness were identified as important. Some staff also noted the importance of balance bikes as a precursor to learning to cycle.

“We realised that the children noticed that riding their bikes impacted on their bodies and started to think about and talk about hydration, energy and their hearts beating faster from rushing around.”

Sociolinguistic skills were also referenced as well as turn taking, teamwork and negotiation as well as role play.

We initially thought of bikes in terms of physical development but were quite surprised by how much it provoked language and conversation all initiated by the children. For example, they stopped each other asking for one ticket or two as they passed through different areas.

“The children became very fixated by the Green Cross Code with lots of what seemed like quite “bossy” turn-taking and “telling off” about not sticking to the rules”

Staff found that while children responded well to staff extending their ideas for example children referencing traffic lights and then staff making traffic lights with them, their ability to extend their own play more was interesting. Especially in their use of role play and reflecting their home life. For example

“Children used role play and PSED in their bike play. Stopping outside the mud kitchen, putting mud on their wheels and then going to the “car wash” or stopping outside the shed and waiting for ice cream to be served.”

“We had set up a garage but the children led the play and extended it by pretending Mummy and Daddy had broken down and they needed to ride to the garage.”

Parents’ responses were much more focused on physical skills and they made no reference to socio linguistic skills. Regarding the physical skills needed to ride a bike many parents suggested children would be learning these at nursery. This reflected the view of nursery staff that the children would most likely learn to ride a bike in their setting. Parents listed a much longer list of concerns regarding bike-riding including the ability to stop, start, steer, navigate, control speed and predict danger, in contrast to staff who only mentioned braking as a challenge.

Staff also noticed an interesting contradiction among parents’ attitudes to risk. Although they worried about the perceived dangers of learning to ride a bike they actually allowed their children to go very fast on them. However, if they simply ran fast or were climbing something unaided parents were much more anxious and either warned or stopped them entirely.

With regards to a bike lending scheme staff, just under 30% of the respondents already operate a bike lending scheme and the others were either considering one or had put the decision on hold while we were in Covid-19. Of the parents, 54 % rejected the idea of a bike lending scheme. The majority reason was that their child already had a bike or the distance between home and the nursery was too far. Of the respondents who wanted a bike lending scheme, half did not give a reason for why they answered yes and the two most common reasons given from those who gave an explanation were that their child enjoys cycling and that they wanted their child to learn how to ride a bike. One nursery had a follow up conversation with parents who became more inclined to borrow bikes during Covid. These families had started meeting in the local park and being part of the group gave them more confidence to use the park more often and they borrowed the bike so their child could cycle there.

Recommendations and Next Steps

The staff leading the research agreed they were much better informed about the usage of bikes and wondered whether we should [now](#) examine how we use other standard nursery resources [to](#) support children's learning and development. The staff all agreed that they looked differently at how children used bikes and how in the hands of more informed adults they are a good source of multi-layered learning. Being part of the study improved their observation skills as they were much more motivated to see what the children saw. For example

“ I was watching the child on his bike. He stopped when he noticed a leaf on the ground and used it as a roundabout. I would never have noticed that level of detail before the research”

The Bike Research had also extended the conversation about being outside and the importance of connecting with nature. The [approach](#) described by Charles Weaver as “the poetry of your back garden” [resonated with many](#) of the researcher staff. This was [provoked](#) by being outside with the bikes, [enjoying](#) more conversations about healthy lifestyles and [a greater use](#) of parks and green spaces. One staff member commented

“ I hadn't ridden a bike for years as I had an accident when I was young and I had not gotten back on a bike. But I decided it was worth a risk. I was petrified but I bought a bike and honestly, it was amazing just cycling into the forest. It did me such good”

With regards to the process of the research, staff all agreed that it made them reflect and consider their teaching. Their challenge was to infuse their colleagues with the same enthusiasm and willingness to reflect. They all noted that their colleagues were willing to learn more about how the children used the bikes, but it was the most curious staff who were able to self-reflect and take their learning into their practice. There was no correlation as to whether staff were qualified or unqualified, the researcher staff linked their observations to colleagues' personalities and attitude. Of course, this is a small study so this assumption would need deeper examination for greater veracity.

Staff recommended that the study is extended across all 42 nurseries in the organisation, but to make the link between [children's bike use](#) and [positive health outcomes](#) more explicit. They also suggested we focus on examining other “Sacred Cows” of Early Years such as sand trays, dolls and mud kitchens.

Reviewing our Outdoor Policy and developing an organisational training programme called *Connecting To Nature* may also help staff see the benefits of weaving ways of learning about nature into daily teaching activities. This is described by Richard Louv (2012) as Vitamin N. (Nature) who also quotes research in the American Journal of Preventive Medicine in (2008) that suggests greener neighbourhoods may have a long-term positive impact on children's weight and overall health including exposure to higher levels of essential vitamin D.

Finally, they recognised the challenge of conducting an action research study across the organisation and suggested that in future individual staff may create their own small action research projects so they could 'learn by doing' and use the methodology and tools of action research with confidence.

References

- Boudreau, D. (2005). Use of a Parent Questionnaire in Emergent and Early Literacy Assessment of Preschool Children. *Language, Speech, and Hearing Services in Schools*, 36(1), 33-47. [https://doi.org/10.1044/0161-1461\(2005/004\)](https://doi.org/10.1044/0161-1461(2005/004))
- Bradley, E. H., Curry, L. A., & Devers, K. J. (2007). Qualitative data analysis for health services research: developing taxonomy, themes, and theory. *Health services research*, 42(4), 1758-1772. <https://doi.org/10.1111/j.1475-6773.2006.00684.x>
- Cheng, J et al. "Obesity leads to declines in motor skills across childhood." *Child: care, health and development* vol. 42,3 (2016): 343-50. doi:10.1111/cch.12336
- Dymont, J. , and T. S.O'Connell . 2013. "The Impact of Playground Design on Play Choices and Behaviors of pre-School Children." *Children's Geographies* 11 (3): 263-280. doi:10.1080/14733285.2013.812272. [\[Taylor & Francis Online\]](#), [\[Web of Science®\]](#), [\[Google Scholar\]](#)
- García-Hermoso, A., Alonso-Martinez, A.M., Ramírez-Vélez, R. *et al.* Effects of Exercise Intervention on Health-Related Physical Fitness and Blood Pressure in Preschool Children: A Systematic Review and Meta-Analysis of Randomized Controlled Trials. *Sports Med* 50, 187-203 (2020). <https://doi.org/10.1007/s40279-019-01191-w>
- Glaser, B. G., & Strauss, A. L. (1967). *The Discovery of Grounded Research: Strategies for Qualitative Research*. New York: Aldine De Gruyter.
- Jarvie, W. K. (2012). Qualitative Research in Early Childhood Education and Care Implementation. *ICEP* 6, 35-43. <https://doi.org/10.1007/2288-6729-6-2-35>
- Johnston, J. (2008). *Methods, Tools and Instruments for Use with Children*. Young Lives. Technical Note, No. 11, Oxford.
- Lavrakas, P. J. (2008). *Encyclopedia of survey research methods* (Vols. 1-0). Thousand Oaks, CA: Sage Publications, Inc. doi: 10.4135/9781412963947
- Louv, R. (2012) *The Nature Principle*. Algonquin Books of Chapel Hill US
- Manners, L. (2019) *The Early Years Movement Handbook*. Routledge
- Meier, C., & Lemmer, E. (2015). What do parents really want? Parent perceptions of their children's schooling. *South African Journal of Education*, 35(2), 1-11.
- National Resource Centre for Health and Safety and Childcare and Early Education. *Achieving a state of healthy weight; A national assessment of obesity prevention terminology in childcare regulations* (2011) Aurora, CO University of Colorado, Denver
- Obee, P., Sandseter, E.B.H., & Harper, N.J. (2020) Children's use of environmental features affording risky play in early childhood education and care, *Early Child Development and Care*, DOI: 10.1080/03004430.2020.1726904

O'Connor, A., & Daly, A. (2016) *Understanding Physical Development in the Early Years : Linking Bodies and Minds* Abingdon Routledge

Pascal, C., and Bertram, T., (2012) Praxis, ethics and power: Praxeology as a participatory paradigm for early childhood research, in *European Early Childhood Education Research Journal*, vol 20 (4), pp. 477-493.

Petrie, P. and Statham, J (2009). "Pedagogy: A Holistic Personal Approach to Work with Children and Young People Across Services Briefing Paper"; London Thomas Coram Research / Institute of Education.

Play Together on Pedals' in Glasgow Report. (2017)
<https://www.cyclinghub.scot/mediaLibrary/other/english/17311.pdf>. Accessed 4 Sept 2020.

Saldaña, J. (2003). *Longitudinal qualitative research: Analyzing change through time*. Walnut Creek, CA: AltaMira Press.

United Nations (1989) Convention on the Rights of the Child . Geneva: United Nations

UNESCO (2010) EFA Global Monitoring Report Oxford University Press

Weaver, T. (2015) Returning to the Poetic: *EYE (Early Years Educator)* 17. 7 November 28-30

Zamani, Z. 2016. "'The Woods is a More Free Space for Children to be Creative; Their Imagination Kind of Sparks out There': Exploring Young Children's Cognitive Play Opportunities in Natural, Manufactured and Mixed Outdoor Preschool Zones." *Journal of Adventure Education and Outdoor Learning* 16 (2): 172-189. doi:10.1080/14729679.2015.1122538. [\[Taylor & Francis Online\]](#), [\[Web of Science ®\]](#), [\[Google Scholar\]](#)

Xu, W., & Zammit, K. (2020). Applying Thematic Analysis to Education: A Hybrid Approach to Interpreting Data in Practitioner Research. *International Journal of Qualitative Methods*, 19. <https://journals.sagepub.com/doi/full/10.1177/1609406920918810>

<https://www.pescholar.com/wp-content/uploads/2019/02/appg-fit-healthy-children-report-on-pe-18.pdf>

https://www.wilder.org/sites/default/files/imports/HEiP_CyclesforChange_REM_2-18.pdf
<https://www.fitforsport.co.uk/blogs/detail/78-of-uk-children-failing-to-meet-recommended-fitness-levels#> Accessed February 2021

https://www.wilder.org/sites/default/files/imports/FINAL_CyclesforChange_REM_3-15.pdf
Accessed March 2021

<https://www.cyclinghub.scot/mediaLibrary/other/english/17311.pdf>. Accessed 4 Sept 2020.

https://www.london.gov.uk/sites/default/files/what_makes_it_harder_for_londons_children_be_healthier.pdf Accessed February 2021

https://www.london.gov.uk/sites/default/files/every_child_a_healthy_weight.pdf Accessed 14 March 2021