RESEARCH ARTICLE

Perspectives on School Infrastructure: A British Example

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Abstract

Since the 2013 "State Strategy on education development in the Republic of Azerbaijan", modern educational infrastructure for lifelong learning has been one of the main strategic directions in the country. Five years since "The Strategy" came into force, we are still unsure what we should invest in and what we should not invest in. Bringing evidence from a country with high levels of research into educational infrastructure - the UK- we can draw conclusions about which school spaces are the most worthy of investment in accordance with the relevant teaching methods outlined in the aforementioned Strategy.

Since school spaces inform and support relevant teaching methods, assessing their relevance to their users, - teachers and school children - is critical in deciding where investments should be made in order to provide the best possible learning and teaching spaces to meet the long-term needs of the country.

This research employs evidence from a British public primary school in the North East of England as a case study, where a constructivist view of education and an experiential/ hands-on approach to learning dominate schooling. Mixed research methods, including observation of the school, diamond ranking activities with the children and their teachers, and an interview with the head teacher were employed in order to understand the children's and teachers' views towards different learning spaces in their school and classrooms. The study concludes with clear summary of each space's use and necessity, and suggestions for further investment. The study reveals interesting facts on children's and teachers' attitudes towards school infrastructure, as well as how their views coincide with each other's.

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Introduction

The 2013 "State Strategy on education development in the Republic of Azerbaijan" highlights educational infrastructure for lifelong learning as a main strategic direction. However, strong research evidence is needed in order to strategize investment in learning infrastructure. Drawing conclusions from research evidence in the example of British schools will help us to understand which school spaces are relevant and worth investing in in terms of learner and teacher satisfaction. British primary schools employ experiential, constructivist, and student-oriented teaching practices in order to deliver the national curriculums. There is an inter-dependent relationship between the

constructivist teaching styles and the physical environment of the school. While constructivism informs the design of the learning environments of the school, the school spaces, in turn, support the relevant teaching practices. Student-centred learning has been a topical issue at school and policy level since the constructivist educational methods began informing educational practices. It allows learners to actively construct their own understanding and meaning of knowledge. This kind of learning lets learners take responsibility for their own learning process, since they need to make connections to make sense of the information. As a result, learning becomes an experiential, rather than a transmissive process. But to what extent does the school infrastructure support this type of student-centred experiential learning? Relevant tools and spaces can give the learners chances to explore, test, and participate in building practical knowledge. That is why school spaces worldwide are changing to support dialogical and active learning and to promote children's experiential understanding.

This is a research-based project investigating children's and teachers' attitudes to the learning environments in a primary school in the United Kingdom, focusing on the learning spaces in the school, what children feel about their spaces, and how teachers evaluate their effectiveness in terms of learning. It is of great importance that the children can get the most out of the existing environment in the school, since they spend much time there, engaging in different learning and social activities. The more the children feel comfortable and pleased with the school, the more likely they are to enjoy school and be motivated to learn.

Schools spend huge amounts of money on the maintenance and renewal of the school spaces, furniture, state-of-the-art educational technology, educational software etc. How are these spaces being used? Some spaces and tools in the school may be used less often than the others, and some may be neglected over time. Very often, certain tools are bought at large expense by the schools, and not used as much as they were supposed to be.

Since the 1990s, constructivism has begun to revolutionise teaching and learning practices. From this point of view, the children construct knowledge based on their own experiences, and modern schools employ hands-on learning and practical teaching methods, where children are actively engaged in teaching and learning. There is considerable evidence that this method produces more interesting and interactive learning time in class and more positive attitudes towards school. These theoretical changes in education have informed changes in the design of schools and of learning environments.

Schools now adjust their spaces to support contextualised, goal-oriented, and real-life student learning. This representative case study looks at the effects of the infrastructure on children's learning. The school is a community school that is situated in North East England, in a slightly isolated part of a small market town. It has 151 pupils on roll. There is a Specialist Language class with a special listening station and other practical/ physical tools to support learning, which is run by language and speech therapists. Classrooms in the school have been designed to support different skills. All are large and tidy. The whiteboards in some classrooms have been recently replaced with flat screen Apple TVs. All classrooms have the following basic resources: a large carpet area, whiteboards (or flat screen TVs), child-size tables and chairs, and other appropriate furniture. The Early Years Unit (the Nursery and the Reception classrooms) was fully refurbished early in the 2015-2016 school year, at the cost of £30,000. The reason for the changes in the Early Years Unit was that the previous design, learning resources, and furniture were old and outdated. The Nursery teacher describes it: "You see the classroom area is so big. We have recently bought some new furniture, so that we can make small, purposeful areas in the class" (field notes).

The school library and the computer room are situated in the same room. The school puts special emphasis on teaching Information and Communication Technologies (ICT) skills.

There is a large outdoor area, which includes: a play area, used for Physical Education, two playgrounds, and a Community Garden. They have different types of climbing and running facilities, an empty space for ball games, wooden tools and stools, and other resources. The Early Years playground has a lot of physical facilities: slides, ropes, playhouses, a sandbox, a seesaw, a spring rider, and other children's toys.

One of the most interesting places in the school is the Community Garden, situated at the back of the school building. The garden area is big enough for the children to work in groups, individually, or with the gardeners. It has several

small purposeful parts to support different gardening skills and science learning. This part of the school is used for a considerable amount of curriculum time, and the school is planning to increase this time in the coming years.

Methodology

The main methods of data collection were observation of the school, a diamond ranking activity with the children and the teachers, and a semi-structured interview with the head of the school that followed the diamond rankings. Additional methods, such as photographing the school, a preparatory focus group interview with teachers and analysis of the official Ofsted report and the school website have been used in order gain a thorough knowledge of the school.

Any research in the UK and at Newcastle University is subject to ethical consideration both at faculty level and at the level of the ethics committee, and should follow the guidelines set by the British Educational Research Association (BERA) for conducting objective, ethically appropriate, and harmless research (BERA, 2011). For anonymity purposes, neither the school name nor the participants' names will be used, and names are replaced with pseudonyms.

Case studies are often criticized because of validity concerns. These concerns can be overcome by using multiple research methods for data collection. An interesting study on using multiple methods for understanding children's perceptions provides evidence that multiple methods can produce valuable insights into children's complex world and experiences, which otherwise might have been more difficult (Darbyshire, MacDougall and Schiller, 2005).

Initial preparation included consideration of the school website, the last Ofsted report in which the school had been evaluated as 'good' (Ofsted, 2012), and the 'Compare School and College Performance' website of the UK's Department for Education. This was important gaining familiarity with the school and setting expectations before the actual visit to the school. An observation of the school and a small focus group interview with the class teachers and the teaching assistants were conducted in order to gain an initial impression of how and how frequently the school spaces were used. During the focus group, the teachers were asked: 1) about the learning spaces in the school, 2) how frequently they use each space, 3) general comments about the effectiveness of each space in terms of learning, and 4) whether children liked the learning spaces. Based on the answers given during the teachers' focus group, the most frequently used school spaces were divided into two groups: classroom spaces and common spaces. Each class uses the common learning spaces in the school, such as the ICT room and the library, the outdoor playing area, the playgrounds, and the school garden, as well as their own classroom. A general approach has been followed in taking photos in order to ensure their comparability and generalise the results in the analysis process.

Figure 1. Early Years Unit common spaces: the playground

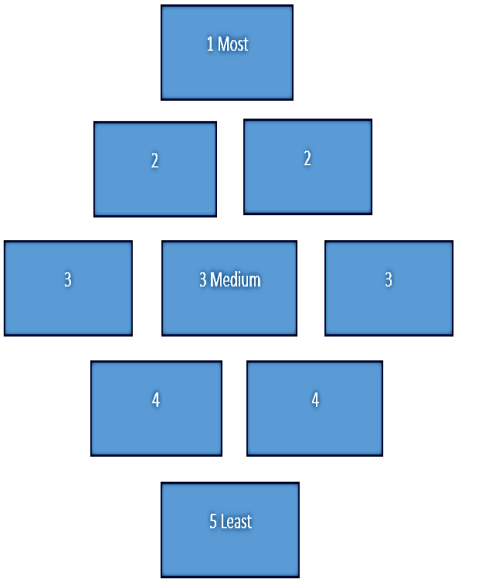

Figure 2. Year 2: Carpet space and table space

Guidelines set out by Clark et al. (2013) were used in designing the diamond ranking activities. The diamond ranking activities present enough visual data for the participants to get involved in the questions and to promote valuable discussion among them (Clark, 2012). Visual methods activate people's visual memory, which in turn helps them to recall memories and experiences (Harper, 2002). Children were worked in groups of four to six, to discuss the photos, deciding as a group on their favourite and least favourite space. They also wrote their comments about each space around the photos (Figure 3 and Figure 4). Overall, 104 children and six teachers participated in the diamond rankings.

Figure 3. Diamond ranking of nine photos

Each group of children was given a set of nine photos of their own classroom and of the common learning areas in the school, an A2 paper sheet, a glue stick and a few pens to write their comments. The children were asked: 'Which is your most favourite and least favourite spaces to learn in the school?' They commented on how they felt about learning and spending time in those spaces (Figure 5).

Figure 4. A set of nine photos for the diamond ranking activity in Year 3

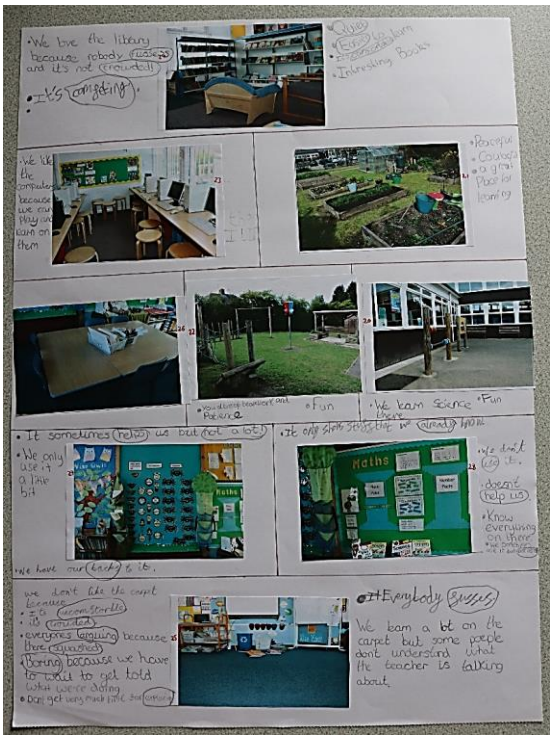

Figure 5. Diamond ranking activity in Year 4 (a group of 5 children)

The teachers were asked to rank the spaces according to their effectiveness in terms of children's learning. For triangulation purposes and in order to positively contribute to the school, the results from the diamond rankings were discussed with the head teacher in a semi-structured interview. The interview questions also asked about the usage and

organisation of different learning spaces, management and maintenance of the infrastructure, the costs for creating and maintaining spaces, and effective usage of them. Interview preparation included an interview guide, consultation of official statistics, such as the school's income and outgoings, the proportion of the costs spent on the infrastructure, and relevant comments in the latest Ofsted report. The interview included questions about the recent changes in the Early Years Unit, the reasons for these changes and the costs associated with them, the Specialist Language Class, and the Community Garden. There was also discussion of the school's renovation and maintenance, and the most recent Ofsted report and its effects on the infrastructural changes in the school. The results from the diamond ranking activities were reported to the head, and they were discussed in detail.

Results

The focus group interview with teachers revealed that the teachers mostly consider 'computers and books' as the main learning resources. Nearly all teaching staff mentioned the computer room as an enjoyable space to work in, while 'reading and reading areas in classrooms' were the least favoured activity and space. The teachers think that the children enjoy play time, as well as music and creative arts, which happen in the computer room., Teachers also emphasised the importance of the carpet space. One of them pointed out: 'When they [children] are on the carpet, they are less distracted by peers, and all of them are close to you'. The teachers emphasised the positive effects of the school garden on children's learning.

The results show that for the children, the top ranked learning spaces are the school garden and the large playground (Figure 6). The computer room too, has a high position on the diamonds (60%). The children ranked the carpet space and the classroom displays as their least favourite spaces for learning in the school. The diamond ranking of the school spaces is accompanied by the children's comments about these spaces. The children in all classes used the word 'fun' when talking about learning outdoors. This was evident from their comments on the school garden and the large playground.

'We work in teams in the playground, and get fresh air', Charlie, Year 4

'You develop teamwork and patience [in the large playground]', Casey, Year 4

'It is colourful and peaceful in the garden', Colin, Year 3

The children labelled the spaces which they disliked as 'boring'. Nearly all children mentioned that sitting on the carpet and listening to the teacher was boring. Jess from Year 4: 'It is boring because you have to sit quietly and wait for ages to be told what you are going to do'. Many children commented on the physical difficulties of sitting on the carpet.

Of all nine categories, children think that listening to the teacher on the carpet and doing tasks at their tables are the most effective times for learning, although they do not find these particularly interesting or 'fun'.

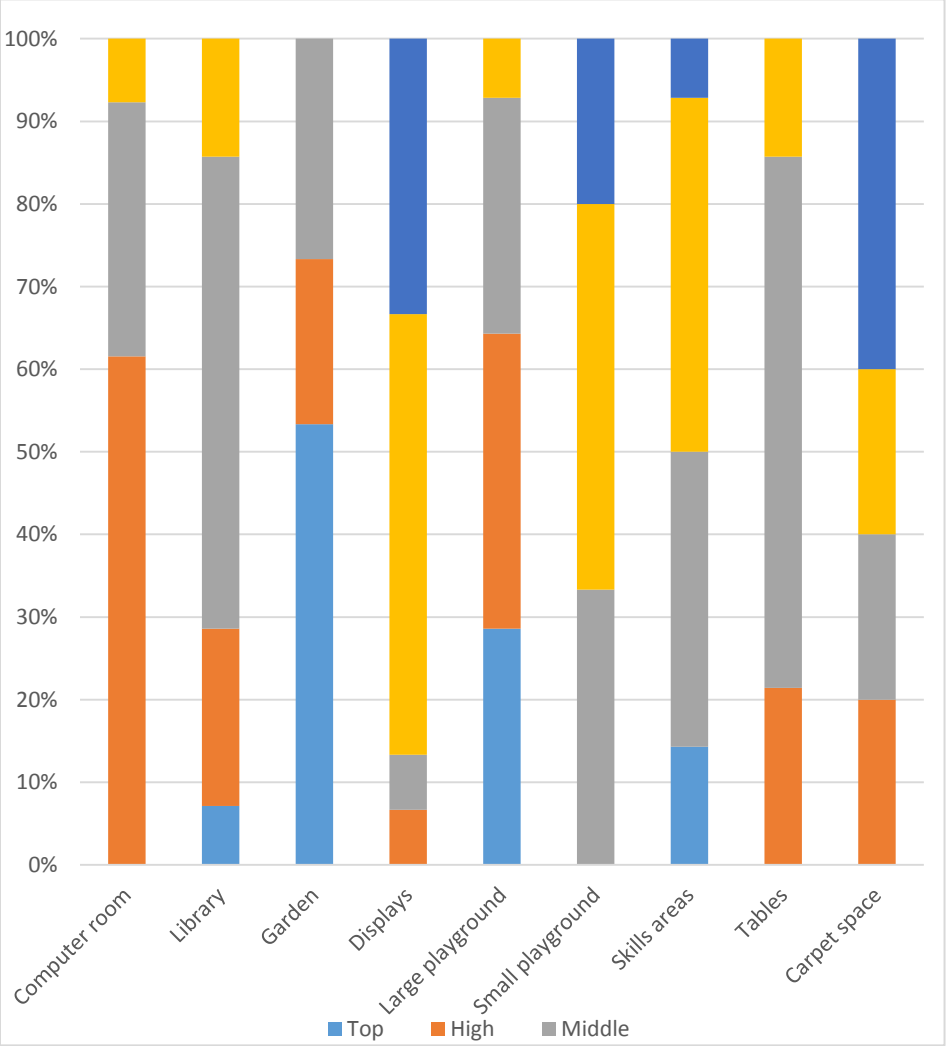

Figure 6. Diamond rankings in Year 1, Year 2, Year 3 and Year 4

The library was the only space towards which there was a conflict between boys' and the girls' attitudes during the activity. The diamond rankings revealed that the children find the classroom displays as 'only decorative' and 'not useful'. However, when the displays are placed on the front wall of the classroom, and if they are relevant to the ongoing topic, the children frequently refer to them.

The children in the Nursery and Reception classes consistently expressed their liking of their playground (Figure 7).

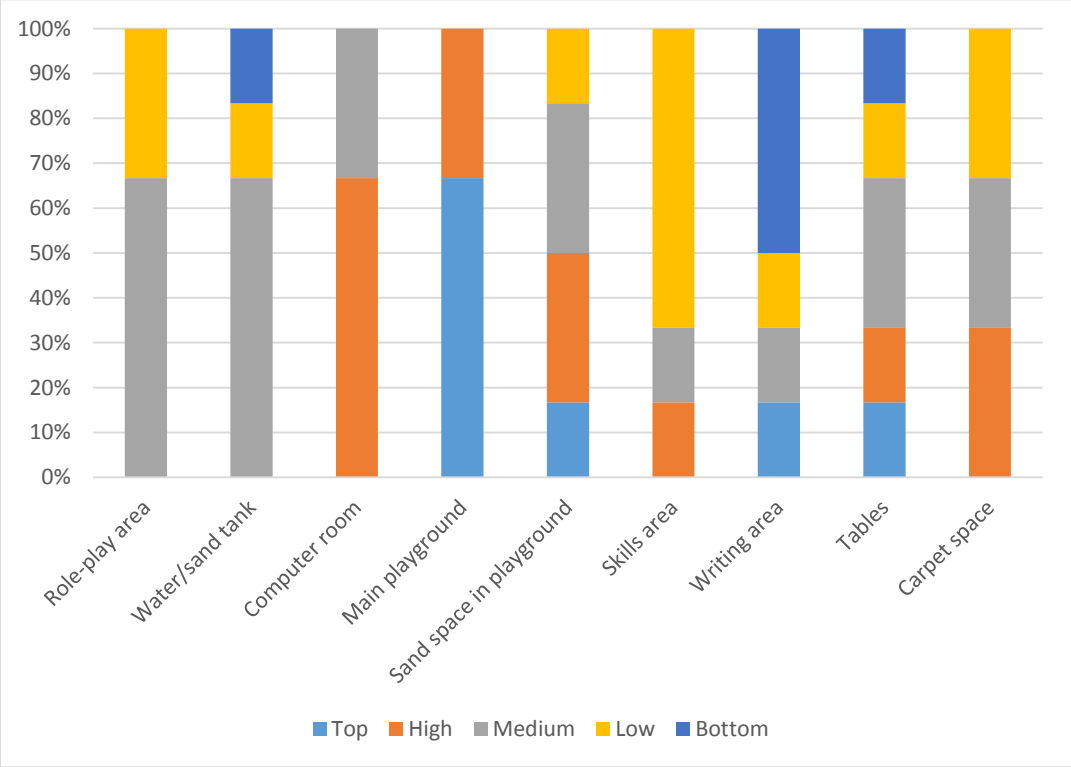

Figure 7. Diamond rankings in the Early Years Unit

Like the playground itself, the little sand and stones space in the playground is very popular among the Nursery and Reception class. Amelie, Reception class: 'I love pulling up the buckets on the rope and I love pulling them through the stone twig... I learn to be nice to my friends'. The children in the Early Years Unit preferred the outdoor areas to their classrooms (Figure 7).

Year 1 – Year 4 teachers' diamond rankings revealed that they find the carpet space and the table space are the most effective places for children's learning (Figure 8). There is a considerable preference for the carpet space in the teachers' diamond rankings (75%).

'New learning, focused listening and group discussions happen on the carpet. So it is the most important space', Year 4 teacher

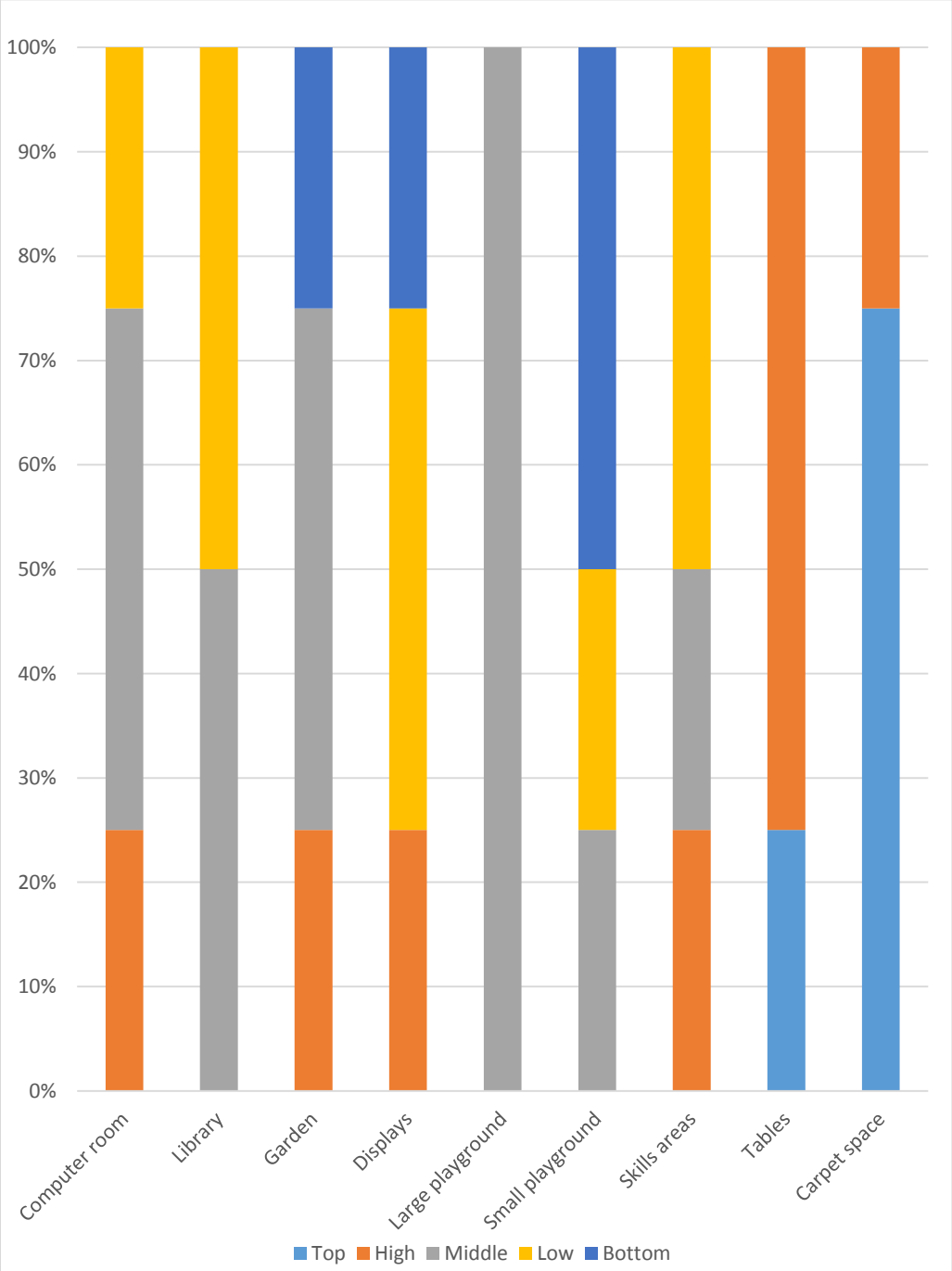

Figure 8. Diamond rankings of the teachers of Year 1, Year 2, Year 3 and Year 4

The teachers think that the computer room, classroom displays and small skills areas in the classrooms are more important and effective for learning than the time spent outdoors. However, they still acknowledge the effectiveness of the school garden in terms of science learning and group work. Similarly, the Reception class teachers have positive attitudes to the indoor areas in terms of learning (Figure 9).

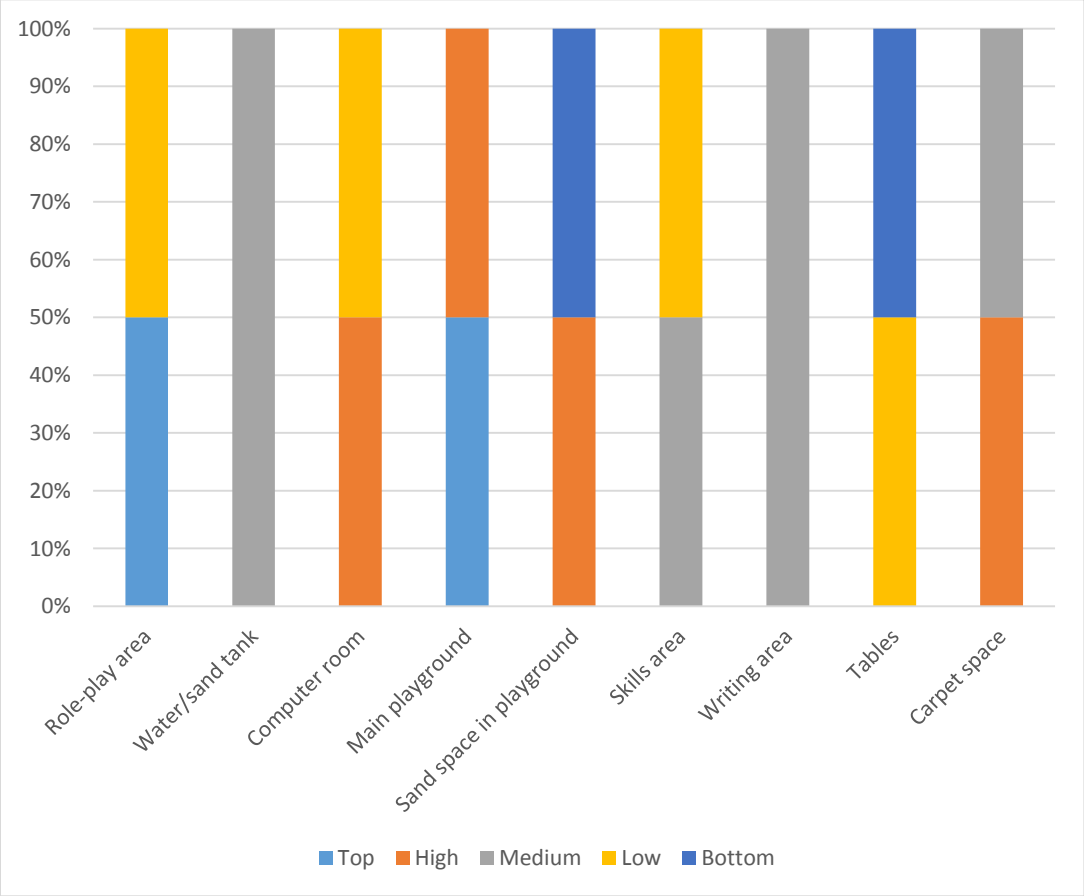

Figure 9. Diamond rankings of Reception class teacher and the teacher assistant

The Reception teachers think that the carpet space is very important in terms of whole-class teaching and find that it develops the children's listening and discussion skills. They pointed out the effectiveness of the computer room in terms of learning and research. They think the outdoor area is very effective for learning, especially physical and group-work learning. The Reception class teacher: '...It is good for their holistic development. They choose what to do there, either individually or in groups. Playing there develops their sensory learning'.

The interview with the head teacher of the school revealed interesting points about the costs and future plans regarding the development of the learning environments in the school. The head shared her thoughts about the use of the Specialist Language Class, Community Garden, library space, and recent changes in the Early Years Unit. She explained why the school needed significant changes in the Early Years Unit:

'We had some money to be spent. So I decided to look at every classroom in the school. And because it was a big amount of money.., I asked every member of staff and the governors, and we had walks in the school... We looked at every room, and discussed what was good and what could be improved. As a result of that we decided that the Early Years needed improvement, in terms of what was available there... £30,000 was spent for total refurbishment... we came up with a design'.

The 2012 Ofsted report included points about the lack of learning opportunities for more able children, as well as the fact that the children's writing skills were behind their reading and maths skills: 'I thought there should be a role play area in Early Years, where children could write within that.... Also in the library, we replaced adult-size table and chairs

with child-size furniture, so that a group of children can go there and work with a teaching staff, while others are in the classroom with the class teacher. This created spaces for more abled children too'.

Discussion and Conclusion

This case study confirms that the children's attitudes towards school are highly affected by the changes in school spaces. A well-known review of 400 studies by Hanushek (1997) suggested that school resources had no positive or negative effects on student performance, and that more investment in resources did not necessarily bring positive changes. However, recent studies report different findings. It was anticipated from the review of the literature that the children's and teachers' views towards the learning spaces might not coincide in terms of how they define learning. The results of this case study coincide with the results of an Irish study by Murphy, Marley and Veale (2012), as both studies suggest that the children prefer more hands-on and experiential science learning.

This study supports McCarter and Woolner's findings of teacher's and children's views on the carpet space in classrooms (2011). Children's mostly negative attitudes towards spending time on the carpet are related to the passive, transmissive learning that happens there and they are strongly affected by the physical difficulties of sitting on the carpet for a long time. Sitting quietly on the carpet conflicts with the active nature of the child. Overall, the children do not describe 'learning' as enjoyable and 'fun'. For example, the younger children, especially in Early Years and Year 1 do not think they 'learn' when they do some work in the garden or in the playground, which are, in fact, learning spaces, and are included in the curriculum time.

The results of this case study support the results of the research on the children's attitudes towards IWBs in classrooms by Wall, Higgins and Smith (2005). However, interestingly, a study by Heemsherk, Kuiper and Meijer (2014)revealed no positive or negative relationship between the combined use of interactive whiteboards (IWBs) and virtual learning environments (VLE) and student learning, but shows a positive effect of the former on student motivation.

Previous studies suggest that the availability of different resources and their effective use improve student attainment and achievement in many classes, especially in maths and science lessons (Murillo and Roman, 2011; Steele, Vignoles and Jenkins, 2007). Used together with suitable pedagogical techniques, and supported by educational theories, the physical school environment can improve student learning (Diaz, Nussbaum and Varela, 2015; Sandars et al., 2015). Evident from Uruguay's Plan Ceibal where the 'a laptop for each student' policy was employed, computers are the reality of nearly every classroom today. However, it is unclear how these laptops would improve the quality of education (Cardellino and Leiringer, 2014). As Cuban (2001) suggests, there also needs to be efficient pedagogical changes and transformed and integrated teaching practices in order to effectively use the computer technology in schools. The same approach needs to be taken in Azerbaijan as well; while investing in technology, human resources, educational content, and teaching practices must also be considered. Moreover, technology in the classrooms may decrease the flexibility of the learning environments, because computers and other large technologies are heavy and difficult, sometimes even impossible, to move. It is important for the schools to set out the priorities in adjusting learning spaces.

Three different literature reviews concluded that engaging in gardening in schools improved children's social and learning outcomes (Blair, 2009; Dillon et al, 2003; Williams and Dixon, 2013). Dillon et al (2003) draw evidence from the literature that spending time in garden space improves children's learning, social interaction, and environmental understanding. School gardens are a great way to understand nature, nutrition, healthy food, environmental sustainability, and civic responsibility. Perhaps most importantly, all the curriculum subjects can easily be adapted to be taught in the school garden. Given the children's positive views on the school garden and their favourite activities to do there, effective pedagogical practices can be applied in this learning space.

This case study was successful in eliciting the children's and teachers' attitudes towards different learning spaces in the school. While the majority of educational research focuses on the effects of the learning spaces on educational outcomes and academic results, there is not much literature on children's and teachers' views and ideas about the

schools and learning. Such research can be helpful in understanding the children's and teachers' attitudes towards their own schools. The next may be an actual school design based on the findings of this research.

Conclusion

Considering the evidence of a country with a leading educational system, Azerbaijan can employ a long-term national strategy that best fits learners' needs. Instead of investing large amounts of money in interactive whiteboards, smart boards, expensive software and computers; firstly the educational priorities should be clarified. Many factors, such as the lack of competent school leaders and teaching staff, the shortage of modern learning materials, and the absence of educational software in Azerbaijani language ought to be considered well before investing in new infrastructure.

However, there are certain lessons to be taken from the British example. First is the right balance of "fun" and "learning", and the fact that spaces can foster positive attitudes towards school. Physical learning environments in the schools directly influence how the children feel and behave. Second is the need to expand learning through outdoor spaces like school and community gardens, especially in urban areas. Since there is so single formula for children's learning, a variety of learning spaces provide an effective base for a variety of teaching and learning practices, such as whole class, group, collaborative, and individual learning. For this reason, flexible and integrated learning environments in the schools are very important. During the diamond rankings, some children mentioned that they feel more comfortable and happier when working with their friends, while some preferred being alone in a quiet part of the classroom. The school spaces ought to meet the needs of all children, and there should be relevant spaces and environment for all to learn.

Conflict statement

There is no any conflict of interest.

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