CHILDREN'S AND TEACHERS' VOICES: A FRAMEWORK FOR SCHOOL DESIGN

by

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This research and its findings might be of interest to people who participated including pupils, teachers and headteachers. The findings also would be useful for architects, designers, policy makers and who are involved in building new schools for future.

Abstract

The school environment affects pupils' and teachers' health, work and emotions: on average they spend around six hours a day and over one thousand hours a year in school. There is strong evidence for the argument that good design of school buildings makes these places pleasanter and more functional; and increases the quality of the considerable amount of time users spend there. A problem identified in a review of literature was that there appeared to be a gulf between school users and designers. This thesis is an effort to bridge that gap by involving school users' voices in the design process. It has been argued that users have a lot of implicit knowledge about school buildings and it would be valuable to make this explicit so that it can be instructive to all educators, architects, designers and policy-makers.

This study explores the views and expectations of pupils and teachers regarding their school environments and has focused on making a tool for the school design process, based on information and reflections provided by both user groups. The research objective required the undertaking of three separate studies: analysis of secondary data, qualitative and quantitative empirical studies, each one leading to the next. The findings revealed that teachers and pupils are not necessarily more satisfied with recently built schools as compared with much older schools. The findings helped to highlight the importance attributed to various issues by each user. It is revealed that the two groups of participants have different priorities in terms of the types of things in their environment that are more important to them. However, within each user group there are clear patterns in responses. Overall, 'Nature and Outdoors' became the least important category for both school users. 'Facilities' was the most important category for pupils though 'Comfort and Control' was the most important category for teachers.

The overall findings have been developed as the basis for a 'generative tool' for school design to guide the design and decision-making processes of architects and designers. The generative tool and the relative importance of each item helped to progress the study further by suggesting an 'evaluative tool for designers': able to assess the quality of an existing school or a new school at various stages of design by consideration of the given scores and the weighting that each item obtained according to school users' opinions. It is suggested that further research could, in a similar way, involve other school users in the design process by developing appropriate tools.

Chapter 1 – Introduction

1.1. Research motivation

> "Of all the projects an architect can be asked to design, none can be more interesting and challenging than the school – in which the most important of all human activities, the education and development of our children, takes place... , the success of education depends so much on the quality of the pupil/ teacher relationship. This then requires an architect who is sensitive to human relationships and aware of how to promote and foster them through the built environment." (Lawson, cited in Dudek, 2000, p. vii)

This section will present the personal motivation for the inquiry. It has been argued that the school environment affects students' and teachers' health, work, leisure, emotions, and sense of place and belonging (Sanoff et al., 2001). For my part, my experience of working in an infant school for a year whilst conducting this study, opened my eyes to the design problems that affected the everyday lives of the school users.

Schools need to be as well designed as any other building and satisfactory for their users; however, there are schools that have failed to meet these requirements. What I experienced in a school as one of the staff may perhaps have been typical of many schools. An uninviting hall with no natural light and view to the outside, lots of school activities happening (physical activities, art performances, assembly and dining): and usually causing problems, unpleasant and noisy classrooms and a school yard without any shelter to enable children to play outside on rainy days, were not pleasant for either pupils or teaching staff. It appeared, just as a casual observer, that these issues could easily cause behavioural problems, among school users. My most memorable experience in that school happened on a rainy day when the children were not allowed to go outside to the school grounds and had to stay in their classrooms: something they did not like. Disruptive behaviour such as screaming and fighting was evident during the lunch break as the children needed physical activities to release their stress, rather than to be confined to their classrooms. So, in that school, did the pupils lack the space they needed? Another question I asked myself was whether they really noticed their environment and its physical features? A study carried out in this school could partly respond to these questions.

Also, during this study I was involved in a teaching course (PCHE) which required me to teach in a studio at the School of Architecture. While teaching there, I realised that the physical environment: its appearance, comfort and facilities, are not only important for students, but also for teaching staff, if they are to be inspired and work more efficiently. It became more noticeable to me when I spent a short time teaching in another university, which represented a different environment in terms of its inspirational qualities. Of course, the design of spaces seemed an important factor in creating this difference in impact, but what were the design features or environmental issues responsible for creating such different spaces? And are architects and designers aware of these impacts on users?

Both these experiences were motivational for conducting a study to involve the main school users and find out how the physical environment can be improved to satisfy their needs. Therefore, although they are different types of school users, motivation and interest guided the researcher to involve both pupils and teachers as the two main school users in this research and to find out their views and expectations about their schools.

1.2. Research questions and aims

The role of education within society has always been important: although today, the function of school architecture in that process is less obvious. As Dudek (2000) argues, successive governments have failed in this area. "At the beginning of the new millennium, the evidence of this neglect can be seen in numerous badly maintained buildings, so-called 'reception classes' for the rising fours accommodated in lofty Victorian classrooms, inner city secondary schools with little or no external recreation spaces, and generally overcrowded, noisy classrooms" (p. ix); however, the school actually is an institution which is intended to nurture, care for and educate children within the framework of structured age-related class groups (ibid).

Additionally, buildings are the most expensive physical assets of the school. A major programme of school construction and refurbishment is under way in England. According to 'Creating excellent secondary schools: a guide for clients' (CABE, 2007), Building Schools for the Future (BSF), the government's £45 billion investment programme, aims to rebuild or renew every secondary school in the country by 2020. It is the biggest capital investment in education for 50 years.

Moreover, Primary Capital Programme (PCP) aims to rebuild, and remodel a great number of primary schools. Funding started in 2008 and runs for around 15 years (Every child matters: Primary capital programme, 2006); therefore, getting school design right is more important than ever and fundamental to the delivery of such ambitious programmes.

Creative and practical solutions can be used to improve schools' quality and meet children's and teachers' needs while repairing or upgrading existing schools or constructing new buildings. It is important to find out their particular perspectives and concerns, their special needs, and spaces needed to support activities. However, it seems a great deal of school design today is commissioned by clients who are not themselves school users. Therefore, as Lawson (1997) argues, architects have relatively little contact with the users of buildings as the communication between them is frequently indirect (p. 85).Thus, it can be argued in the context of schools, that the voices of pupils and teaching staff might not be transferred to designers to be included in the school design process. Indeed, recent research confirms the limitations on direct contact between school users and architects in the context of contemporary school procurement routes in England (Parnell et al., 2008). The issues which emerged from this argument led me to pose the first question of this research:

- What are children's and teachers' concerns about physical features and spatial qualities of their schools?

and following on from this:

- Are there any consistencies in the voices of users about their school environments that could inform the school design process?

These questions gave rise to sub-questions related to methodology:

- How could the school users' opinions about their schools be gathered?
- How could pupils and teaching staff be involved in this research?

Therefore, the thesis' main aims are as follows:

- To identify, clarify and compare aspects of school design that concern teachers and pupils

- To present this information in a format that might inform designers and architects involved in school design

This will be achieved by:

- Exploring ways in which pupils and teachers can participate in this research and their voices about their school environments can be gathered (whether directly or via literature)

- Developing design tools which are based on the gathered voices of pupils and teachers.

1.3. Outline of methodology

The carrying out of this research has fallen into several stages. In the initial stage, a literature review was conducted. Then this research started with two exploratory qualitative studies in two infant schools for gathering children's voices. The next phase of study involved gathering the main issues related to the school environment that concern the two user groups. Therefore, by applying different approaches, pupils' and teachers' voices were gathered and analysed. The published data was used to identify issues important to children and a further exploratory study was carried out with teachers to gather new data addressing issues of concern for them. However, it was essential to test whether or not these findings represented the views of most children and teachers. Therefore, it was necessary to develop a questionnaire for each user.

The two surveys and their subsequent analysis highlighted the issues of concern for each school user. Differences and consistencies in the results for the two user groups were identified and used as the basis for developing a generative tool to inform the school design process. The reviewed literature was also drawn upon where relevant to highlight any evidence that supported the users' views, or conversely, the findings were used to illustrate where literature might be questioned. Finally, data analysis permitted the relative importance of each item to be suggested. Retrospectively, the questionnaire also acted as a pilot study in terms of piloting the format of an evaluative design tool for designers - which is based on pupils and

teacher's voices - to help them to assess the quality of existing or new schools. More detailed explanation of methodological issues and methods is given in the thesis as the relevant issues unfold. Figure 1.1 shows the key phases in the research process.

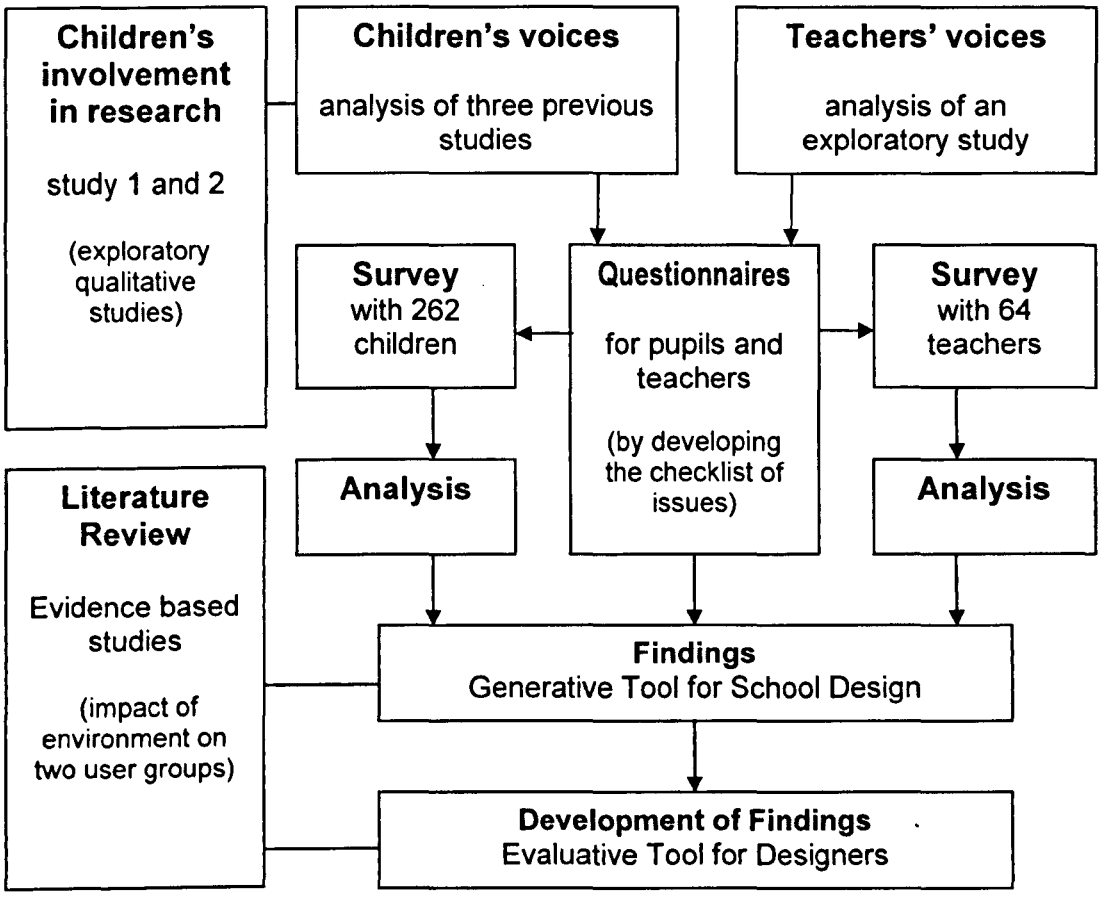


Figure 1.1. Key Phases in Research Process

1.4. Structure of the thesis

This thesis is divided into eight chapters. Chapter One (Introduction) gives the background to the research problem, highlighting the research questions, the aims, and motivation for the thesis. An overview of the key phases of the current research has been presented, and is now followed by this outline of the structure of the thesis.

Chapter Two presents a review of literature relating to school design programmes in England, the idea of eliciting and valuing school users' views, needs and

expectations regarding that environment to highlight why schools are important places to be explored. This chapter also aims to identify the known impacts of various spatial features and environmental design qualities on school users. The chapter highlights the gap existing between designers and the two main school users - pupils and teachers. It also reviews a number of assessment tools for school environments and suggests how appropriate they are in the context of building schools for the 21st century. Conclusions are drawn in order to inform the direction of the next stages of research in this study, which would involve both pupils and teachers.

Chapter Three presents and discusses a number of existing research methods for involving children in research. It also tests certain methods for finding out children's views about their schools, by conducting exploratory qualitative studies in two infant schools in Sheffield. The aims of these studies were 'to find out the ways that children could be involved in this research' and 'to determine their concerns about their school environment'. The findings of the two studies are presented in this chapter. It considers how the results of these two studies helped to find the appropriate methods and ages of children needed for data collection in the main empirical study.

Chapter Four presents and categorises the issues raised by children about school design which emerged through an analysis of three previous studies in the UK: 'The School I'd Like' (Burke and Grosvenor 2003), 'Joinedupdesignforschools' (Sorrell 2005), and 'The Young Design Programme' (The Sorrell Foundation 2006 and 2007). It aims to provide a categorised list of items (or design issues) highlighted by children. The perceived relevance and importance of these design issues are then to be tested in an empirical study with pupils, using an evaluative tool, in the next stage of this research.

Chapter Five presents and discusses the results of the empirical study carried out with pupils in two secondary schools in Sheffield. This chapter presents the methodological approach to developing an evaluative tool as well as children's views. It reports and discusses the results of empirical studies carried out in relation to children's satisfaction with their existing school as well as the importance of each item that they scored. The findings support the idea of developing a framework for

school design based on pupils' views which fits better with their needs, values and expectations.

Chapter Six discusses the approach taken to gathering teachers' voices through an exploratory study with teaching staff and analyses their opinions. It presents the results and explains how the exploratory study highlighted a list of issues which would help to make an evaluative tool (similar to that for pupils) for teachers. The empirical study tested the emergent issues with teaching staff in the same two secondary schools that agreed to participate in this study. This chapter reports and discusses the findings which helped to develop a framework for school design based on teachers' views.

Chapter Seven discusses the differences and similarities between pupils' and teacher's views about various issues and categories related to school buildings and their grounds. It helped a better understanding to be obtained by looking at these two points of view in parallel and comparing the findings. The overall findings are developed as the basis for a 'generative tool' for school design to guide the design and decision-making processes of architects and designers. The generative tool and the relative importance of each item helped to progress the study further by suggesting an 'evaluative tool for designers': able to assess the quality of an existing school or a new school by consideration of the given scores and the weighting that each item obtained according to school users' opinions.

In Chapter Eight, the thesis is discussed in relation to previous research findings. It presents a number of areas in which the current work relates to previous findings by other researchers. Implications are then given for research design and school practice and for research methodology to involve school users in the design process. The chapter highlights the limitations of this research and ends with conclusions and some suggestions for future research.

Chapter 2 - Background: School Environments

The first aim of this chapter is to review the literature relating to school design programmes in England, the idea of eliciting and valuing school users' views, needs and expectations regarding their environment and to show why schools are important places to explore. The second aim of this chapter is to identify the known impacts of various spatial features and environmental design qualities on school users. The final aim is to review a number of assessment tools for school environments and find out how appropriate they are in the context of building schools for the 21st century in order to inform the direction of the next stages of research.

2.1. Physical environment and environmental psychology

> "We value space because of its power to organize, promote pleasant relationships between people of different ages, create a handsome environment, provide changes, promote choices and activity, and its potential for sparking all kinds of social, affective and cognitive learning. All of this contributes to a sense of well-being and security in children. We also think that space has to be a sort of aquarium that mirrors the ideas, values, attitude, and cultures of the people who live within it." (Malaguzzi, 1984. cited in Edwards et. al, 1993, p. 145)

In order to be able to discuss the physical environment, it seems important to define the words 'space, place and environment' which are used in this section. It has been argued that 'space' has a special 'language' of its own (Lawson, 2001) and transmits silent messages that people interact with consciously or unconsciously. This language is interpreted in people's minds and their emotions respond to it. Harrison and Dourish (1996) describe the relationship between space and place. They state that 'space' is the opportunity, while 'place' is the understood reality, and suggest that place is a more suitable concept than space in providing an appropriate framework for understanding people's interaction with their physical environment. Whereas space refers to the structural, geometrical qualities of a physical environment, place is the notion that includes the dimensions of lived experience, interaction and use of a space by its inhabitants.

In addition, the 'major constituents' which amalgamate to form 'places' have been discussed by Canter (1977, p. 158), who concluded that 'a place is the result of

relationships between actions, conceptions and physical attributes'. Canter (1977, p.159) believes that with the three component model it is possible to look for those aspects of physical attributes which have the greatest likelihood of linking to the other components of the place in question: those which facilitate the identification of places.

The concept of 'environment' has been discussed by Ittelson (1973) who believes that environment surrounds, and nothing and no one can be apart from it. In addition, the presence of meanings and motivational messages carried by the environment, and the concept of ambience relate to the 'aesthetic', 'social' and 'systematic qualities' of the environment (ibid, p. 13 -15). An 'environment' is a living, changing system. More than the physical space, it includes the way time is structured and the roles we are expected to play. It conditions how we feel, think, and behave; and it dramatically affects the quality of our lives (Greenman, 1988, p. 5). Canter (1977) believes 'the ways in which we conceptualise places form an integral part of our interactions with them' (p. 13).

'Environmental interactions are ongoing activities, difficult to specify for any given point in time. Furthermore, it is the resultant effect of a repeated set of interactions, over an extended period, which is likely to have the strongest mark on our conceptual systems' (ibid, 128). These repeated interactions with environment have their special importance in the school environment context where different user groups are involved. Therefore, the environmental design quality of schools seems an important topic for discussion.

In review of numerous publications on educational theory and spaces, the quality of the 'learning environment' was found to be rarely mentioned and as Dudek (2000), for example, believes: 'pencils and paper, are 'resources', the surrounding built fabric is seemingly not considered in these terms.' In the scale of value, the architectural quality comes very low on the list of priorities when discussed by educationalists' (p.42). However, Taylor and Vlastos (1975) argue that 'the quality of a school's physical environment makes a difference in behaviour and learning of children' and 'better quality learning environments will produce happier children who look forward to school instead of dreading it' (p.138).

According to the National Curriculum Framework (2005), on average pupils spend around six hours a day and over 1000 hours a year in school where they are

continuously interacting with the physical environment of their schools consciously or unconsciously. The amount of time young people spend in school, from preschool to end of secondary school, is so significant that it is important to recognise that much of this time is devoted to 'living' as well as learning (Sanoff, 1992, p. 41). It is necessary to view the school as a 'place' where children 'live' and do various activities, and not only as a place where knowledge and skills, defined by the curriculum, are transmitted. In this respect, and based on Canter's (1977) definition of place, school has also been fully identified when we know 'what behaviour is associated with it', 'what the physical parameters of the setting are' and 'the descriptions, or conception', which school users hold of that behaviour in that physical environment.

Moreover, Scott and Spencer (1998) point out the importance of 'environmental psychology' in designing schools and discuss that although the various 'physical features' of a school are determined in part by design brief, evaluating the impact of such designs on users is important. They also discuss that 'the age group of pupils' has implications for the basic spatial designs as each space (e.g. classroom) can send 'messages' to pupils about their involvement in the place which need to be different based on their age. Also 'educational objectives' of a school as a second level of factors, which could have their effects on school design, need to be considered by design team. Finally, 'the size and organisation of school' needs also to be taken into account that may be related to pupils' satisfaction with the school (ibid, p. 519-521).

In support of this discussion, Gifford (1987) also argues that educational settings can and should make education more efficient and enjoyable and physical setting may not make or break education on its own; however, it can interact with non-environmental factors in order to promote or hinder the learning process. His person-environment model states that the 'personal characteristics of students' interact with 'physical features of the learning setting' and the 'social-organizational climate' (rules, curriculums, teaching style, etc.) to produce learning related attitudes (satisfaction with school, commitment with learning, etc.) and behaviour (class participation, learning and performance, etc.) (ibid, p. 268). Therefore, the psychological impacts of physical settings (features) in school as well as those aspects of setting that are social, organisational and educational are important to be considered for school design. It could also be argued that school users are experts in these fields to inform designers about their needs.

2.2. School design programmes in England

2.2.1. Policy review

In 1992 the UK government adapted the policy of financing public services including the building and refurbishment of schools via the public-private finance initiative (PFI) (Burke & Grosvenor, 2003, p. 18). Besides, in February 2003, Building Schools for the Future (BSF) was launched by the Department for Children Schools and Families (formerly the Department for Education and Skills). It is a long-term programme of investment and change in England that will help transform education for secondary age students (DCSF, 2008, p. 4). According to 'Creating excellent secondary schools: a guide for clients' (CABE, 2007), Building Schools for the Future (BSF) - the government's £45 billion investment programme - aims to rebuild or renew every secondary school in the country by 2020. It is the biggest capital investment in education for 50 years. At the launch of the programme, David Miliband, Schools Minister at the time, said that: "School buildings should inspire learning. They should nurture every pupil and member of staff. They should be a source of pride and a practical resource for the community" (DCSF, 2008, p. 4).

It is worth emphasising the scale and scope of BSF as there is no project like it anywhere in the world. Not since the huge Victorian and post-war building waves has there been investment in the school capital stock on this scale, and certainly the potential for new ways of learning has moved on considerably since then. Investment in the three decades before BSF was announced had been minimal, meaning that there were very few architects, procurement experts or head teachers in the system with experience to build on. Even the research base has little to tell us about how we should design sustainable learning environments for the future. Therefore, sustainability in the project has been a cause of concern because neither the BSF consultation document nor the launch document discussed sustainability (House of Commons Education and Skills Committee, 2007).

Secondary schools provide a major resource for local communities, and as such, the new and refurbished facilities delivered by BSF are being designed for shared community use wherever appropriate. In line with the "Every Child Matters" agenda, every BSF school will be an extended school, offering additional or dual use facilities, such as sport halls, libraries, nurseries and ICT resources. BSF offers a great

opportunity to integrate schools into wider regeneration projects, repositioning our schools at the heart of communities (DCSF, 2008, p. 5).

As part of the BSF programme, there are a number of stages that a local authority has to go through. Before the process begins local authorities should start to make plans and consult with partners. A BSF project director and project team should be recruited early on in the process to deliver the demanding schedule. There will be a high-level project board which usually meets monthly; a project team which typically meets weekly to deal with the detailed issues and a consultative stakeholder group. However, schools and other key delivery partners should expect to be involved (perhaps through a representative) in these structures. Governors and other partners should contact the BSF lead officer in the local authority if in any doubt on these matters (ibid). It seems there are levels of uncertainty about school users' involvement in this programme as described and the question remains is how school users' voices especially pupils would be heard and gathered to be considered for design of future schools.

However, there are a number of guidelines for design of secondary schools including 'Building Bulletin 98', Briefing Framework for Secondary School Projects. It was originally produced by Department for Educational and Skills as guidance (for secondary school buildings and grounds) for school designers; however, it is now used within the BSF environment as benchmarking and in a much more legislative manner. This bulletin offers a framework for every secondary school to develop a strategic 'masterplan', incorporating any future building project, whether major new buildings or minor refurbishments. Moreover, it identifies the key issues that should be addressed in the brief to ensure that the design is in line with the organisation and preferences of the school (DFES, 2004).

There are a number of specified Key Design Requirements defined by this bulletin identified as essential in the brief for any school project including 'flexibility and adaptability', 'access and inclusion', 'safety and security', and 'environmental performance' (DFES, 2004, p. 21-23). Although it seems a useful guideline for school design, it could be argued that one of the main focuses of this bulletin is giving standards (for different areas including net Area and non-net area of buildings) rather than guidance for design. Also this guidance (the solutions or suggestions) has not been based on the views and expectations of school users as guidance for designers; however, in the section called 'Vision for the School' it is indicated that

'the client's brief should communicate to the design team' that the buildings should inspire and enhance 'educational performance, staff satisfaction, pupil satisfaction, and community involvement' (ibid, p. 15).

Reviewing the process of BSF reveals that it is currently behind schedule, but there are opportunities for it to catch up with the timetable, and be completed within the broad fifteen year plan; however, it is far from clear that it would be sensible to do so, or whether the main concern should rather be to complete it appropriately (House of Commons Education and Skills Committee, 2007, p. 14). At this stage of the BSF project, it seems that there are key areas which need to be examined and one of them related to this discussion is whether 'the planning and procurement process is working effectively, and if not, how does it need to be changed?' (ibid) In this relation, John Sorrell of the Sorrell Foundation (cited in House of Commons Education and Skills Committee, p. 17) emphasised the need for consultation with pupils, and was concerned that often that consultation was only lip service:

> "Very often what happens is the school is designed basically and then the kids are brought together for an hour, they are shown the designs of the focus group and at the end of it boxes are ticked. What I am calling for is a much, much deeper involvement of pupils in the overall client stakeholder group, and it is a big group because you have head teachers, teachers, parents, governors, local community, the LAs. It is a very, very big stakeholder group on the client side. The ones I plead for are the children because they are the ones who are likely to be left out of the discussion. It is making a big mistake if we do not involve them properly. Of course they are not designing the schools, what they are doing is helping to inform the people who are designing them and that is the whole point. If you create a great vision, a great brief and you have a great designer working with that great brief then you have a good chance of getting a good result."

Evidence has been presented regarding missed deadlines within the programme and insufficient time to consult and think through issues (House of Commons Education and Skills Committee, 2007): "There is a very strong argument that the initial 'visioning' phase should be lengthened. All authorities in the waves so far announced should already be addressing the issue of what they want of their schools" (ibid, p. 23). Perhaps, consultation with school users and gathering their views as a brief could inform the BSF programme and be used as a base for the proper continuation of this programme. This has been recommend in BSF documentation to 'consult and inform all interested stakeholders' and there is a long list of suggested consultation methods to include (DCSF, 2008, p. 24) which are presented without any details for

their use; therefore, it seems there is not any particular designed (tested) tool to gather school users' views.

As part of the BSF programme, design assessment has been considered: CABE's Schools Design Assessment Panel is intended to help local authorities to evaluate the design quality of proposals, support bidders in meeting briefing requirements and refining their proposals and ensure that design quality remains consistently high (ibid, 34). Based on CABE's publication in 2007, 'Creating Excellent Secondary Schools', the 'ten points for a well-designed school are as follows':

1. A high-quality design that inspires users to learn
2. A sustainable approach to design, construction and environmental servicing
3. Good use of the site, balancing the needs of pedestrians, cyclists and cars and enhancing the school's presence in the community
4. Buildings and grounds that are welcoming to both the school and the community while providing adequate security
5. Good organisation of spaces in plan and section, easily legible and fully accessible
6. Internal spaces that are well proportioned, fit for purpose and meet the needs of the curriculum
7. Flexible design to allow for short term changes of layout and use, and for long-term expansion or contraction
8. Good environmental conditions throughout including optimum levels of natural light and ventilation for the different activities within the buildings
9. Well-designed external spaces offering a variety of different settings for leisure, learning and sport
10. A simple palette of attractive materials, detailed carefully to be durable and easily maintained and to age gracefully

However, it has been pointed out that CABE has developed these points over time, drawing on their knowledge of the school building design process and the "Checklists have an obvious value but they do not in themselves lead to good design: good design is the result of the successful synthesis of these key points" (ibid, p. 7). Therefore, the question would be how the checklists could be developed if the views and expectations of school users were included.

Besides, because of the scale of the project (BSF) and the amount of money proposed to be spent, "there is a danger that everyone involved will concentrate on

getting through to the end and that the question of whether the project's scope and aims remain appropriate will not be asked" (House of Commons Education and Skills Committee, 2007, p. 56). It has been noticed as part of BSF process it is vitally important lessons are learned from the earliest schools and projects in the process. It is suggested that here should be a post-occupancy review of every school within the BSF programme so that a proper assessment can be made of what has worked well and what has caused difficulties, on procurement and construction issues and also on the design and conception of the school. These reviews should be circulated widely so that all those involved in BSF can use them to ensure that mistakes are not repeated, and that good ideas are adopted more widely (ibid, p. 43).

In addition, it needs to be mentioned that 'primary schools' are not included in BSF, but there is a separate programme to provide for the rebuilding, remodelling or refurbishment of 50% of primary schools over the next 15 years, which was announced in March 2006 (Every Child Matters: Primary capital programme, 2006). It has been designed in a very different way to Building Schools for the Future. BSF has begun in areas with traditionally high levels of deprivation, while the Primary Capital programme is targeted to "address deprivation nationally and in every authority and responding to population changes" (ibid, p. 4). However, authorities are not being brought into the programme in waves. There have been regional pilot schemes in the first year (2008), and after that (from 2009) all authorities will benefit from access to funding (ibid). The Government clearly has significant ambitions for this Primary Capital programme as for BSF; however, it is not so wide-ranging nor is an equivalent amount of money being made available which may be because primary schools are much smaller than secondary schools and may not be expected to have the same specialised features as secondary schools. It is noticeable that the primary document specifically refers to sustainable design unlike the original BSF launch document (ibid). This new program can benefit from the lessons that might be learned from evaluating the design quality and satisfaction of school users in the new secondary schools built so far, to find out the existing problems and prevent their repetitions for new primary schools in the future.

2.2.2. Educational transformation

It could be argued that the organisation of learning has never before been so rigidly organized and the subject boundaries have never been more strictly observed which is something that today's children are aware of and suspect is not beneficial to them (Burke and Grosvenor, 2003, p. 58). The history of education shows institutional change on the surface, but fundamentally the classroom, its routines, the regimentation of life, the lived experience of school does not change (ibid). However, there has been a clear aspiration from the outset of Building Schools for the Future that local authorities should use this opportunity to transform (to reform and redesign) secondary education in their areas. This transformation could happen by thinking differently about all aspects of the process of developing and delivering new schools, exploring various questions such as 'what do we want education to be in the 21st century?' and 'how can we learn from the best current schools?' (House of Commons Education and Skills Committee, 2007, p. 36).

It has been pointed out that learning in schools becomes limited to a pre-selected and served up curriculum (Apple, 1995). "Learning will happen with ease when it is allowed to be fun and when children are regarded as [...] individuals who are made comfortable in mind, body and sprits. Part of the sense of comfort and stimulation will result from being granted some control, choice and direction in their learning" (Burke and Grosvenor, 2003, p. 71); however, the curriculum in schools is perceived by children and young people as too limited and inflexible, restricting their chances of drawing effectively from knowledge and skills later on (ibid, p. 58). It is reflected a concern that "learning is becoming increasingly limited in schools today by administrative and social structures" (ibid, p. 67). Therefore, it might be worth finding out and considering children's priorities for educational changes which can affect the design of schools for the future.

Moreover, school buildings have their impacts on education. The Centre for Learning and Teaching (CfLaT) explored the foundational areas of how the physical environment might impact on learning (Higgins et al., 2005; Woolner et al., 2007a). In the past, educators and architects had a predetermined vision of schools: "Educational specifications were written for the architect as if there were a form for school design which included so many look-alike classrooms, hallways, gymnasiums, cafeterias for institutional food distribution, and administrative offices ..." (Taylor, 1991). Many architects who intend to design "a school of the future" are puzzled by

the old-style educational specifications with prescribed and predetermined square footage needs, which are now no longer practical. Architects want educators to envision with them what the school of the future will be; however, the educators are having a difficult time articulating the educational program of the future, its curriculum and instructional methodology and because no one can foresee the future, construction is under way using outdated models and design formats (ibid).

Building Schools for the Future (BSF) intends to help 'transform education' for secondary age students by providing 21st century learning environments that engage and inspire young people, their teachers and the wider community; however, it needs to be mentioned that "educational transformation" is not a single process, and it will not stop when the school buildings are completed. It is a big leap to 'improve learning and achievement for every child and young person', 'enhance school diversity and parental choice', 'increase the use of schools by the community', 'use new thinking and opportunities and be creative in designing for learning', 'seize opportunities through new technologies' and 'produce places for learning that are exciting, flexible, healthy, safe, secure and environmentally sustainable' (DCSF, 2008, p. 13).

An integral component which links buildings with teaching and learning is Information Communications and Technology (ICT) (ibid, p. 5). In terms of embedding transformation in teaching and learning practices, ICT is a fundamental element. The BSF programme intends to embed ICT in schools by 'increasing the level of ICT provision', 'designing buildings that allow maximum use of ICT', 'providing managed services which guarantee availability of ICT' and 'providing incentives to develop the use of ICT in teaching and learning' (Price Waterhouse Coopers, 2008).

In addition, related to 'learning' it is recommended by BSF that schools in the future must be able to help children and young people to 'learn in range of different ways, in a variety of environments and at times that respond to their individual needs', 'experience learning that will prepare them for their future life and work', 'develop confidence and feel safe and secure in and around their places of learning', 'use high quality computer technology to inspire and support their learning', 'extend their learning and leisure beyond the school' and 'make good progress, resulting in high levels of achievement' (DCSF, 2008, p. 14). Therefore, it might be asked, 'how much can school buildings and grounds respond to these requirements?' and 'are there other issues to be considered in school designs that BSF might have not included so far?'

Moreover, one of the key issues in secondary education in the coming years will be 14–19 education. The Government is committed to the introduction of 14 diplomas to be available to all students in the age group across England by 2013. Although the Government clearly says that it does not expect any school to be able to provide them on their own, and that they will be delivered collaboratively by schools and colleges across an area. In this respect it is suggested that when planning the development of schools in an area, local authorities must ensure that the way provision for 14–19 education is to be made and in which responsibility for delivering each of the diploma lines is to be shared, is considered at an early stage. It is also important that schools should be seen as a system, not just individual institutions (House of Commons Education and Skills Committee, 2007, p. 43).

Finally, it seems that building themselves not only can impact teaching and learning, but also can themselves teach pupils. As Taylor (1991) argues 'learning environments can teach'; for instance, a solar greenhouse can help children nourish life outside themselves, understand botany, and begin to learn about alternative energy systems. The structure of the building itself can teach physics, concepts of tension, compression, force, load cantilevering, fenestration patterns, the awareness of solids/voids and massing as a basis for descriptive geometry. School grounds also can teach pupils and hills, valleys, trees, gardens, and graphics, all become learning tools (ibid).

Therefore, this awareness and consideration as well as other issues discussed in this section could influence the future design of schools in order to promote the learning process. In addition, it could be learned, as Burke and Grosvenor (2003, p. 9) point out, that if schools are to be a successful vehicle for learning in the twenty-first century, it is crucial that children and young people are involved in determining their nature, design, organisation, ethos and use. However, as Woolner et al. (2007b, p. 237) argue, there is a more fundamental problem in policy-level thinking: "it is not clear whether new directions in teaching and learning should lead innovation in school design or whether innovative design will shape educational practice".

2.3. Impact of school environment on users

2.3.1. An overview

The review of literature explains how the school environment affects children's and teachers' health, work, and emotions. The impacts of a school on its users can be classified as 'qualitative' and 'quantitative'. The review shows that the literature can be divided into two types; 1) opinion-based literature (e.g. experience/ reflection of designers) 2) evidence-based literature: which presents the findings of an empirical research study. Furthermore, empirical studies have tended to focus primarily on the impacts of various design and environmental features on pupils.

Dudek (2000) believes that the physical environment in general and in specific ways is deemed to have an effect on the success of the children: not only academically but also socially. This is similar to the view expressed by Sanoff (1992), which points out that the business of schools is not to ensure academic performance alone. According to Dudek (2000), school is an institution which is planned to nurture, care for and educate pupils. It has been stated, however, that both quality of student life and education are directly affected by the quality of school environment (Sanoff, 1992, p. 41).

In the literature exploring physical learning environments, Higgins et al. (2005) argue that physical elements in the school environment can be shown to have noticeable effects on both teachers and pupils. However, review of literature shows that there is not much evidence about the positive impact of 'good' school environment on users though it might be expected. Research indicates that a poor fit between a student and the school environment may lead to poor performance and may carry some psychological or physiological cost, even if the student does perform well (Maxwell, 2000); and, as Earthman (1997) has argued, children who feel disoriented, uncomfortable or bored in school are certain to be more challenged in their ability to learn and pursue their potential. However, research shows that students learn best in stimulating, safe, and resource-rich learning environments (Lackney 1998). Moreover, poor school conditions make it more difficult for teachers to deliver, affect their health and increase the possibility that teachers leave the teaching profession (Schneider, 2003, p. 4).

In addition, the report titled 'Do K-12 School Facilities Affect Education Outcomes?' explains that there is increasing evidence of a correlation between the adequacy of a school facility and student behaviour and performance; factors such as building age and condition, quality of maintenance, temperature, air quality, lighting, noise, and colour can affect pupil health, safety, sense of self and psychological state. Also, results of a study of working conditions in urban schools claim that physical conditions have direct positive and negative effects on teacher morale, sense of personal safety, feelings of effectiveness in the classroom, and on the general learning environment.

However, there are certain factors related to schools and the physical environment which need to be considered in this discussion. One of these factors is the age group of pupils and their needs. Dudek (2000, p. 88) believes the difference between the physical and psychological make-up of the school child at the beginning of the primary school process (aged 4 or 5) and at the end (aged 11) is significant. Pupils are considerably more mature and independent at the age of 11 or 12 than when they first enter the school. Younger children are more focused on their immediate surroundings whereas older children will generally be more outward looking, interested in the wider social and spatial environment. Another issue for consideration is the size of schools. Secondary schools are almost always larger both in terms of the physical size of things, and the numbers accommodated: as on average they cater for 780 to 1200 students (ibid, 93-95). Therefore, the impact of school environments on pupils could differ according to their age and their type of school.

In order to present and discuss the literature further in relation to the focus of this study, it would seem to be appropriate to present both opinion- and evidence-based literature in relation to various design features of school environments and their impact on pupils or teachers.

2.3.2. Opinion-based and evidence-based literature

There has been a body of literature stressing different points of view on the importance of various architectural or environmental issues in schools and their impacts on both groups of school users; however, the amount of literature related to children is significantly higher than the level of information on teachers.

The literature review shows that although a variety of environmental issues in schools have been the focus of study for a number of researchers, there are few findings which focus on an amalgamation of these issues. Inadequate 'temperature control, lighting, air quality and acoustics' were found to have detrimental effects on teachers and learners: in particular, on concentration, mood, well-being, attendance and, ultimately, attainment (Higgins et al., 2005). Earthman (2004) rates temperature, heating and air quality as the most important individual elements for student achievement. However, researchers have emphasised that each of these issues has special effects on school users. These are described as follows:

- **Lighting**

The importance of 'lighting' has been highlighted by different researchers. According to Earthman (2004), more studies have been completed on how lighting affects students than any other school building component. The Heschong Mahone Group (1999) completed a study regarding the effects of natural daylight on student achievement and reported that natural light affects learning positively. It was also found that full-spectrum light increases children's attention to their teacher (Ott, 1976), decreases student absenteeism (London, 1988), and, when a change to full-spectrum lighting occurs, it can reduce illness and fatigue in students caused by the usual institutional fluorescent classroom lighting (Harmon, 1991). 'Natural' and 'full-spectrum' lighting have been found to reduce mental fatigue and sooth students with hyperactivity disorders (Dunn et al., 1985). It is suggested that good lighting can only be achieved by a combination of direct and indirect lighting (Barnitt 2003; Butin, 2000). Finally, as adjustable lighting controls provide greater options in lighting levels throughout the classroom, all windows and skylights should be equipped with blinds (Butin, 2000).

- **Acoustics**

Another issue that has been emphasised in relation to schools is 'acoustics'. Regarding school buildings, it was stated that the most serious acoustic problems are due to noise transfer between rooms and excessive reverberation in rooms, which are often the case in old Victorian buildings or in more recently designed open-plan schools (Baumann & Niederstatter in Dudek, 2007, p. 29). Based on their study, it can be concluded that children experience a feeling of well-being if the acoustic design suits the function of the room (ibid, p. 30). Activities within the classroom have been found to contribute highly to the ambient sound level (Wohlwill and Heft, 1991).

Evidence shows noise interferes with learning both while it occurs and after the noise is gone (Gifford, 1987); therefore, good acoustics are fundamental to good academic performance (Schneider, 2002) and are crucial in classrooms for all age groups (Dudek, 2007). It is therefore, very important to limit the amount of noise that exists in schools. Various solutions are proposed to the problems of inadequate acoustics, such as increased carpeting (Tanner & Langford, 2002) and ceiling hangings to dampen reverberation (Maxwell & Evans, 2000). It is also stated that it would be beneficial to children to create different zones offering a variety of acoustic characteristics including places of silence and concentrated tranquillity, places for eating, speaking, singing and making music (Baumann & Niederstatter in Dudek, 2007, p. 29).

- **Ventilation**

The importance of 'ventilation' in educational establishments continues to be emphasised (Kimmel et al., 200; Khattar et al., 2003). The inadequacies of indoor air in schools continue to be linked to ill-health (Ahman et al., 2000). Warm temperatures create sluggish, tired students while cold temperatures affect a student's dexterity (Lackney, 1999).Moreover, student achievement is further reduced by poor ventilation, lack of air movement and poor humidity control (ibid, p. 1).

- **Colour**

'Colour' was said to have an effect on creating a comfortable and relaxed atmosphere (Hathaway, 1987), on blood pressure (Taylor and Gousie, 1988), on productivity and accuracy (Engelbrecht, 2003), on students' achievements (Tanner and Lackney, 2006) and on 'children's cooperative behaviour' (Read et al., 1999). Also, the importance of different colours for different age groups (Engelbrecht, 2003; Pile,1997), for protecting eyesight, creating surroundings that are conducive to study, and in promoting physical and mental health (Mahnke, 1996), was emphasised. Hathaway (1982) believes that when colour is properly used it can improve the environment for learning. The use of appropriate colours for different activity spaces was also suggested by Pile (1997): to convert an atmosphere into one that is pleasing, exciting and stimulating (Papadatos,1973); however, it was also reported that distracting colour combinations could lead to task confusion and slow reaction (Chan & Petrie, 1998).

- **Display**

'Means to display art work' has been another highlighted issue. It is believed that displays of children's work are critically important to the classroom environment as long as they are presented without over-elaboration within a clear and ordered aesthetic (Dudek, 2000, P.58-59): although poor display of children's work can make the visual aspect cluttered (ibid). Furthermore, Killeen et al. (2003) argue that displays of children's work increase feelings of ownership and involvement, leading to improved motivation. They found a correlation, not a causal link, between inclusive artwork and positive attitude. Also, according to school users' opinions, display of students' work makes the school more welcoming (Maxwell, 2000). Changing displays was also highlighted as one of the design principles fundamental in developing a school building assessment programme (Lackney, 1998).

- **Furniture arrangement and chairs**

'Furniture arrangement', especially in classrooms, has been another issue that has caused argument among researchers. Research which specifically compares rows [of desks] and tables (Wheldall et al., 1981; Wheldall & Lam, 1987; Hastings, 1995) suggests that less attentive and less successful students are particularly affected by the desk arrangement, with their on-task behaviour increasing very significantly when seated in rows instead of at tables. It is pointed out by these authors that the vital mediating element between the physical environment and improved classroom climate could be the reduction in negative interactions between teacher and student, since the students seated in rows are able to concentrate better and so provoke fewer admonishments.

In addition, it has been argued that classroom layout affects the social interaction of both teachers and students (Gifford, 1987). Placing chairs in a circle, instead of in rows and columns, for instance, makes it clear that discussion and interaction are involved (Gump, 1987). Also a 'horseshoe' formation where students can see each other and the teacher is recommended by Galton et al. (1999) and Alexander (1992) and it was found by Marx et al. (2000) that more questions are asked by children when seated in a horseshoe arrangement than when they are in rows. However, Horne-Martin (2002) argues that 'horseshoe' formation is a very controlling and teacher-dominated approach. In this respect Higgins et al. (2005) suggest that, as different room arrangements serve different purposes, it is necessary for classrooms to have some degree of flexibility.

In addition, the need to have appropriate 'chairs' in schools has been discussed by a few researchers. A classroom study found that children showed a significant improvement in on-task behaviour and a marked change in sitting positions following the introduction of newly (ergonomically) designed furniture (Knight and Noyes, 1999), though Linton et al. (1994) did not observe any different sitting positions in the children in their study when using ergonomically designed furniture and suggest that students need guidance on proper use of such furniture. It is also suggested that given the difference in size between school children, adjustable furniture might seem sensible (Zandvliet & Straker, 2001).

- **Circulation areas**

Regarding 'circulation areas' in school, Dudek (2007) argues that poorly designed circulation can make movement around the building difficult and even facilitate bullying; however, well designed circulation encourages a positive ethos and make sense of a school building (ibid, p. 20). He stresses wayfinding and legibility in schools and suggests the use of colour for this purpose and emphasises the importance of minimising the travelling distances and making the circulation area interesting (ibid, p. 163). Furthermore, circulation patterns surrounding activities encourage children to look around and see what is available, and fluid traffic patterns provide a means for better communication (Loughlin and Suina, 1982; Moore and Lackney, 1995).

- **Toilets and drinking water**

'Toilets' are an area in schools that need attention. There are common, consistent findings in many of the studies regarding toilets. In a study titled 'Lifting the lid on the nation's school toilets' (Children's Commissioner for Wales, 2004) published by the Children's Commissioner for Wales, it is stated that use of substandard toilet facilities during the school day by children and young people has a negative impact on their health and development. Another study shows that toilets were one of the key factors which teachers felt had a negative impact on pupil behaviour, are perceived by many as small, restricted spaces, and often unsupervised by teachers: making them hot-spots for pupil misbehaviour (Teacher Support Network and the British Council, 2007).

'Drinking water' is perhaps not directly related to architecture, but the space it requires and easy access to it are a cause for concern in schools. Although school drinking water is usually close to toilets, teachers reported a desire to have water in

the classroom (Heshong, 2003). Also, it is stated that access to drinking water in schools should be more readily available as 'fresh, clean drinking water is essential to maintain good health, especially in children' (Walters & Cram, 2002).

- **Storage and lockers**

'Storage' is another issue which has been discussed. In Heshong's (2003) study, teachers reported a desire to have lots of storage in the classroom. It is argued that accessible, well thought out storage leads to more time spent learning (Gump, 1987; Loughlin & Suina, 1982). Lockers where children can store their belongings seem to be an important factor: with research showing a positive relationship between the provision of lockers and student achievement scale scores (Cash, 1993).

- **Safety**

'Safety' is an important issue for all school users, but especially for children. The need to define safe secure territories was stated by Dudek (2007) to affect students' learning and was highlighted as one of the design principles fundamental to developing a school building assessment programme (Lackney, 1998). Also, Kennedy (2002) declared that '. . . the best way to ensure that a school building provides a secure environment is to design it with that in mind' (p. 1).

- **Attractiveness**

'Attractive spaces' and their importance have been discussed by some researchers. Dudek (2007) highlighted the importance of providing attractive modern environments which appeal to fashion conscious children, especially in secondary schools. Sommer and Olsen (1980) found that a room specifically designed to be friendly and attractive, seemed to increase student participation in discussions and in asking questions during classes.

- **School grounds and landscape**

'School grounds' and their use have been looked at from different perspectives. Children and young people can spend up to twenty-five percent of their total school time in the school grounds. Therefore, school grounds offer an important resource for learning, play and child development, and for promoting positive health and well-being, understanding of the environment, citizenship and physical activity for children; however, there is a belief that the potential of this resource currently lies untapped in many schools (Casey, 2003). Where potential is recognised and schools

do make improvements to their grounds, their motivations for change, as identified by Kenny (1996, p.6), tend to fall into six categories: curriculum use; improvement of behaviour; better play facilities; improvement of safety; enhancement of the image/appearance of the school; attracting wildlife and improvement of the natural heritage value of the site.

The way grounds are designed appears to strongly influence the way children behave in them. The study titled Grounds for Learning (n.d.) by the Scottish programme of Learning through Landscapes found that 73% of schools that had improved their grounds reported improved behaviour and 64% reported a decrease in bullying. Play in a diverse natural environment has also been shown to reduce or eliminate bullying (Malone & Tranter 2003) and children who play in natural surroundings have been shown to have more positive feelings about each other (Moore 1996).It has been suggested that nature buffers the impact of life's stresses on children (Wells 2003) and stimulates healthy social interaction (Moore, 1986; Bixler et al., 2002). Titman's research (1994) suggests that to children school grounds are 'essentially signifiers of the ethos of schools' (p. 63). School grounds, by their design and the way they are managed, convey messages and meanings to children that influence their attitudes and behaviour in various ways (ibid).

Moreover, exposure to natural environments was a highlighted issue that 'improves children's cognitive development by improving their awareness, reasoning and observational skills' (Pyle, 2002). Furthermore, with regard to 'views', it was stated that children with views of and contact with nature score higher on tests of concentration and self-discipline (Wells, 2000; Taylor, 2002). Heshong (2003) also found that teachers preferred classrooms with windows and views.

Provision for 'outdoor learning' was emphasised by Casey (2003), with school grounds identified as an important resource for learning, play and child development, and for promotion of positive health and well-being, understanding of the environment, citizenship and physical activity for children. Also a significant correlation associating the students' test scores with outside learning areas was identified (Tanner and Lackney, 2006). Issues relating to landscape, school grounds and outdoor learning are acknowledged as being very important and much more extensive than represented here; however, they cannot be explored in any greater detail within the scope of this thesis.

2.3.3. Summary

The review of literature highlights the different key issues related to school environments; however, there are not equal numbers of studies for the various themes. Most studies have stressed environmental and physical features, such as lighting, temperature, ventilation, acoustics, colour, furniture arrangements, circulation area, toilets, school grounds and landscape; therefore, in some areas very few studies have been conducted.

An important, but largely ignored factor is how these environmental issues are perceived by pupils and teachers. Are there also other issues that need to be studied which are important for teaching staff and pupils in schools, but which do not appear in the literature?

In general, the focus of study for most researchers in the area of schools has been the classroom itself and this has caused the neglect of lots of other activities happening in school during a school day. Although the classroom is an important place in which children spend significant amount of their time for learning, the other activities, such as dining, physical activities and assembly are important if schools are to support positively the lives as well as the learning of pupils in a holistic way.

Finally, a useful result of this part of the literature review is the highlighting of effects of different environmental issues on children's mood, health, behaviour, learning and outcomes which might not have emerged clearly from children's or teachers' voices. In this respect, this summary of literature can support and might potentially explain the findings of this study when teachers and pupils highlight their important issues in the following phases of the research.

2.4. Users' involvement in school design

The UK government's own watchdog on architectural matters, the Commission for Architecture and the Built Environment (CABE) has recently voiced concern over design standards of new schools built under the initiative (Burke & Grosvenor, 2003, p. 19). CABE has warned that there is insufficient effort being made to consult the school users. It has suggested that schools need to get involved in that process and be specific about what they need (Fraser, 2002, cited in Burke & Grosvenor, 2003, p.

19). Furthermore, the Building Schools for the Future programme in England has intensified the debate about the need to engage young people in the process of designing their learning environments.

The need for involvement of school users has been stressed by a number of researchers. Sanoff (1992) believes that achieving more effective educational facilities relies upon an approach rooted in the recognition of the building's users (p. 2). He argues that although school buildings are said to be made for people, those who actually occupy or use school buildings are seldom able to influence the way in which they are designed. He believes that nearly all the important decisions are based on factors that have very little to do with the way people use school buildings or the way school buildings affect their users because those decisions are made by administrators, public officials, builders, architects, and others, who, in most cases, do not occupy the buildings eventually constructed. Therefore, this lack of user participation has been cited as a major reason for dissatisfaction: not least because these users can serve as valuable sources of information in the building development process (ibid).

Involvement of pupils and teachers might seem significantly important when architects and designers are involved in designing schools where these two groups are the main users. Dudek (2000) and Clark (2002) recommend the genuine involvement of students and teachers in the design process. It seems children's participation has provided a challenge to researchers as it is argued that most architects have not studied the child sufficiently as the user of schools and architectural plans seldom include children's suggestions (Taylor & Vlastos, 1975). However, it is important to embrace the developmental needs of children as design determinants, which are divided to three areas of body, mind, and spirit (Taylor, 2002) and to explore children's own ways of seeing and naming issues of concern and their special needs.

It can be argued that children can serve as valuable sources of information which need to be explored. Participatory research around the world has pointed out that children gravitate naturally to a purposeful engagement with their material world, and that they have strong feelings about the environments they use every day (Hart, 1997; Chawla, 2001). Therefore, in developing a brief for the design of school buildings, their involvement would be beneficial.

Additionally, involvement of teachers is important. Within the teaching profession there has been some disquiet about the standard and quality of buildings that have recently emerged and concern that the school designs of today will rapidly become outdated as the organisation of learning changes in the future (Grosvenor & Burke, 2003, p.18); therefore, they might be currently facing some difficulties in delivering lessons in their schools.

In order to involve both groups of users and find out their views about their schools, some researchers have developed questions and rating scales to measure users' opinions and perceptions. These could be used to involve school users in a design process. However, concerns are sometimes voiced about problems of subjective responses failing to match up with objective measures (Evans & Stecker, 2004; Salame & Wittersheim, 1978; Knez & Hygge, 2002). Despite this point of view, a number of studies have been carried out to gather school users' voices.

The number of studies involving both teachers and pupils being questioned on their opinions about their school environment is very small; however, in a study by Sanoff et al. (2001) a qualitative assessment of existing school facilities was conducted by 67 students and all the teachers in a middle school. Findings from this survey revealed a number of key deficiencies identified by students and teachers including 'lack of spaces for individual learning styles', 'lack of private space for students inside and outside the building', lack of outdoor learning environments, 'lack of outside quiet areas for eating', 'poor connection between indoor and outdoor areas' and 'poor adaptability of classrooms to changing uses'. In addition, a study conducted by Ahrentzen and Evans (1989) in five elementary schools revealed that while teachers are somewhat sensitive to the range of children's needs, teachers' and children's prioritising of these needs differ considerably.

There are, however, three studies published in the UK involving investigation of children's opinions about their schools, namely, 'The School I'd Like' (Burke and Grosvenor 2003), 'Joinedupdesignforschools' (Sorrell, 2005), and 'The Young Design Programme' (The Sorrell Foundation, 2006 & 2007), and these will be discussed and analysed in Chapter 4. A lack exists not only of children's involvement, but also of teacher participation. It seems teachers have been involved even less than children in school-based studies. In this context, very few studies have been published; for example, in Heshong's (2003) study, teachers were reported to desire more space, a good location and quiet environment, ample storage and water in the classroom.

Teachers preferred classrooms with windows, daylight and views, but these were not a top priority.

The main teacher-related study is perhaps that conducted by Teacher Support Network and the British Council for School Environments (2007) which ran an online survey asking 530 teachers for their opinions on their school environment and the impact this has on teaching and learning and pupil behaviour. Teachers were asked to rate the design of their school in terms of providing an effective learning environment. It was found that almost one third rated it as poor. Only 12 per cent of respondents considered the design of their school buildings to be effective. According to the respondents, narrow corridors contribute to 'aggressive behaviour and arguments among students'; lack of 'a proper desk and chair' inhibit a teacher's ability to do their job; and lack of temperature control in classrooms up and down the country means children are too cold or too tired from the heat to learn effectively. In considering the most important aspect of the school environment, classroom layout came out on top (87%), closely followed by good ventilation (86%) and lighting (70%).

In addition, toilets are seen by many teachers as small, and hot-spots for pupil misbehaviour. Adequate outdoor space where people can relax, socialise or run around and play was the key issue for a large number of respondents. Many teachers also made reference to the use of displays as they help to decorate spaces: making them more attractive learning environments; and they also demonstrate to pupils that their work is valued. Finally, three-quarters of all teachers consider ICT to be either essential or important to their teaching (ibid). The issues raised by teachers show that teachers can be vocal about their school environment and highlight the main existing problems.

Involvement of both main users is important: especially as it can be shown that 'different users have different perceptions and needs, which often differ from the architect's perspective' (Higgins et al., 2005). Although these differences are important, they remain largely unexplored. Another valid argument is that the number of existing studies seems insufficient at a time when there is such a great investment of money in schools in the UK. Furthermore, these studies have not collated all the relevant issues in a form that would provide a useful framework for designers.

Therefore, because of the importance of school users' participation, this research attempts to focus on involving pupils and teachers and follows the idea that 'designing a school is like writing a film treatment, while the screenplay is written by those who inhabit the school and construct its identity day by day' (Ceppi & Zini, 1998, p.17). This involvement would inform designers about school users' preferences and needs and bridge the gap between them.

2.5. Assessment tools for schools

After decades of having to meet the enormous costs of refurbishment and repairs, the UK government in 1992 adopted the policy of financing public services including the building and refurbishment of schools via the public-private finance initiative (PFI) (Grosvenor and Burke, 2003, p.18). Being able to measure the quality of design in schools has become especially important in the current UK context, with the Government - and its private partners - spending large amounts of money on building new schools through the BSF and Primary Capital Programmes. The measurement of design quality can be seen as one aspect of providing public accountability. There are a number of tools for assessing school design that are intended to inspire and measure change, to allow comparisons to be made between schools (Tanner, 1999), or to facilitate a greater understanding among users of their environment (Sanoff et al., 2001). Some of the existing tools for assessing school environments will now be described and discussed.

In the UK, the Design Quality Indicator (DQI) is a tool that assists a building's procurement team in defining and checking the evolution of design quality at key stages in the development process (CABE, 2005). The DQI for Schools is a version of this tool which is intended to be more applicable to the needs of schools and was adapted from the DQI by the Department for Education and Skills (DfES) to be used on all types of school project. The use of DQI for schools (DQIfS) is currently mandatory in BSF.

In a published visual guide for secondary schools by CABE (2005), Picturing School Design, the use of DQI for secondary schools was reported on and it was mentioned that design quality should be discussed, specified, evaluated and checked at various stages throughout the design and procurement process. The experience of using the

DQI enables a conversation between stakeholders about design and the design process, can help communicate and share values and clarify design strengths and weaknesses and identify opportunities for improvement. The tool is designed for use at three stages in the school building project: 1) Briefing where the stakeholders will weight each of the DQI statements according to how they want their school to be designed and what they want it to feel like. This will form part of the brief for the school 2) Mid-design: this can be used to check how the design is progressing and to evaluate the proposal against the original aspirations 3) Occupation: at this stage the DQI can inform the client and the design team about how well the building is performing.

DQI for schools (DQIfS) consists of 111 statements under three headings including 'functionality, building quality and use'- which are split into ten sections. DQI includes the following three main headings and sub-headings:

• Functionality is concerned with the way in which the school building is designed to be used and is split into Access, Space and Uses.

• Build Quality relates to the performance of the school building fabric and is split into Performance, Engineering Service and Construction.

• Impact refers to a building's ability to create a sense of place, and to have a positive effect on the local community and environment. The DQI for a school is split into Community, Within the School, Form and Materials and Character and Innovation.

Although some aspects of school design were highlighted in 'Picturing School Design' by CABE (2005), application of the DQI in seven secondary schools as case studies, exposed its weaknesses in a few aspects; only architects and designers were involved in the assessment of these schools and that the views of users are not included, either implicitly (i.e. being embedded into the tool through its design) or explicitly, through their direct involvement in the evaluation. Moreover, the statements defining the tool are very brief, and arguably ambiguous and limited. It is suggested that if a tool could instead be developed based on the various issues emerging from pupils' and teachers' views relevant to design of a school, it might look different to the DQIfS and could potentially increase the validity of assessment, as the quality of a building could be evaluated according to what is important for school users, and not based on what designers regard as important factors.

There are, however, other tools to be discussed. Sanoff et al (2001) introduces two assessment tools for schools. The first one is the Six Factor School Building Assessment which offers individuals and groups a procedure for taking a structured walk through and around a building. Observers using this checklist appraise visual and spatial quality in terms of six key elements - context, massing, interface, wayfinding, social space, and comfort. By using a series of checklist questions and a rating scheme, each factor is appraised. The process requires comments to supplement the factors described in the checklist (Sanoff et al., 2001). Although this tool might be useful for designers to assess the quality of a school building, it is not based on school users' voices.

The second comprehensive assessment tool is the School Building Rating Scale. This assessment tool is organised into categories that are essential components for meeting the demands of an optimum learning environment. The components of the rating scale include 'physical features, outdoor areas, leaning environments, social areas, media access, transition spaces and circulation routes, visual appearance, and safety and security'. Fifty-five statements pertaining to the school building are rated by building users such as students and school staff (Sanoff et al., 2001). Although this tool can involve school users in school assessment, the statements for ranking did not emerge from their voices. The statements might therefore reflect a designer's priorities instead of including all their particular concerns. In addition, the language of the statements and the 7-point ranking scale are not applicable for use with all age groups of pupils.

There are also some collective concerns related to school design which could be seen as criteria for a school assessment tool. At a regional Council of Educational Facility Planners International (CEFPI) conference, Jeff Lackney (1998) summarised several research-based design principles that are fundamental in developing a school building assessment programme. These principles are, namely, 'stimulating environments, places for group learning, linking indoor and outdoor places, public space, safety, spatial variety, changing displays, resource availability, flexibility, active/passive places, personalised space, and the community as a learning environment'. In addition, Lang (1996) concluded that the following six general categories include criteria which are essential components for meeting the demands of learning based schools, including: 1) Size, Shape and Scale 2) Acoustical Quality

and Noise Control 3) Illumination and Views 4) Temperature, Humidity and Ventilation 5) Communication, Electrical Power and Technology 6) Material Finishes, Textures and Colours.

As well as the assessment tools that have been discussed, Nair and Fielding (2005), in their book, The Language of School Design, introduce 25 patterns for design of schools in the twenty-first century. These patterns could work as a framework (or generative tool) for school design. Their work relies heavily on a version of this conceptual framework. Each of the 25 patterns identified includes a description and sketches of a particular pattern and a concrete or real example of this pattern in an existing school. It could be argued that the patterns of Nair and Fielding lack variety in both scale and detail, but also they are limited to school building components: with the exception of 'Connection to the Community'. The objective of Nair and Fielding has been to create a graphic kit of parts as a shared outline of ideas which will be useful for professionals and clients. It could be the answer to one of the major roadblocks to innovation which is the lack of a common design vocabulary for all school stakeholders to share (ibid, p. 2). It does not claim to be scientifically based and was drawn from their experience as school planners. Therefore, this collection of patterns (issues) might, again, not be representative of school users' perspectives. The list of patterns does, however, appear to be quite extensive:

1) Classrooms, Learning Studios, Advisories and Small Learning Communities 2) Welcoming Entry 2) Student Display Space 4) Home Base and Individual Storage 5) Science Labs, Arts Labs and Life Skills Areas 6) Art, Music and Performance 7) Physical Fitness 8) Casual Eating Areas 9) Transparency 10) Interior and Exterior Vistas 11) Dispersed Technology 12) Indoor/Outdoor Connection 13) Soft Seating 14) Flexible Spaces 15) Campfire Space 16) Watering Hole Space 17) Cave Space 18) Design for Multiple Intelligences 19) Day lighting 20) Natural Ventilation 21) Full Spectrum Lighting 22) Sustainable Elements and School as 3D Textbook 23) Local Signature 24) Connected to the Community 25) Bringing It All Together (Nair and Fielding, 2005). It could be argued that these patterns might be adapted, if voices of school users could be included, to make a generative tool for school design.

Finally, reviewing literature in this area also illustrated that the assessment tools which exist for some other public buildings - including health care and care home buildings - seem more developed and evidence-based compared with the tools that

have been discussed above. One of these tools, known as ASPECT (A Staff and Patient Environment Calibration Tool), is a tool for evaluating the quality of design of staff and patient environments in healthcare buildings. It delivers a profile that indicates the strengths and weaknesses of a design or an existing building. It is based on a database of over 600 pieces of research and consists of a series of relatively simple and non-technical statements. ASPECT is designed to be used by those involved in the commissioning, production and use of healthcare buildings. In particular, public- and private-sector commissioning clients, developers, design teams, and project managers can use it. User clients such as patient representatives and members of the general public should also be able to use it (ASPECT, 2008). The tool enables the user to produce a set of scores making up a profile of how well a particular environment works in relation to all the research (Lawson, 2005).

Besides, the other tool known as Achieving Excellence Design Evaluation Toolkit (AEDET) is the healthcare-focused equivalent of DQI and has been tailored to meet the needs of the healthcare sector and solve a number of significant methodological problems found in its early incarnation which more closely resembled the DQIs. ASPECT expands on one section of AEDET, providing further detail about 'the staff-patient environment' (Lawson, 2007). Therefore, it seems perhaps some lessons can be learned from these tools for making a similar tool for school buildings.

Some of the issues highlighted by the existing generative or assessment tools for schools have been emphasised by research dealt with in the literature review; however, the questions still remain: 'what do the two main groups of school users - teachers and pupils- raise as important issues to be considered in the assessment tool for school design?' And, 'what might be the other issues that have not been included in the existing tools, but matter for both groups of school users?' This research tries to address these questions.

2.6. Conclusion

The literature review carried out at the beginning of this study provided considerable information about school environment, school design programmes in England and their importance, and a number of physical features of schools that affect children's (or teachers') health, well-being and productivity. However, the psychological impacts

of physical settings (features) in school as well as those aspects of setting that are social, organisational and educational are important to be considered for school design. On the other hand, all aspects of school and schooling interrelate and it would be difficult to separate different aspects such as school building, landscape and site location as well as human factors including school management, teaching and non-teaching staff, and pupils that all can have their effects on the experience of schooling for school users.

However, as Gifford (1987) points out, most researchers can not consider all these factors in a single study although most would agree where possible that interaction among them should be considered (p. 268). Therefore, the main focus of this study has been on physical features of schools. Moreover, as the review revealed a relative lack of attention paid to the direct perceptions and views of school users in the context of design research, the importance of involving users in school design was highlighted.

It is concluded that the research literature has not adequately involved school users or gathered their voices to highlight all the important issues which need to be considered in school design. Review of the existing assessment tools shows that they are not based on pupils' and teachers' views. Also, it seems there is a gap between designers and school users because of the lack of an appropriate framework for finding out the views and expectations of the two main school users - pupils and teachers.

Therefore, this study will involve pupils and teachers in order to find out their opinions about the design of their school. However, the question is how to involve them in this research and how to evaluate their views? An appropriate method is needed to involve both groups of school users and gather their voices, which might lead to the development of a framework for school design.

Chapter 3 – Involving children in research

3.1. Overview

It seems that in comparison to research with adults, engaging children in research can present many barriers; although, it can be argued that children have lots of experience, knowledge and opinions: especially regarding places familiar to them such as schools. However, Titman (1994) found that, whilst there was lots of research concerning children, far less actually involved children. Hart (1997) also comments that of the many hundreds of projects in his files involving environmental actions by children, very few describe a process for involving children in research. Titman (1994) noticed that, although some researchers mention the difficulty of obtaining reliable data from children, others produced methodologies designed to enable this objective: thus producing a rich source of data as well as a range of remarkable research models (ibid, p. 3). Therefore, this raises the issue of difficulty, but also the possibility, of research with children in different disciplines, including school design. This chapter discusses the importance of children's involvement in research and the possible methods for researching their perspectives especially about school environments. It also presents and discusses the two exploratory qualitative studies conducted with children in two infant schools. The aims of these studies were 'to find out the ways that children can be involved in this research' and 'to determine their concerns (views) about their school environment'.

3.2. Children's participation in research

Children have often been excluded from large-scale quantitative research, or data has been gathered about them from carers and parents because of the view that they are not experienced social players. However, as children's roles as consumers and citizens are being taken increasingly seriously, more attention is being paid to collecting data from them (Roberts, 2000).

Furthermore, the movement for the child voice to be heard and recognised is underpinned by a philosophical shift within the wider community to listen to the views of children initiated by the UN Convention on the Rights of the Child (1989). Significantly, the Convention asks for the inclusion of children and young people to be involved in decision-making on structures and initiatives that concern them (Article 12).

There is already a lot of evidence that involving children and young people in the planning, delivery and evaluation of government services has a number of benefits. 'Better services' is one of the highlighted benefits, ensuring that policies and services more genuinely meet children's needs (CYPU, 2001, p. 2). Other cited benefits include, 'promoting citizenship and social inclusion' and 'personal and social education and development', producing more confident and resilient young people (CYPU, 2001, p. 6).

Reviewing literature in the context of this research reveals that consultation over school buildings in the past has tended to centre on educators, and so miss out direct involvement of students (Woolner et al., 2005). However, there is increasing conviction that children should participate in decision-making (Burke and Grosvenor, 2003; Clark et al., 2003), including about school-design (DfES, 2002). Therefore, it seems a further tension to the process of consultation associated with the current school building programmes to find out to what extent should the views of children and young people impact on decisions and how best are they consulted.

3.3. Methods for engaging children in research

In social research the use of visual media is increasingly common (Prosser, 1998) and in research with children is a recognised way in which to engage with children effectively and when used alongside other methods, they also permit exploration of particular issues in more depth (Christensen & James, 2008, p. 160).There are a range of methods which can be used for asking children their opinions; and they vary in usefulness according to the age group of the children concerned.

Based on the literature, it can be found that there are two main classifications for the methods used in research to involve children. When children 'evaluate' visual data, the methods used include various types of evaluation. According to Sanoff et al. (2001, p. 6), the rating scale is a form of evaluation which systematically assesses an environment relative to defined objectives and requirements. The methods which are usually used for evaluation are Photo Questionnaire, Interviews, Wish poem (ibid) and use of 'smiley/sad faces' (Cox and Robinson-Pant, 2003). Photo questionnaires and interviews are an effective means for eliciting 'evaluative comments' about physical settings (Sanoff et al., 2001, p. 17), while using smiley and sad faces, especially with young children, is an effective technique for discussion of good and bad points in their learning environment; and can be used with presentation of positive and negative

pictures to highlight aspects of the school which children like and dislike (ibid). Even very young children can use this method to express their own feelings (Creig and Taylor 1999, p. 118). Finally, a 'wish poem' can be used, which is an approach that encourages children to fantasise about their dream school: to allow for the free flow of information (Sanoff et al., 2001, p. 20).

However, when children 'create' visual data, the methods employed are usually Photographs and Drawings. Studies have revealed how when children become active photographers, they provide much insight into what is meaningful to them from their own perspectives (Christensen & James, 2008, p. 160). Children can take pictures of different spaces about which they have good or bad feelings. The pictures can then be used to discuss and illustrate issues. More recent studies have extended to work with children's own photographic view of primary school settings (Clark and Moss, 2001). However, ethical guidelines need to be established about how images are to be used at the time and afterwards (Prosser, 1992). Images need further discussion and interpretation, preferably in dialogue with the child to avoid misinterpretation (Coates, 2004; Prosser, 1998)

Another method by which children can express their views about environment is 'drawing' (Sanoff et al., 2001, p. 14). Drawing as a 'visual strategy' can help children to clarify a point under discussion (Cox and Robinson-Pant, 2003). Children's drawings are believed to reveal their inner mind; however, drawings are similarly subject to false interpretations of the questioner, and it is essential to be correlated with a selection of other sources of information and to operate in an open exploratory way with children and their drawings (Creig and Taylor, 1999, p. 79). To increase the validity of data, researchers tend to use a combination of methods of data collection (Lewis and Lindsay, 1999, p.193). This can help researchers to understand the story behind children's' drawings which can improve the quality of data analysis. Therefore, it seems that other methods, such as wish poems and interviews, can be used with this method.

Among the methods mentioned above, interviews seem to be commonly used among researchers from a number of disciplines for studying children's views (Lewis and Lindsay, 1999). However, there is a danger of the child's views being lost due to the actions of the interviewer (ibid); and there are certain methodological problems to be solved, including those involving language use, literacy levels and differences in stages of cognitive development (Scott, 2008, p. 89). It is argued that less structured methods

of interviewing are more appropriate for younger children; although according to Scott, when they reach the age of seven, it is possible to use both individual and group semi-structured interviews with them (ibid, p. 90). However, there is an inevitable tension between covering planned topics and allowing the participants themselves to set part of the agenda, which needs the skills of researchers to use the interactive quality of the situation to choose important issues without pursing every point raised in detail (Creig and Taylor, 1999, p. 131).

There are a number of concerns regarding use of interviews. One of the main disadvantages of this method is that children of all ages are expected to be influenced by the proximity of their classmates as children are likely to quiz one another on their responses and may be tempted to give answers that win favour with the classmates (Scott, 2008, p. 92); therefore, this might affect the quality of data collection. Another issue related to this method is availability of time for data collection, as interviewing is 'time consuming' and this may be a constraint (Lewis and Lindsay, 1999, p. 190); therefore, it might not be an appropriate method for all researchers.

Finally, there are some common issues that need to be considered for involving children in research in order to improve data quality. In choosing the appropriate method, 'age' is an important issue. It is stated that children's performance on memory tasks improves significantly with age: and by the age of 11, their ability to remember is not much different from that of adults (Scott, 2008, p. 91). It is argued that surveys designed for adults, such as standardised questionnaires, can be used by this age group of children; although, potential literacy problems need to be considered (ibid, p. 91). Alderson shows that children as young as seven years can fill out questionnaires if they are presented appropriately (Alderson and Arnold, 1999). The other issue is 'type of questions'. As children are often called on by adults to give answers even when they do not have the information and responses of 'don't know' can be considered as inattention or lack of cooperation, questions have to be relevant to the children's own perspective and knowledge in order to achieve meaningful data (ibid, p. 96).

In seeking the views of children in the context of school design, two studies were conducted in order to test a number of the possible methods discussed above. This investigation would yield valuable data in itself and also lead this study to find an appropriate method for the next stages of gathering children's views.

3.4. Children's involvement in research

3.4.1. Study 1

This study was carried out in March 2006 in an Infant school (Nether Green) which was built in about 1974. After getting permission from headteacher, parents and teachers, only those pupils who had handed in their consent form (signed by parents) participated. The participants were 30 pupils in Year 1 (5-6 years old) in 3 different classrooms. The study focused on the classroom environment: this is an important area of a school because it is the zone in which most time is spent (Dudek, 2000). The aim was to assess children's preferences in relation to the classroom environment.

- **Methods**

In order to gain more precise results after analysis of the data, several methods were used for the study, including Photography (Photo elicitation), Drawing, Sad/smiley face ratings and Interviews. The methods which were used for 'evaluation' were Photo elicitation with Interviews for eliciting evaluative comments, and use of Smiley/sad faces; however, when children were 'creating' visual data the methods were Photographs and Drawing (the existing classroom and their ideal classroom). The methods and results are discussed as follows:

1) Smiley/sad faces

According to children's comments on the positive and negative features of their classroom, a list of the main issues was gathered. There were 6 factors: of 'colour, light, form, size, material and view' that children could rate by use of the sad/smiley face method. Overall, 28 pupils out of 30 participated in this part of the study. As young children at this age had potentially limited communicative abilities, this was an effective method for expressing like and dislike. Moreover, they could choose straight face if they were not sure about their feelings. An explanation was given as an introduction and they were asked to complete the face beside each item by drawing the emotions given as example on their questionnaire sheet. Although the items were written on their questionnaire, each item was read for the participants (as a group) in each classroom and time was given to them to think and respond. As a result, half of them were happy about form and light as used in their classroom. The most unsatisfactory aspect was size of the classroom: with only one-third being happy with it.

2) Photo elicitation and interviews

The other method used was photo elicitation, for which the children were divided into groups of 3 or 4, and then took photos of the places in their classroom that they thought were 'good' or 'bad'; however, some of them who had difficulties taking photos themselves, asked the researcher to take that particular photo(s). Afterwards, each group was able to view their photos on a computer and discuss why they liked or disliked those particular parts of their classroom. A number of children's quotes in relation to the corresponding photos taken (Figure 3.1) are presented as follows.

- Windows

"it is good sitting by windows."

"it's good to have different shape of windows"

- View

"having big windows to see outside
when you sit on the carpet"

- Blinds

"blue blinds and the pattern are nice, like
a piece of sky"

- Light (lamps)

"having yellow colour lamps, not white"

"it is good to have lights with changing colours,
like disco light; then blinds change colour,
and carpet change colour.

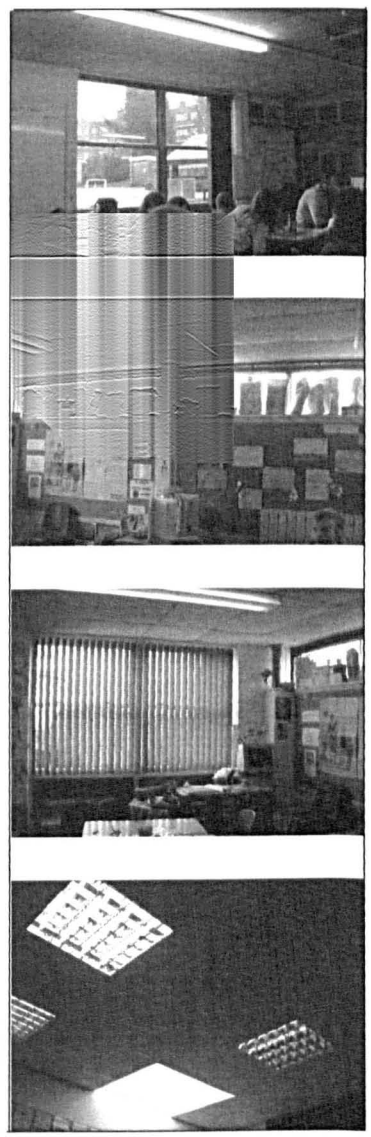


Figure 3.1. Children's Photos

- Displays

"This is my painting"... "mine is there"

- Colours

"lots of colours, red, purple,...."

- Walls

"I'd like different shape and colours...
butterflies or rainbows on the walls."

- Floors

"It is good to have nice carpet, not rough."

"It is good to have a big rainbow on floor"

- Ceiling

"Good to have a ceiling with blue colour or red"

- Storage (cupboard)

"It is good lots of room to put things in it"

- Cloakroom (hangers)

"It looks not nice, not tidy"

- Flowers (plants)

"It is good to have a corner with lots of flowers"

"I like this tree on the wall"

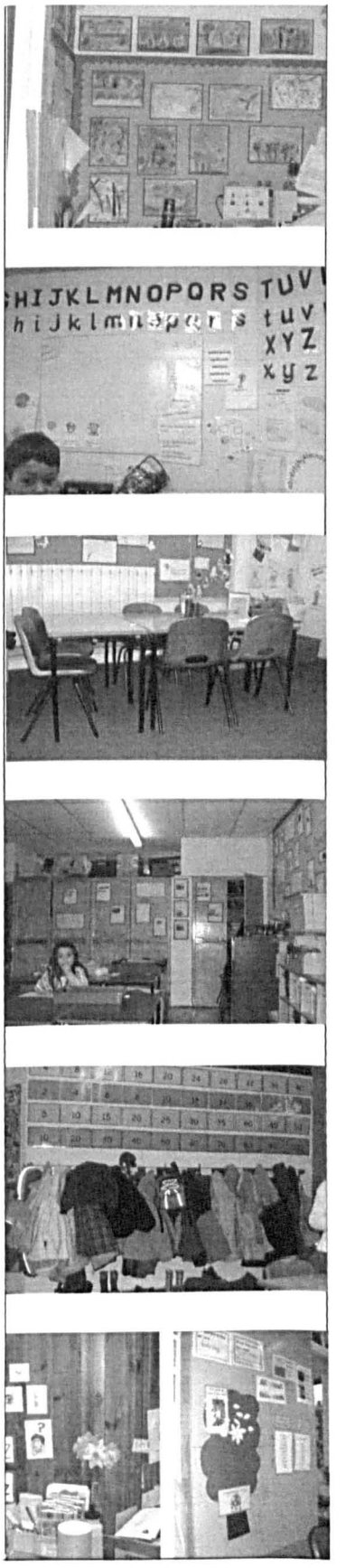


Figure 3.1. Children's Photos

3) Drawing

In addition, another method was used which was very effective for eliciting their responses. Children were first asked to draw their classroom and then the classroom they wished for with any changes they would like to do. Children were later interviewed individually about their two drawings. They were asked to describe their drawings which helped to find out which design features they noticed in their classroom and what changes they would make. Figure 3.2 shows the photos of classroom 1 (taken by?) and Figure 3.3 provides two examples of a child's drawings who wished to change the colour of carpet from grey to red and have a view (of flowers) through the window.

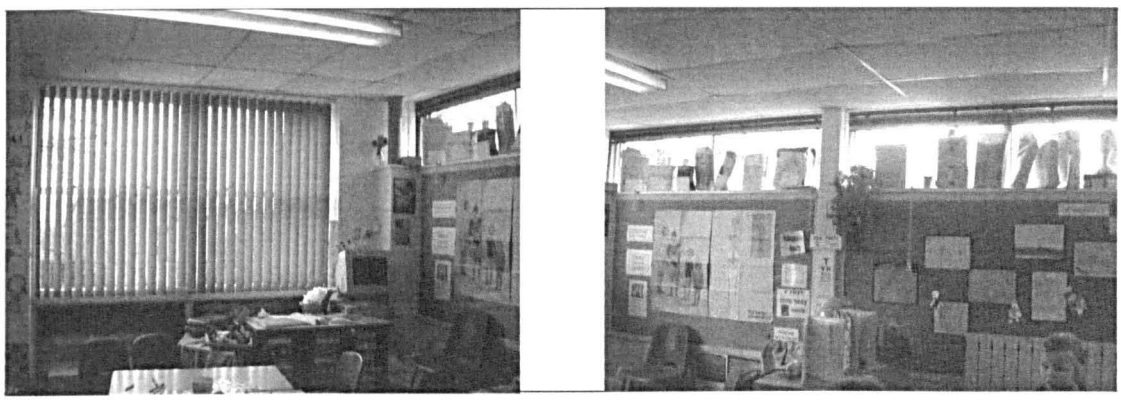
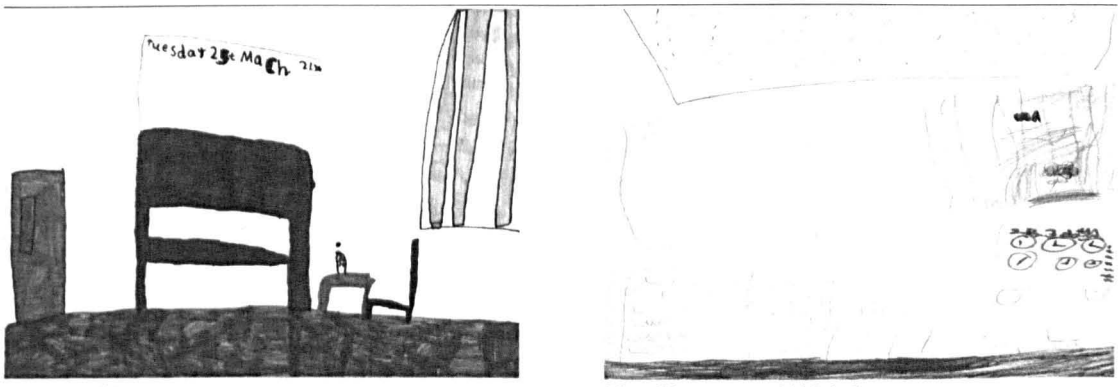


Figure 3.2. Photos of Classroom 1



Existing Classroom | The Classroom I Wish for

Figure 3.3. A Child's Drawings of Classroom 1

Figure 3.4 shows the photos of classroom 2 and Figure 3.5 illustrates two examples of a child's drawings who wished to change the colour of artificial lights (to make them colourful) and have a place to rest/sleep in the classroom.

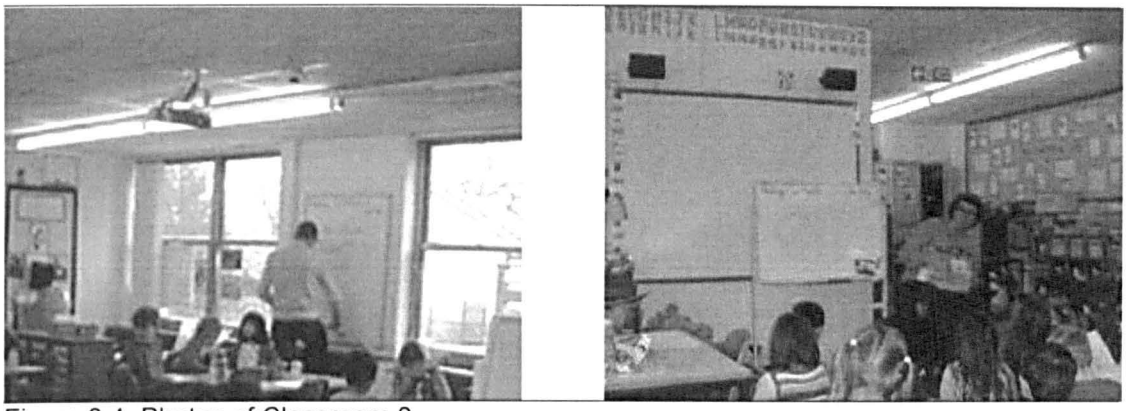
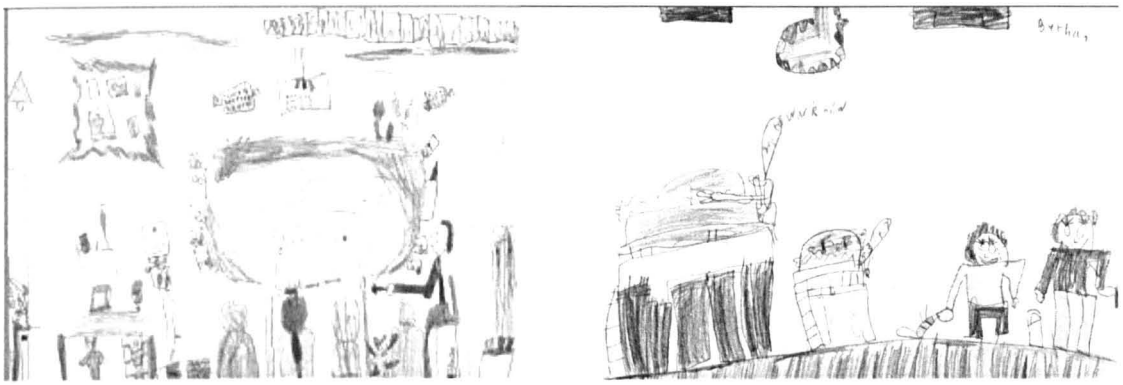


Figure 3.4. Photos of Classroom 2



Existing Classroom

The Classroom I Wish for

Figure 3.5. A Child's Drawings of Classroom 2

Finally, Figure 3.6 shows the photos of classroom 3 and Figure 3.7 illustrates two drawings of a child who wished to change the size of the existing window to be able to see outside. Flowers as images or view through the window were a concern for this child as can be seen in the drawing.

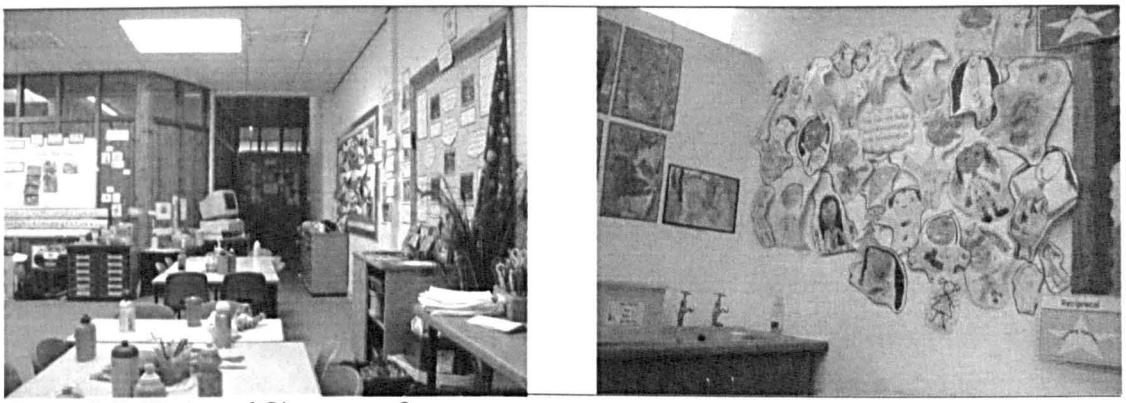
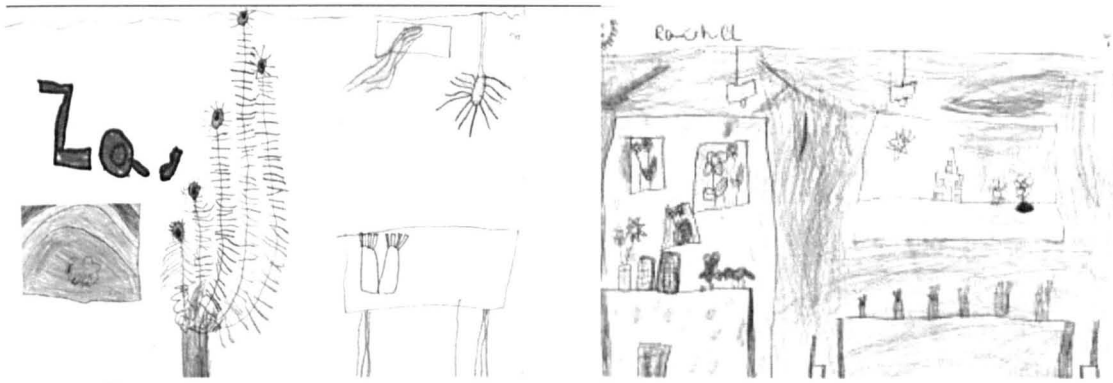


Figure 3.6. Photos of Classroom 3



Existing Classroom | The Classroom I Wish for

Figure 3.7. A Child's Drawings of Classroom 3

- **Overall findings**

Overall, the analysis of study 1 showed that children noticed some architectural features of their classroom, like colour, light (lamps), windows, view, doors, carpet, blinds, boards, details and their own things (e.g. art work). The children suggested changing their classroom in order to have big windows, differently shaped windows, different lamps (shape and colour or even colourful lights), and patterns on the walls/ ceiling/ floor, like a rainbow or colourful circles, colourful walls and carpet (yellow, orange and red), and to have flowers/ plants (natural and images), cupboards, and a cloakroom with enough hangers in their classroom. Based on children's voices, it can be concluded that their suggestions for changes mainly were to do with 'colour and decoration', 'physical features' and 'facilities'.

3.4.2. Study 2

This study was carried out in another infant school (Royd) in March 2007, after getting permission from headteacher and teachers, as part of the classroom activity. The study focused on the whole school (all the indoor and outdoor spaces).

- **Part one: methods and findings**

The first aim of this study was to find out the spaces that children liked or disliked in their school and the reasons for their choices. The participants were 36 pupils in Year 2 (6-7 years old). The pupils from 2 different classes were divided into 4 groups of 9 to discuss and highlight the places they liked and disliked. The study started with a brainstorming session, which discussed the concepts of buildings and places. Teachers and teaching assistants helped in the process by writing a list of the places the children mentioned.

Then a visit was conducted to the place most highlighted by a majority of pupils in each group. Some photos of these places were taken with the children and their voices were recorded as they were explaining their concerns. The photos were printed and discussion with the children continued in the classroom.

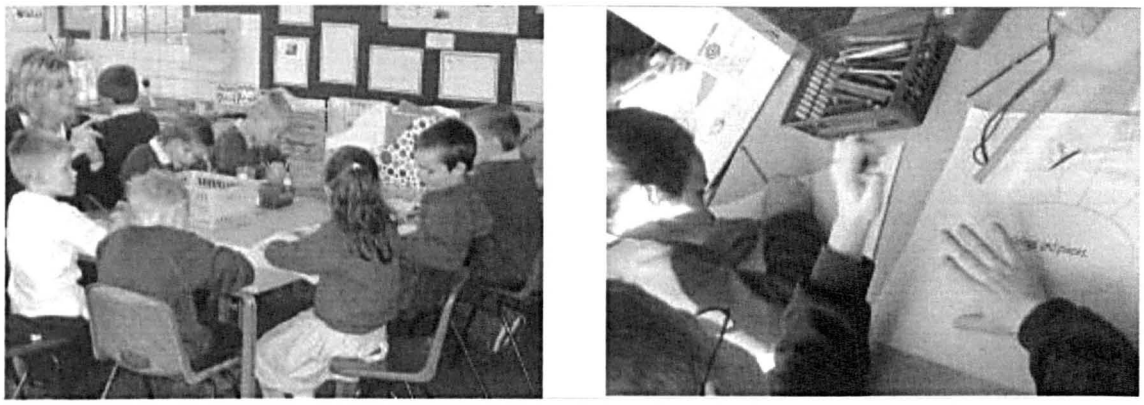


Figure 3.8. Research Process with Children in the Classroom

There were some places for which children in different groups agreed on whether they liked them or not. The outdoor spaces that children said they liked were the 'playground', 'wildlife garden' (both selected by all 4 groups), and 'banked area' (selected by 3 groups). The spaces they liked are illustrated in Figure 3.9. Some of the children's quotes are presented in relation to the actual photos presented in Figure 3.9 as follows.

- Playground

"it is nice because of playtime...
and meeting friends"

- Wild life garden

"you see creatures, frogs...it is peaceful"

- Banking

"it is nice in summer because of grass ...fun, using your body; doing cartwheel."

- Classroom 9

"it is colorful, look nice,... nicely decorated."

- ICT suite

"good time on computers...fun, ...sharing equipment"

- Hall

"because of assembly and PE"

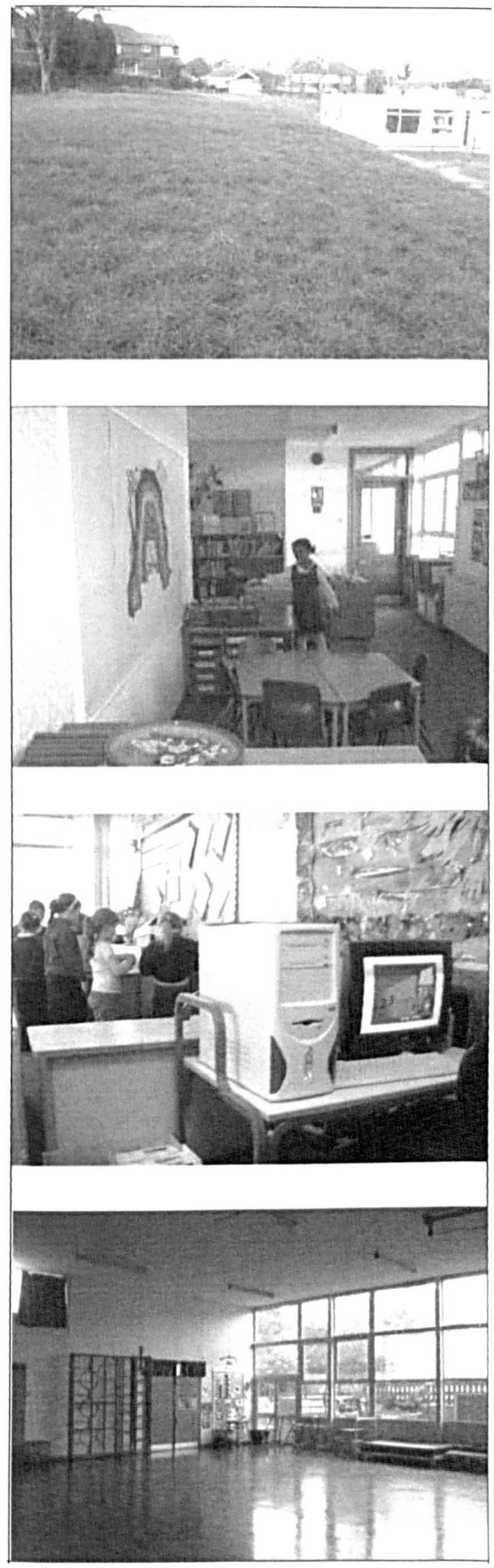


Figure 3.9. Children's Favourite Places

The indoor spaces that children said they liked were 'ICT suite' (selected by 3 out of 4 groups), 'hall' and 'classroom 9 (both were selected by 2 groups) which are illustrated in Figure 3.9. However, there were some places that children disliked, namely, 'corridors', 'dining room', 'naughty yard, 'link' (which were selected by 2 groups), 'classroom 8' and 'toilets' (both were selected by 3 out of 4 groups). The photos of these places taken by children are presented in Figure 3.10, while children's quotes related to these photos are as follows.

- Dining room

"too noisy, ...get shouted at...it's a mess ...has to tidy up"

- Corridors

"you are bumping into people... it is long and dark"

- Naughty Yard

"you sit and not play...small ...not allow running."

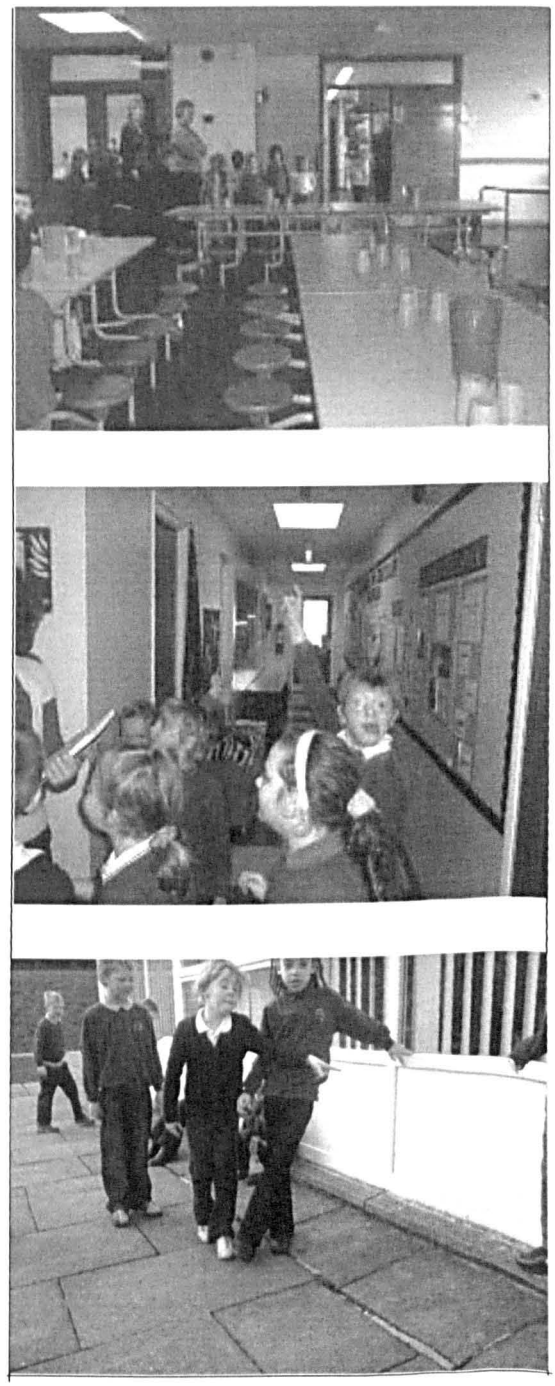


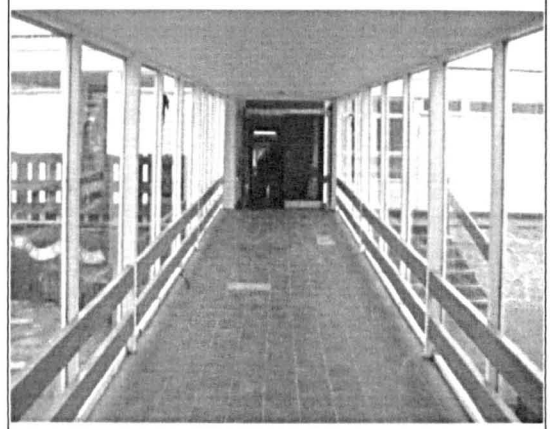
Figure 3.10. Places Disliked by Children

- Class 8

"No colours...,cold"

- Link (glass bridge)

"a bit dull, no colour...
when you shout, you get earache"



- Toilets

"Because they smell... and are dirty"

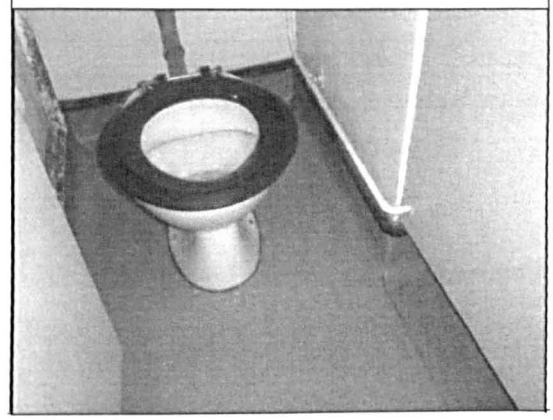


Figure 3.10. Places Disliked by Children

- **Part two: method and findings**

In addition, the second aim of this study was to find out children's preferences regarding the places they would like to change. They could write down their responses on a piece of paper (table) to highlight their problematic issues and proposed forms of change. This part of the study could be conducted with only 20 pupils who were asked to write their views under these titles: 'what I want to change about my school' and 'how I could

change it'. Based on children's opinion, their preferences and desired changes (all are presented even if they are repeated) are as follows.

- Some suggested changes were to do with colour and decoration based on their voices:

- "I would paint it a different colour, I would make it pretty. Paint it like the rainbow. I would paint some flowers. "
- "I would change the colour. I would paint it sunshine yellow."
- "I would put some drawing on the walls to make it nicer."
- "I would change the paint in class 7."
- "I would change the dining room; it would be nice to do more paint."
- "I want the doors to be steel doors in red. I want to change class 7's roof to be blue by colouring it by paint."
- "I want the walls to be painted yellow."
- "I want to change outside by paintings on the floor."
- "I want to change Mrs. Lee's office [headteacher] to a nice place. I want to put a big bright rainbow. I could put pictures up on the class windows that could be change."
- "I want to change outside Mrs. Lee's office, the link, the hall, the dining room, the library ...by putting flower borders on the top of the wall....by putting bright colours in the entrance."

- Some suggested changes were to do with facilities and spaces which are presented as follows:

- "When we come in, I want to change the path."
- "I want to change the path."
- "I would change the game outside we could change them."
- "I want to change classroom 8."
- "I would change class 8."
- "I want to change the hall".
- "I want to change cloakroom. Make it bigger."

- "I want more flowers in school; more frogs in the pond. We could plant seeds; could put more tadpoles in the ponds."
- "To make the school bigger; to make the playground bigger. I would change the link."

- Some suggested changes were to do with the feeling of the spaces including these voices:

- "I want to change the school to a happy school."
- "I want to change it to a kind school."
- "I would change our school to a kind school."
- I want to make our school welcoming."

Finally, findings show that children were using all their senses to understand the use of space, but also the impact of space upon themselves. They were also making links between spaces and events. They picked out spaces not only because of the physical space itself, but also the events occurring within them. Moreover, they are clearly capable of suggesting changes for improvement of their school, based on their own experiences.

3.5. Conclusions

Although it can be problematic, researching children's perspectives on their schools is a fascinating task. The conclusion can be summarised in both areas of 'the reflections on the methods' and their effectiveness and 'the findings themselves' as follows.

- **Reflections on the methods**

One of the sub-questions related to methodology has been 'how could the school users' opinions about their schools be gathered?' In case of children studies showed that appropriate methods which do not rely on the written word to facilitate gathering their voices, such as photo elicitation and drawings as well as interviews could work well. Visual methods proved especially effective for this age group (5-7 years old), although the children of 6-7 years old also showed their capability to write their views briefly. However, in response to the other sub-question: 'how could pupils be involved in this research?' it was discovered that understanding children's concerns about their schools

and applying these methods of data collection takes a long time. It was not only difficult for the researcher to collect data from a great number of pupils using these methods, but also, school schedules created serious time constraints. Although it can be argued that a large sample size is not the main aim when gathering qualitative data, if complementary quantitative data is to be gathered, alternative, more efficient methods will be required.

Therefore, these two studies helped the researcher to realise that another appropriate method is needed if a significantly larger number of opinions is to be gathered within the constraints of this study. They also highlighted the issue of limited experience in the context of children in infant schools, as these children are likely to have only experienced one school environment; as a result it seemed to be quite difficult for them to imagine different school environments. Therefore, finding the appropriate age of children as well as appropriate quantitative data collection method(s) will be considered for the next stage of the empirical study.

- **Findings**

The studies showed children have valuable knowledge about their schools and can be seen as experts in this field. The number of children that participated in these two studies was limited and so it is not possible to generalise the findings; however, the studies reveal children's ability to highlight the problems, appreciate the positive design considerations and even make suggestions for change (improvement) in their schools. They did reveal some of their concerns about their schools which were an initial response to one of the research questions of this study: 'what are children's concerns about physical features and spatial qualities of their schools?' Children's opinions could suggest initial categorises for the suggested changes in their schools including 'colour and decoration', 'facilities and spaces' and 'the feeling of the spaces'. There has been another research question: 'are there any consistencies in the voices of users (children) about their school environments that could inform the school design process?' The findings suggest that the response to this question is positive, as consistency can be seen among children's voices; however, further research with a considerable number of children is needed to explore this question further. Finally, lessons have been learnt for the next stages of this research, such as the importance of being familiar with children's language and the issues they raise. These lessons might help the researcher in the analysis, which will be addressed in the next chapter, of three projects reporting the indirect voices of children.

Chapter 4 – Analysis of existing data: a conceptual framework for the study

4.1. Children and school environments

Viewing the world 'through the eyes of a child' might seem extremely important when architects and designers are involved in designing schools where the main user is a child. This chapter focuses on children's voices. Although school buildings are said to be made for pupils, they are seldom able to influence the way in which they are designed because most of the decisions are usually made by administrators, public officials, builders, architects, and others, who, in most cases, will not be the users of the finished schools. Children can serve as valuable sources of information which need to be explored.

It is important to find out children's own ways of seeing and naming issues of concern, their special needs, spaces needed to support activities and aesthetic preferences. This chapter presents and classifies the issues raised by children about school design which emerged through an analysis of three previous studies in the UK: 'The School I'd Like' (Burke and Grosvenor 2003), 'Joinedupdesignforschools' (Sorrell 2005), and 'The Young Design Programme' (The Sorrell Foundation 2006 and 2007). It aims to provide a categorised list of items highlighted by children which helps to develop an evaluative tool for the next stage of this research to be tested in the empirical study.

4.2. Highlighted themes – indirect voices of Children

Architects and designers aim to develop the quality of future school environments by defining the 'good characteristics' of different schools as case studies (CABE, 2005). It is suggested that the involvement of children as users of schools could make this process more successful. Although pupils' voices have been gathered in a few studies in the UK, they have not been classified as a framework for architects and designers for use in the school design process. In order to classify children's voices, three studies have been explored in the UK as they have been the only published resources that extensively report children's opinions about schools; though others present architects' points of views on school design (Creating excellent secondary schools: a guide for clients., 2007). These three studies have been 'The School I'd Like' (Burke and Grosvenor 2003), 'Joinedupdesignforschools' (Sorrell 2005), and 'The Young Design

Programme' (The Sorrell Foundation 2006 and 2007), which all gathered children's views about schools. Table 4.1 presents the overall view of these three studies including the number of pupils and schools involved in each study, types of schools and the year of study.

Table 4.1. Overall View of the Three Previous Studies in the UK

Studies in the UK		Approximate number of participants	Number of schools	Type of schools	Year
1. The School I'd Like		3000	150	primary, secondary	2001
2. Joinedupdesignforschools		700	100	primary, secondary	2002-2005
3. The Young Design Programme	Pilot	100	10	primary, secondary	2005-2006
	Study	160	13	primary, secondary	2006-2007

A summary of each of these three studies is described in the following sections, while their analyses are discussed in the following section of this chapter.

4.2.1. The School I'd Like competition

In 2001, The Guardian agreed to host 'The School I'd Like' competition which received numerous entries from primary, lower secondary and upper secondary schools across the whole of the UK. The focus of the competition was the future of the school itself (Burke and Grosvenor 2003). The competition was launched after Catherine Burke sent a letter to the editor of The Guardian Education Supplement, Becky Gardiner, and asked for help for the project she was running. She wanted to know what children felt about their schooling. Therefore, the previous competition that The Observer had run in 1967 asking children to design the school of their dreams was dug out and provided an immediate incentive to run the competition again (Gardiner, in Burke and Grosvenor 2003, p. xi). There were prizes to encourage entries. The prize for the winner in each of the three categories (primary; years 7-9; years 10-13) was £10,000 of Toshiba ICT equipment and Microsoft software for their school (Phipps, 2001).

For this study, children's opinions have been explored through 'The Education Guardian' (Birkett 2001a) and 'The School I'd Like' book in which Burke and Grosvenor (2003) reported the main raised issues related to different aspects of schools because it was not possible to access the original data produced from this competition. It is not clear how many students participated in this project. The Education Guardian (Birkett 2001a) reports that: 'children's voices have not been heard during this election campaign – until now. Some 15,000 of them entered our competition, The School I'd Like, demanding radical change'. However, Burke, one of the authors of 'The School I'd Like' (Burke and Grosvenor 2003), in response to the question raised for this study – what was the exact number of participants? – reports that:

> "The exact numbers are not known. The Guardian newspaper estimated that 150 schools had taken part and then simply multiplied that by 10 to come up with the figure of 1500 children. But there were many schools that entered with more than ten children's ideas and there were a few from outside of school entered. It is difficult to know without counting but my estimate is something like 3000 children." (Personal contact, 2007)

Regardless of the exact number, children aged between 5 and 18 were asked to describe or design 'The school they'd like'. Young people were encouraged to provide entries in whatever format they considered most appropriate. As Birkett (2001a) reports, entries were encouraged in any form including videos, models, epic poems, plays, dictated comments, drawings, architectural plans, photographic collages and Braille essays. The competition spontaneously produced dozens of models, hundreds of plans and thousands of related designs of ideal sites for learning. Additionally, children used drawings and paintings to express their ideas on different issues in schools, including the school buildings. According to Burke and Grosvenor (2003), the design ideas address more than the shape of building and the ordering of spaces; the school children would like was beautiful, comfortable, safe, listening, flexible, relevant and respectful, a school without walls, a school for everybody.

In addition, 'The School I'd Like' reflects children's views about education in general, while some part of the data presents their opinions about 'school building'. It sets these voices, recorded during a three month period in early 2001, alongside the voices of children recorded in 1967, who were all responding to the same task: to describe or design 'The School I'd Like' (Burke & Grosvenor 2003). Burke in response to the question raised for this study – what was the method of data collection and analysis? – reports that:

> "The material was collected directly from the competition call - the entries were posted to The Guardian and as far as possible all of them were kept and looked at. As for analysis, we used as a guideline, the issues that were detected as important in 1967 when the same competition was held by The Observer newspaper and the results published in Edward Blishen's book. In addition, we looked for ideas from the children that connected with current agendas. Finally, we noted what seemed to be - regardless of these last factors - substantive consistent issues for children." (Personal contact, 2007)

Although this competition was not conducted as a formal piece of academic research, a significant number of children participated, making it one of the largest informal surveys of children's attitudes towards schooling in the UK. According to Burke & Grosvenor (2003), the specific condition under which the task was presented to children was unknown; however, many entries to the competition were clearly influenced by teachers who provided a structure for the exercise. The task to write an essay on 'the ideal school' or 'what you would change about school' was in many cases set as homework.

Children's voices were raised about schools; however, what was reported as findings of this competition might not have been entirely their voices because of the other participants involved in this competition and their effects on the results, like teachers, and researchers who interpreted the data. Despite the possibility of these factors affecting the findings, the results seem to be worthy of analysis.

In order to use the findings of 'The School I'd Like', the results of this competition were explored as reported in the available resources - 'Education Guardian' by Birkett (2001a, 2001b) and 'The School I'd Like' book (Burke & Grosvenor 2003). Although some children's quotes were reported directly, they have been excluded from the analysis as they were individual voices and could not be representative of all children; therefore, selection of issues was instead based on the 'substantive consistent issues' as discussed and identified in the secondary sources. Furthermore, the written texts which were related to curriculum, uniform and teachers' personalities were not included in this analysis as they were not relevant to the focus of this study. The complete data related to school environment and children's associated needs were extracted for analysis and are presented in Appendix 4A.

4.2.2. Joined up design for schools

In the 'joinedupdesignforschools' programme, the second source of gathered data, unlike in The School I'd Like competition, children worked as clients with a number of

the UK's leading names in design and architecture. The main aim of this project was to identify what children and young people wanted to change in their schools and how their proposed design solutions could lead to useful improvements. Wider project aims included helping pupils to discover life skills and attributes that would be useful to them through their lives and to highlight the value of joining up education and design (Sorrell, 2005, p. 6).

This project was piloted in 2000–01 with seven schools in different locations in the UK. The initial results encouraged Demos, the independent think-tank, to publish the study as 'Design for Learning', and recommend a national initiative towards the improvement of the school environment. In 2002, the Department of Education and Skills provided funding support to help extend the initiative over a three-year programme. Thus, it was possible for the project to test and refine the process with more schools, bring more designers into the programme and research further pupil concerns about their learning environment, at the same time providing guidelines for the adoption of the process, and feeding initiatives such as the 'Governments' Building Schools for the Future Programme' (Sorrell, 2005, p. 6 &7).

The project named 'joinedupdesignforschools' has been carried out with approximately 100 schools in projects and workshops. Up to the point of publication in 2005, the project had involved 700 pupils in client teams and 10,000 pupils indirectly. There were 54 design businesses, 150 individual designers, 100 head teachers and 175 teachers involved and 170 visits accomplished by client teams (Sorrell, 2005). However, when analysing the project information, little information was found relating to how pupils were involved or how many students in each school were indirectly involved. The issues which were discussed in schools with pupils also varied from school to school.

Additionally, those pupils, who were involved directly in this project, visited different buildings at the start of the project, to be inspired. Pupils were divided into groups and participated in brainstorming regional workshops organised by the Foundation team: discussing items such as 'what is good about your school?' and 'what they felt about its reputation, about its environment inside and outside'. Each team produced a shortlist of three challenging issues in their schools (e.g. lockers, toilets, etc.). Overall, the pupils identified over 100 issues. Finally, as a result of this project, through discussions between client teams (children) and designers, a list of 'common issues' emerged. The list was narrowed down to eleven issues including colour, communication, dinner halls and canteens, learning spaces, reception areas, reputation and identity, sixth form

spaces, social spaces, storage, toilets and uniform, plus one special issue – whole school plan (Sorrell, 2005, p. 35). However, the number of children (or schools) raising each common issue is not clear as there was no quantitative survey reported. Furthermore, these common issues had different relative weights.

The common issues and the detailed briefs that were extracted by the researcher and classified in relation to each common issue are reported in appendix 4B. Among these issues, 'uniform' is not relevant to built environment and this research, and 'whole school plan' is an issue that was reported only with few quotes that could not be representative of the majority of pupils. For all the existing issues above, pupils' 'quotes' which present individual opinions have not been presented because they can not be generalised as common views. In addition, because the focus of this study is finding out pupils' opinions (not finding solutions for the existing problems), the design concepts (solutions) developed in response to each 'common issue' in the schools have not been considered as part of this research and further analysis.

4.2.3. The Young Design Programme

Finally, the project called 'The Young Design Programme' is considered as the third source of data. This was developed out of Joinedupdesignforschools projects. It joins up pupils in primary and secondary schools with university students and practising designers. In this project pupils were considered as clients, with the university students acting as consultants mentored by the professional designers. The university students were selected by interview from different disciplines across the university including graphic design, spatial and interior design, information design, advertising, illustration, media practice, photojournalism, artefacts, and architecture (Sorrel Foundation, 2006). The pupil client teams set design briefs for the student design teams to address. The overall focus was on 'how to improve quality of life in schools through good design'.

During 2005 and 2006, The Sorrel Foundation (2006) ran a 'pilot' study with 45 students from four colleges of the University of the Arts London and more than 100 pupils from 10 London primary and secondary schools. The pupils were asked to identify the challenge they wished to set their student design consultants. The pupils then developed a brief and, together, over the course of an academic year, the pupil clients and student designers carried out research and visits. The design students responded to their pupil client teams by preparing and presenting a design concept. Although the number of

pupils involved in this project was smaller than the other two, it raised similar issues to Joinupdesignforschools project, while not developing classified themes. However, the results reported are brief, with little detail about each issue. The result of the 'pilot' study - the highlighted 'themes' and related details about pupils' briefs based on the report by the Sorrel Foundation (2006) - are presented in Appendix 4C.

The Young Design Programme was extended during 2006 and 2007 to three universities (University of the Arts London, University College Falmouth and Leeds College of Art and Design), involving 90 students from different design modules working with 160 pupils from 13 primary and secondary schools. After the period of planning and preparation, four stages were undertaken: challenge, brief, conversation and concept. The student designers and pupil client teams were introduced at an event called 'The Challenge', in which the pupils identified the main design challenges that they wanted to address. The pupils then returned to their schools and developed their design brief. They presented it to their designers followed by the important conversation stage in which the pupils and students held several meetings and went on visits together to inspire design ideas. The project reached a climax when the student design teams presented their final concept to their pupil clients (The Sorrell Foundation, 2007). As the brief was developed prior to the external visits, these did not affect the brief or the challenge, but may have affected the design concepts. In comparison to joinedupdesignforschools, the issues raised were quite similar, but the reporting scarce. The main highlighted themes in each school and the brief details are reported in Appendix 4D.

4.3. Analysis approach

The information presented in the above section reveals the various issues pupils noticed in their schools. Their voices also highlight the existing problems in schools and their expectations from school buildings and grounds. These voices are qualitative data that need to be analysed. At this stage, the question was 'how to analyse the pupils' voices that emerged from the three aforementioned studies in order to develop a conceptual framework for school design?'

When conducting qualitative research where the intention is aimed towards theory development, grounded theory provides a set of systematic inductive methods – both a method 'consisting of flexible methodological strategies and ... the products of this type

of inquiry' (Charmaz, 2004, p. 440). A 'grounded theory' approach was used to discover the emergent issues for school design raised by children in the aforementioned studies. Strauss and Corbin (1998) describe the term 'grounded theory' as theory which is derived from data, systematically gathered and analysed through the research process. In this method, data collection, analysis, and eventual theory stand in close relationship to one another and the researcher begins with an area of study and allows the theory to emerge from the data. Benefits to this approach include a 'flexible yet systematic mode of inquiry, directed but open-ended analysis, and imaginative theorizing from empirical data' (Charmaz, 2004, p. 441).

Grounded theory was first stated by Glaser and Strauss (1967) in The Discovery of Grounded Theory as a way 'to move qualitative inquiry beyond descriptive studies into the realm of explanatory theoretical frameworks, thereby providing abstract, conceptual understanding of the studied phenomena' (ibid, p. 441). Following Glaser's approach to grounded theory, beginning with Strauss (1967) and continuing after the new direction taken by Strauss and Corbin (1990), the analytical strategy involves studying basic social processes, using comparative methods and constructing abstract relationships between theoretical categories.

The strategy began with 'coding' to generate the bones of analysis with two main phases of coding: 1) an 'initial' phase (involving naming each word, line, or segment of data followed by) 2) a 'focused, selective' phase that used the most significant or frequent initial codes to sort, synthesize, integrate and organise the large amounts of data, generating categories and themes (Charmaz 2006, p. 46). Then, the researcher's descriptive material, thoughts and interpretations of the researcher were moved into 'memos'. Memo writing helped to define the theoretical categories (themes) which were emerging.

4.4. Issues raised

The qualitative data gathered from the three studies has been analysed, though it is noted that this is secondary analysis (analysis of an analysed set of data). The aim of the analysis was to classify the issues to help the final goal of this study – making a tool for school design based on school pupils' points of view. The analysis was carried out for each study separately. As pupils' voices related to different activities happening in school, the highlighted issues are presented in connection with individual activities; however, there were also issues related to the whole school (non-activity based).

For each of the aforementioned studies, analysis was carried out to find out the name of activities highlighted by children. A total of nine activities emerged including 'structured learning (through lessons), study (work), chillout (rest), refreshment, entering, toilet (wash), physical activity (including play and art performances), circulation and assembly' (Ghaziani, 2008). Table 4.2 presents the activities highlighted and the frequency with which they are reported in the analysed data for each project (study). Although there are questions about the validity of these frequencies as absolute numbers since this is a secondary analysis, they perhaps begin to suggest the relative importance of the issues being raised, according to the pupils.

Table 4.2. List of Activities Emerging from Studies

Activities	Frequency of each activity mentioned in studies				Total No.
	The School I'd Like	Joinedup design forschools	Young Design programme		
			Pilot (2005-2006)	Study (2006-2007)	
1. Structured Learning learning, lessons, classroom	15	6	2	---	23
2. Study/work work, study to learn	Study:1 Work: 3	Study: 1 Work: 2	---	Study:1	8
3. Chill out/rest chill out, rest, relax	4	2	---	---	6
4. Refreshment dining, eating, drink	Eating:9 Drink: 6	Eating:4	Eating:2	Eating:3	24
5. Entering reception area, gate	1	3	---	---	4
6. Toilet/wash toilet, wash/ rinse, drying	3	Toilet: 4 Rinse: 1 Drying: 1	---	---	9
7. Physical activity play, playground, play equipment, art performance	Places to play: 3	Places to play: 1	Places to play: 1 Dance/art performance: 1	Places to play: 3	9
8. Circulation	1	---	1	---	2
9. Assembly	1	---	1	---	2

The results help in comparing frequency in each study and among different studies. Based on what emerged from table 4.2, in 'The school I'd like' all nine activities were mentioned by pupils and in 'Joinedupdesignforschools' seven activities were highlighted. Moreover, among the nine identified activities, 'structured learning' and 'refreshment'

were mentioned most frequently, while 'circulation' and 'assembly' were the activities least frequently mentioned by pupils in their briefs.

This analysis highlights that there are various activities happening in schools which need designers' attention. It might raise this question for the next stage of this research to address: 'is there a different importance level for various activities and activity spaces in schools from the children's point of view?' The various issues which emerged for each study (sets of data) through initial coding are presented in tables. It should be mentioned that the issues (words) are taken directly from the data. Table 4.3 shows the issues which emerged from 'The School I'd Like' study.

Table 4.3. Issues Emerging from 'The School I'd Like' Study

Category	Emergent Issues (initial coding) – 'The School I'd Like'
Structured learning	o Appropriate Temperature o Provision of experience, experiments and exploration for lessons/learning o Stimulation provided by aromatherapy essences of fruits o Provision of gentle music play to help concentration o Provision of outdoor learning environment (in school grounds/ open-air designed space) to feel real artefacts or nature o Uncluttered [tidy] o Trees, grass, wild gardens o Zoos, pet corners, bird boxes
Studying/ work	o Peace and quiet (not noisy) o Provision of computers to allow flexible study o Provision of laptops to be used outside for work
Chill out/rest	o The design of resting area not to cause noisy and hectic environment
Assembly	o Circular arrangements (instead of in rows) o Freedom of expression in pupil-adult discussions [need]
Refreshment	o Pleasant environment for eating o Provision of Picnic tables for eating outside o Fast food dinner system o Enough time to consume and enjoy food - queue system can be changed (food service) o Flexibility provided for eating habits of children associated with culture/belief o Provision of pleasantly served food and reduce the impact of authority and control/force o The design of dining area not to cause noisy and hectic environment o Provision of socialising as well as dining o Having some choice over seating arrangements o Furnishing to create a warm, quieter and calmer atmosphere o Provision of drink machines, fizzy drinks, water o Provision of soft drinks in playground o Provision of drinking water in every classroom o Unrestricted access to drinking water o Provision of water coolers in schools and classrooms
Entering	o Provision of scanning handprints, an intercom, or swipe card at school gate (Safety and security)
Toilet/ wash	o Less institutional and more welcoming o means of removing smell o Toilet door locks provided o Provision of toilets flushes (not chains) o Accessible toilets
Physical activity	o Safe playground with no danger of falling o Provision of more space and equipment for young children to play with (e.g. swings and climbing apparatus)
Circulation	o The design not to cause noisy and hectic environment o Built environment to allow freedom of movement

Whole school	o Colourful (brightly coloured walls) o Adding colours in school yards o Softy textured inviting interiors o Carpeted floor o Covered brick walls o Visually pleasing environment o Appropriate size; children not to feel small [Appearance] o Material; environment not be hard - children feel safe if they fall o Fantastical design o Up-to-date design o Inclusive school design, usability for everyone o Comfort and safety, less hard space o Skylight/ roof light (natural) o Level of light to be satisfactory o Type of lights to be appropriate o Provision of natural features: water, wildlife and animals o Connection with the community through the school building and its landscape o Well designed, comfortable furniture with variation for different body sizes o Provision of soft seats, sofas and beanbags, cushions o Provision of Chairs as egg /dome shaped, 'enclosing the head and waist', Swedish style o Tables to have appropriate height o Tables not to scrape knees o The design not to cause noisy and hectic environment o Blinds provided to control sunlight o Accessibility of fire exits from every room o Bullies to be controlled by designing, anti-bully alarm o Provision of older pupils to look out for the younger (caring)-Buddy system o Feel proud of the school [need] o Built environment to inspire the senses and allow privacy o Design considers children's sense of vulnerability o Contact with natural world - no fence o Open air school or underwater school (were imagined) o Outdoor space to be filled with: objects, mazes, ponds, swings, gardens, slides and swimming pools (visions as examples: from tree-houses and forts, pirate ships and adventure playgrounds, to full-scale theme parks with motorised rides) o Provision of various activities in the school grounds; appropriate for different age groups and their temperaments. o Consideration of computers and their associated accessories in designing spaces o Adequate sickbays o Pleasant environment for gathering o Peace and quiet spaces o Provision of doing what pupils enjoy/ your own interest o Flexibility needed o Provision of appropriate lockers to store belongings (to be safe) o Provision of chairs 'with pockets and holders' o Durable lockers that will not be damaged

Table 4.3. Issues Emerging from 'The School I'd Like' Study

In addition, table 4.4 presents the issues emerging from Joinedupdesignforschools as follows.

Table 4.4. Issues Emerging from Joinedupdesignforschools

Category	Emergent Issues (initial coding) - Joinedupdesignforschools
Structured learning	o Modern, inspiring places o Decorated in cheerful, calming colours, bold and bright colours o Coloured flooring o Use of colour to separate areas o Lots of natural light via large windows o Variety (spaces look different) o Means to display pupils' work o View context: to see the seasons changing [plants/trees] o Spotlights (instead of strip-lights) o Roller blinds (instead of curtains) or vertical blinds o Fresh, clean air; not smelly [ventilation] o Appropriate temperature in different seasons; provision of air-conditioning o Spaces help concentration o Use of ergonomic furniture to aid concentration o Seating with adjustable height, and able to recline, with soft cushioned seats o Adjustable, folding tables, with storage beneath them o Easily movable desks to change into a semi-circle arrangement
Studying/ work	o A flexible space o Developing new ways of working and learning to help pupils deal with academic pressures o Built environment is suitable for study and work in a relaxed way
Chill out/ rest	o Built environment allows pupils to relax away from the pressure of the classrooms o Provision of seats o Sheltered spaces o Feel like (pupils') own space (personalising space) o Built environment to allow a relaxing break to socialise
Refreshment	o Built environment allows less queuing time [fast service] o Pupils have a choice to serve themselves o Hygiene standards provided o A choice between cold snacks and hot meals [e.g. provision of vending machines] o Own place to eat lunch, away from younger pupils o Appealing environment o Décor, layout
Entering	o Welcoming feeling to everyone o Well designed gate o Enough signage o Expressing school's values in a cheerful, welcoming way o Entering area provides facilities for school's administrative hub, meeting/ greeting area, and where sick pupils are cared for
Toilet/ wash	o Adequate toilet size o Provision of adequate hand-driers o Provision of special basin for rinsing off mud from pupil's sports boots o Secret smoking and bullies can be controlled by design o Plumbing problems can be solved easily o Clean, graffiti-proof
Physical activity	o An interesting playground, not too exposed or open to elements

Whole school	o To be proud of school [need] o Reputation (Identity) of school for pupils and wider community [need] o Feel welcoming [need] o Bold, modern and cheerful colours (colour to enhance atmosphere and mood, colours to make the space calm, in particular with older pupils) o Attractive, inspiring (interior) o Good signage to prevent confusion/ getting lost o Contribution to a vision for a new school o Built environment can inform the community about what happens (e.g. through website/magazines) o New sign systems and environmental installations o Lockers: Graffiti-proof, look nice, enough space for bags, coats and a place to store work safely o Maximize wall space, create display cabins o Secure places to put books, stationery, equipment, bags and coats o Lockers to be big enough to share o Possibility to personalise lockers without damaging them

Table 4.4. Issues Emerging from Joinedupdesignforschools

Finally, table 4.5 illustrates what emerged from the third source of data - The Young Design Programme which includes both its pilot and study.

Table 4.5. Issues Emerging from The Young Design Programme (pilot and study)

Category	Emergent Issues (initial coding) The Young Design Programme- pilot and study
Structured learning	o Dynamic technology spaces with easy access to facilities o Interesting, inspiring o Durable (materials)
Studying/ work	o Comfortable furniture o Built environment to allow privacy o Suitable lighting
Chill out/rest	o A quiet, relaxing social space outside
Refreshment	o Interiors provide sufficient seating for pupils o Food service system allows quick serving to prevent queuing o Outside eating space provides waterproof shelter, sufficient bins, and enough seating
Toilet/ wash	o Toilets to be kept clean
Physical activity	o Places to eat; main canteen, pleasant food service o Sufficient indoor space to play o Colourful playground o Shelter o Seating in playground o Space allows to play ball games
Circulation	o Built environment to prevent crowding in corridors
Whole school	o Provision of sufficient indoor social space for all pupils at break times o Various places to go at break time o Reliable storing space for coats o Flexibility of space o Movable furniture o Spaces could be cleaned easily and fast o School's identity and reputation; reflecting the key values of pride, Presence and community [need] o Identity concept (and to be unique): Symbolising what pupils do o Built environment to offer enough places to go at break time o Built environment to prevent noise in quiet spaces o A social space where everyone with different abilities is included o Provision of enough seating for outside social spaces o Provision of shelters for outside social spaces o Built environment allows a greater feeling of ownership o A versatile, interesting outside social space o Signage or separate entrance o Colourful exterior o Landmark building visible from the street (clearly defined identity to announce the school's presence) o Interesting interiors o A reinvigorated space with a great sense of fun o Connection to the community; sharing school with the community o Personalising school o Built environment to allow way finding easily by navigational system o Built environment to allow reflection of pupils' achievements and personalities

The findings from these tables need to be analysed and classified in the next phase of analysis with the help of selective coding. After reviewing the initial results which

emerged from the three aforementioned studies (table 4.3, 4.4 and 4.5), similarities could be seen among them. It allowed the analyses of the three projects to be put together to provide a detailed picture of the whole. All of the issues related to various activities were put together to form one table overall. Furthermore, the issues related to the whole school (non-activity based) were also collated. Reviewing these new tables helped to establish another structure for organising the issues. Therefore, all emergent issues were divided into two main categories: 1) 'needs' 2) 'physical features and spatial qualities' of school environment. Although children's comments revealed their particular needs for various 'activity spaces' (e.g. flexible spaces for study, large open dining spaces, etc.), the review also discovered some 'generic needs' of pupils that are not dependent on a specific activity happening in school, but which are relevant to the whole school (e.g. security and safety). Table 4.6 presents children's needs in relation to activities and Table 4.7 shows their generic needs (Ghaziani, 2008).

Table 4.6. Activity Based Needs of Children

Activity	**Needs**
1. Structured learning	Stimulation , Concentration , Cognitive (to know and explore)
2. Study/work	Privacy , Relaxation
3. Chill out/rest	Relaxation, Feeling of ownership
4. Refreshment	Relaxation, Freedom, Socialising , Personalisation
5. Entering	Security, Expression (school's values)
6. Toilet/wash	Safety and security
7. Physical activity	Safety
8. Circulation	Freedom of movement
9. Assembly	Expression (opinions)

Table 4.7. Generic Needs of Children

Needs
Socialising
Security and safety
Connection to the community
Identity and reputation
Personalisation
Privacy
Feeling of ownership
Feeling welcoming
Feeling proud of school

4.5. Outline framework

At this stage of categorising the issues, it was necessary to consider the aim of this study which was to make an evaluative tool based on considerations pupils raised about their schools. To this end, reviewing a few other tools seemed useful to give direction to the way the emergent codes (issues) need to be organised. Therefore, among the existing tools for public buildings, ASPECT (2008) - A Staff and Patient Environment Calibration Tool was reviewed which has eight headings as its structure. This helped to inform how a structure should be defined and the issues related to physical features and spatial qualities might be categorised. Although few headings of ASPECT could be used for naming some categories, some headings or sub-headings could not be applicable for schools and new headings needed to be defined.

Hence, the emergent codes relating to activities or to the whole school were reviewed again to link them with some possible sub-categories. All the codes were written on different pieces of paper which had to be sifted and sorted out as sub-categories by moving them gradually according to their links; for example, some issues were related to 'light', 'temperature', 'ventilation', 'view', 'appearance', 'use', 'character' and so on. It needs to be mentioned that during this stage it was found that lots of issues that were related to particular activities were repeated not only across activities, but also for the whole school (non-activity-based) category. Consequently, it was considered appropriate to re-categorise the issues that were linked to the whole school; for example, 'lighting' was an issue related to several activities that could be expanded to the whole school. During this process the number of issues that specifically related to activities was reduced significantly and the overall number of issues was reduced, as some highlighted codes actually were examples or explanations (details) of other issues (for example, 'trees, garden, mazes, grass, wild garden and ponds' became the details of 'access to landscape'). Therefore, by omitting the repetitive issues and separating the details, the number of issues reduced from 128 to 54.

Based on the emergent sub-categories, some higher level categories were defined; at this stage, the process of relating categories to their sub-categories - which is called 'axial coding' (Strauss and Corbin, 1998) - was needed, linking categories at the level of properties and dimensions. At the final stage of analysis, six categories were identified (Ghaziani, 2008), which are as follows:

1. **Indoor Spaces (interior)** – the interior of school buildings and how they look.
2. **Comfort and Control** – the comfort levels of pupils and teaching staff in school buildings and the extent to which these can be controlled.
3. **Activity Spaces** – specific design features and qualities that are required for different activities.
4. **Nature and Outdoors** – the extent to which pupils have contact with the natural world, whether they can see and access nature both indoors and outdoors.
5. **Facilities** – those facilities (services) that are important for pupils.
6. **Exterior** – the exterior of school buildings and their appearance.

Related 'issues' emerged for each category from the studies. They are presented in no particular order as there was no information indicating their relative importance in the three aforementioned studies. It needs to be mentioned that the wording of the issues reported here has changed slightly compared with the words taken directly from the analysis in order to summarise the points raised. The notes (examples) in parenthesis provide some details which have emerged from children's voices (ibid).

The emergent issues for 'indoor spaces' based on previous studies are as follows:

(1) Softly textured interior (e.g. carpet)
(2) Durable finishes
(3) Colourful walls and floors (bold and cheerful colours)
(4) Flexible spaces (e.g. large spaces can be divided)
(5) Variety of spaces
(6) Inviting, attractive and inspiring interior (up-to-date, tidy and clean spaces)
(7) Means to display art work (e.g. display cabins on walls)
(8) Finding your way around easily (e.g. signage, navigational system)
(9) Usability of building by everyone with different abilities

The emergent issues for 'comfort and control' category are as follows:

(1) Satisfactory levels of natural light (windows, sky/roof light)
(2) Appropriate types of artificial lights (e.g. spotlights)
(3) Easily controlled natural and artificial lighting
(4) Blinds to control sunlight (e.g. roller/vertical blinds)

(5) Good acoustics to control noise

(6) Natural ventilation

(7) Controlling ventilation system (e.g. fresh air through windows)

(8) Air-conditioning

(9) Appropriate temperature in different seasons

(10) Easy control of the temperature

The following issues present the findings regarding children's expectations of the various 'activity spaces' in school.

(1) Provision for outdoor learning (e.g. open designed space)

(2) Places for rest and meditation (chill out spaces for break time)

(3) Some decoration in the dining spaces

(4) Preventing crowded dining spaces (e.g. fast food or self-service, enough places with sufficient seating)

(5) Creating a warm atmosphere by furnishing the dining spaces (e.g. flexibility for seating arrangement)

(6) Spaces for an administrative hub and for meeting or greeting

(7) Space for caring for sick pupils

(8) Indoor spaces designed especially for play

(9) Spaces for art performances or physical activities

(10) Plenty of room for movement in circulating areas to prevent crowding

(11) Easy talk between pupils and staff in the assembly (e.g. circular form or arrangement)

The emergent issues relating to 'nature and outdoors' according to analysis are as follows:

(1) Access to the landscape (e.g. trees, garden, mazes, grass, wild garden, ponds)

(2) A pet corner or bird boxes

(3) Interesting and versatile outdoor space

(4) Relaxing outdoor space

(5) Define outdoor spaces according to elements (not too exposed or open)

(6) View of nature from inside the building (to see seasons changing, e.g. plants, trees)

In addition, there is a long list of issues relating to 'facilities' (services) in schools which is as follows:

(1) Audio system (for playing gentle music)
(2) Appropriate chairs (soft cushioned, reclining, with adjustable height and variation for different body sizes)
(3) Appropriate tables or desks (adjustable, movable, folding tables with holders, which do not scrape your knees)
(4) Appropriate lockers to store personal belongings (secure to put books, bags and coats, to look nice, to be durable, graffiti-proof, proper size and possibility to be personalised)
(5) Easy access to the media and technology space (e.g. computer room)
(6) Easy access fire exits for every space
(7) Scanning handprints or swipe card at the school gate
(8) A waterproof shelter outside (for eating, resting and socialising)
(9) Seating in the school ground (for eating and resting)
(10) Picnic tables outside (for eating)
(11) Easy access to drinking water (in school grounds and classrooms)
(12) A choice of cold snacks or drinks (e.g. vending machines)
(13) Appropriate toilets (easy access, lockable doors, toilet flushes, graffiti-proof materials, basins for rinsing off mud and adequate hand dryers)
(14) Equipment for various activities in the school grounds suitable for different age groups (e.g. space for ball games, swimming pool)

Finally, the emergent items for the 'exterior' category are as follows:

(1) Colourful exterior (building)
(2) Connection to the community (through building and landscape).
(3) Landmark building (visible from the street and announcing the school's presence).
(4) A well-designed gate for the building

Based on the above findings, the key question that again gives direction to the development of a theoretical framework is 'how important is each item and overall category for pupils?' In order to find this out, the checklist of items could be tested with children in different schools through an empirical study; however, there is a need to make an 'evaluative tool' to ask the 'importance' of each item, but also allowing some

degree of flexibility in order to consider the possibility of key issues which have not been raised previously and might be added to the checklist.

4.6. Review conclusions

In this chapter, the amalgamated pupils' opinions have been analysed to reveal details of existing problems in schools. The results show that pupils know a tremendous amount about their school environment and they can provide extremely valuable information for school designers. The findings suggest the importance of looking at school as not only a place to learn but also a place for socialising, relaxation and fun. Therefore, the whole experience of schooling is important. These findings are supported by Sanoff (1992) who states the amount of time children and young people spend in school is so significant that it is important to recognise that much of this time is devoted to 'living' as well as learning. Dudek (2000) also states the need for various activity spaces as they provide essential developmental experiences beyond the confines of the class base (P. 44).

The analysis has shown that children have special needs which require special spaces. This study helped identify the children's needs and desires for either the whole school environment or for different activities happening there. In addition, what emerged from the aforementioned three studies suggested categories for 'physical features and special qualities' in schools. It is intended that the emerging classification system and the related items might guide architects and designers in their discussion and consideration of pupils' views during the design process. This potentially could lead to making schools better places for children. The emergence of clear themes in these findings supports the value in the idea of promoting and considering children's opinions in the school design process which seem important for Building Schools for the Future (BSF) and Primary Capital Programme (PCP) that aim to rebuild or renew schools in the UK.

Designing and testing an appropriate evaluative tool for children (in primary and secondary schools) might be useful for architects and designers to find out the most and the least important issues for them which might affect the quality of school design for the future. Further research is needed to evaluate the importance of emergent design issues and develop an appropriate framework for the design of schools. It is also

suggested that all school users, such as teachers, need to be involved and consulted as well as children. Following chapters will address these issues.

Chapter 5 – Children's views: empirical study

5.1. Aims and research questions

Various issues have emerged from the analysis of the three studies discussed in Chapter 4. Children's voices regarding school buildings and grounds were classified into six categories including indoor spaces (interior), comfort and control, activity spaces, nature and outdoors, facilities and exterior. Furthermore, related items emerged for each category.

The key questions which will be addressed in this chapter are 'how important is each item for pupils? How important is each defined category overall? And how much are children satisfied with each item (and category) in their existing schools?' In order to answer these questions, the checklist of items needed to be tested in various schools with a number of children; however, there was a need to make an 'evaluative tool' to find out the 'importance' of each item in order to develop an appropriate framework for school design and thus fulfil the aim of this study. This chapter presents the methodological approach to developing an evaluative tool as well as children's views. It also reports and discusses the result of empirical studies carried out in two secondary schools.

5.2. Developing an evaluative tool

In order to choose an appropriate method for evaluating the issues raised during the empirical study, relevant literature was reviewed. The aim has been to find a way that pupils could score each item easily and accurately. The result would be the analysis of 'quantitative data' and the necessity of this approach will be discussed.

5.2.1. Quantitative data

In the previous stage of this study, qualitative analysis led to the compilation of a list of categorised items. This approach had some advantages as the data and the analysis were 'grounded in reality' which is a particular strength; however, there are some disadvantages to qualitative research. As Denscombe (1998) describes, the data may be less representative compared with quantitative data, which makes it difficult to

establish how far the findings from the detailed, in-depth study of a small number of instances may be generalised to other similar instances. Moreover, interpretation is bound up with the 'self' of researcher and it can be argued that the findings are a creation of the researcher rather than a discovery of facts. In addition, there is a possibility of de-contextualizing the meaning during the process of coding and categorising the field notes, texts or transcripts so that the words get taken literally and out of context.

Therefore, testing the previous findings seems essential. An appropriate method needed to be adopted to allow pupils to highlight the relative importance of each of the items or add any extra items to the checklist. Bryman (1992) discusses the possibility of combining quantitative and qualitative research in order to produce a general picture and points out by combining the two, the validity of researcher's claims (conclusions) are enhanced if results can be shown to provide mutual confirmation. However, because qualitative and quantitative research have their strengths and weaknesses, caution is necessary to ensure that the two sets of results are not in fact addressing different issues. Bryman (1992) also points out that qualitative research may facilitate quantitative research by acting as a source of hunches or hypotheses to be tested by quantitative research. In addition, the presence of qualitative data may greatly assist the analysis of quantitative data - by conveying a sense of solid, objective research.

According to Bryman (1992), there are some advantages and disadvantages of quantitative analysis. One of the advantages is quantitative data lend themselves to various forms of statistical techniques based on the principles of mathematics and probability rather than the values of the researcher; therefore, confidence can be obtained by researchers as statistical tests of significance give researchers additional credibility in terms of the interpretations they make (Bryman, 1992, p. 204 - 205).

5.2.2. Questionnaires as a means of data collection

In order to test the previous findings in a small number of schools with a large number of participants, use of questionnaires seemed to be appropriate. According to Denscombe (1998), questionnaires are appropriate to use for research involving large numbers of respondents: the respondents can be expected to be able to read and understand the questions, and what is required tends to be fairly straightforward information which can be used subsequently as data for analysis. The successful use of questionnaires

depends on developing the right balance of effort in the planning stage, which as Denscombe points out, includes consideration of 'production', 'organisation' and 'permission' (ibid).

Production of questionnaires was an important issue for this study as the process of designing the questionnaires and producing a document of high-quality appearance which was simple, clear and quite attractive, especially for children, required a great deal of time and effort. In addition, the process of distribution and collection of questionnaires demanded keeping an eye on school organisation. The timetables of the schools were an important issue to consider for data collection as school holidays and exams limited the study schedule; however, questionnaires were a quick way to gather data compared with other data collection means such as interviews.

Moreover, one of the advantages of questionnaires that Denscombe describes is supplying 'standardized answers' because they eliminate the effects of personal interaction with the researcher. However, there are disadvantages to questionnaires including the lack of opportunity for the researcher to check the truthfulness of the answers. In addition, pre-coded questions can be frustrating for respondents to answer, and can also bias the findings toward the researcher's, rather than the respondent's, way of seeing things (Denscombe, 1998); however, as the items emerged from the qualitative data (children's own voices), this lessens the potential for problems of questionnaire bias toward the researcher's interest, to a degree. Furthermore, all the emergent items (issues) were converted to statements for each of the defined categories in a form appropriate for children's questionnaires.

5.2.3. Ordinal data and its application

The collection of ordinal data seemed appropriate for this study because according to Bryman (1992), ordinal data is based on counts of items assigned to specific categories which stand in some clear, ordered, ranked relationship. Therefore, it could help to find the importance of the identified items through the use of rating scales. Miller (1956) points out that 'there is a clear and definite limit to the accuracy with which we can identify absolutely the magnitude of a unidimensional stimulus variable.' He proposed to call this limit the 'span of absolute judgment', and maintained that for unidimensional judgments this span is usually somewhere in the neighbourhood of seven. The most common example of ordinal data comes from the use of questions in which respondents

are asked to respond on a five-point scale such as 'strongly agree (1), agree (2), neutral (3), disagree (4), strongly disagree (5)'. This scale is known as the 'Likert scale' (McIver and Carmines, 1981). However, for this study, it is important to find the appropriate ranking scale for children's questionnaires.

In the context of school design and researching children, two study reports have been reviewed which suggest gathering children's opinions by means of a 'rating scale'. Sanoff et. al (2001) in the 'School Building Assessment Methods' describe the different forms of pupil participation, including the School Building Rating Scale, as a comprehensive assessment tool. This qualitative assessment tool has been organised into categories which are essential components necessary for meeting the demands of an optimum learning environment. The components of the rating scale include 'physical features, outdoor areas, learning environments, social areas, media access, transition spaces and circulation routes, visual appearance, and safety and security.' The questionnaire includes 'fifty-five statements' pertaining to the school building to be rated by building users such as students and school staff. The rating scale is a 7-point numeric scale based on a continuum from very unsatisfactory (VU) to very satisfactory (VS). This study shows the possibility of using rating scales for children; however, it could be argued that it seems complicated to apply a 7-point scale for all age groups of children. Therefore, making rating scales age-appropriate is an issue to deal with.

In the other relevant report: Technical Report, Evaluation of Building Schools for the Future (Price Waterhouse Coopers, 2007), the pupils' questionnaire is based on a rating scale to evaluate their opinions about their 'school and its facilities, views on school, about their teachers and themselves' (in four main sections). The type of scale varies from 3-point (Agree, Not sure, Disagree) to 5-point (Very Good, Good, Neither/nor, Poor, Very Poor). However, changing the type of scale might confuse children; therefore, consistency seems especially appropriate for children.

One of the issues that needed to be thought about was choosing the appropriate age group of pupils. The previous exploratory studies and their findings suggested choosing Year 7 children who are aged 11-12 years and are in the 'transition' year. One of the main reasons for this is their recent experience of at least two different school environments, This group of pupils is likely to have a heightened awareness of their school environment compared to other year groups, which could enable them to compare the positive and negative features of their current and previous schools helping them to respond to the questionnaires more critically.

As the child in the age group of 11 to 12 years may lack the written skills to produce a response, choosing a scaled response to investigate children's views also could help them to respond more easily compared with open ended questions to which they had to write answers themselves. For this age group of children, however, it was attempted to choose a simple ranking scale, linguistically familiar to children; therefore, a 4-point scoring scale was selected that indicated 4 as the best score, which it is reasonable to expect, and 1 as the poorest score. In order to express a level of agreement with a statement, the scores are defined as follows.

1. Awful
2. Okay
3. Very Good
4. Fantastic

Similarly, another 4-point scoring scale was defined that let children choose the importance of each item for the school they would like. The scores are as follows.

1. Does Not Matter
2. Nice to have
3. Important
4. Essential

In addition, as children might not be confident about their answers in highlighting the importance of an item in their ideal school, another feature which is called 'levels of confidence' was added to the evaluative tool. There might be statements (items) that can be scored more confidently, while some statements are difficult to answer because of lack of information or knowledge. Therefore, there are two levels of confidence to be applied: 'low' or 'high'.

5.2.4. Format of the questionnaire

In order to design the questionnaire for pupils, a critical issue to consider has been the child's ability to respond to the written language demands. Therefore, it has been attempted to construct each statement in a way to contain only one complete thought and keep the language of statements simple, clear and direct. Furthermore, in choosing the format of questionnaire, there have been various ways in which questions could be put. It could be argued whether the overall questionnaire would benefit from using a variety of question forms, or whether it is better to choose a consistent style. As Denscombe (1998) argues, 'variety' stops the respondent becoming bored and falling into pattern of choosing one answer to all questions; however, it allows the respondents

to get used to the kind of questions and be able to answer quickly and with less likelihood of confusion or misunderstanding. In this study, a consistent style is applied for the questionnaire; however, it seems that some degree of flexibility would be beneficial in order to consider the possibility of key issues which were not raised previously and might be added in the open section. The format of the children's questionnaire is presented in the table (5.1) below.

Heading (category)		Your school				The school you would like					
		How **satisfied** are you with each item?				How **important** is each item?				Confidence	
		 It's Awful 1	 It's OK. 2	 It's Very Good 3	 It's Fantastic 4	Does Not Matter 1	Nice to Have 2	Important 3	Essential 4	Low	High
ID (no.)	Description (item/issue)										

Table 5.1. Format of Children's Questionnaire

On the cover page of the questionnaire, it was explained to pupils that 'there is a list of different issues that lots of children in different schools around the UK have raised about school buildings and their grounds. All of the issues have been categorised and put into the tables below. We would like to know your opinion about them.' Furthermore, children were informed in this cover page that 'Each table shows a category of similar issues, e.g. Indoor Spaces, Comfort and Control' and 'the guidance notes (separate sheet) help to explain some of the items'. They were asked to 'rate all of the items in the tables twice': 'The first time you have to rate how satisfied you are with your school and the second time you have to rate how important each item is to make your school a better place. 'Importantly, it was explained to them that 'there are no right or wrong answers': to let children be free and creative about their responses.

It was asked precisely that in this survey, we would like to know:

(1) How **satisfied** are you with your school? Please rate each item on the following scale.

1. It's Awful
2. It's OK.
3. It's Very Good
4. It's Fantastic

(2) How **important** is each item for the school you would like to have? Please rate each item on the following scale.

1. Does Not Matter
2. Nice to have
3. Important
4. Essential

In addition, they were asked to show their confidence. Therefore, on the cover page was the explanation: 'when you identify the importance of each item for the school you would like, please tell us how confident you are about your answers by choosing a Low or High level of confidence.'

Finally, in the open section of the questionnaire, they were asked to add any comments they could think of and then rank them (4-Point scoring scale) based on the importance of that issue (see Appendix 5A).

5.3. Data collection

There are two questions still needing to be addressed, namely, 'how was access to the data obtained? And how was the population selected?'

5.3.1. Ethics and consent

Ethical issues are especially important for child and young person centred research. Within the context of schools, getting consent from pupils is a complex process which usually involves lengthy negotiations with headteachers, parents, and teachers. They are all involved in the process of gaining access to the views of children. On the other hand, participation and consent by pupils is not entirely under their control.

In order to get permission for this study, they were two stages to pass: 1) getting authority from the University of Sheffield (School of Architecture) by completing the ethical forms and sending all the information related to the research to the university 2) getting permission from those under the schools' authority: headteachers, children and parents. The information sheets for headteachers, children and parents as well as the consent forms for each (see Appendices 5C, 5D and 5E), alongside the ethical forms, were submitted to the University of Sheffield, School of Architecture, to obtain the necessary approval before the start of data collection.

To conduct the survey, all the information sheets and consent forms as well as a formal letter to headteachers (see Appendix 5B) were sent by post to secondary schools in Sheffield. In addition, the copy of Ethical approval from the University of Sheffield and a supporting letter from the supervisor were attached and posted. However, at the beginning, several schools were approached by the researcher in person as it was supposed it could be more productive to talk face to face with headteachers. This approach was time-consuming and during a busy school day it was often not possible to talk directly to headteachers; therefore, this strategy was not continued. For this study, gaining permission from appropriate authorities took a considerable amount of time. Afterwards, the schools were contacted by telephone and email in order to gain their responses. Most of the schools were unwilling to get involved.

Finally, after getting permission from two secondary schools in Sheffield, the data collection started. The questionnaires were sent to headteachers before the start of data collection so that they could assess them or ask for changes to be made in respect of language, length or so on. It was suggested to headteachers that there was a possibility of dividing the questionnaires into two parts if necessary. This could help pupils to fill them out in a shorter time, but over two sessions. This idea, however, was not accepted by headteachers and it was decided that the survey should be carried out once only.

As planned with school headteachers, the questionnaires were handed out to pupils during a school day, based on each class's schedule and possible free time. Therefore, getting parents' consent was not essential: as firstly, the school conducted this research under its own supervision and secondly, the research method did not include any photos, voice recording or films of children which would have rendered it necessary for headteachers to get permission from pupils' parents.

However, involvement in this survey was optional for children: so they could choose if they wanted to participate. As the researcher was not allowed to have contact with children for data collection it remained unknown how headteachers and teachers informed children about this research, what they explained to them and how they offered the pupils the option of whether or not to participate. These issues might even have affected the results although it seemed the only way to conduct the research in the schools. The positive point about filling in the questionnaires in the classrooms instead of at home was reducing the influence of parents over their children's responses which could have had a significant impact on the results of the study; however, it is a

possibility that teachers might have helped or influenced pupils in filling in their questionnaires.

5.3.2. Case studies and participants

The empirical study involved children in one school year group (Year 7). Research involved the distribution of 355 questionnaires with a response rate of 73.8% achieved in total. Tapton, the first school where the study was carried out, was a new school which was built 6 years ago. In this school 174 out of 230 distributed pupil questionnaires (75.6%) were returned. The second school was Myers Grove (built more than 40 years ago and due to be demolished in couple of years). 88 out of 125 distributed questionnaires (70%) were returned from the second school. Overall, in their questionnaires, 189 out of 262 children indicated their gender. The proportions of girls and boys were almost the same (49.7 % girls and 50.3% boys); therefore, equality of both genders exists for the majority of responses where gender was identified.

Schools	No. of pupils	Type of building
Tapton (school 1)	174	New
Myers Grove (school 2)	88	Old

Table 5.2. Summary of Case Studies and Number of Participants (pupils)

Interestingly, almost all the questionnaires received from pupils in Myers Grove (school 2) were complete, while there were some incomplete questionnaires obtained from Tapton (school 1). At the beginning it was assumed the reason was the school authority and its impact; however, in a meeting with the headteacher of school 2, he mentioned "we did not force them to complete the questionnaires...we like our students...pupils were told that their opinion is important for the new school we plan to build". The results have been given back to the headteacher of Myers Grove to be used for the design of their new school (BSF-funded school).

Because data collection was conducted on different days or weeks when each class had some free time, it took more than a month to collect data from both schools. The two schools are located in two different areas of Sheffield; Tapton School, which was expanded by time, located at Fulwood area of Sheffield, while Myers Grove School

serving the area between Malin Bridge and Stannington and located on the edge of the countryside between the Loxley and Rivelin valleys. It needs to be mentioned that not only the 'location', but also 'socioeconomic status' of these two schools have been different from each other which might have effects on the collected data.

Finally, to supplement the questionnaires, further information about the schools was gathered, including school plans and photos from inside and outside which might help the analysis. The following figure (Figure 5.1) shows the floor plans of school 1 (Tapton), while Figures 5.2 and 5.3 show photos of external and internal spaces of the two schools which were taken by the researcher.

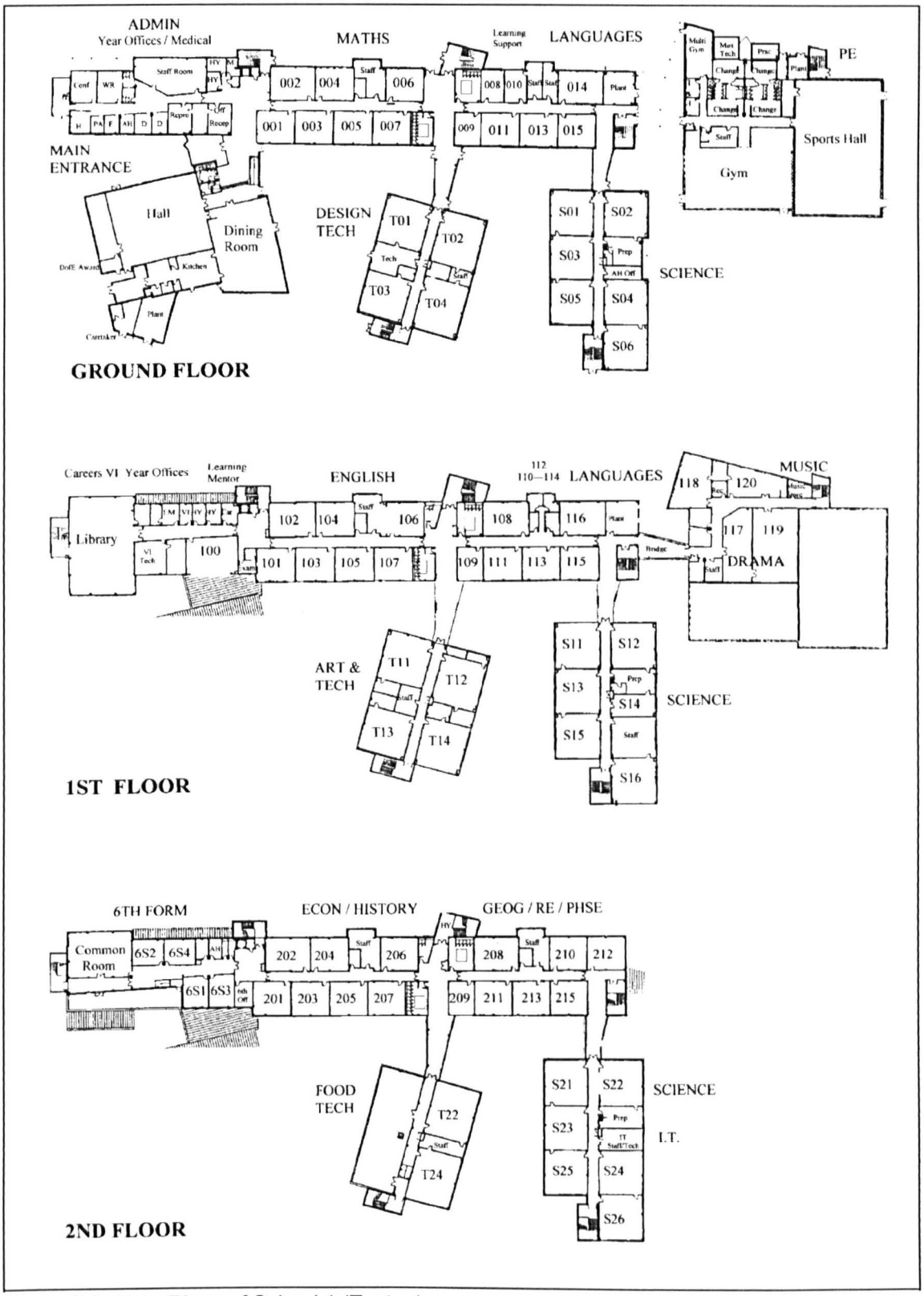
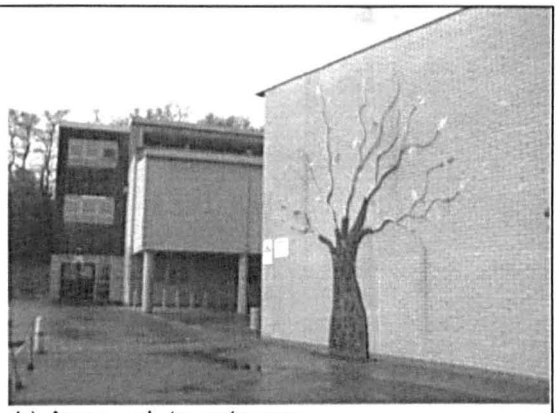
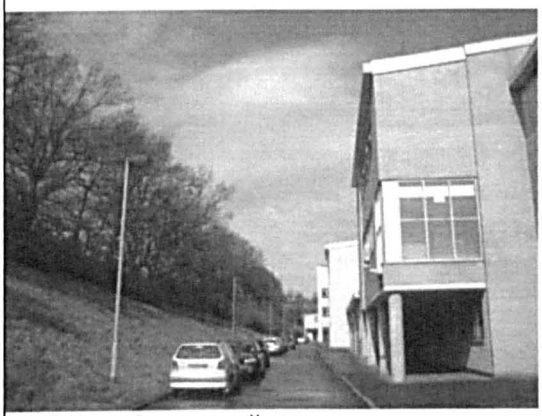


Figure 5.1. Floor Plans of School 1 (Tapton)

a) Entrance area

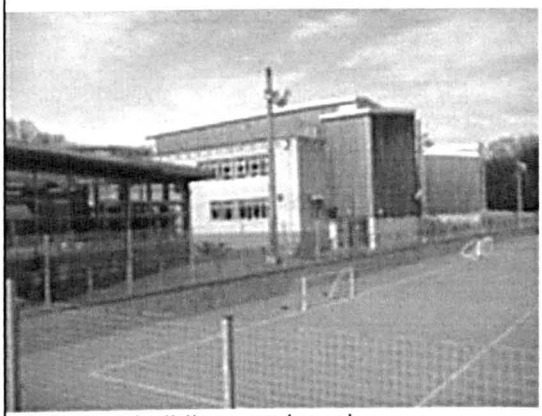


b) Approach to entrance



c) External surroundings

d) School yard



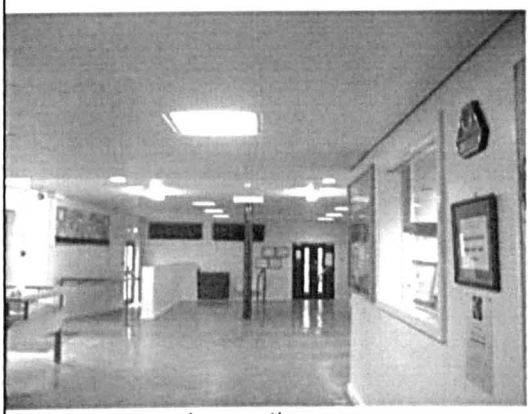
e) School buildings and yard

f) Outdoor area for dining

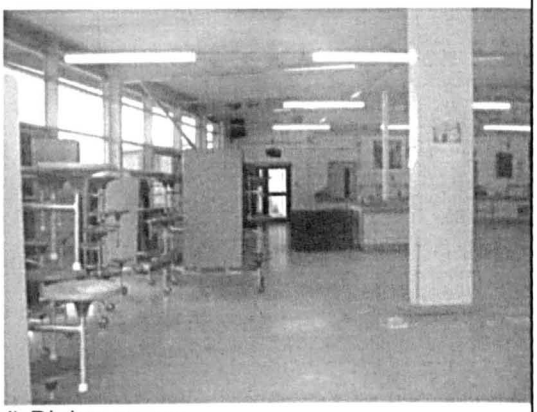
Figure 5.2. Photos of School 1 (Tapton) - Exterior

g) Football pitch

h) Seats in school yard



i) Entrance and reception area



j) Dining space

k) Classroom

l) Indoor sports centre

Figure 5.3. Photos of School 1 – Indoor and Outdoor Spaces

Figure 5.4 shows the second school's plans. The photos of exterior and interior spaces that were taken by the researcher are presented in Figures 5.5 and 5.6 respectively.

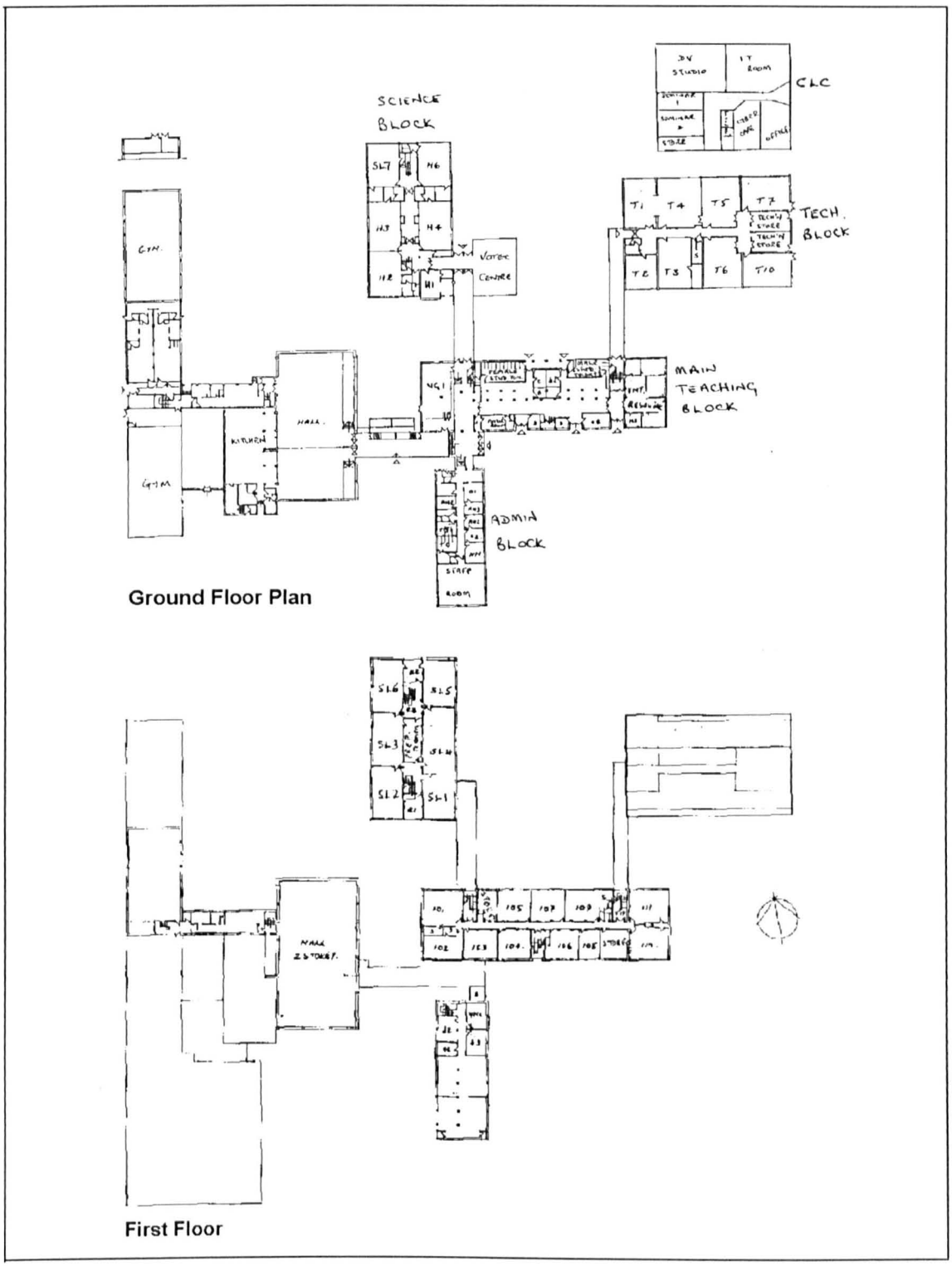


Figure 5.4. Floor Plans of School 2 (Myers Grove)

a) Site plan

b) School gate for pedestrians

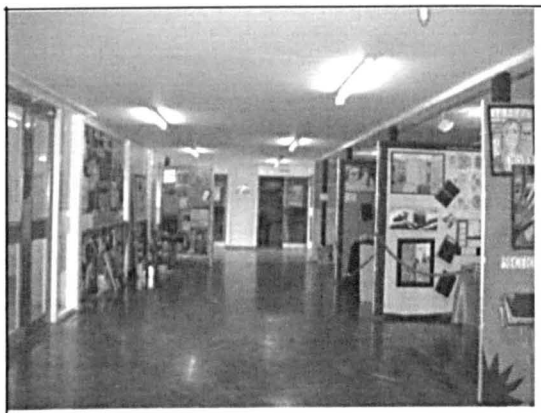
c) Car park

d) Main entrance

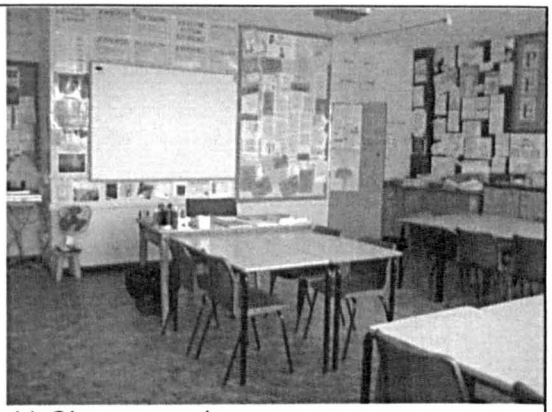
e) Landscaped area

f) School yard

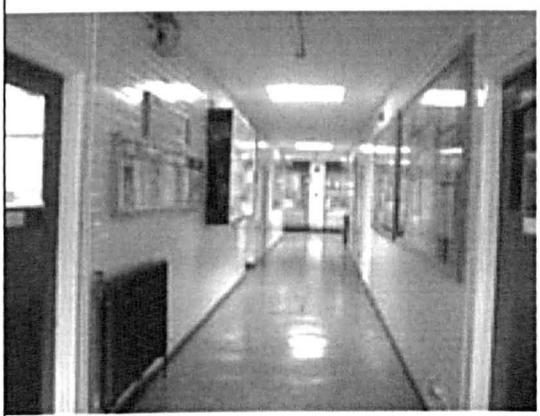
Figure 5.5. Photos of School 2 - Exterior



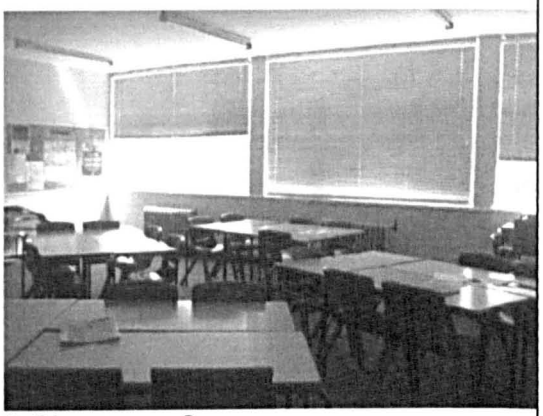
g) Display area



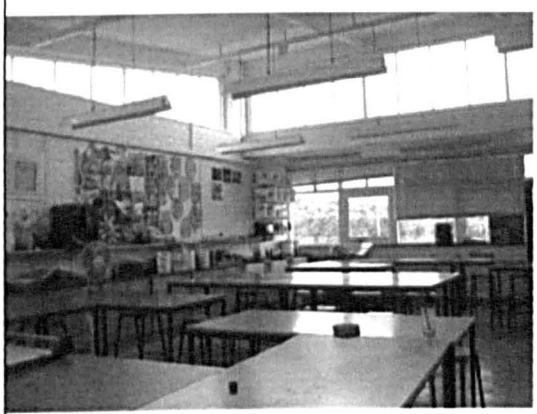
h) Classroom 1



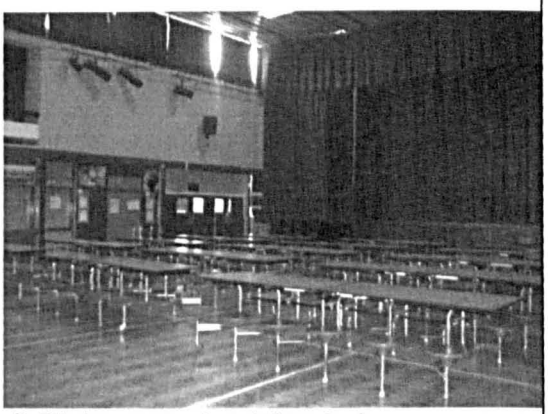
i) Circulation area



j) Classroom 2



k) Art workshop space



l) Dining area (and theatre)

Figure 5.6. Photos of School 2 - Interior spaces

5.4. Analysis

The aim of this data collection has been to find out children's views directly and test the developed framework. In this section, the results of data analysis are presented for each school separately to illustrate their satisfaction and the relative importance levels of various issues. By comparing each identified category in both schools, the differences in importance levels among items in each category, as well as between the various categories themselves, will be highlighted. In addition, children's overall satisfaction will be illustrated and compared. By analysing the data, this study tries to respond to certain key research questions. These are as follows;

- Do students in different schools have similarities and differences in their views?
- Do children in different schools have different satisfaction levels?
- What are the significant items that could contribute to a generative tool for school design?

In the whole study, there are 6 tables and figures that present the main defined categories. This survey evaluates the 'satisfaction' level for various items concerning the existing school and the 'importance' of each issue. Each item has an abbreviation as ID which presents its category plus its number. The first letter presents the category; for example, 'I' shows the 'interior' category. The second letter is 'S' or 'I'. 'S' presents the satisfaction while 'I' shows the importance level.

The presentation of data, the process of transforming a mass of raw data into tables and charts, is a vital part of making sense of the data. It is a process of artfully moulding, extracting and refining the raw data, undertaken by researchers so that the meaning and significance can be grasped (Bryman, 1992, p. 183). However, although large volumes of data can be a strength of quantitative analysis, without care, they can start to overload the researcher, and can result in too much complexity (Bryman, 1992, p. 205).

Therefore, in order to reduce the complexity of the analyses, it has been attempted to present the major results as graphs (figures) and discuss them in this section, while the detailed analyses are reported in the appendices (see Appendices 5F and 5G).

5.5. Findings

5.5.1. Questionnaire design limitations

After evaluating the questionnaires, it was revealed that children had problems scoring one of the items in the Comfort and Control category because they had difficulty understanding the meaning of the word 'acoustics'. As it happened, there was no possibility of testing this questionnaire with a group of children before empirical study. As some of the questionnaires were incomplete, it gave rise to the idea that a shorter questionnaire could be more successfully completed by pupils in this age group (11-12 years). Although a serious attempt was made to reduce the number of items for rating, it seemed some children became too bored to complete their questionnaires.

Therefore, there are certain recommendations for improving the questionnaire; 1) dividing the satisfaction and importance rankings into two separate questionnaires to be ranked by pupils on two different occasions 2) dividing the existing questionnaire into two parts as was thought of before, but was not accepted by the schools' headteachers. Finally, it is recommended to add a column to the questionnaire where pupils can choose 'unable to score' for the items on which they do not have enough knowledge to respond.

In total, 262 questionnaires were analysed. Questions might be asked as to what unexpected factors arose during the research, and what effect did they have? Overall the maximum number of possible responses was 262; however, the response was not the same for all the items in the questionnaires as for some items the number of responses fell to a minimum of 163. In order to reach logical conclusions and moderate the influences of varying numbers of responses on findings, a weighted grand mean was calculated for each heading. It helped to establish more realistic ranking scores for the six headings overall.

5.5.2. Comparing the importance levels

In presentation of the findings, there are 6 headings that were defined as categories of items in the questionnaires. As finding the importance of each item has been the main aim of this study, the relevant results are presented first and in more detail compared with the results on satisfaction (the details of analysis for importance of each item in

each school are presented in Appendix 5H). Therefore, the two sets of data (from two schools) were evaluated and compared to find out the important differences. The following figures (Figures 5.7, 5.8, 5.9, 5.10, 5.11 and 5.12) present the mean (average score) for each item in schools 1 and 2. Each figure illustrates the means in a way to highlight the mean differences, from minimum difference between schools 1 and 2 (on the left side of the figure) to maximum (on the right side). They help to disclose the items on which children in the two schools have had similar or different opinions regarding importance. The tables beside each figure show the list of items for each heading.

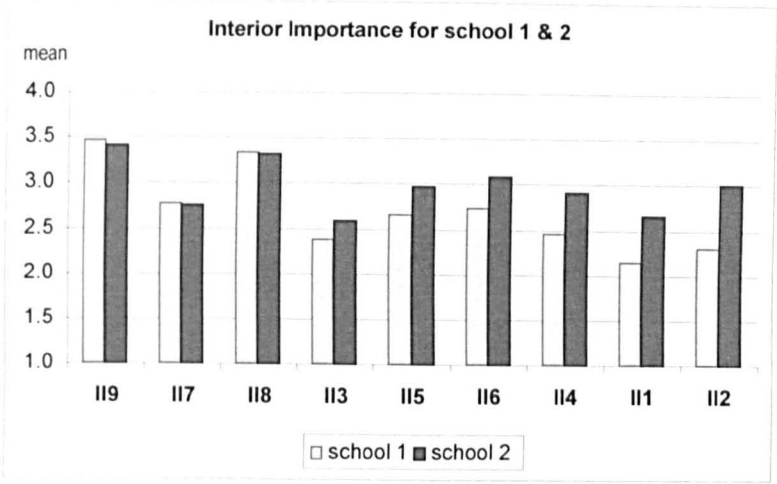


Figure 5.7. Mean Scores of Interior Importance in Two Schools

ID	Items
II1	The interior is softly textured
II2	Interior finishes are durable
II3	The walls and floors are colourful
II4	The interior provides flexible spaces
II5	The interior has a variety of spaces
II6	The interior looks inviting, attractive and inspiring
II7	The interior provides means to display art work
II8	It is easy to find your way around
II9	The building is usable by everyone with different abilities

ID	Items
CI1	There are satisfactory levels of natural light
CI2	There are appropriate types of artificial lights
CI3	Students can easily control natural and artificial lighting
CI4	There are blinds to control sunlight
CI5	There are good acoustics
CI6	There is natural ventilation
CI7	Students can easily control ventilation system
CI8	Air-conditioning is provided
CI9	Room temperature is appropriate in different seasons
CI10	Students can easily control the temperature

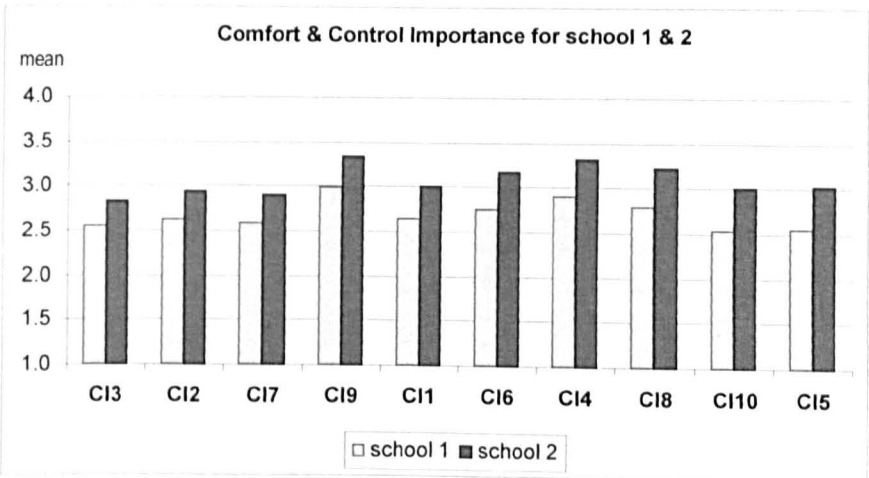


Figure 5.8. Mean Scores of Comfort and Control Importance in Two Schools

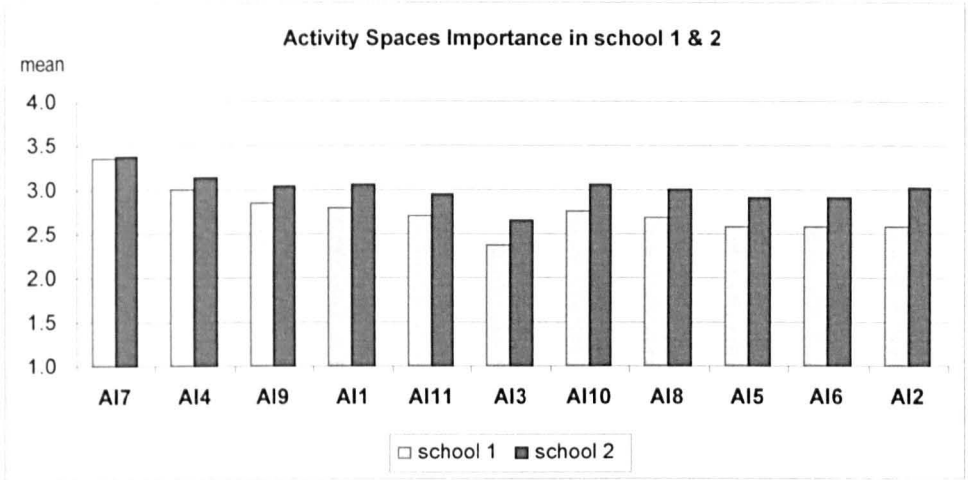


Figure 5.9. Mean Scores of Importance of Activity Spaces in Two Schools

ID	Items
AI1	There is provision for outdoor learning
AI2	There are places for rest and mediation
AI3	There is some decoration in the dining spaces
AI4	The layout of the dining spaces prevents crowding
AI5	The furniture in the dining spaces creates a warm atmosphere
AI6	There are spaces for an administrative hub and for meeting or greeting
AI7	There is space for caring for sick pupils
AI8	There are indoor spaces designed especially for play
AI9	There are spaces for art performances or physical activities
AI10	There is plenty of room for movement in circulating areas
AI11	The physical environment helps easy talk between pupils and staff in the assembly area

ID	Items
FI1	There is provision for an audio system
FI2	There are appropriate chairs (seats)
FI3	There are appropriate tables or desks
FI4	There are appropriate lockers to store personal belongings
FI5	There is an easy access to the media and technology space
FI6	There are easy access fire exits for every space
FI7	There are scanning handprints or swipe card at the school gate
FI8	There is a water-proof shelter outside
FI9	There is seating in the school ground
FI10	There are picnic tables outside
FI11	There is easy access to drinking water
FI12	There is choice for cold snacks or drinks
FI13	There are appropriate toilets
FI14	There is equipment for various activities in the school ground suitable for different age groups

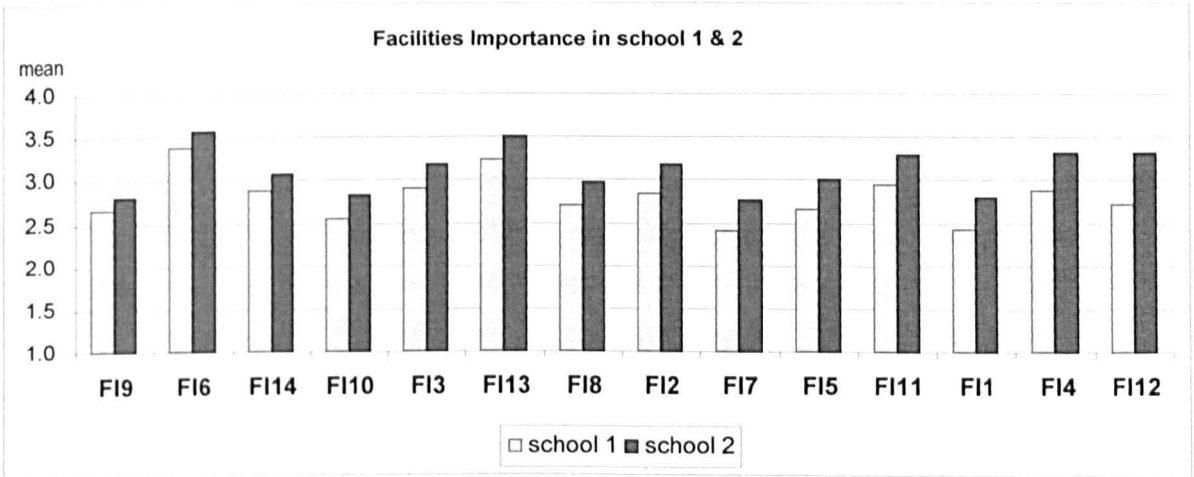


Figure 5.10. Mean Scores of Importance of Facilities in Two Schools

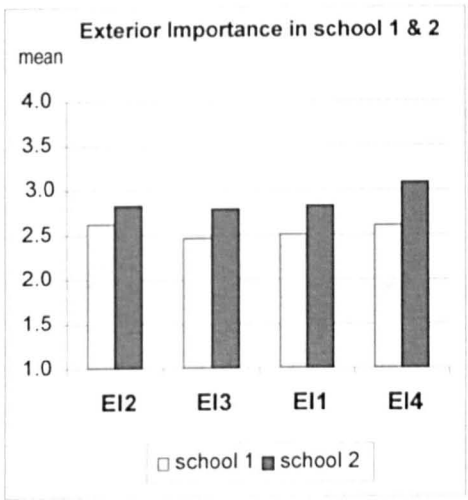


Figure 5.11. Mean Scores of Importance of Exterior in Two Schools

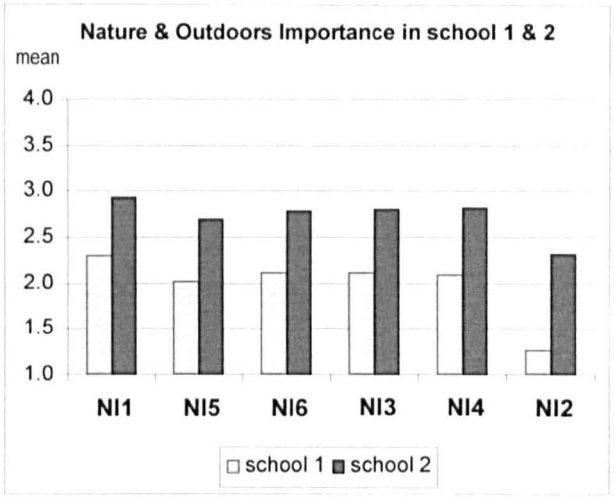


Figure 5.12. Mean Scores of Importance of Nature and Outdoors in Two Schools

ID	Items
EI1	The exterior (building) is colourful
EI2	There is a connection to the community
EI3	The building acts as a landmark
EI4	There is a well-designed gate for the building

ID	Items
NI1	There is access to the landscape
NI2	There is a pet corner or bird boxes
NI3	The outdoor looks interesting and versatile
NI4	The outdoor looks relaxing
NI5	Outdoor spaces are defined by the elements
NI6	There is a view to nature (when you are inside the building)

Overall, in the six categories the majority of pupils in school 2 highlighted a greater importance level compared with school one for each item. Despite the mean differences, the trend between the responses in both schools seems similar; however, in order to find out the relationship between two sets of data, a correlation test is needed. It also will help to disclose the validity of putting all the data from two schools together.

Therefore, the Spearman rank-order correlation coefficient test was applied. The goal of a correlation analysis is to see whether two measurement variables co-vary, and to measure the strength of any relationship between the variables. According to Siegel and Castellan (1988), the Spearman rank-order correlation coefficient is a measure of association between two variables which requires that both variables be measured in at least an ordinal scale so that the objects under study may be ranked in two ordered series.

The two variables (mean scores of all items) from both schools were converted to ranks and a correlation analysis was done on the ranks. The P-value from the correlation of ranks is the P-value of the Spearman rank correlation. That the relationship between

children's views in two schools is highly significant (X=0.7271, 52 d.f., P<0.001) is illustrated in Figure 5.13. Therefore, the result supports the possibility of putting the data from both schools together in order to find out the overall importance of each item.

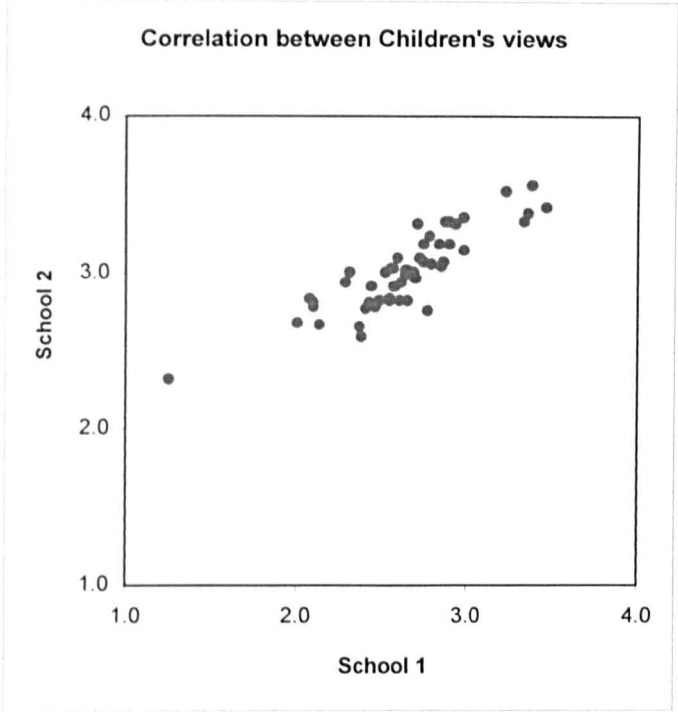


Figure 5.13. Relationship between Children's Views in Two Schools

5.5.3. Overall Importance

On considering the strong correlation (agreement) among the responses, the data from both schools were put together and included 262 children's voices (not all of them responded to all the items).

The order of each item in the following graphs is based on mean score; therefore, the bottom items show the highest means while the top items have the lowest mean scores. The six following diagrams present children's views on importance of various items for the six categories. In each category, the items are divided into 'important' and 'quite important' and 'nice to have' based on their mean score. Also the items have been classified.

The six following diagrams (figures) present pupils' views on importance of various items for the six categories. In each category, the items are divided into 'important' and 'quite important' and 'nice to have'.

The three classifications are based on their mean scores and percentages; therefore according to rating scales (1-4), the items which have been rated over 3 are classified as 'important' while the items rated between 2.5 and 3 are 'quite important'. Finally, there are items that are relevant, but with a score between 2 and 2.5, which are considered as 'nice to have' in this classification. The following are the findings which emerged for each category.

1. Interior

The total number of responses in this category was between 235 and 248. In addition, 52% of the participants expressed their level of confidence for their responses. The majority of them (89%) articulated 'high' confidence. Figure 5.14 illustrates overall the children's views on importance of the Interior items in percentages, while Figure 5.15 shows the grand mean scores (and standard deviation).

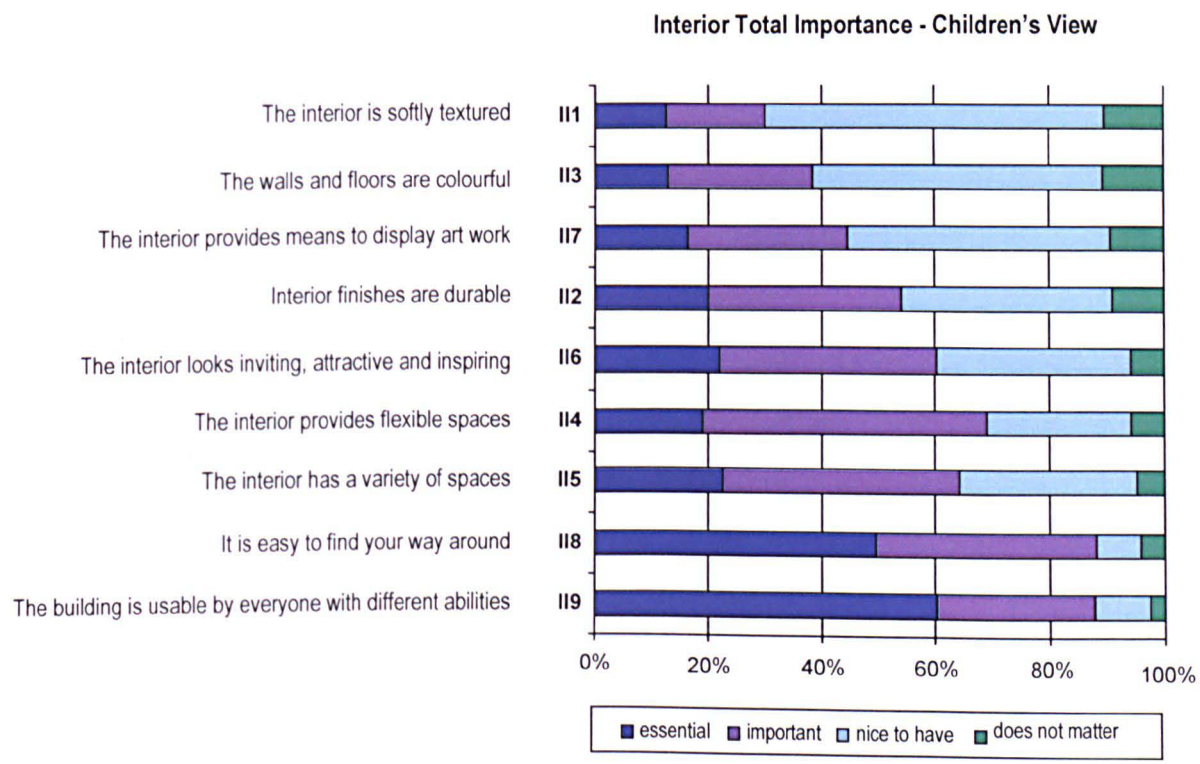


Figure 5.14. Children's Views Overall on Importance of Interior Items

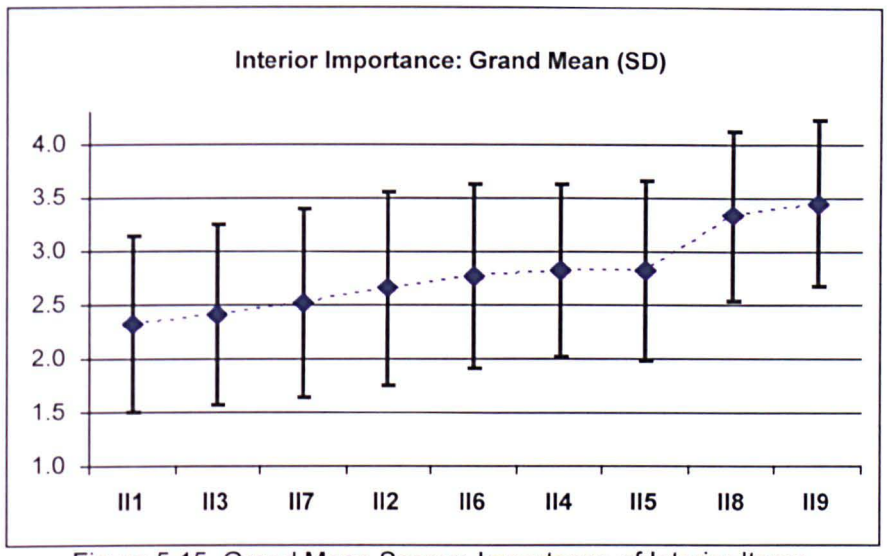


Figure 5.15. Grand Mean Scores: Importance of Interior Items

The results suggest that interior items can be divided into three groups including 'important', 'quite important' and 'nice to have'. The 'important' items (rated by 88% at 3 and over) are 'usability of building by everyone with different abilities' (II9) and 'finding your way around easily' (II8). The 'quite important' items (rated by 54% at 3 and over) are 'variety' (II5) and 'flexibility' (II4) of spaces, 'inviting, attractive and inspiring interior' (II6) and 'durable finishes' (II2). The results also indicate three items as 'nice to have' (rated by 46% at 3 and over), namely, 'softly textured interior' (II1), 'colourful walls and floors' (II3), and 'means to display art work' (II7).

2. Comfort and Control

The total number of responses for items in this category was between 214 and 232. Also, among the 44% of the children who expressed their level of confidence for their responses, the majority (78%) articulated 'high' confidence. Figure 5.16 illustrates children's views overall on importance of the Comfort and Control items in percentages, while Figure 5.17 shows the grand mean scores.

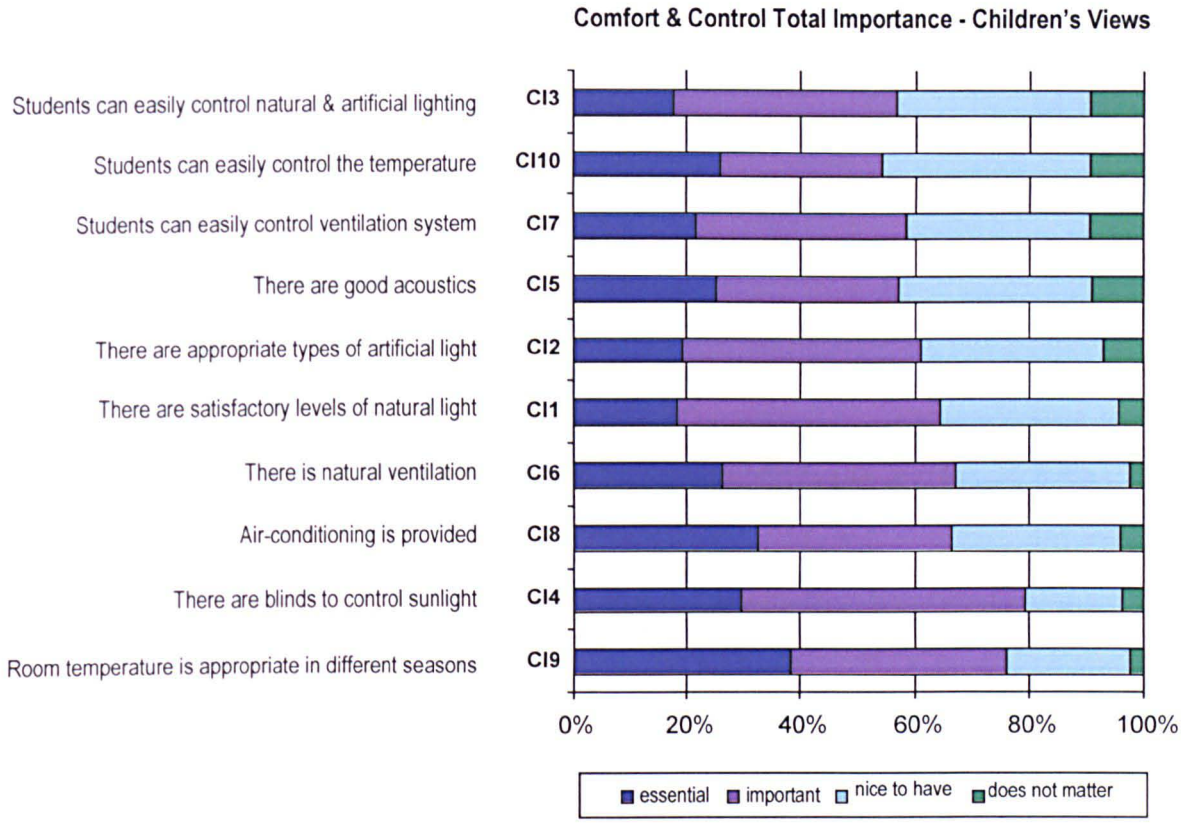


Figure 5.16. Children's Views Overall on Importance of Comfort and Control Items

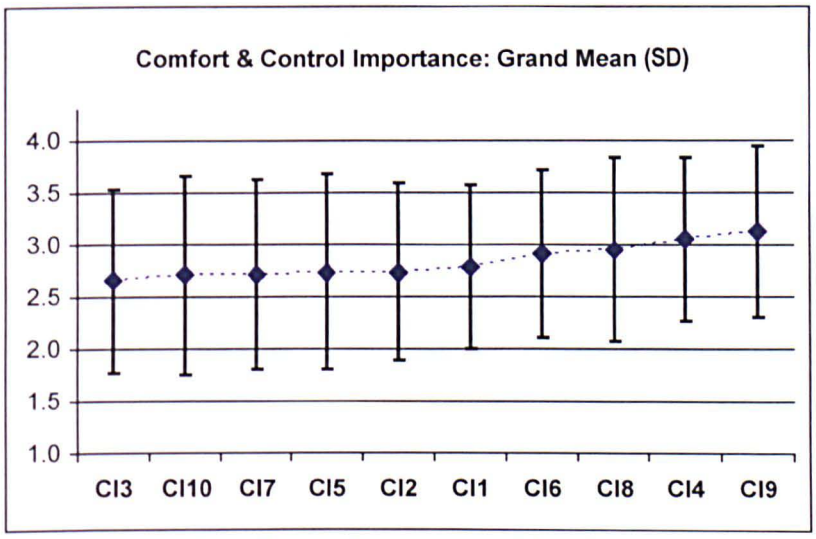


Figure 5.17. Grand Mean Scores: Importance of Comfort and Control Items

The results suggest that the items can be divided into two groups: 'important' and 'quite important'. The 'important' items (rated by 76% at 3 and over) are 'appropriate room temperature in different seasons' (CI9) and 'blinds to control sunlight' (CI4). The 'quite important' items (rated by 54% at 3 and over) are 'controlling temperature easily' (CI10), 'provision for natural ventilation', 'provision for air-conditioning' (CI8), 'controlling

ventilation system easily' (CI7), 'satisfactory levels of natural light' (CI1), 'appropriate types of artificial lights' (CI2), 'controlling natural and artificial lighting' (CI3) and 'good acoustics' (CI5).

3. Activity Spaces

The total number of responses for this category varied between 201 and 215. Also, among the 42% of the children who expressed their level of confidence for their responses, the majority (80%) chose 'high'. Figure 5.18 illustrates children's overall views on the importance of the Activity Space items in percentages and Figure 5.19 shows the grand mean scores.

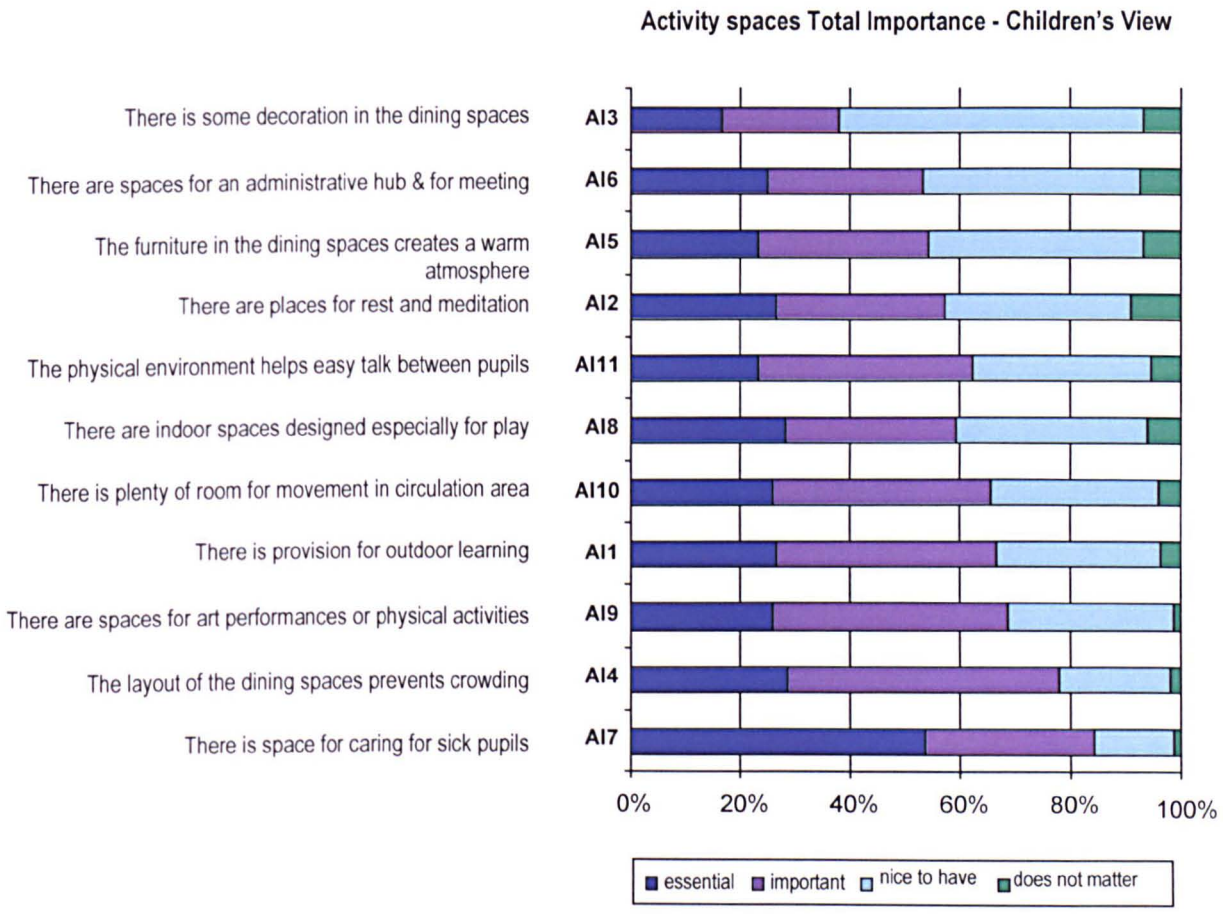


Figure 5.18. Children's Views Overall on Importance of Activity Space Items

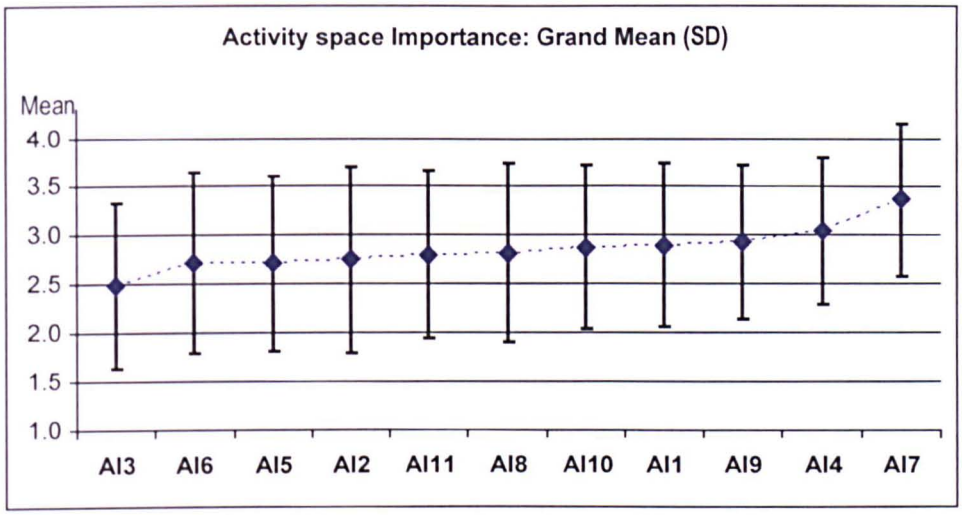


Figure 5.19. Grand Mean Scores: Importance of Activity Space Items

Based on the results, the items have been divided into 'important', 'quite important' and 'nice to have'. The 'important' items (rated by over 46% at 3 and over) are 'space for caring for sick pupils' (AI7) and 'layout of the dining spaces to prevent crowding' (AI4). The 'quite important' items rated by over 53% of pupils at 3 and over. These items are 'spaces for art performances or physical activities', 'provision for outdoor learning' (AI1), 'plenty of room for movement in circulation areas' (AI10), 'places for rest and meditation', 'Indoor spaces designed especially for play', 'spaces for an administrative hub and for meeting or greeting' (AI6), 'a warm atmosphere in the dining spaces created by furniture', and 'physical environment that helps easy talk between pupils and staff in the assembly area' (AI11) Finally, the least important item (the only 'nice to have' item), that has been rated by 56% at 3 and over, is 'decoration in the dining spaces' (AI3).

4. Nature & Outdoors

The total number of responses for this category varied between 183 and 194. In addition, of the 37% of the children who expressed their level of confidence for their responses, the majority (80%) selected 'high'. Figure 5.20 illustrates overall children's views on importance of the Nature and Outdoors' items in percentages, while Figure 5.21 shows the grand mean scores.

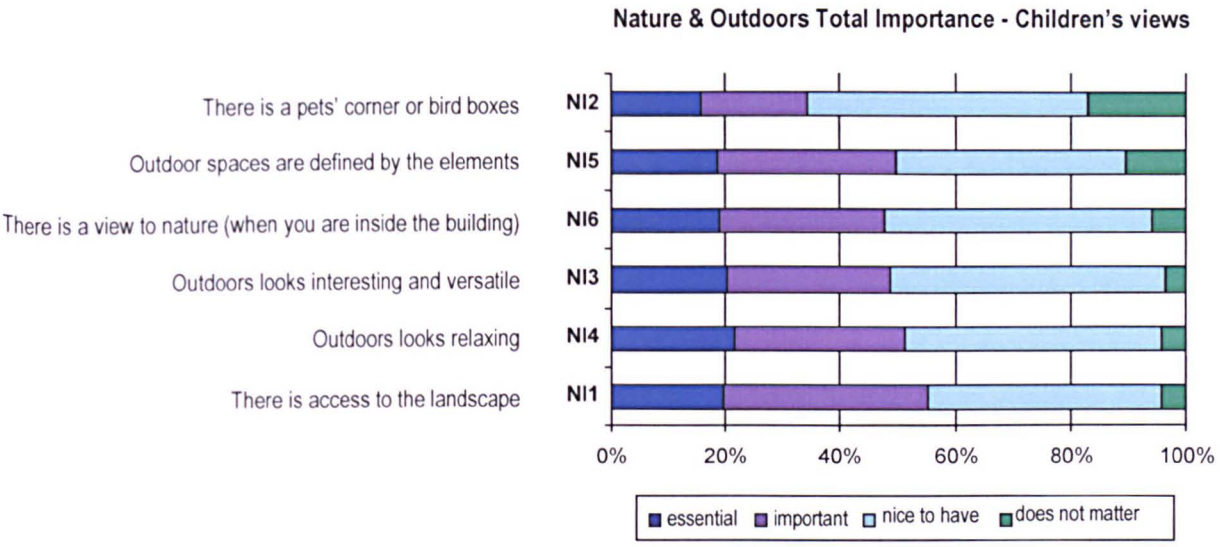


Figure 5.20. Children's Views Overall on Importance of Nature and Outdoor Items

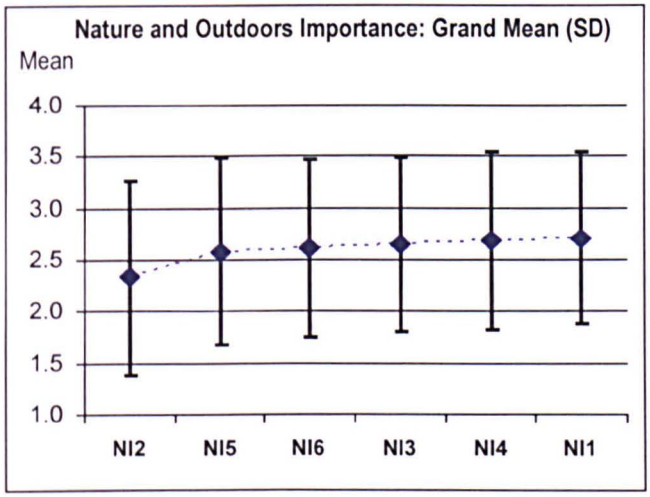


Figure 5.21. Grand Mean Scores: Importance of Nature and Outdoor Items

Based on the results, the items have been divided into 'quite important' and 'nice to have'. The 'quite important' items (rated by over 47% of pupils at 3 and over) include 'a view to nature' (NI6), 'access to the landscape' (NI1), 'outdoor spaces are defined by the elements' (NI5), and 'outdoors looks interesting and versatile' (NI3). However, the two 'nice to have' items are 'a pets' corner or bird boxes' (NI2), and 'outdoors looks relaxing' (NI4).

5. Facilities

The total number of responses for this category varied between 167 and 177. In addition, from the 34% of the children who expressed their level of confidence for their responses, the majority (80.4%) articulated 'high' confidence. Figure 5.22 illustrates children's views overall on the importance of the Facilities' items in percentages and Figure 5.23 shows the grand mean scores.

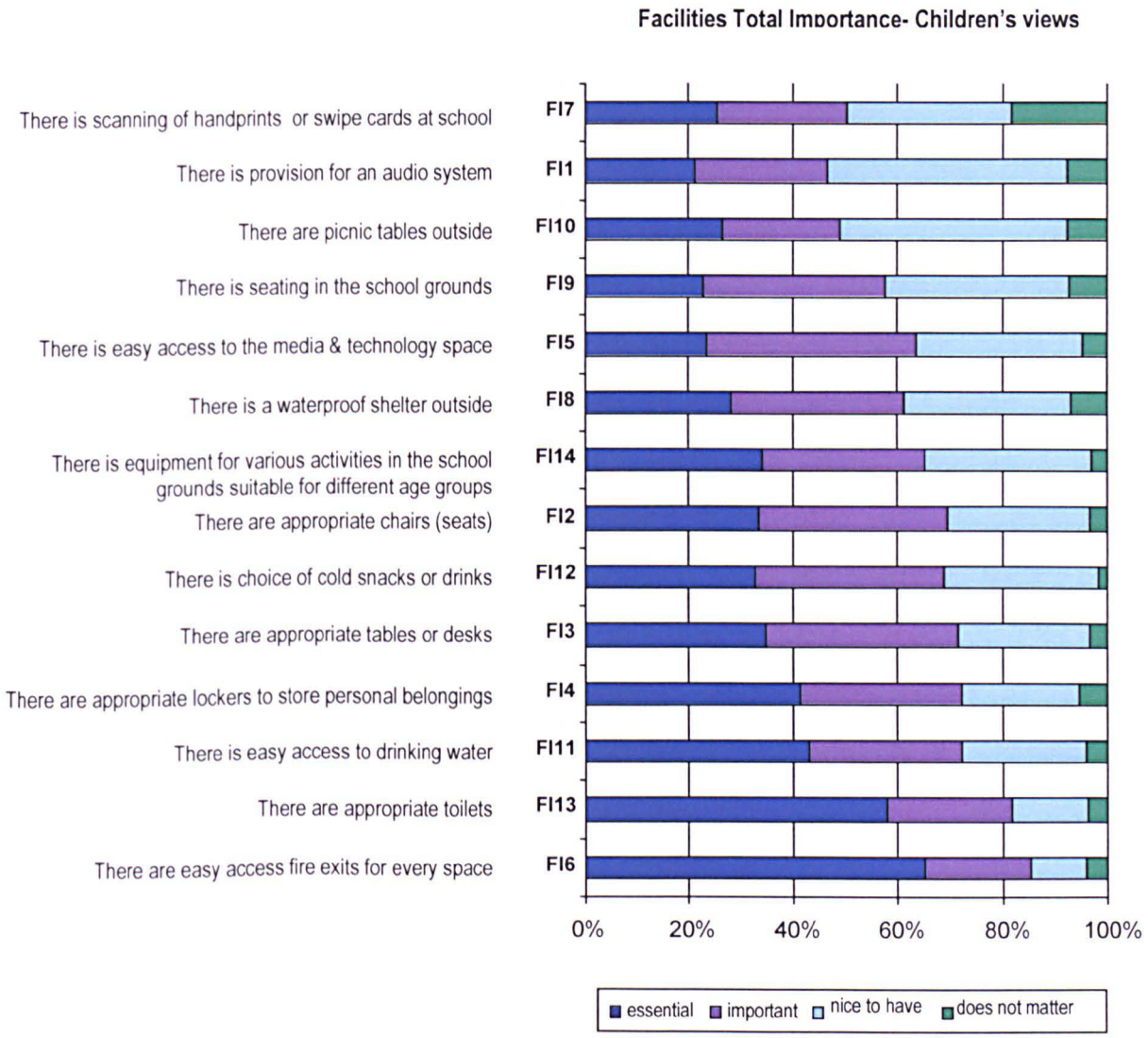


Figure 5.22. Children's Overall Views on Importance of Facility Items

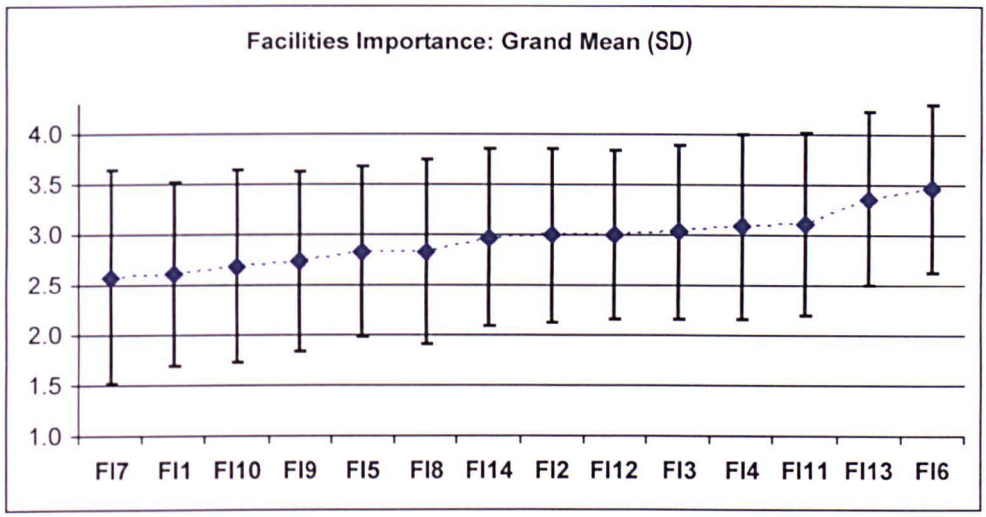


Figure 5.23. Grand Mean Scores: Importance of Facility Items

The findings indicate that the items have been divided into 'important' and 'quite important'. The 'important' items (rated by over 69% of pupils at 3 and over) are 'easy access to fire exits for every space' (FI6), 'easy access to drinking water', 'appropriate toilets' (FI13), 'appropriate lockers to store personal belongings' (FI4), 'appropriate tables or desks' (FI3) and 'choice of cold snacks or drinks' (FI12).

The 'quite important' items (rated by over 46% at 3 and over) include 'equipment for various activities in the school grounds suitable for different age groups' (FI14), 'a waterproof shelter outside' (FI8), 'provision for an audio system' (FI1), 'appropriate chairs (seats)', 'seating in the school grounds' (FI9), 'picnic tables outside' (FI10), 'easy access to the media and technology space', and 'scanning of handprints or swipe cards at the school gate' (FI7).

6. Exterior

The total number of responses for this category varied between 163 and 165. Also, from the 32% who expressed their level of confidence in their responses, the majority (78.7%) articulated 'high' confidence. Figure 5.24 illustrates overall the children's views on the importance of the Exterior items in percentages, while Figure 5.25 shows the grand mean scores.

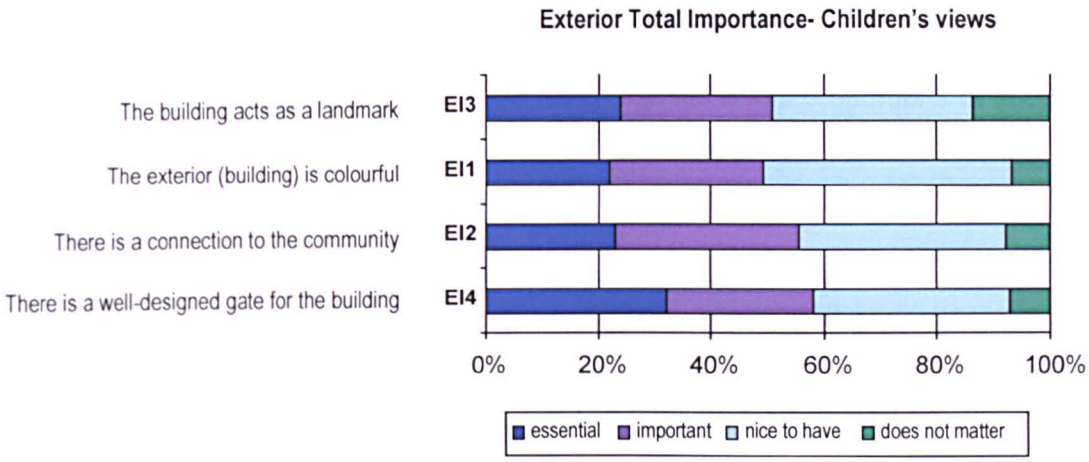


Figure 5.24. Children's Overall Views on Importance of Exterior Items

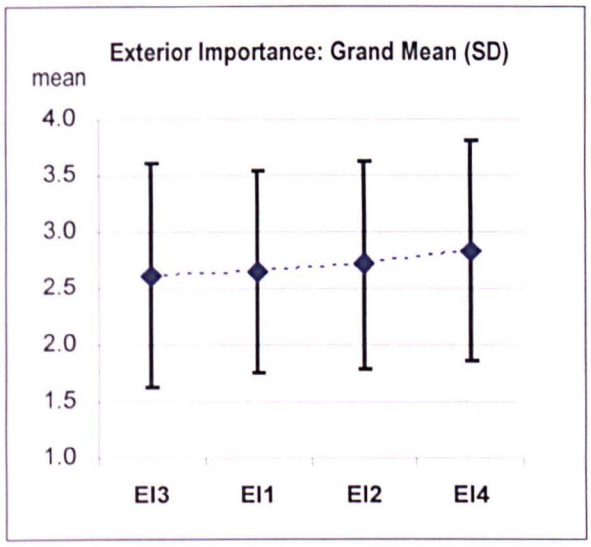


Figure 5.25. Grand Mean Scores: Importance of Exterior Items

Findings suggest that all the items in this category were 'quite important' (rated by over 49% at 3 and over) including 'a well-designed gate for the building' (EI4), 'building acts as a landmark' (EI3), 'exterior (building) is colourful' (EI1) and 'a connection to the community' (EI2).

5.5.4. Weighted grand mean

As the number of participants in the two schools was different especially with regard to the various categories (as some categories were left blank by some participants), the weighted grand mean has been calculated which applies equal proportions of findings for comparing means in different categories. Table 5.3 presents the calculations of weighted grand mean scores.

	School	No.	Mean	Total No.	(mean1*N1)+ (mean2*N2)/ N1+N2
Interior	School 1	137	2.69		
	School 2	80	2.98	217	2.80
Comfort & Control	School 1	125	2.69		
	School 2	73	3.08	198	2.83
Activity Spaces	School 1	109	2.75		
	School 2	79	3.03	188	2.87
Nature & Outdoors	School 1	99	2.50		
	School 2	78	2.72	177	2.60
Facilities	School 1	79	2.79		
	School 2	70	3.13	149	2.95
Exterior	School 1	83	2.57		
	School 2	76	2.89	159	2.72

Table 5.3. Weighted Grand Mean Calculation

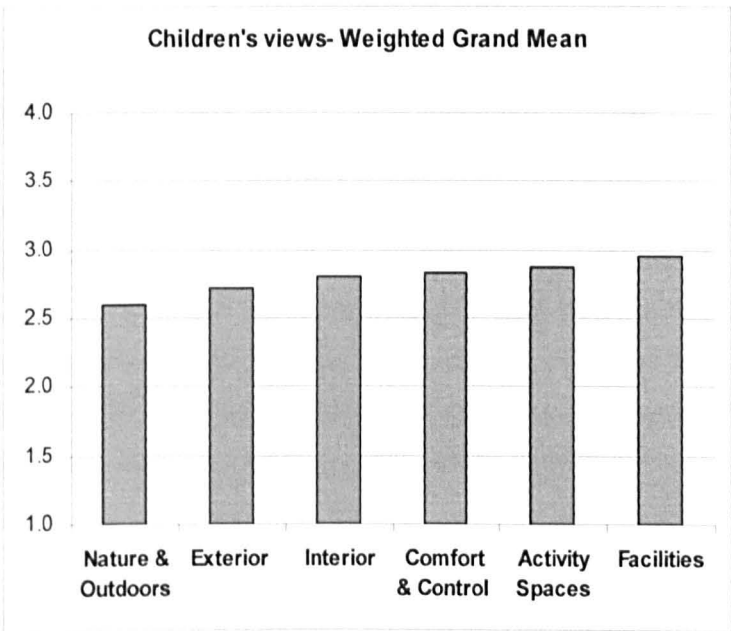


Figure 5.26. Weighted Grand Mean Scores

Based on the overall findings and comparing weighted grand means for the six categories (Figure 5.26), the most important category for children was Facilities, while Nature and Outdoors and then Exterior were the least important categories for children.

Furthermore, the difference in grand mean between the most important (Facilities) and the least important (Nature and outdoors) category for children was about 13%.

It might appear somewhat surprising that Nature and Outdoors was the least important category for children who engage in physical activities in school grounds (yard). It needs to be noted that 'provision for learning outdoors' in the Activity Spaces category and 'shaded/covered outdoor area' in the Facilities category, are related to outdoors though including these items does not change the overall importance of this category. Therefore, it raises the 'why' question for consideration. There are three factors which might be responsible; the first one is weather: as the frequency of rainy or gloomy days in England may discourage children from being involved in outdoor activities and enjoying nature. The second factor may be the high involvement of children with technology (computers) as schools nowadays receive funding to provide ICT equipment. Although this has considerable benefits in allowing flexibility in terms of wider communication, the question needs to be asked, whether, as Simmons (1993) believes, we live in a technological environment and not a natural one and we have used technology to change our surroundings so much that it is rarely correct to talk of the natural environment any longer. Finally, the third reason could be 'cultural' which means that children have not been encouraged to use the outdoors. Further research is needed to address this issue and determine the reasons.

5.5.5. Children's comments

What are the issues that were not included in the evaluative tool (questionnaire) but were raised in the open section of the questionnaires by children? And what are the issues that were emphasised by pupils based on their comments? Interestingly, most of the comments have been about 'facilities' which was the most important category for children based on the findings. All the children's comments related to each category were classified and were counted according to the number of repetitions (see Appendix 5l).

Although there was a significant number of different ideas (comments), only the most commonly raised ones are revealed here.

Among the comments, those mentioned that were among the existing items in the questionnaires were 'lockers' (No. = 20), 'toilets' (No. = 12), and having choice of food;

they asked for 'more food choice', 'snack/ vending machines' and 'food stands'; for example, 'candy shop', 'Hot dog stand', 'on site McDonald's' (total No. =11). In addition, 'outdoor seats and shelter' was highlighted by pupils: having 'benches/ seats outdoor' (No. = 9) and 'shelters outsides' (No. = 5). Finally, 'safety' was identified (No. = 7) - 'security system, hand prints, swipe cards and CCTV cameras'.

There were, however, some new items among the comments. Swimming pool was a highlighted item (No. = 19) as well as 'proper P.E/ sports equipment' (No. = 12) and 'Bike sheds' (No. = 10). In addition, 'skating' was a favourite activity for children as some pupils asked for a 'skate park' (No. = 6) and 'Ice-skating rink' (No. = 5).

The new comments may suggest new additions to the list of items for the 'evaluative tool'; however, further research is needed to find out the importance of these issues by testing them with a greater number of pupils.

5.5.6. Initial framework

The findings provide the basis for an initial framework which highlights children's views about their school environment. A series of items were classified under a sub-category for each of the six categories. The importance classification emerged from the results on overall importance of items was presented previously. Table 5.4 summarises children's views as an initial framework.

Table 5.4 Initial Framework Based on Children's Views

Category	Theme	Importance Classification (children's views)		
		Important	Quite Important	Nice to Have
Interior	Use	-usability of building by everyone with different abilities		
	Way finding	-easy to find your way around		
	Materials		-durable finishes	-softly textured interior
	Appearance		-inviting, attractive and inspiring interior -colourful walls and floors	-means to display art work
	Character		-variety -flexibility	
Comfort & Control	Temperature	-appropriate room temperature in different seasons	-controlling temperature easily	
	Ventilation		-provision for natural ventilation -provision for air-conditioning -controlling ventilation system easily	
	Light	-blinds to control sunlight	-satisfactory levels of natural light -appropriate types of artificial light -controlling natural and artificial lighting	
	Acoustics		-good acoustics in different spaces	
Activity spaces	Use	-space for caring for sick pupils	-spaces for art performances or physical activities -provision for outdoor learning -plenty of room for movement in circulation areas -places for rest and meditation	

			-Indoor spaces designed especially for play -spaces for an administrative hub and for meeting or greeting	
	Character	-layout of the dining spaces to prevent crowding	-a warm atmosphere in the dining spaces created by furniture -physical environment to help easy talk between pupils and staff in the assembly area	
	Appearance			-decoration in the dining spaces
Facilities	**Access**	-easy access to fire exits for every space -easy access to drinking water	-easy access to the media and technology space -scanning handprints or swipe cards at the school gate	
	Use	-appropriate toilets -appropriate lockers to store personal belongings -appropriate tables or desks	-equipment for various activities in the school grounds suitable for different age groups -a waterproof shelter outside -provision for an audio system -appropriate chairs (seats) -seating in the school ground -picnic tables outside	
	Choice	-having choice of cold snacks or drinks		
Nature & Outdoors	**Access**		-access to the landscape	
	Use			-a pets' corner or bird boxes
	Appearance		-outdoors looks interesting and versatile	-outdoors looks relaxing
	View		-a view to nature	
	Character		-outdoor spaces are defined by the elements	

Exterior	**Appearance**		-a well-designed gate for the building -building acts as a landmark -colourful exterior (building)	
	Character		-a connection to the community	

This initial framework based on pupils' views will be further developed in the following stages of research.

5.5.7. Children's satisfaction

The data gathered relating to children's satisfaction with items in their existing schools were analysed and the results presented (see Appendix 5G). As it was not the main focus of the study, only the overall findings are presented here. In each category the items for which pupils in schools 1 and 2 had significantly different satisfaction levels are highlighted as follows.

- Among items in the Interior category, 'provision for displaying art work' (IS7) was the only item with which children in school 1 were less satisfied in comparison and this difference is statistically significant ($t [257] = -3.362$; $p=0.001$).

- In the Comfort and Control category, 'blinds for controlling sunlight' (CS4) was the only item that children in school 1 were less satisfied with in comparison and this difference is statistically highly significant ($t [252] = -4.875$; $p<0.001$).
- In the category of Activity Spaces, in comparison between the two schools there was no item that children in school 1 were less satisfied with. Also, except for one item, 'the space for caring sick pupils' (AS7), which was more satisfactory in school 1, the other items did not show a statistically significant difference.

- In the Nature and Outdoors category, 'access to the landscape' (NS1) was the only item that children in school 1 were less satisfied with in comparison and this difference is statistically highly significant ($t [210] = -2.566$; $p=0.007$), whilst the other items did not exhibit a statistically significant difference.

- Among items in the Facilities category, in comparison there was no item that children in school 1 were less satisfied with.

- Among items in the Exterior category, there was no item that children in school 1 were less satisfied with. On the other hand, pupils in school 1 were more satisfied with only one item, 'colourful building' (ES1) and for the rest of the items the difference was not statistically significant.

In order to compare children's opinions in the two schools for the six main categories, the grand mean scores were calculated. The findings are presented in Figure 5.27 and show the difference between the overall satisfaction of children in schools 1 and 2.

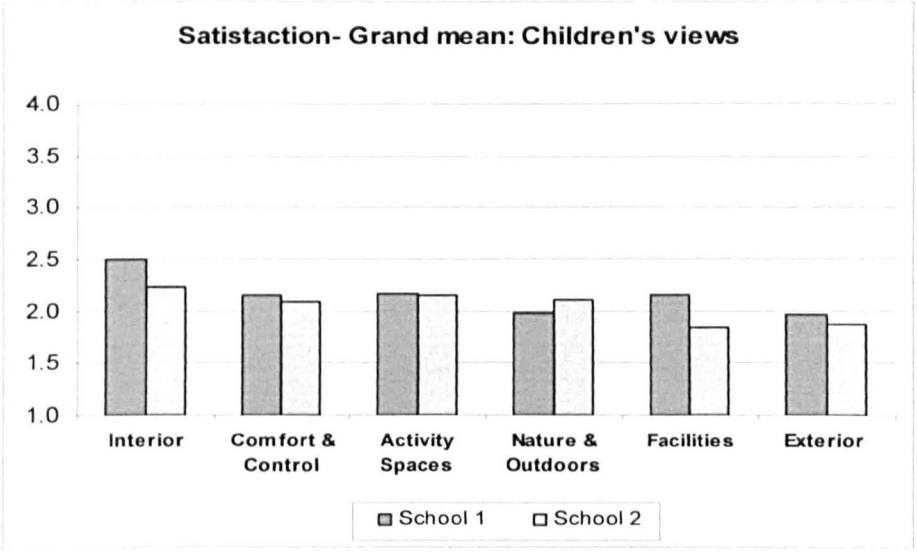


Figure 5.27. Comparing Overall Satisfaction in the two Schools by Grand Mean Scores

The results show that satisfaction levels for both old and new schools are not as different as might be expected (the highest differences belong to Facilities and Interior categories). Mean scores of 1.95 - 2.50 for the new school may show that architects might have failed to design a completely satisfactory school for children.

Although pupils have overall been more satisfied with the new school (school 1) regarding five categories, Nature and Outdoors was ranked higher in the old school (school 2). It could be explained by looking at the site plans and location of both schools which show that school 2 has a wonderful outdoor space and large green fields compared with school 1.

Although more case studies are needed for generalisation of the results and success in designing new schools, there are questions raised by the current research; are there important items that architects have not considered in their designs for new schools? If so, do they need to listen to children's voices and incorporate their views into school designs?

5.6. Conclusions

The findings confirmed that all the items were relevant to the school environment according to children, while they may have shown differences in importance. The findings support the idea of developing a framework for school design based on pupils' views which fits better with their needs, values and expectations. Establishing the difference in importance of each item from a collective children's point of view may help architects and designers to be able to design more satisfactory schools for children who spend a great amount of time every day in schools. It is also suggested that all school users, such as teachers, need to be involved and consulted as well as children. The following chapter will address and discuss this issue.

Chapter 6 – Teachers' views

6.1. Aims and research questions

The whole school environment should work efficiently for all of its users. Therefore, beside children, teaching staff as one of the main users of the school environment have been studied to find out their needs and expectations. This chapter presents the methodological approach taken to develop an evaluative tool for teachers. Conducting an exploratory study helped to highlight a list of issues; an empirical study tested the emergent issues with teaching staff in two secondary schools. This chapter reports and discusses the results of exploratory and empirical studies carried out.

6.2. Developing an evaluative tool

In order to make an evaluative tool, the items to be evaluated needed to be identified as well as the method of evaluation and format of the evaluative tool.

6.2.1. Data collection

There has been a lack of evidence based research focusing on teachers and their preferences for school design. At the time of carrying out this part of the study, March 2007, no published findings were found for use as a source of common issues raised by teachers in the UK: though, as discussed in Chapter 4, there were a few resources for analysis of children's voices which could be used for shaping the evaluative tool. Therefore, an exploratory study was conducted with 20 teachers in order to gather their voices and highlight the key themes for the next stage of the study.

However, it needs to be mentioned that the only research that was published later was conducted by Teacher Support Network and the British Council for School Environments (2007) that ran an online survey to ask 530 teachers for their opinions on their school environment. It was too late for the researcher to incorporate it into this research, but the findings will be compared finally.

It was arranged for this exploratory study to be done on two planned occasions in Sheffield. The first one was at two teacher training events in The Centre For The Study Of Childhood And Youth in the University of Sheffield. The second occasion was a

workshop about the Reggio Philosophy in Action in St Mary's Church (conference centre) in Sheffield. These events were attended only by primary school teachers. The organisers of these events were contacted by the researcher and it was agreed to leave some time at the end of events for short questionnaires to be filled in by those who were interested. The questionnaire asked teachers to share their opinions about the design of their schools, guided by three broad questions to be answered:

- What are the good things in the school they teach in? (Top 5)
- What are the main problems in their school? (Worst 5)
- What do they think a 'good school' would be?

In this exploratory study, 20 primary school teachers participated. They were also given the opportunity to talk about their opinions if they wanted to explain the issues they had raised in their questionnaires. Seven out of the 20 (in two groups) were interested in participating in an interview to explain their responses in detail. Their conversations were sound recorded to help to understand the issues they raised though they did not add more items to the data.

For analysis of gathered data, some of the responses which were related to curriculum, time restrictions and funding have not been included because the focus of this study has been finding out teachers' needs from school environments. The analysis was based on identifying the key themes and concepts arising from the exploratory study (see Appendix 6A). When coding technique was applied to find the issues highlighted by this study, it was investigated whether a classification similar to that applied for children's voices in Chapter 4 could be used for this analysis or not.

6.2.2. Issues emerging from the exploratory study

The result showed the possibility of applying a similar classification; therefore, the six categories are as follows.

1. **Indoor spaces (interior)** – the interior of school buildings and how they look.
2. **Comfort and control** – the comfort levels in school buildings and the extent to which these can be controlled.
3. **Activity spaces** – specific design features required for different activities.

4. **Nature and outdoors** – the extent to which pupils have contact with the natural world and whether they can see and access nature both indoors and outdoors.
5. **Facilities** – those facilities that are important for teachers.
6. **Exterior** – the exterior of school buildings and their appearance.

Related 'items' emerged for each category from the exploratory study which are presented below under the appropriate headings.

1. Indoor Spaces (interior): the following issues emerged relating to indoor spaces.

- interior looks calm and relaxing
- interior looks attractive, inviting and friendly, light and airy
- durable finishes
- colourful walls and floors
- colourful and attractive décors
- variety of spaces
- means to display art work
- flexible spaces
- safe indoor spaces
- welcoming and light entrance area
- short circulation area
- not cluttered corridors

2. Comfort and Control: the issues related to this category can be divided into light, ventilation, temperature and acoustics and are as follows.

- adequate natural light
- appropriate types of artificial light
- controlling sunlight & daylight
- controlling ventilation by opening windows/ doors
- enough fresh and clean air indoors
- good ventilation for toilets
- appropriate temperature in different seasons
- controlling room temperature
- appropriate heating system
- good acoustics to minimise unwanted noise

3. Activity Spaces: the issues raised relating to this category, which include both teachers' and children's needs, are as follows.

- meeting spaces for teachers
- a special area for physical activities
- suitably equipped school grounds for play

4. Nature and Outdoors: includes the following emergent issues.

- access to usable landscaped area/ grass
- garden (plants & flowers) inside the building
- quiet areas for working outside
- view to green fields/ greenery (from inside)

5. Facilities: The issues raised by teachers relating to this category are as follows.

- accessible toilets from classrooms
- warm water for washing
- water drinking/ dispensers inside and outside
- storage (cupboards) close to classrooms
- enough room for cloakrooms
- shaded/covered outdoor areas
- electronic doors
- space for a child with particular behaviour problem
- a welcoming place for parents
- parking area for visitors or parents

6. Exterior: the following issue was raised.

- attractive frontage and entrance

At this stage, the key questions needing to be addressed are 'how important would each item be for teachers? How important is each defined category overall? And how satisfied are teaching staff with each item (and category) in their existing schools?'

In order to find the answers to these questions, a checklist of items was established (by converting each issue to a statement). Also, in order to test these items with a number of teachers, it was necessary to make an 'evaluative tool': to find the 'relevance' and 'importance' of each item.

6.2.3. Questionnaires

In order to test the previous findings in schools with a large number of participants, the use of questionnaires again seemed appropriate. As in the case of the children's quantitative data, ordinal data would be gathered during this part of the study.

Although there are various rating scales available for questionnaires, especially for use with adults, it was decided to apply a similar scale to the one chosen for the children's survey because it would allow final comparison of the findings and disclose the similarities and differences among the rated issues and categories; therefore, a 4-point

scoring scale was used for the evaluative tool: that indicates 4 as the best score which it is reasonable to expect, and 1 as the poorest score. In order to express a level of agreement with a statement, the scores are defined similarly to the children's as follows.

1. Awful
2. Okay
3. Very Good
4. Fantastic

Similarly, another 4-point scoring scale was defined that let teachers choose the importance of each item for their ideal school. The scores are as follows.

1. Does not matter
2. Nice to have
3. Important
4. Essential

In addition, similarly to the children's questionnaire the 'confidence' part was added as respondents might not be confident about their responses on the importance of an item in 'the school they would like to have'. Therefore, there are two levels of confidence, ranked as 'low' or 'high'.

A similar format to the children's was also chosen, although the items to be considered were different. Also in the open section of the questionnaire, they could add any comments and then rank those (4-Point scoring scale) according to their importance (see Appendix 6B). The only difference concerning the format of questionnaire was graphical: the sad/ smiley faces beside the scales for ranking satisfaction were not presented in the teachers' questionnaire.

6.3. Data collection, case studies and participants

Information sheets for headteacher and teachers as well as the consent forms for each person (see Appendixes 6C and 6D) were sent by post to secondary schools in Sheffield alongside the information sheets and consent forms for children and supporting documents (see Chapter 4). Before starting the data collection, a sample of the questionnaire was sent to the headteachers of the two schools that had agreed to participate: so they could assess it or ask for changes needed in respect of language, length or so on.

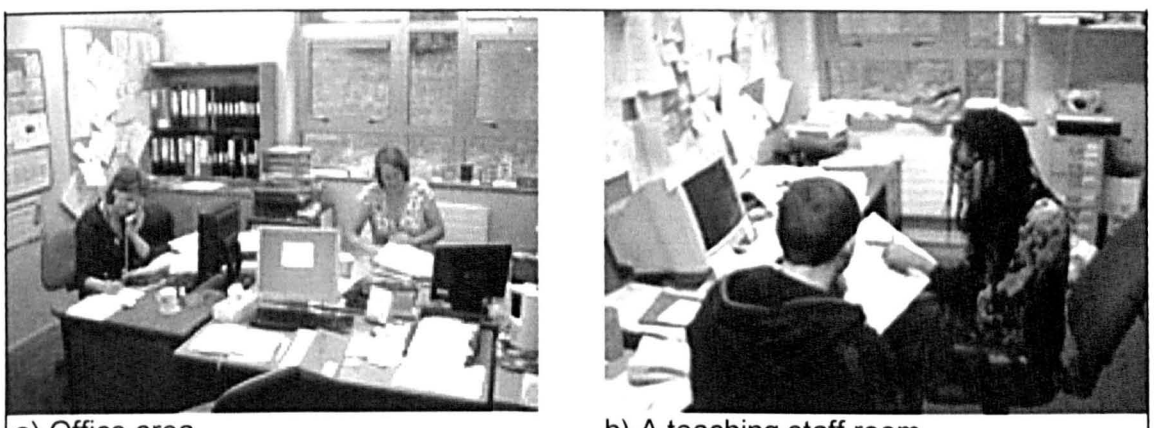
As planned with school headteachers, the questionnaires were handed out to teachers in school at break time or were put in their pigeon holes. However, involvement in this survey was optional for teachers and there was no obligation for them to participate. Therefore, teachers could have filled in the questionnaire at any time they preferred: even at home, and then returned it to school. The data were gathered during April and May 2008. There were 170 questionnaires distributed and a response rate of 37.6% was achieved. In school 1, Tapton, 39 out of 120 distributed questionnaires (32.5%) were returned. At the second school, Myers Grove, 25 out of 50 questionnaires (50%) were completed and returned. The summary is presented in table 6.1.

Schools	No. of teachers	Type of building
Tapton (school 1)	39	New
Myers Grove (school 2)	25	Old

Table 6.1. Summary of Case Studies and Number of Participants (teaching staff)

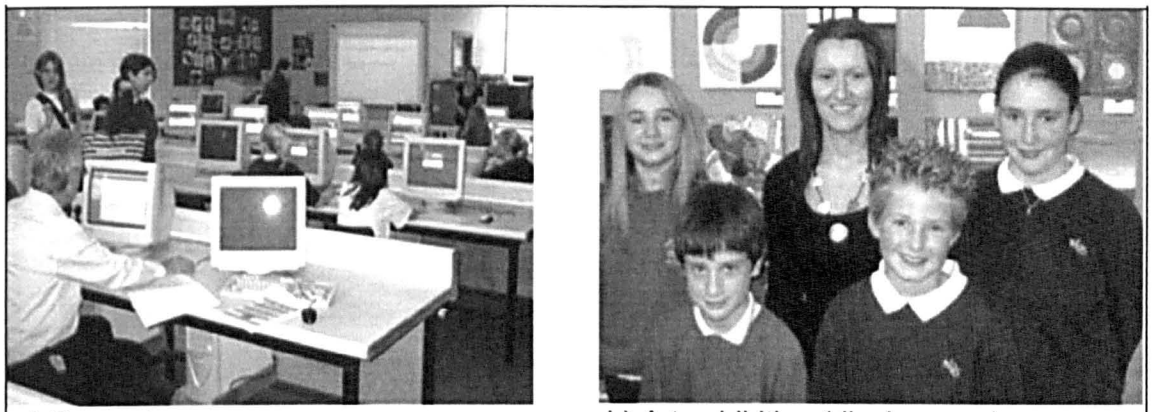
The number of returned questionnaires suggests that teachers were quite unwilling or too busy to take part, although schools set a date for them to return their questionnaires.

Information about the schools, including school plans and some photos from inside and outside, was presented in Chapter 4 (see Figures 5.1, 5.2 and 5.3 for school 1 and Figures 5.4 5.5 and 5.6 for school 2). In addition, Figure 6.1 shows photos of staff spaces in School 1 and 6.2 shows photos of school users and spaces in school 2.



a) Office area b) A teaching staff room

Figure 6.1. Photos of Staff Spaces in School 1
Source: http://www.taptonschool.co.uk



a) Computer area b) Art exhibition (display area)

Figure 6.2. Photos of School Users and Spaces in School 2
Source: http://www.myersgrove.sheffield.sch.uk

6.4. Analysis

The gathered data was entered into SPSS and Excel to be analysed. The aim has been to find out teachers' views about their schools and the school they would like to have. Therefore, the results of data analysis are presented for each school separately to illustrate their satisfaction and the relative importance levels that teachers identified for various issues. By comparing each category in both schools, the differences in importance level among items in each category as well as various categories could be highlighted. In addition, teachers' satisfaction could be illustrated and compared overall. This analysis tries to respond to three key research questions by analysing the data. These are as follows:

- Do teaching staff in different schools have similarities and differences in their views about the importance of various items?
- Do teaching staff in different schools have different satisfaction levels regarding their school?
- What are the significant items based on their opinions that help in making the generative tool for school design?

Similar to previous chapters, there are 6 tables and figures that present the main defined categories. This survey evaluates the 'importance' of each issue and the 'satisfaction' level for various items in the existing schools. In order to present the

results, each item has been given an abbreviation (ID) which presents their category plus its number. The first letter presents the category; for example, 'I' shows the 'interior' category. The second letter is 'S' or 'I'. 'S' indicates 'satisfaction' while 'I' shows the 'importance' level.

An attempt has been made to discuss the data collection method and the success or failure of the evaluative tool, and to present and discuss the major results as graphs in this chapter. The detailed analysis is reported in the appendixes where the tables and charts illustrate teachers' views by presenting the percentage of valid responses in each school (see Appendix 6E and 6F).

6.5. Findings

6.5.1. Questionnaire design

After evaluating the questionnaires, it was revealed that teaching staff had a problem scoring one item, which was 'Circulation area is short' in the Indoor Spaces category, because they had difficulty understanding the meaning of it. Because the majority of teachers chose their 'confidence level' by ticking the relevant column in their questionnaires, it might show this part of their evaluative tool was appropriate for them. Finally, the addition of a column to the questionnaire is recommended so that teachers can choose 'unable to score' for the items to which they do not have enough knowledge to respond. In total 64 questionnaires were analysed. The number of responses was almost the same for the majority of the items in the questionnaires which means that most of the questionnaires were complete.

6.5.2. Comparing the importance levels

In presentation of the findings, there are 6 headings that were defined as categories of items in the questionnaires. As finding the importance of each item has been the main aim of this study, results relevant to this are presented first and in more detail compared with the results for satisfaction. The details of analysis for importance of each item in each school are presented in Appendix 5H. Therefore, the two sets of data (from two schools) were evaluated and compared to find out the important differences. The following figures (figure numbers) present the mean (average score) for each item in schools 1 and 2. Each figure illustrates the means in a way which highlights the mean differences from minimum between school 1 and 2 (on the left side of the figure) to

maximum (on the right side). They help to disclose the items on which teachers in the two schools have had similar or different opinions regarding their importance. The tables beside each figure show the list of items for each heading. All the following figures illustrate mean scores of importance for individual items for each category in the two schools; however, Figure 6.3 presents the importance of Interior, while Figures 6.4 and 6.5 show the importance of Comfort and Control and Activity Spaces in that order. Figures 6.6, 6.7 and 6.8 present the importance of Facilities, Exterior, and Nature and Outdoors in the two schools respectively.

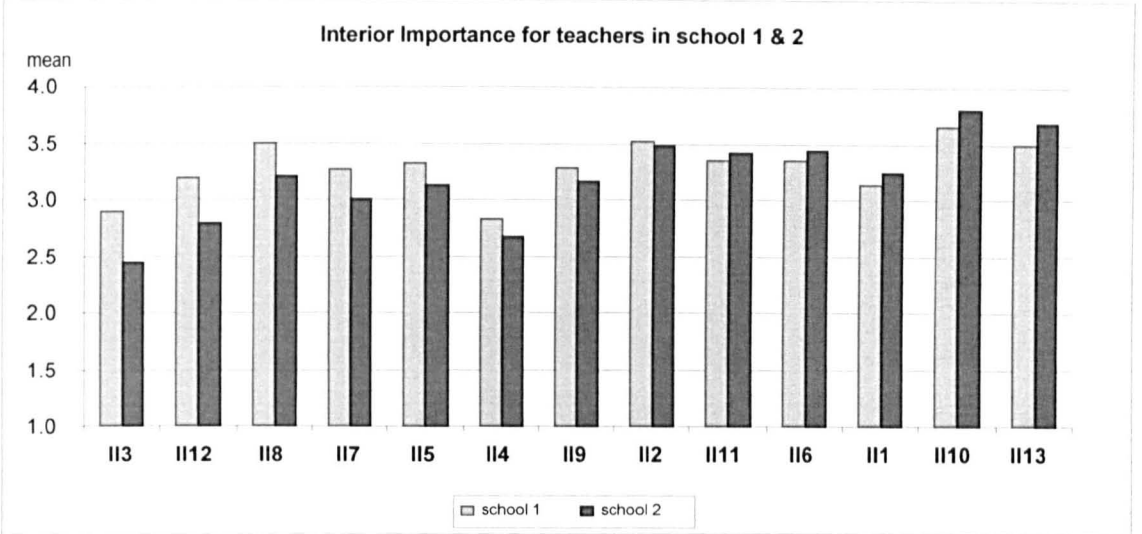


Figure 6.3. Mean Scores of Interior Importance for Teachers in Two Schools

ID	Items
II1	The interior looks calm and relaxing
II2	Interior finishes are durable
II3	The walls and floors are colourful
II4	There are colourful and attractive décors
II5	The interior has a variety of spaces
II6	The interior looks attractive, inviting and friendly
II7	The interior provides means to display art work
II8	The interior looks light and airy
II9	The interior provides flexible spaces
II10	Indoor spaces are safe
II11	The entrance area is welcoming and light
II12	The circulation area is short
II13	Corridors are not cluttered

ID	Items
CI1	There is adequate natural light
CI2	There are appropriate types of artificial lights
CI3	Sun light & day light can easily be controlled
CI4	Ventilation can easily be controlled by opening windows/ doors.
CI5	There is enough fresh and clean air indoors
CI6	There is good ventilation for toilets
CI7	There is appropriate temperature in different seasons
CI8	Room temperature can easily be controlled
CI9	There is appropriate heating system
CI10	There are good acoustics to minimise unwanted noise in different spaces

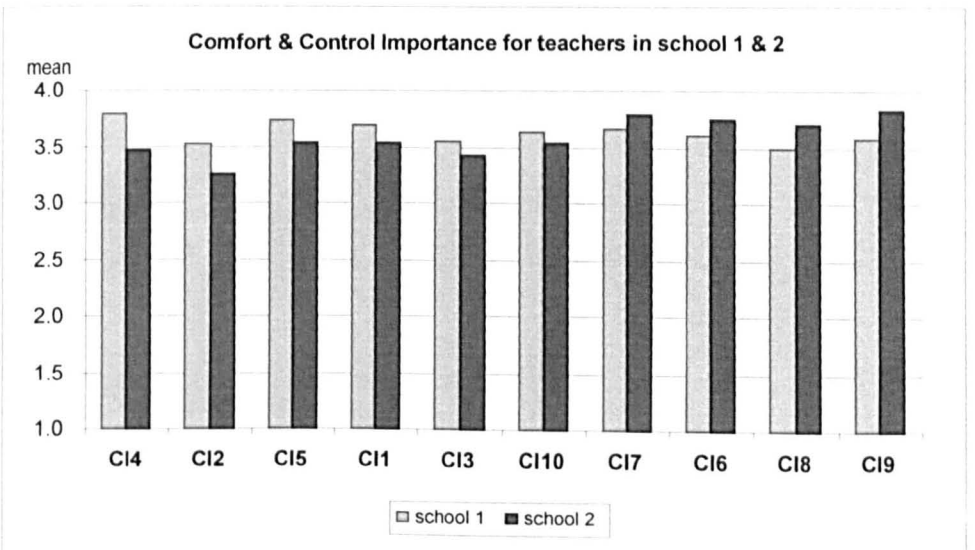


Figure 6.4. Mean Scores of Comfort and Control Importance for Teachers in Two Schools

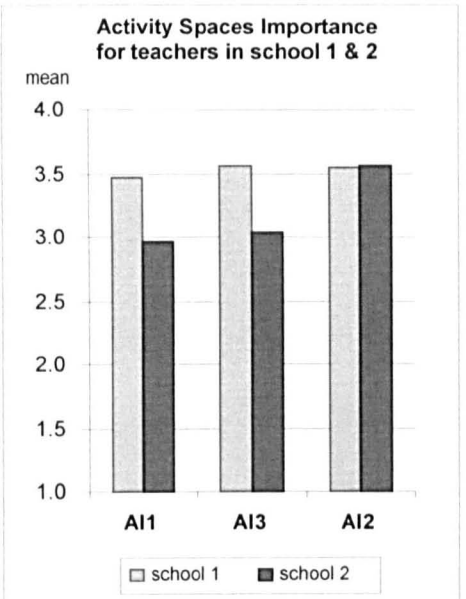


Figure 6.5. Mean Scores of Importance of Activity Spaces for Teachers in Two Schools

ID	Items
AI1	There are meeting spaces for teachers
AI2	There is a special area for physical activities
AI3	The school ground is suitably equipped for play

ID	Items
FI1	Toilets are accessible from classrooms
FI2	There is warm water for washing
FI3	There are water drinking/ dispensers inside and outside
FI4	The storages (cupboards) are close to classrooms
FI5	There is enough room for cloakrooms
FI6	There is shaded/covered outdoor areas
FI7	There are electronic doors
FI8	There is space for a child with particular behaviour problem
FI9	There is a welcoming place for parents
FI10	There are parking area for visitors/ parents

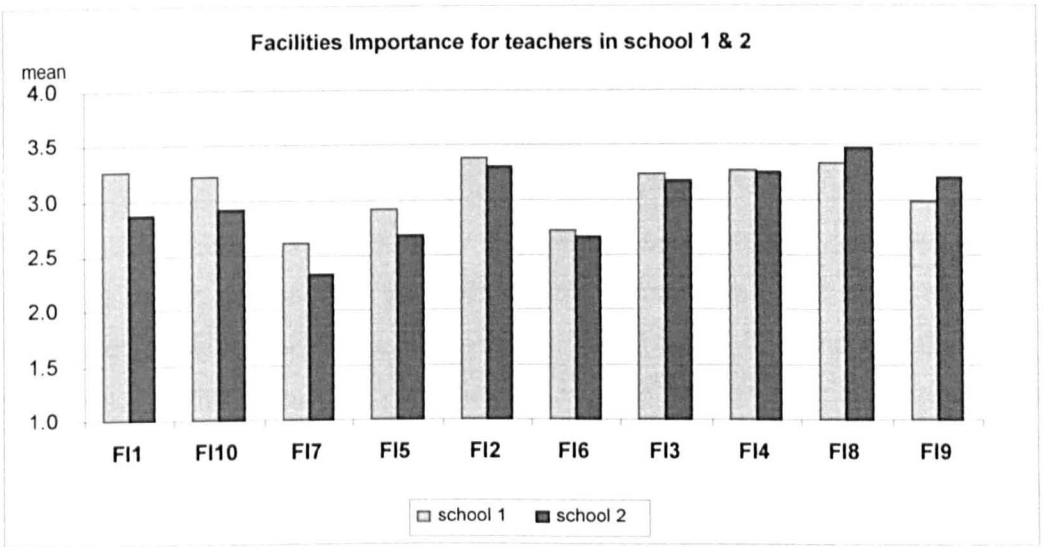


Figure 6.6. Mean Scores of Importance of Facilities for Teachers in Two Schools

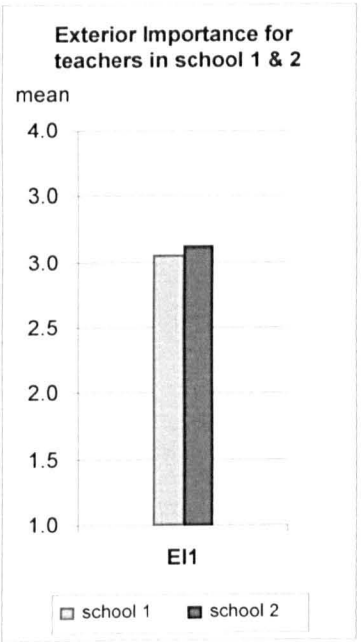


Figure 6.7. Mean Scores of Importance of Exterior for Teachers in Two Schools

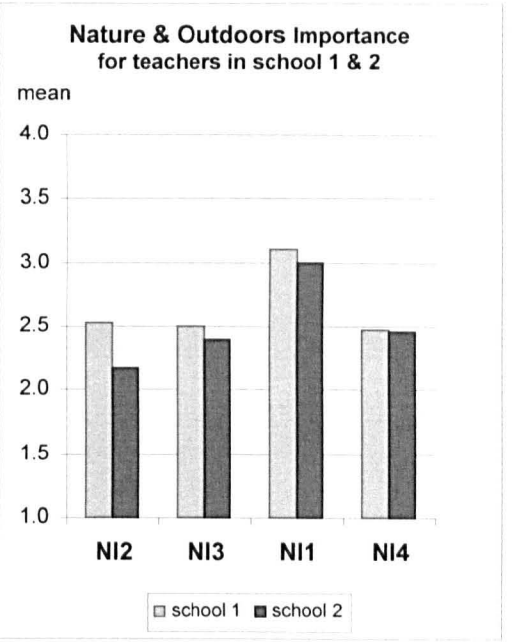


Figure 6.8. Mean Scores of Importance of Nature and Outdoors for Teachers in Two Schools

ID	Items
EI1	There is an attractive frontage and entrance

ID	Items
NI1	There is access to usable landscaped area/ grass
NI2	There is a garden (plants & flowers) inside the building
NI3	There is quiet areas for working outside
NI4	There is a view (when you are inside the building) to green fields/ greenery

Overall, in the six categories, teachers in school 1 highlighted greater importance levels compared with school 2 for the majority of items. Despite the mean differences (which are small), the trend between the responses in both schools seems similar; however, in order to find out the relationship between the two sets of data, the correlation test is needed. It also will help to find out the validity of putting two sets of data together.

Therefore, the Spearman rank-order correlation coefficient test was applied. The two variables (mean scores of all items) from both schools were converted to ranks and a correlation analysis was done on the ranks. The P-value from the correlation of ranks is the P-value of the Spearman rank correlation. The relationship between teachers' views in the two schools is highly significant ($X=0.7182$, 39 d.f., $P<0.001$): as illustrated in Figure 6.13. Therefore, the results support the possibility of putting the data from both schools together in order to find out the overall importance of each item.

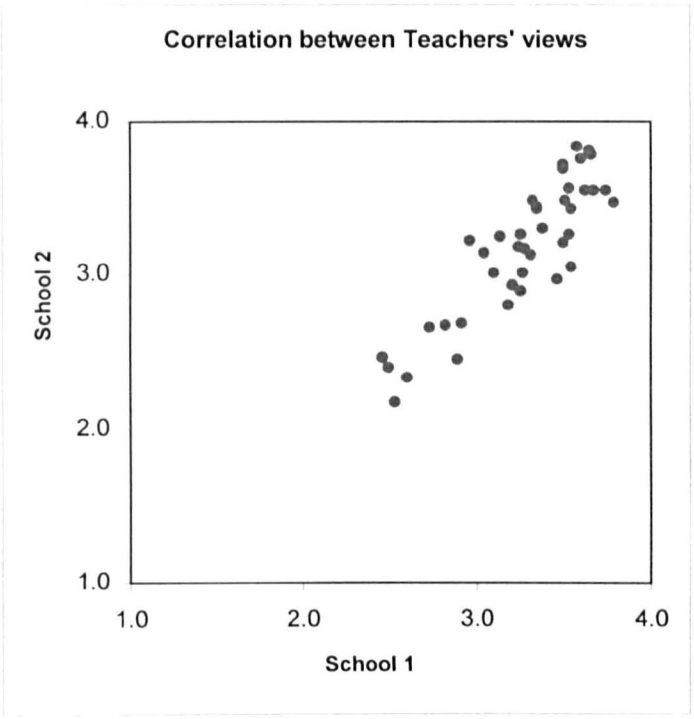


Figure 6.9. Relationship between Teachers' Views in Two Schools

6.5.3. Overall Importance for items

By considering the strong correlation (agreement) among the responses, the data from both schools were put together: which included 64 teachers' voices. Among the teachers, 63 out of 64 indicated their gender in their questionnaires. The gender proportions differed as the majority of participants were female (63.5 % female and 36.5% male).

The findings are presented for each item in percentage as well as in mean score. In each category the order of items in the percentage graphs is based on their mean score; therefore, the bottom items have the highest means while the top items have the lowest mean scores. There are four classifications based on items' mean score; therefore according to rating scales (1-4), the items which have been rated over 3.5 are classified as 'essential', while the items rated between 3 and 3.5 are 'important', between 2.5 and 3 are 'quite important'. Finally, there are items with scores between 2 and 2.5 which are considered as 'nice to have' in this classification. It needs to be stated that for all six categories (and items), the majority of teachers highlighted their confidence levels as 'high'. The following figures represent the findings which emerged for each category.

1. Interior

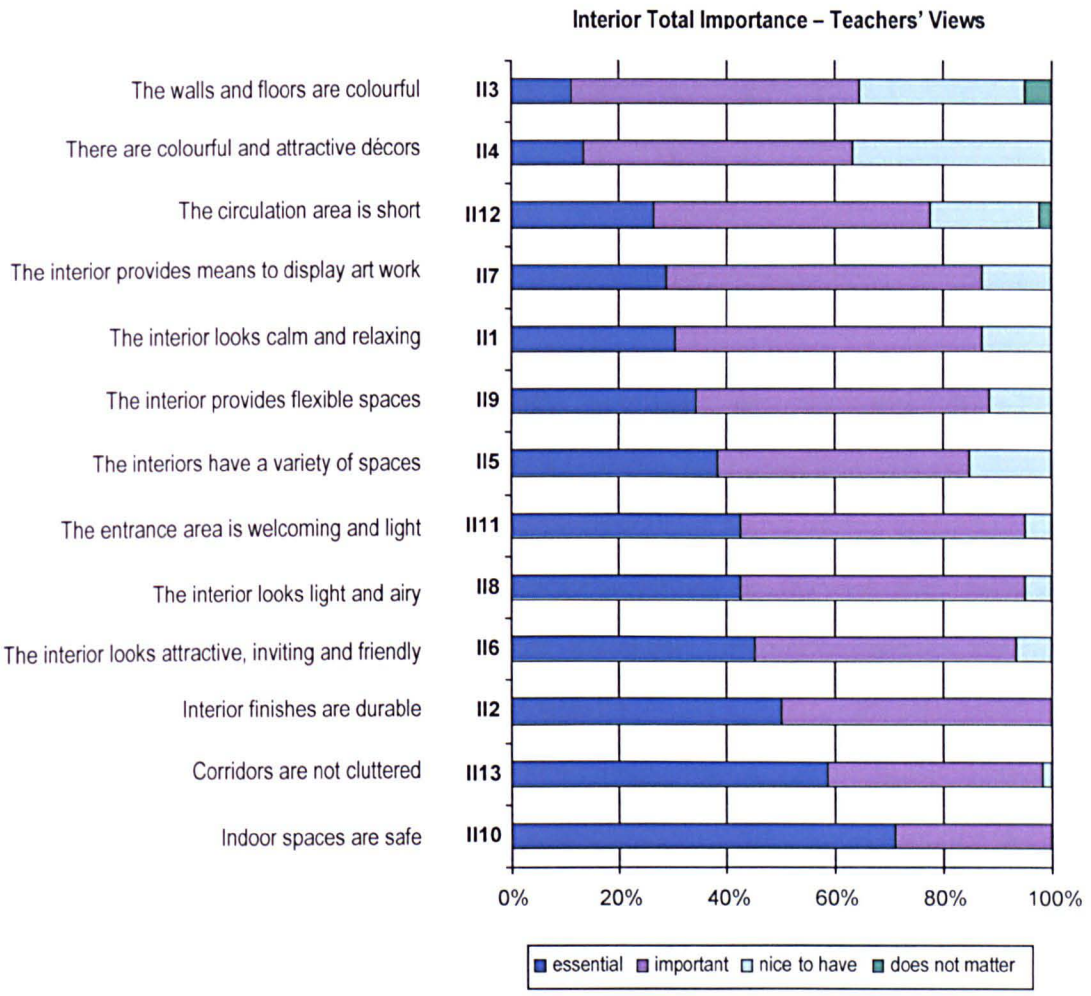


Figure 6.10. Overall Teachers' Views on Importance of Interior Items

Figure 6.10 illustrates teachers' views overall on the importance of the Interior items in percentage, while Figure 6.11 shows the grand mean scores (and standard deviation)

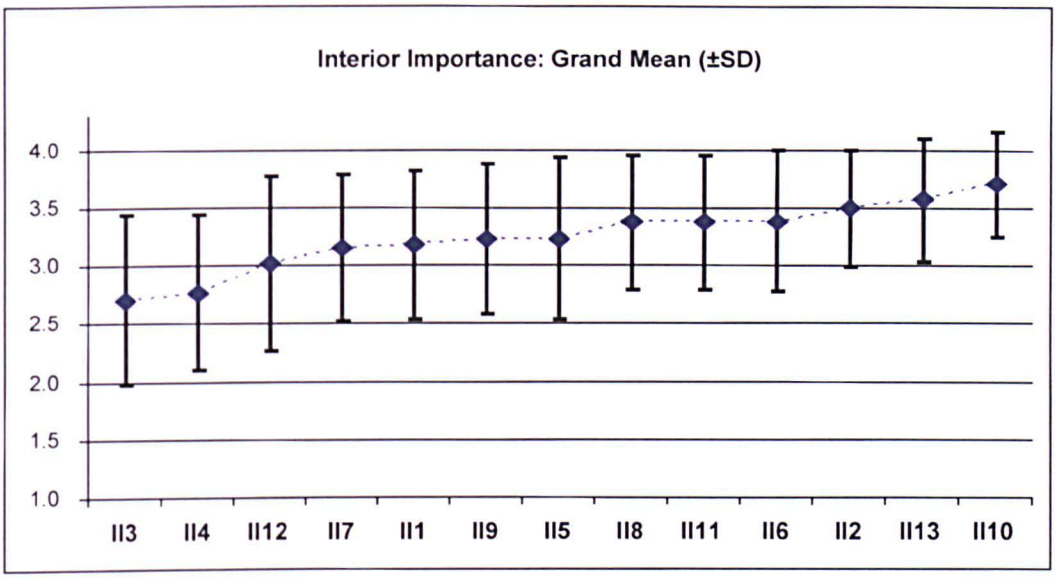


Figure 6.11. Grand Mean Scores: Importance of Interior Items for Teachers

The results suggest that interior items are divided into three groups including 'essential', 'important' and 'quite important'. The 'essential' items are 'safe indoor spaces' (II10), and 'not cluttered corridors' (II13). The 'important' items include the majority of items (rated by over 77% of teachers at 3 and over) which are 'durable finishes' (II2), 'short [length] circulation area' (II12), 'attractive, inviting and friendly' interior (II6), 'calm and relaxing' interior (II1), 'light and airy' interior (II8), 'welcoming and light entrance' (II11) and 'means to display art work' (II7), 'variety' (II5), and 'flexibility' (II9). The 'quite important' items, (rated by over 63% of teachers at 3 and over) are related to the appearance of buildings including 'colourful walls and floors' (II3) and 'colourful and attractive décors'.

2. Comfort and Control

Figure 6.12 illustrates teachers' views overall on the importance of the Comfort and Control items in percentage, while Figure 6.13 shows the grand mean scores.

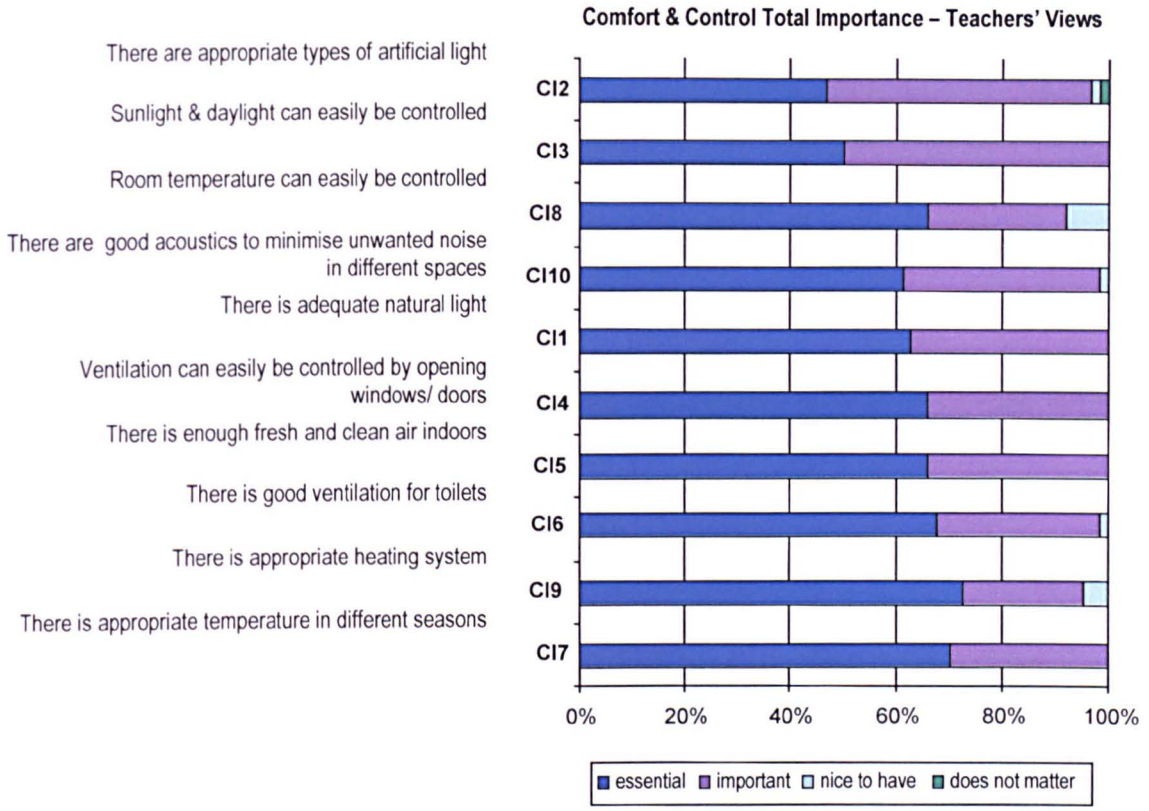


Figure 6.12. Overall Teachers' Views on Importance of Comfort and Control Items

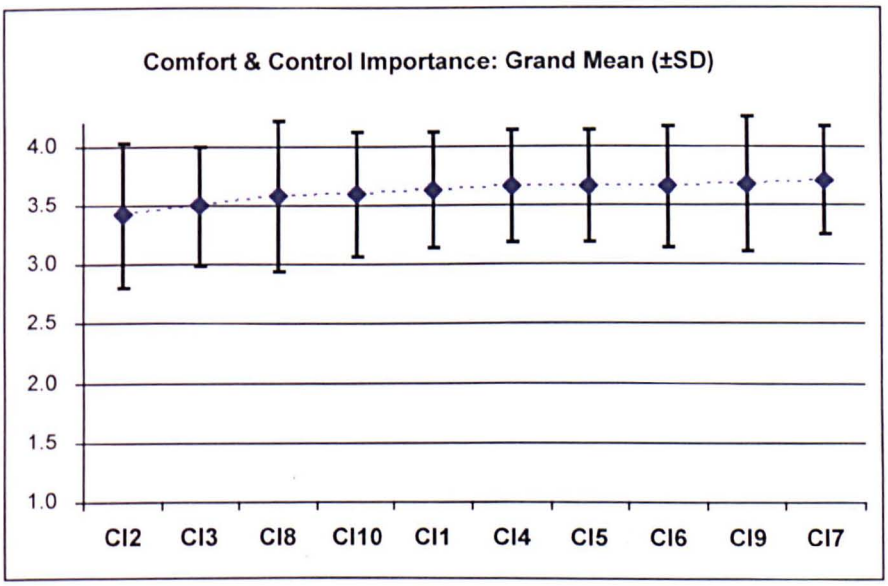


Figure 6.13. Grand Mean Scores: Importance of Comfort and Control Items for Teachers

According to the results, all the items were 'important or essential' for over 91% of teachers. The majority of items were 'essential'. The most important items are related to five items. 'Adequate natural light' (CI1), 'sunlight & daylight can easily be controlled' (CI3), 'appropriate temperature in different seasons' (CI7), 'enough fresh and clean air

indoors' (CI5), and 'ventilation can easily be controlled by opening windows/ doors' (CI4) have been given the two highest ratings by all the teachers (100%). However, the highest mean scores belong to items related to temperature; 'appropriate temperature in different seasons' was the item which scored the highest. The least important item in this category was 'appropriate types of artificial light' (CI2).

3. Activity Spaces

Figure 6.14 illustrates children's views overall on the importance of the Activity Space items in percentage and Figure 6.15 shows the grand mean scores.

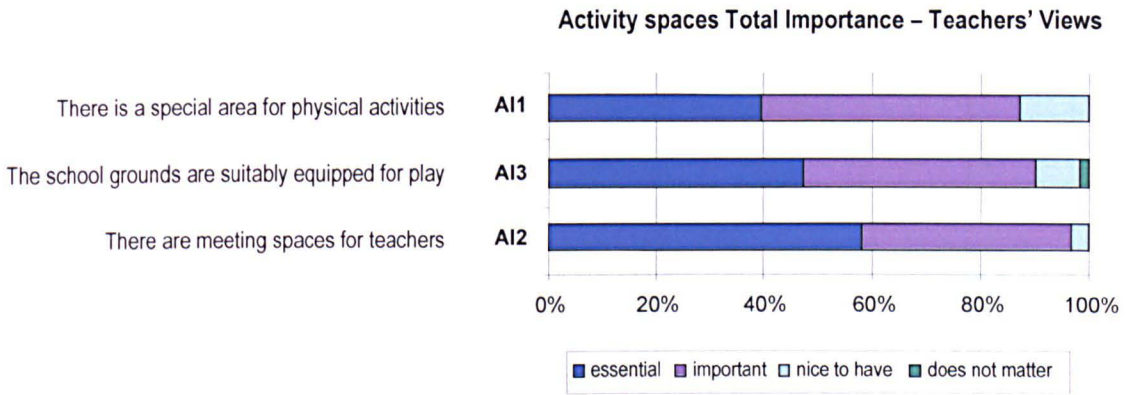


Figure 6.14. Overall Teachers' Views on Importance of Activity Space Items

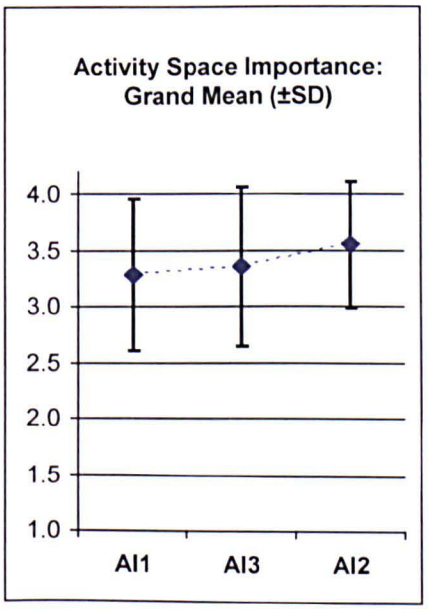


Figure 6.15. Grand Mean Scores: Importance of Activity Space Items for Teachers

Based on the findings, all the three items have been 'essential' or 'important' for teachers (rated by over 87% at 3 and over). The two items relating to children needs - 'a special area for physical activities' (AI2) and 'suitably equipped school grounds for play' (AI3) achieved more importance than the only item related to teachers' - 'meeting spaces' (AI1).

4. Nature & Outdoors

Figure 6.16 illustrates teachers' views overall on the importance of the Nature and Outdoors' items in percentage, while Figure 6.17 shows the grand mean scores.

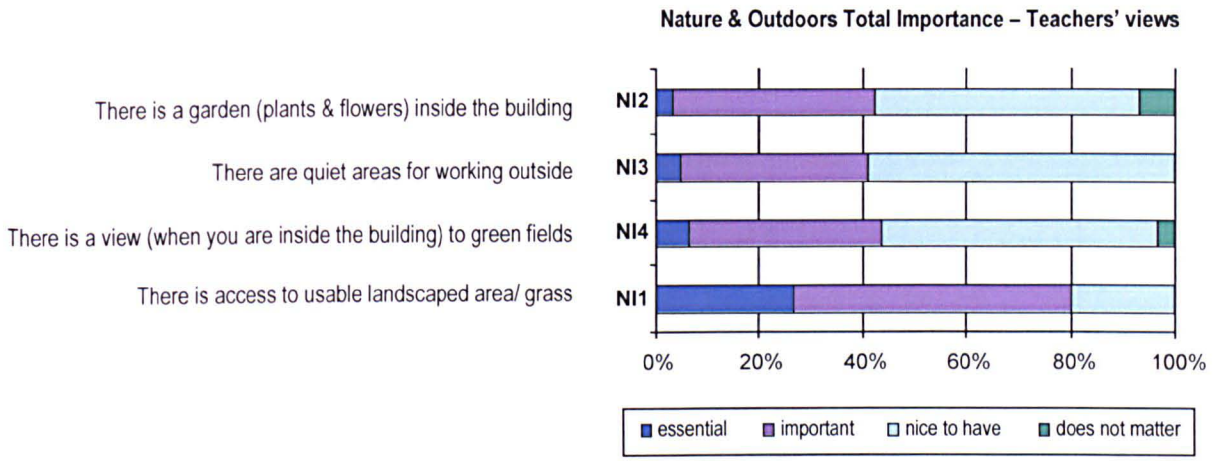


Figure 6.16. Overall Teachers' Views on Importance of Nature and Outdoors' Items

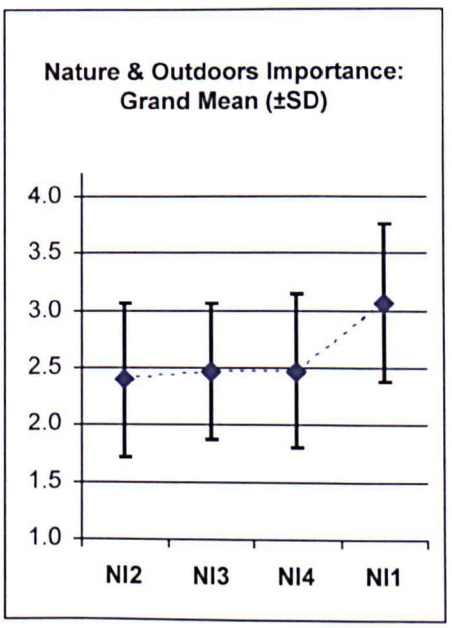


Figure 6.17. Grand Mean Scores: Importance of Nature and Outdoors' Items for Teachers

All the items have been divided into 'important' and 'nice to have'. The 'important' item, which has a significant difference from other items (rated by 80% at 3 and over) is 'access to usable landscaped area/grass' (NI1).The three items identified as 'nice to have' (rated by over 90% at 2 and over) including 'quiet areas for working outside' (NI3), 'a view to green fields/ greenery' (NI4) and 'a garden (plants & flowers) inside the building' (NI2).

5. Facilities

Figure 6.18 illustrates overall teachers' views on importance of the Facilities' items in percentage and Figure 6.19 shows the grand mean scores.

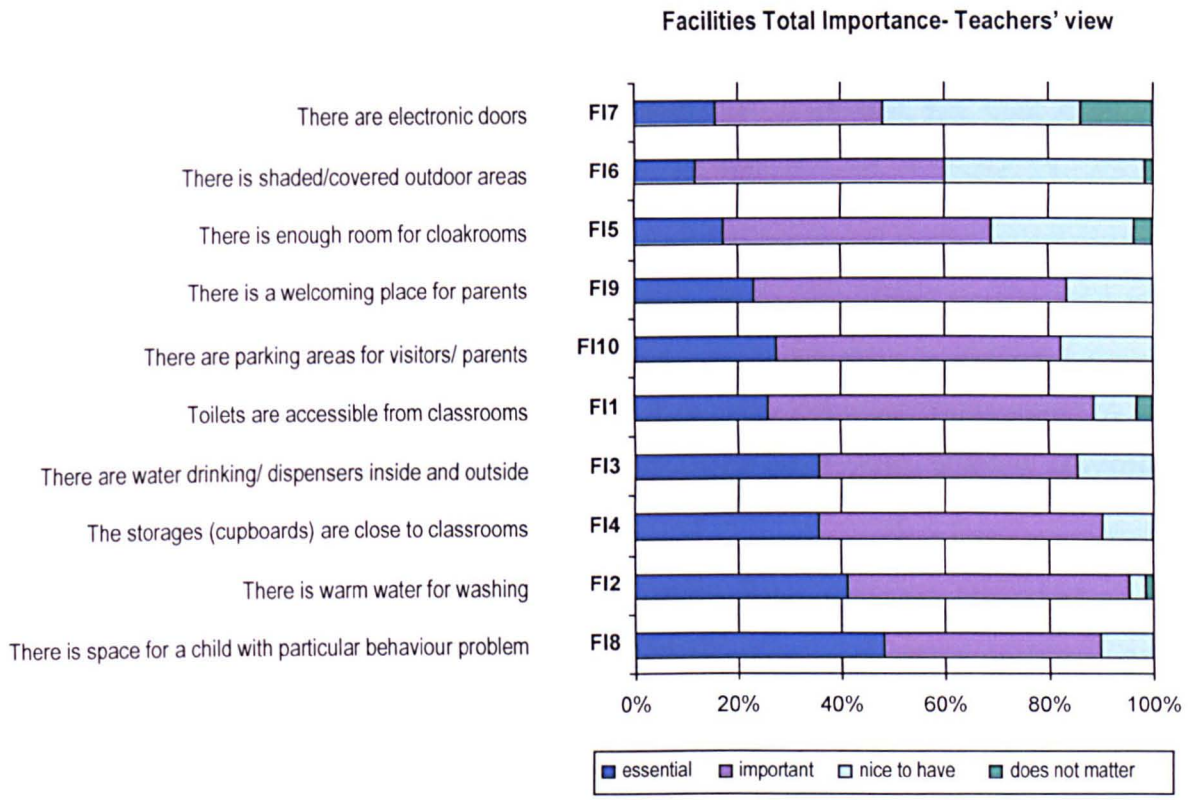


Figure 6.18. Overall Teachers' Views on Importance of Facilities' Items

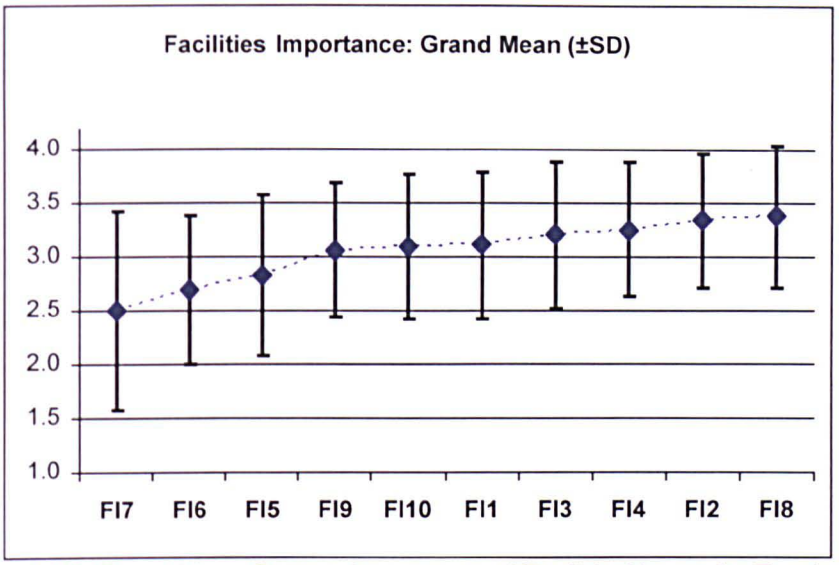


Figure 6.19. Grand Mean Scores: Importance of Facilities' Items for Teachers

The findings indicate that the items can be divided into 'important' and 'quite important'. The 'important' items (rated by over 82% at 3 and over) are 'space for a child with particular behaviour problem' (FI8), 'a welcoming place for parents' (FI9) and 'parking areas for visitors/ parents' (FI10). Access also has been important as 'accessible toilets from classrooms' (FI1), 'access to water drinking/ dispensers inside and outside' (FI3), 'access to warm water for washing' (FI2) and 'access to storages (cupboards) close to classrooms' became important items as well. The 'quite important' items (rated by over 48% at 3 and more) including 'enough room for cloakrooms' (FI5), 'shaded/ covered outdoor areas' and 'electronic doors' (FI7).

6. Exterior:

Figure 6.20 illustrates teachers' views overall on the importance of the Exterior items in percentage, while Figure 6.21 shows the grand mean score.

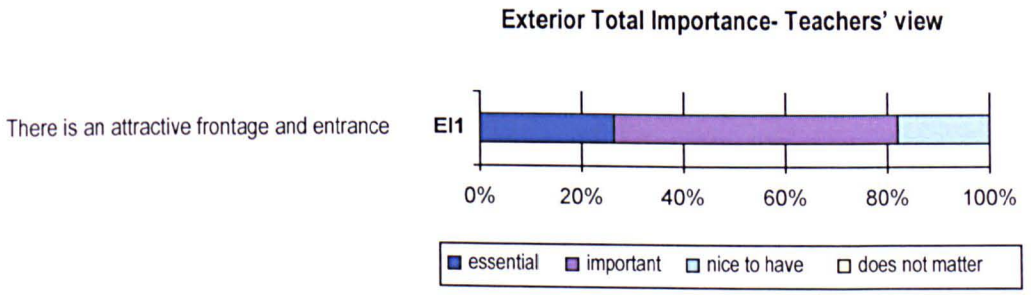


Figure 6.20. Overall Teachers' Views on Importance of Exterior Items

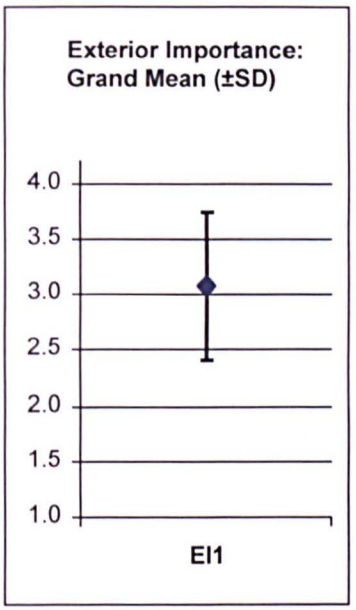


Figure 6.21. Grand Mean Scores: Importance of Exterior Item for Teachers

The only item in this category, which has been rated by over 82% at 3 and more, is 'an attractive frontage and entrance' (EI1).

6.5.4. Weighted grand mean

The number of participating teaching staff in the two schools was different; therefore, the weighted grand mean has been calculated which allows the equal proportion of findings for comparing mean scores in different categories. Table 6.2 presents the weighted grand mean scores.

	School	No.	Mean	Total No.	(mean1*N1)+ (mean2*N2)/ N1+N2
Interior	School 1	24	3.33	42	3.26
	School 2	18	3.17		
Comfort & Control	School 1	38	3.63	61	3.61
	School 2	23	3.58		
Activity Spaces	School 1	37	3.53	60	3.41
	School 2	23	3.20		
Nature & Outdoors	School 1	36	2.65	59	2.60
	School 2	23	2.51		
Facilities	School 1	33	3.09	52	3.03
	School 2	19	2.92		
Exterior	School 1	37	3.05	61	3.08
	School 2	24	3.13		

Table 6.2. Weighted Grand Mean Calculation for Teachers' responses

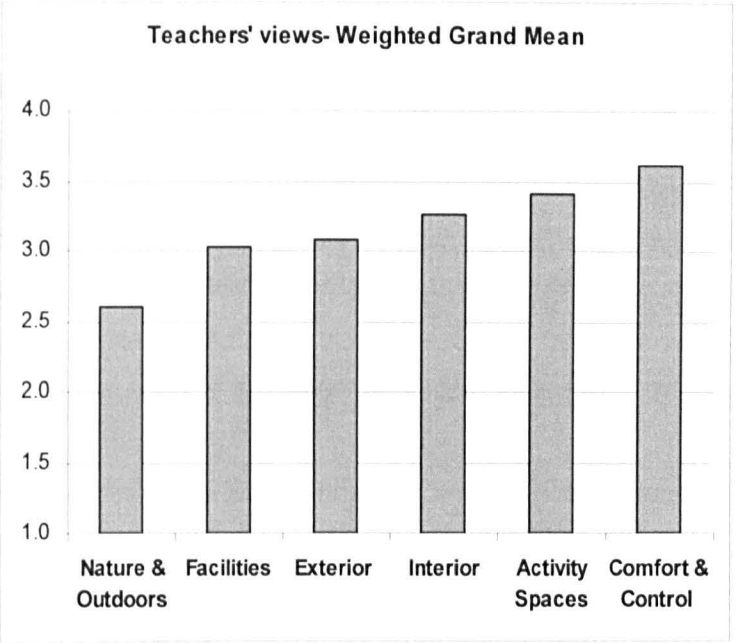


Figure 6.22. Weighted Grand Mean Scores for Teachers' Opinions on Importance of Categories

Based on the overall findings and comparing weighted grand means for the six categories (Figure 6.22), the most important category for teachers has been Comfort and Control and the least important one has been Nature and Outdoors. The difference between means of these two categories is about 39% as the mean scores vary from 2.6 for Nature and Outdoors and reach the highest score of 3.6 for Comfort and Control category.

It might not be surprising that Nature and Outdoors has been the last priority for teachers who do not participate in physical activities (play) in school grounds; however, it might be surprising to see Facilities is the second least important Category for teachers and even less important than Exterior.

6.5.5. Teachers' comments

It might be asked: 'what are the issues that were not included in the teachers' evaluative tool but were raised in the open section of the questionnaires by them?' It has been more difficult to classify teachers' comments as they covered wider issues compared with children's comments although the number of teachers was less (64 in total). Although 'Comfort and Control' was the most important category for teachers based on previous findings, most of their comments related to 'facilities' and then to 'activity spaces' which might present the need for adding more items in these two categories.

All the teacher's comments relating to each category were classified and were counted based on the number of repetitions (see Appendix 6G). Although there was a significant number of comments, the most important ones in this context are those that were raised most frequently by teachers.

The comments relating to existing items were in the 'facilities' category and included 'parking', 'toilets' and 'storage': having 'good and safe and secure parking area' was a highlighted issue for teachers and installation of CCTV in staff car parks and a fenced area (total No. = 7) were suggested. In addition, 'toilets' were raised and they mentioned the need for 'staff toilets on all floors', 'for both men and women', 'close to classrooms' and 'improved toilets for students' (total No. = 5). They asked for plenty of 'storage' to be in classrooms (No. = 4). Moreover, teachers asked for 'lockers for children in classrooms' (No. = 5) which was not related to their existing items.
There have been some new items highlighted. Among 'activity spaces', 'dining areas' were mentioned and teachers asked for 'adequate dining areas', 'a separate dining area', and 'sufficient, effective dining facilities to cope with numbers in school' (total No. = 4). Moreover, a few teachers asked for 'a separate exam area' and 'exam facilities that do not affect day to day running of the school' (No. = 3).

The new comments could suggest new issues to be added to the list of items for the teachers' evaluative tool; however, further research is needed to find out the importance of these issues by testing them with a greater number of teaching staff.

6.5.6. Initial framework

The findings suggest an initial framework which highlights teachers' opinions. A series of items were classified under a sub-category for each of the six categories. The classification for 'importance' emerged from the results of overall importance of items which were presented previously. Table 6.3 summarises teachers' views as an initial framework. This initial framework will be developed in the following stage of research when both children's and teachers' views are merged to make a final framework for school design.

Table 6.3. Initial Framework Based on Teachers' Views

Category	Theme	Importance Classification (teachers' views)			
		Essential	Important	Quite Important	Nice to Have
Interior	Safety	-safe indoor spaces			
	Materials		-durable finishes		
	Circulation	-not cluttered corridors	-short length circulation area		
	Appearance		-attractive, inviting and friendly interior -calm and relaxing interior -light and airy interior -welcoming entrance -means to display art work	-colourful walls and floors -colourful and attractive décors	
	Character		-variety -flexibility		
Comfort & Control	Temperature	-appropriate temperature in different seasons -appropriate heating system -controlling room temperature easily			

	Ventilation	-enough fresh and clean air indoors -controlling ventilation by opening windows/ doors -good ventilation for toilets			
	Light	-adequate natural light	-appropriate types of artificial light -controlling sun light and daylight easily		
	Acoustics	-good acoustics to minimise unwanted noise			
Activity spaces	**Use** (for children)	-a special area for physical activities	-suitably equipped school grounds for play		
	Use (for teachers)		-meeting spaces		
Nature & Outdoors	**Access**		-access to usable landscaped area		
	Use				-quiet areas for working outside
	View				-a view to green fields/ greenery
	Vegetation				-a garden inside the building
Facilities	**Access**		-access to water drinking/ dispensers inside and outside -access to warm water for washing		
	Use		-storage (cupboards) close to classrooms -toilets close to classrooms -space for a child with particular behaviour problem -a welcoming place for parents -parking areas for visitors/ parents	-cloakrooms with enough room -shaded/ covered outdoor areas -electronic doors	
Exterior	**Appearance**		-an attractive frontage and entrance		

6.5.7. Teachers' satisfaction

The data gathered related to teachers' satisfaction with the various items for their existing schools were analysed and the results presented in detail (see Appendix 6D). As it was not the main focus of the study, only the overall findings are discussed. The aim is to find out teachers' satisfaction regarding the six categories. In order to compare their opinions, the grand mean scores were calculated. The findings are presented in Figure 6.23 that shows the difference between the overall satisfaction of teachers in both schools.

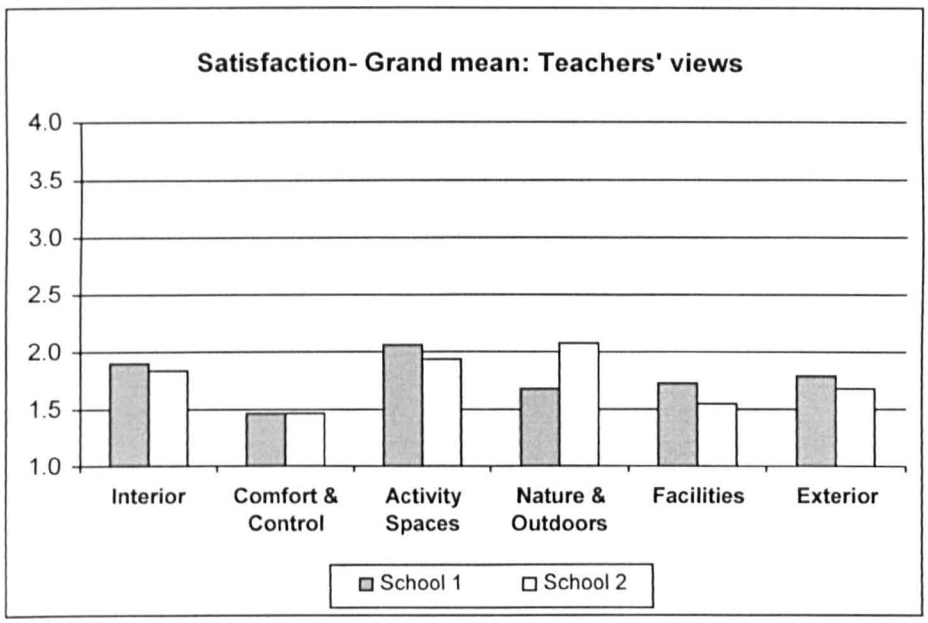


Figure 6.23. Comparing Overall Teacher Satisfaction in two Schools

The results show that satisfaction levels for both old and new schools are not very high as the highest mean score is 2.1. The least satisfactory category has been 'Comfort and Control' where the mean score is slightly below 1.5. Interestingly, this category was ranked similarly by teachers in both schools. This result was unexpected because the new school (school 1) reasonably should have been more comfortable than the old school (school 2); however, the findings show the same satisfaction with Comfort and Control.

Although teachers have been slightly more satisfied in the new school (school 1) regarding four categories, Nature and Outdoors was ranked significantly higher in the old school (school 2). It could be because of the location of school 2 which has large green fields compared with school 1. Among the items in the Nature and Outdoor

category, 'quiet areas for working outside' and 'a garden (plants & flowers) inside the building' were ranked similarly; however, the mean scores for two items - 'access to usable landscaped area/ grass' and 'view to green fields/ greenery' were significantly higher in school 2 and the mean differences reach 0.77 and 0.88 respectively.

In summary, findings show that teachers are not very satisfied with their school environment, suggesting that their voices need to be heard regarding different issues for improvement of their schools. The question which remains unanswered is 'are new schools very different from the buildings built in the 20th century?' Of course, more research needs to be carried out as two case studies could not be sufficient to respond to this question.

6.6. Conclusions

The findings show teachers have clear opinions about their school environment which many will share if invited. There are clear patterns in their responses suggesting that many teachers have similar views about design issues based on their experience of working in school buildings.

Findings identify that over all, all the items which emerged from the exploratory study are considered relevant to school environment by the teachers surveyed, while they have gained differing importance based on the results of empirical study. The findings also help to develop a framework for school design based on teachers' views which would fit better with their needs, preferences and expectations. As in the case of the framework informed by children's views, this could help architects and designers to be able to design more satisfactory schools for the users - in this case teachers.

It is suggested that merging the opinions of school users - children and teachers - could help to build a comprehensive framework that includes both their views and expectations. It would present various issues that they highlighted as well as their relative importance. Chapter 7 will address and discuss this issue.

Chapter 7 – Design tools based on pupils' and teachers' voices

The views and expectations of each school user group, in this case children and teachers, had to be revealed individually; however, a better understanding could be obtained by looking at these two points of views in parallel and comparing the findings. The first part of this chapter will compare and discuss these findings. It might not be easy, but it is important to design, as far as possible, a school environment that responds to the needs, values and expectations of its various users. Merging the opinions of different school users groups also could help to build a comprehensive framework that represents differing views and expectations.

In addition, the importance levels for various issues highlighted by each school user can be applied to the framework to give relative weights to these issues It is suggested, therefore ,that this 'merged' framework be developed into tools to guide the design and decision-making processes of architects and designers. These tools would help them in the initial stages to generate designs by identifying important issues and prioritising these issues in relation to each other, and in the later stages could permit assessment of the quality of school designs. The second part of this chapter therefore presents a proposed generative design guidance tool and a design evaluation tool.

7.1. Comparing children's and teachers' views

7.1.1. Importance

This section focuses on categories only to highlight the similarities and differences among views of users of the two schools; however, the following section will address and explain the individual items. In comparing the overall importance, all categories were rated higher by teachers except Nature and Outdoors which was rated equally by both users and became the least important category for them. 'Facilities' was rated as second least important category for teachers. 'Activity spaces' became the second most important category for both users.

It might not be surprising that 'Nature and Outdoors' was the last priority for teachers: who do not engage in physical activities (and play) in school grounds; however, it might be surprising to see 'Facilities' is the second least important Category for teachers and

even less important than Exterior. Figure 7.1 illustrates the teachers' and children's opinions on importance of the categories.

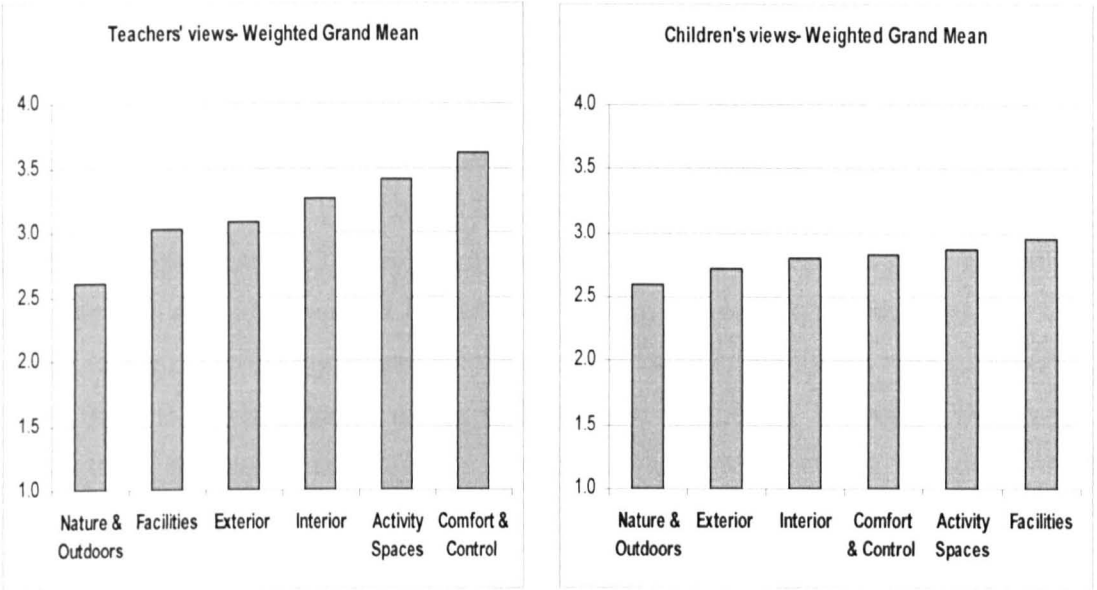


Figure 7.1. Teachers' and Children's Opinions on Importance of Categories

'Nature and Outdoors' has been the least important category for both users. It needs to be pointed out that 'provision for learning outdoors' in the Activity Spaces category and 'shaded/covered outdoor area' in the Facilities category, are related to outdoors though including these items does not change the overall importance of this category. Therefore, it might raise this question: 'does it mean outside is not important and the school users have become detached from it'? Although, it seems nature and outdoors could have lots of benefits and be even a vehicle for learning. A growing body of literature shows that the natural environment has profound effects on the well-being of adults, including better psychological well-being, superior cognitive functioning, fewer physical ailments and speedier recovery from illness (Wells, 2003). Moreover, it is generally accepted that the environment is likely to have a more profound effect on children due to their greater plasticity or vulnerability (ibid). So, do teaching staff and pupils need to be encouraged to notice the importance of Nature and Outdoors? Probably such an encouragement and awareness is needed.

In continuation of the comparison of school users' opinions, the analysis of data uses a one way Chi-square test to investigate whether there is significant difference (from expected distribution) among the overall scores of categories for each user group (children or teachers). The technique is of the 'goodness-of-fit' type in that it tests whether a significant difference exists between an 'observed' number of objects or

responses in each category and 'expected' number based on the null hypothesis (Siegel and Castellan, 1988. p. 45). The level of importance of a particular category has been observed for comparative purposes.

Based on teachers' overall views on 'importance' and comparing grand means for the six categories, significant differences can be seen for four categories. For Activity spaces, Comfort and Control, Nature and Outdoors and Exterior the difference were highly significant ($P<0.001$) and the null hypothesis is rejected for these categories, while for Facilities ($p=0.182$) and for Interior ($p=0.433$) the differences have not been significant (the null hypothesis is accepted). However, based on the result of the Chi-square test for children, significant differences can be seen for all the categories ($P <0.001$) and the null hypothesis is rejected for these categories. Therefore, this test shows a trend in views of school users rather than random responses. Conclusions can be built on the basis of these results.

In addition, a correlation coefficient test was applied to find out if there is any relationship between school users' views. Figure 7.2 presents the correlation between children's and teachers' opinions on the importance of the six defined categories based on weighted grand means ($X=0.0488$, 4 d.f.). As X is close to zero, this relationship is not significant. It seems that children and teachers have significantly different opinions about the importance of various categories.

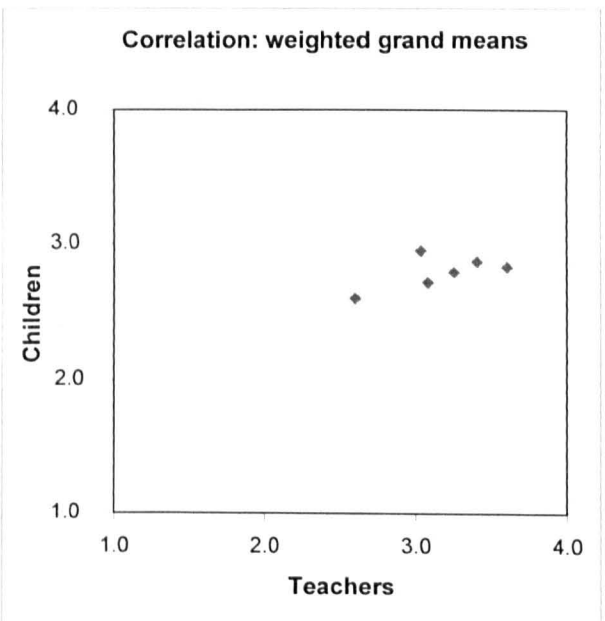


Figure 7.2. The Correlation between Children's and Teachers' Opinions on Importance of Categories

Furthermore, in order to find out whether the difference between teachers' and children's opinions in six categories is significant or not, a two way Chi-square test has been applied because 'when the data consist of frequencies in discrete categories, the chi-square test may be used to determine the significance of differences between two independent groups'. For the purposes of this test, 'the data are arranged into a frequency or contingency table in which the columns represent groups and each row represents a category of the measured variable' (Siegel and Castellan, 1988. p. 111). In each category the average number of children and teachers for each ranking scale (1-4) has been calculated and presented in table(s) 7.1 as follows:

Interior	Children Nos.	Teacher Nos.
1. does not matter	17	0
2. nice to have	81	7
3. important	81	30
4. essential	63	23

Nature and Outdoors	Children Nos.	Teacher Nos.
1. does not matter	14	2
2. nice to have	84	28
3. important	54	25
4. essential	36	6

Comfort and Control	Children Nos.	Teacher Nos.
1. does not matter	13	0
2. nice to have	67	1
3. important	87	21
4. essential	57	39

Facilities	Children Nos.	Teacher Nos.
1. does not matter	10	1
2. nice to have	54	11
3. important	52	31
4. essential	56	17

Activity Spaces	Children Nos.	Teacher Nos.
1. does not matter	10	0
2. nice to have	75	5
3. important	65	26
4. essential	57	30

Exterior	Children Nos.	Teacher Nos.
1. does not matter	8	0
2. nice to have	34	11
3. important	25	34
4. essential	23	16

Table(s) 7.1. The Average Numbers of User Groups for Each Ranking Scale in Categories

The level of importance of a particular category for each user group (children or teachers) has been observed for comparative purposes. Based on overall views of users and the results of this test for the six categories, the significant differences can be seen for five categories ($P<0.001$) and the only category in which the difference has not been statistically significant is 'Nature & Outdoors' ($p=0.121$) which is the least important category for both users.

The findings show the importance of different categories. Although the most important ones can bring researchers' and designers' attention to the importance of, their

consideration, the least important ones could encourage further interdisciplinary research to find out the reasons behind this perceived lack of importance.

7.1.2. Satisfaction

Comparing school users' levels of 'satisfaction' could give insight into the areas in schools which might need improvement. As schools were different, the findings presented for each school separately. It needs to be mentioned that the children's and teachers' ranking of items were different though the defined categories were similar. Figure 7.3 illustrates the satisfaction of children and teachers in each school.

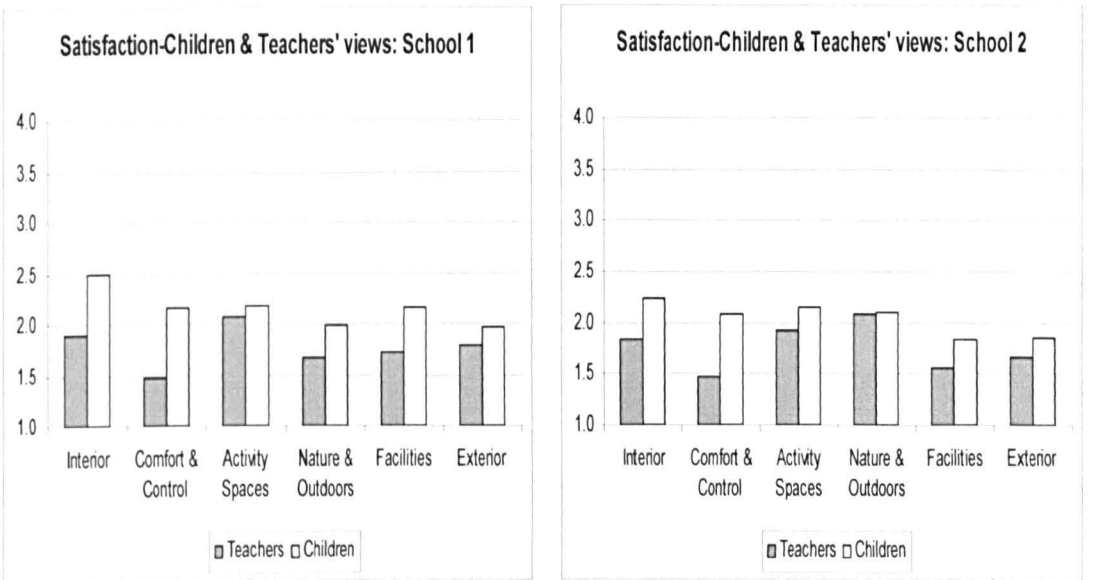


Figure 7.3. Teachers' and Children's Satisfaction Related to Categories in Two Schools

The common result emerging in each school is that children's satisfaction is higher than teachers' for the six categories. A similar and significant mean difference can be seen for the Comfort and Control category between the two users' views. This is actually the category that teachers are least satisfied with in both schools compared with children. So, in reality are children more comfortable than teachers in schools?

Do overall findings show that schools have been fairly suitably designed for children, but failed to satisfy teachers? Nevertheless, children have not been very satisfied with their schools. Most of the scores have been about 2 (which means 'okay' in the rating scale). In all the six categories there was no overall rating of very good (mean score of 3) even for children. However, in comparison, for teachers, in most of the categories the mean scores do not reach 2, which means that their opinions have not even been 'okay' on the majority of categories in their schools.

7.1.3. Common issues for both users

Among the items, those relating to the same issues were selected for comparison. Related to the common items ranked by both school users, it would be worth finding out the relative importance each user indicated for them. It helps to determine where teaching staff and pupils have similar or different priorities for common items.

Findings show that the majority of items have been more important for teachers than for children; however, there are a few items that both teachers and children have the same opinion about. In order to present the findings and compare them, it needs to be stated that there are four levels of importance for teachers according to the mean scores for each item. Similar to the presentation of findings in Chapters 5 and 6, the classifications are as follows:

- Essential - when the mean score is more than 3.5. (only applicable for teachers)
- Important - when the mean score is more than 3 and less or equal to 3.5
- Quite Important - when the mean score is more than 2.5 and less or equal to 3.
- Nice to Have - when the mean score is more than 2 and less or equal to 2.5.

The levels of importance are presented as abbreviations; therefore, 'E' refers to Essential, 'I' to Important, 'QI' to Quite Important and 'NH' as Nice to Have, and are applicable for Tables 7.2 and 7.3. The items are sorted out according to their relevant themes and categories. The wording of issues for a few items was slightly changed; for example, in the Comfort and Control category and related to lighting, 'adequate' or 'satisfactory' levels of natural light recorded in each user's questionnaire were considered similar for either of them; however, for a few items both sets of details on points are reported in parenthesis to include what was written in questionnaires relating to that item. Table 7.2 presents the importance of various (common) items for both school users.

Table 7.2. Importance of Common Items for Both Users

			Teachers' view				Children's view			
Category	**Theme**	**Common Items**	**E**	**I**	**QI**	**NH**	**E**	**I**	**QI**	**NH**
Interior	**Appearance**	attractive, inviting interior		X					X	
		colourful walls and floors			X					X
		means to display art work		X						X
	Materials	durable finishes		X					X	
	Character	variety		X					X	
		flexibility		X					X	
Comfort & Control	**Temperature**	appropriate temperature in different seasons	X					X		
		controlling room temperature	X						X	
	Ventilation	natural ventilation (enough fresh and clean air indoors)	X						X	
		controlling ventilation (opening windows/ doors and controlling ventilation system)	X						X	
	Light	adequate natural light	X						X	
		controlling day light easily		X					X	
		controlling sunlight easily [blinds]		X				X		
		appropriate types of artificial light		X					X	
	Acoustics	good acoustics in different spaces	X						X	
Activity Spaces	**Use**	a special space for physical activities (for children)	X						X	
Nature & Outdoors	**Access**	access to usable landscape		X					X	
	View	a view to nature (green fields)				X			X	
Facilities	**Access**	access to drinking water		X				X		
	Use	toilets (accessible from classroom, appropriate)		X				X		
		covered/ sheltered outdoor areas			X				X	
Exterior	**Appearance**	an attractive (well-designed) entrance for building		X					X	

The findings show that children and teachers had different opinions about the relative importance of these common items. Among 22 common items, most were more

important for teachers and highlighted as 'essential' or 'important', while the majority of items were stated as 'quite important' by children. Only two items were highlighted as 'nice to have' by children, namely, 'colourful walls and floors' and 'means to display art work' though, surprisingly, they were more important for teachers. And, the only item identified as 'nice to have' for teachers was 'view to nature' which was more important for children. In addition, there are only three items that were ranked similarly by both users, which are 'controlling sunlight easily [blinds] ', 'access to drinking water' and 'toilets [accessible from classroom, appropriate]': and they were important items for both. Therefore, the findings show the importance of involving both groups of school users in the design process as they have different opinions about even similar issues related to their schools. Being aware of the difference among these two users' views shows the difficulty of design for school designers. Design could be even more difficult as there are yet more school users who are likely to have other sets of priorities.

7.2. Developing a generative tool (framework)

Making a framework based on views of two main school users that emerged from empirical studies would help designers to include their views and needs in their design. This framework (generative tool) can be used at the early stage of school design to inform designers about the importance of various issues that they need to consider as priorities. It would hopefully lead to design of better schools in future. Looking at all the issues ranked by children and teachers shows that there have been some common issues (items) in their questionnaires which can be merged in order to reduce the number of items for the generative tool. However, there are some items related to each school user specifically.

In order to highlight the emergent issues and their importance, it needs to be argued that, although six defined categories have been used to classify the items, some items are interrelated within one category or across various categories; for example, walls are finished with a glossy paint (an interior issue) over hard surfaces such as plaster, speech will be difficult to understand (a comfort issue), or if a large window that provides appropriate natural light (comfort issue) and view (nature) is opened onto a playground, noise will penetrate the room and cause discomfort; therefore, the categorising of items (issues) is helpful, but is not absolute as there are still some interrelationships among various issues not only in different categories, but also in one category.

In order to make sense of the findings, all the items including common and specific ones, were organised in a table. All items were included in this table as none of them were identified as irrelevant by users. Table 7.3 presents the findings in relationship to categories and sub-categories (themes) that each item belongs to. This table could be a generative tool for school design. The list of items helps to present the emergent issues as well as their relative importance according to school users' points of view.

Table 7.3. Importance of Emergent Issues - a Framework for School Design

			Teachers' view				Children's view			
Category	**Theme**	**Item**	**E**	**I**	**QI**	**NH**	**E**	**I**	**QI**	**NH**
Interior	Safety	safe indoor spaces	x				-	-	-	-
	Circulation	short circulation (area)		x			-	-	-	-
		not cluttered corridors	x				-	-	-	-
		easy to find your way around	-	-	-	-		x		
		plenty of room for movement in circulation areas	-	-	-	-			x	
	Use	usability of building by everyone with different abilities	-	-	-	-		x		
	Appearance	calm and relaxing interior		x			-	-	-	-
		light and airy interior		x			-	-	-	-
		welcoming and light entrance		x			-	-	-	-
		colourful and attractive décors			x		-	-	-	-
		softly textured interior	-	-	-	-				x
		attractive, inviting interior		x					x	
		colourful walls and floors			x					x
		means to display art work		x						x
	Materials	durable finishes		x					x	
	Character	variety		x					x	
		flexibility		x					x	

Comfort & Control	Temperature	appropriate heating system	x				-	-	-	-
		appropriate temperature in different seasons	x					x		
		controlling room temperature	x						x	
	Ventilation	provision for air-conditioning	-	-	-	-			x	
		good ventilation for toilets	x				-	-	-	-
		natural ventilation (enough fresh and clean air indoors)	x						x	
		controlling ventilation [opening windows/ doors and controlling ventilation system]	x						x	
	Light	controlling artificial lighting	-	-	-	-			x	
		adequate natural light	x						x	
		controlling daylight easily		x					x	
		controlling sunlight easily [blinds]		x				x		
		appropriate types of artificial light		x					x	
	Acoustics	good acoustics in different spaces	x						x	
Activity spaces	Use	space for caring for sick pupils	-	-	-	-		x		
		spaces for art performances	-	-	-	-			x	
		provision for outdoor learning	-	-	-	-			x	
		places for rest and meditation	-	-	-	-			x	
		Indoor spaces designed especially for play	-	-	-	-			x	
		suitably equipped school grounds for play		x			-	-	-	-
		a special space for physical activities (for children)	x						x	
		spaces for an administrative hub and for meeting or greeting	-	-	-	-			x	
		meeting spaces for teachers		x			-	-	-	-

	Appearance	some decoration in dining spaces	-	-	-	-				X
	Character	a warm atmosphere in dining spaces created by furniture	-	-	-	-			X	
		layout of dining spaces to prevent crowding	-	-	-	-		X		
		physical environment to help easy talk between pupils and staff in the assembly area	-	-	-	-			X	
Nature & Outdoors	Access	access to usable landscape		X					X	
	View	a view to nature (green fields)				X			X	
	Use	quiet areas for working outside				X	-	-	-	-
		a pets' corner or bird boxes	-	-	-	-				X
	Vegetation	a garden inside the building				X	-	-	-	-
	Appearance	outdoors looks interesting and versatile	-	-	-	-			X	
		outdoors looks relaxing	-	-	-	-				X
	Character	outdoor spaces are defined by the elements	-	-	-	-			X	
Facilities	Access	easy access to fire exits for every space	-	-	-	-		X		
		easy access to the media and technology space	-	-	-	-			X	
		scanning handprints or swipe cards at the school gate	-	-	-	-			X	
		access to warm water for washing		X			-	-	-	-
		access to drinking water		X				X		
	Use	storage [accessible cupboards close to classroom]		X						
		lockers						X		
		toilets [accessible from classroom, appropriate]		X				X		
		covered/ sheltered outdoor areas			X				X	
		space for a child with particular behaviour problem		X			-	-	-	-

		a welcoming place for parents		x			-	-	-	-
		parking areas for visitors/ parents		x			-	-	-	-
		cloakrooms with enough room			x		-	-	-	-
		electronic doors			x		-	-	-	-
		appropriate tables or desks	-	-	-	-		x		
		equipment for various activities in the school grounds suitable for different age groups	-	-	-	-			x	
		provision for an audio system	-	-	-	-			x	
		appropriate chairs (seats)	-	-	-	-			x	
		seating in the school grounds	-	-	-	-			x	
		picnic tables outside	-	-	-	-			x	
	Choice	having choice of cold snacks or drinks	-	-	-	-		x		
Exterior	**Appearance**	building acts as a landmark	-	-	-	-			x	
		an attractive (well-designed) entrance for building		x					x	
		colourful exterior (building)	-	-	-	-			x	
		an attractive frontage		x			-	-	-	-
	Character	a connection to the community	-	-	-	-			x	

Finding out the various issues related to school design and their relative importance for school users may help school designers to not only consider these issues in their design process, but also their priorities for each school user. This generative tool would bridge the gap which exists between the main school users and designers by informing them about their points of views. It could lead to more successful design of schools which meet the needs and expectations of their users; however, further research is needed to develop this generative tool and find out how useful it would be for designers.

It needs to be noted that this 'generative tool' is intended to be used at the 'early stage' of school design (either a new school or refurbishment) to inform designers about the

relative importance of various issues according to teachers and students and the areas that might therefore need more attention in the design process; however, this tool has its limits because it does not allow architects and designers to assess either completed school buildings and their grounds or the quality of their designs at different stages. Therefore, a further development of this generative tool, which could be helpful for assessment purposes, is discussed in the following section.

7.3. Developing an evaluative tool for designers

In this study an 'evaluative tool' (questionnaires) was previously defined to be tested and filled in by each school user (children and teachers). At this stage of study, it might seem important to design a tool to be useful for architects and designers to assess the quality of schools' built environments which could be based on the findings presented previously as a framework for school design. Measuring the quality of design is complex. It is hard to quantify as it consists of both objective and subjective components. Perhaps the most important measure in evaluation of a building's design quality is whether it satisfies user requirements and what users think about it. It is expected that well designed schools would increase levels of satisfaction in pupils and teaching staff.

Reviewing the literature shows that in the UK the Design Quality Indicator (DQI) is a pioneering process for evaluating design quality of buildings. The DQI for Schools (DQIfS) is a version of the tool which is more applicable to the needs of schools. Although stakeholders can at an early stage weight each of the DQI statements according to how they want their school to be designed, it could be argued that it is not a user-friendly tool as the statements have not, on the whole, emerged from school users' views. There are other tools defined for certain types of buildings to assess their quality. One such tool - Achieving Excellence Design Evaluation Toolkit (AEDET) - is the equivalent of DQI, but especially for healthcare buildings and has been developed based on research evidence. Within this tool, one section can be expanded to focus in more detail on the staff/patient environment, through a 'plug-in' called ASPECT (A Staff/Patient Environment Calibration Tool). It is proposed that a similar approach could be taken with the DQI for Schools, but in this context the 'plug-in' could instead focus on the teacher/pupil environment. With this in mind, the next section develops the idea of a teacher-pupil environment evaluation tool, based on the research findings; equally, the proposed tool could stand alone.

7.3.1. A teacher- pupil environment evaluation tool

This research suggests a tool for schools which is for evaluating the quality of the teachers' and pupils' environment in schools (buildings and grounds). The tool delivers a summary that indicates the strengths and weaknesses of existing school buildings and grounds. It also can be used for a new school in order to evaluate and compare designs at the various stages during the design process. This is a useful tool for assessing the whole school environment by non-school users such as architects, planners or designers in order to discover the extent to which a school is likely to be fulfilling teachers' and pupils' expectations. Quality of school design should be discussed, specified and evaluated at various stages. This evaluative tool can be used at early stage of design to allow designers to assess their work based on the two main school users' opinion, at mid- stage of design and at the final stage when school is ready for occupation (to check whether the requirements have been achieved).

Although the content of this tool (categories and various issues) is similar to 'generative tool' its format is different. This tool has two main layers, namely, 'scoring' layer on which each item could be scored and 'guidance' layer that gives more details for each item. There are six headings (sections) and each of them will produce a score. The headings have a number of statements (items) that taken together build up an average score for that heading and summarise how good a school environment is.

In addition, each statement has different weighting that needs to be taken into account. Based on the findings of this study, weighting could be applied, which highlights the importance of each item (and for each user). This weighting score might be applied differently for assessing a primary or secondary school because of different age groups of pupils and their varying needs: though further research is needed to find the accurate weighting for this purpose.

The ranking score is similar to that which was defined previously for the evaluative tool; therefore, a 4 point scoring scale could be used that indicates 4 as the best score it is reasonable to expect and 1 as the poorest score. It needs to be considered whether to save 1 for an impossibly bad scheme or 4 for a perfect scheme. In order to express a level of agreement with a statement, the scores should be used as follows:

1. Awful
2. Okay
3. Very Good
4. Fantastic

In addition, on the scoring layer each statement may be given a weighting of 0, 0.5, 1, 1.5 or 2. This can be used to determine the effect (importance) of each statement in arriving at an overall score for each heading. The weighting score can be applied as follows:

- If a statement is not applicable or can not be used, a weighting of 0 can be applied to remove if from the calculations.

- If a statement was highlighted as 'nice to have' according to previous findings, a weighting of 0.5 can be applied.

- If a statement was highlighted as 'quite important' according to previous findings, a weighting of 1 can be used.

- If a statement was identified as 'important', a weighting of 1.5 can be applied.

- If a statement was highlighted as 'essential' according to previous findings, the highest weighting of 2 can be used: to double the effect of that statement in arriving at the overall score for each heading.

For the statement that both users ranked (common items), an average ranking score was calculated and would be applied as weighting. It needs to be mentioned that occasionally the average scores were increased to the higher close weighting; for example, if teachers ranked a statement as essential (weighting 2) and children ranked it as important (weighting 1.5), the average score of 1.75 was increased to the close weighting of 2. This helps to ease the calculation for weighting scores. The weightings will be presented in the 'guidance layer'.

By considering scoring and weighting together, an individual final score would be obtained for each statement that finally helps to calculate the average score for all the statements under a section. Statements weighted zero (0) are excluded from the calculations. Statements weighted (1) have their score added in once, while those

weighted (2) have their score added in twice. In addition, there might be statements that have 0.5 weighing; therefore, they have half of their score added and those with 1.5 weighing have their score added one and a half times. Although it might seem slightly complex, the guidance layer helps to do this calculation in an accurate way. Finally, the scores are obtained and need to be divided according to the number of statements in each section to reach an average score for that heading.

In addition, there is another part which is called 'levels of confidence' as there might be statements (items) that can be scored quite confidently, while some statements are difficult to respond to because of lack of information or knowledge. In the case of statements that it is not possible to score, a weighting of 0 can be used. There are two levels of confidence to be applied: 'low' or 'high'. This part indicates the confidence level in arriving at the score for each heading. If at least half of the statements have low confidence against them, low confidence would be indicated for that heading overall.

Finally, a note field is used to record optional additional comments about the weighting and scoring values for each statement. It is recommended that this part be completed when a statement can not be scored and weighting of 0 is considered.

This suggested evaluative tool is presented for different aspects of the school environment and includes six major headings which are as follows:

1) Interior
2) Comfort and Control
3) Activity Spaces
4) Nature and Outdoors
5) Exterior
6) Facilities

Following are the six tables which together make this evaluative tool for designers. They present the items in relation to each defined category that need to be scored.

1. Interior

ID	Item (statement)	Scoring				Weighting	Confidence		Note
		Awful 1	Okay 2	Very Good 3	Fantastic 4	0, 0.5, 1, 1.5, 2	Low	High	
1.1	Indoor spaces are safe								
1.2	The length of circulation area is short								
1.3	There is plenty of room for movement in circulation areas								
1.4	Corridors are not cluttered								
1.5	It is easy to find your way around								
1.6	The building is usable by everyone with different abilities								
1.7	The interior looks calm and relaxing								
1.8	The interior looks light and airy								
1.9	The entrance area is welcoming and light								
1.10	There are colourful and attractive décors								
1.11	The interior looks inviting, attractive and inspiring								
1.12	The interior is softly textured								
1.13	The walls and floors are colourful								
1.14	The interior provides means to display art work								
1.15	Interior finishes are durable								
1.16	The interior has a variety of spaces								
1.17	The interior provides flexible spaces								

2. Comfort & Control

ID	Item (statement)	Scoring				Weighting	Confidence		Note
		Awful 1	Okay 2	Very Good 3	Fantastic 4	0, 0.5, 1, 1.5, 2	Low	High	
2.1	Room temperature is appropriate in different seasons								
2.2	Room temperature can easily be controlled								
2.3	There is appropriate heating system								
2.4	There is natural ventilation to provide enough fresh air and can easily be controlled								
2.5	Air-conditioning is provided and can easily be controlled								
2.6	There is good ventilation for toilets								
2.7	There are satisfactory levels of natural light that can easily be controlled								
2.8	Sunlight can easily be controlled								
2.9	There are appropriate types of artificial light that can easily be controlled								
2.10	There are good acoustics to minimise unwanted noise in different spaces								

3. Activity Spaces

ID	Item (statement)	Scoring				Weighting	Confidence		Note
		Awful 1	Okay 2	Very Good 3	Fantastic 4	0, 0.5, 1, 1.5, 2	Low	High	
3.1	There is provision for outdoor learning								
3.2	There are places for rest and meditation								
3.3	There is some decoration in the dining spaces								
3.4	The layout of the dining spaces prevents crowding								
3.5	The furniture in the dining spaces creates a warm atmosphere								
3.6	There are spaces for an administrative hub and for meeting or greeting								
3.7	There is space for caring for sick pupils								
3.8	There are indoor spaces designed especially for play								
3.9	There are spaces for physical activities for pupils								
3.10	The school grounds are suitably equipped for play								
3.11	The physical environment eases talk between pupils and staff in the assembly area								
3.12	There are meeting spaces for teachers								

4. Nature & Outdoors

ID	Item (statement)	Scoring				Weighting	Confidence		Note
		Awful 1	Okay 2	Very Good 3	Fantastic 4	0, 0.5, 1, 1.5, 2	Low	High	
4.1	There is access to landscaped area								
4.2	There is a pets' corner or bird boxes								
4.3	The outdoors looks interesting and versatile								
4.4	The outdoors looks relaxing								
4.5	There are quiet areas for working outside								
4.6	Outdoor spaces are defined by the elements								
4.7	There is a view to nature (when you are inside the building)								
4.8	There is a garden (plants & flowers) inside the building								

5. Exterior

ID	Item (statement)	Scoring				Weighting	Confidence		Note
		Awful 1	Okay 2	Very Good 3	Fantastic 4	0, 0.5, 1, 1.5, 2	Low	High	
5.1	The exterior (building) is colourful								
5.2	There is a connection to the community								
5.3	The building acts as a landmark								
5.4	There is a well-designed (attractive) entrance for the building								
5.5	There is an attractive frontage								

6. Facilities

ID	Item (statement)	Scoring				Weighting	Confidence		Note
		Awful 1	Okay 2	Very Good 3	Fantastic 4	0, 0.5, 1, 1.5, 2	Low	High	
6.1	There is easy access to drinking water inside and outside								
6.2	The storage (cupboards) is close to classrooms								
6.3	There are appropriate lockers to store personal belongings								
6.4	There are shaded/ covered outdoor areas								
6.5	There are easy access fire exits for every space								
6.6	There is easy access to the media and technology space								
6.7	There is scanning of handprints or swipe cards at the school gate								
6.8	There are appropriate chairs								
6.9	There are appropriate tables or desks								
6.10	There is seating in the school grounds								
6.11	There are picnic tables outside								
6.12	There is provision for an audio system								
6.13	There is choice of cold snacks or drinks								
6.14	There are appropriate toilets								
6.15	Toilets are accessible from classrooms								
6.16	There is warm water for washing								
6.17	There is enough room for cloakrooms								
6.18	There are electronic doors								
6.19	There is equipment for various activities in the school grounds suitable for different age groups								
6.20	There is space for a child with particular behaviour problem								
6.21	There is a welcoming place for parents								
6.22	There are parking areas for visitors or parents								

Finally, after scoring all the statements in the above categories, the average scores needed to be brought forward from each heading to the following chart. It finally, presents an overall view of the school environment: its strengths and weaknesses based on the average scores for various headings. In addition, the overall confidence level for each heading could be brought forward to this chart as well.

ID	Headings	Scoring				Confidence	
		Awful 1	Okay 2	Very Good 3	Fantastic 4	Low	High
1	Interior						
2	Comfort and Control						
3	Activity spaces						
4	Nature and Outdoors						
5	Exterior						
6	Facilities						

Despite the complexity of measuring the quality of school design it seems vital. Building Schools for the Future, the government's £45 billion investment programme, aims to rebuild or renew every secondary school in the country by 2020. It is the biggest capital investment in education for 50 years. Good design is therefore fundamental to the delivery of such an ambitious programme (CABE, 2007). The whole school environment needs to work efficiently for all of its users specially the two main users - pupils and teachers.

Using this tool means assessing the visual and spatial quality in terms of six key contexts (headings). Seventy-four statements related to the school building and its grounds can be rated by building assessors such as architects and designers. In addition, evidence based literature that has reviewed and supported the importance of a number of issues or explained the impact of them on users is reported in the guidance layer.

7.3.2. Guidance layer for evaluative tool

This guidance layer presents the calculated weighting score for each item based on its importance indicated by school users and the weightings presented previously (see section 7.3.1). It also highlights the existing evidence based research that relates to each item though the details and references can be seen in Chapter 8 for further explanation in relation to each category and its items (see section 8.3).

In this guidance layer each item has the same ID number that was given in the teacher-pupil environment evaluation tool. This layer includes six main headings and their items as follows:

1. Interior

This section deals with the appearance, character and functionality of indoor spaces.

1.1 Indoor spaces are safe

Interiors need to be safe. Safety is an issue that was essential for teachers; therefore, this item has double weighting. Research shows that students learn best in safe learning environments.

1.2 The length of circulation area is short

Circulation is important in school buildings especially when a great number of students and staff are moving around the building at certain time of a school day at once. Having a short length of indoor circulation was an important issue for teachers; therefore, this item has 1.5 weighting.

1.3 There is plenty of room for movement in circulation areas

Circulation areas need to have adequate width to ease movement through school buildings. This was quite important item for pupils; therefore, this item has weighting of 1. Research shows narrow corridors contribute to aggressive behaviour and arguments among students.

1.4 Corridors are not cluttered

The appearance of circulation areas was essential for teachers who would like the corridors to be neat; therefore, this item has double weighting.

1.5 It is easy to find your way around

Ease of way finding was an important issue for pupils which can be achieved by having signage or navigational system. This item has weighting of 1.5.

1.6 The building is usable by everyone with different abilities

Usability of buildings for all pupils was an important issue. The interior needs to be usable for pupils who are disabled and they should be well accommodated without visual or physical barriers. This item has weighting of 1.5. Research evidence provides a strong rationale for the benefits of inclusive schools.

1.7 The interior looks calm and relaxing

Having calm and relaxing indoor spaces was important for teachers. This item has weighting of 1.5.

1.8 The interior looks light and airy

Teachers stressed the importance of having light and airy indoor spaces. This can be achieved by the use of materials and colour as well as natural or artificial light. This item has weighting of 1.5.

1.9 The entrance area is welcoming and light

However large or small the building is, the entrance area should appear welcoming to staff, pupils and visitors. It also needs to be light with appropriate scale that helps to create a welcoming entrance for the building. This item was important for teachers and should have weighting of 1.5.

1.10 There are colourful and attractive décors

Having decoration which makes indoor spaces colourful and attractive was quite important for teaching staff; therefore, this item has weighting of 1.

1.11 The interior looks inviting, attractive and inspiring

Indoor spaces should be inviting, attractive and inspiring for both pupils and staff. It emerged from children's voices that they prefer clean and tidy indoor spaces as well as up to date design. This item was important for teachers, while quite important for children; therefore, a 1.5 weighting needs to be applied. Research shows that a renovated room, designed to be more friendly and attractive, seems to increase student participation.

1.12 The interior is softly textured

A soft textured surface (e.g. carpet) in indoor spaces was something nice for pupils to have; therefore, this item has only 0.5 weighting. Research shows that a renovated room, including soft furnishings seemed to increase student participation rates in discussions and in asking questions during classes.

1.13 The walls and floors are colourful

Various colours have different effects on children and teachers. Walls and floors should have appropriate colours. This item was more important for teachers as children rated this item as 'nice to have' compared with teachers who rated it as a 'quite important' item. Overall, weighting of 1 should be applied. Research shows that use of nature's colours can create a comfortable and relaxed atmosphere; however, warm colours increase the blood pressure and muscular activity, while cool colours lower both. Colour is identified as one of the issues related to student achievement (test scores).

1.14 The interior provides means to display art work

Art work display (e.g. display cabins on walls) was important for teachers, while for children it was something nice to have. Overall, a weighting of 1 could be applied. Studies show that all users of a school agree that displays of students' work make the school more welcoming. Research shows a correlation between inclusive artwork and positive attitudes among pupils.

1.15 Interior finishes are durable

Materials should be chosen to be strong enough to age gracefully and resist possible damage rather than show wear and staining. This item was important for teachers, while quite important for children; therefore, a 1.5 weighting should be applied.

1.16 The interior has a variety of spaces

Variety is important for indoor spaces in schools. The design should have sufficient variety to create interest in terms of form, mass and scale internally. It was important for teachers though only quite important for pupils; therefore, a 1.5 weighting should be considered.

1.17 The interior provides flexible spaces

In school buildings, flexibility is needed, which allows large spaces to be divided for various purposes. This item was highlighted as important for teachers although quite important for pupils. A 1.5 weighting should be considered.

2. Comfort & Control

Section 2 deals with the comfort levels of the staff and pupils in school buildings and the extent to which they can control those levels.

2.1 Room temperature is appropriate in different seasons

The temperature should be comfortable all year. This item was essential for teachers and important for pupils. This item has double weighting. Research shows that there is strong, consistent evidence for the effects of temperature, on student behaviour and outcomes.

2.2 Room temperature can easily be controlled

Controlling temperature at different times of day or in various seasons was essential for teachers, while quite important for pupils. A 1.5 weighting should be considered. Based on studies, inadequate temperature control has detrimental effects on concentration, mood, well-being, attendance and, ultimately, attainment.

2.3 There is appropriate heating system

Providing an appropriate heating system was essential for teachers; therefore, this item has double weighting.

2.4 There is natural ventilation to provide enough fresh air and it can easily be controlled

Providing windows which can be opened to provide fresh air indoors was essential for teachers, while quite important for pupils. A 1.5 weighting should be considered. There is strong evidence regarding the effects of basic physical variables including air quality on student behaviour and outcomes. Besides, the inadequacies of indoor air in schools is linked to ill-health.

2.5 Air-conditioning is provided and can easily be controlled

Ventilation systems need to be controlled by both users. It was quite important for pupils and essential from the teachers' point of view. This item has weighting of 1.5.

2.6 There is good ventilation for toilets

Good ventilation for toilets was known to be essential for teachers though it is likely also to be a concern for pupils. This item has double weighting.

2.7 There are satisfactory levels of natural light that can easily be controlled

Natural light has various impacts on a building's occupants. During the day and in different seasons natural light levels change enormously and occupants generally would like to be aware of these changes. Appropriate windows, sky or roof lights were suggested by users. Changes in natural lighting can be sudden and frequent and require rapid and easy response. This item was ranked as essential by teachers, while was quite important for pupils. A weighting of 1.5 should be considered. Studies show that lighting has effects on concentration, mood, well-being, attendance and attainment. Furthermore, good lighting conditions can induce positive effects and improve performance.

2.8 Sunlight can easily be controlled

Roller or vertical blinds may be useful to avoid sunlight. This was an important item for both users. This item has double weighting.

2.9 There are appropriate types of artificial light that can easily be controlled

Besides natural light, appropriate artificial lights are important to provide sufficient light in various indoor spaces. Spotlights are preferable to florescent lighting based on issues emerging from children's voices. Pupils and teachers should be able to arrange for a range of lighting effects to prevent glare or provide bright light for studying. This item was highlighted as important for teachers although quite important for pupils. A weighting of 1.5 should be considered. Research shows that children in the full-spectrum lit rooms (compared with standard lighting) were less nervous and paid more attention to the teacher. Also, illness and fatigue in students caused by the usual institutional fluorescent classroom lighting were symptoms that were reversed when a change to full-spectrum lighting occurred. Furthermore, evidence shows that full-spectrum lighting decreases student absenteeism.

2.10 There are good acoustics to minimise unwanted noise in different spaces

Different sources of unwanted noise cause distraction for both users during a school day. Considerations include the insulation of internal spaces as well as external surfaces from any noise sources. It was essential for teachers although it was quite important for pupils. A weighting of 1.5 should be considered. The research linking noise to learning is consistent and indicates that good acoustics are fundamental to good academic performance. Also noise affects student behaviour.

3. Activity Spaces

Section 3 deals with the various spaces needed for different activities in school buildings or grounds.

3.1 There is provision for outdoor learning

Designated open space for learning in school grounds was found to be quite important for pupils. It should be given a weighting of 1. Research shows a significant correlation between the students' test scores and outside learning areas. Research also shows outdoor environments are important to children's development of independence and autonomy.

3.2 There are places for rest and meditation

An appropriate place for rest or chill out at break time was quite an important issue for pupils. A weighting of 1 should be considered.

3.3 There is some decoration in the dining spaces

Decoration on walls in dining spaces was found to be nice to have for pupils; therefore, it has only 0.5 weighting.

3.4 The layout of the dining spaces prevents crowding

It was found that pupils would like a dining space which is not crowded and noisy. Dining spaces need to be calm and joyful places for children. Fast food or self service might be useful to reduce crowding as well as providing enough space with sufficient seats. This item was important for pupils and has 1.5 weighting. Research shows that high density conditions cause excess of stimulation, stress and arousal, a drain on resources available, considerable interference, and reduction in desired privacy levels.

3.5 The furniture in the dining spaces creates a warm atmosphere

Furniture can be flexible in order to provide various seating arrangements for pupils and make the dining atmosphere warm and enjoyable for socialising during dining. It was a quite important item for pupils. The weighting of 1 should be considered.

3.6 There are spaces for an administrative hub and for meeting or greeting

Designing adequate space for administration as well as greeting space for visitors or parents was a quite important issue for pupils. It should be considered a weighting of 1.

3.7 There is space for caring for sick pupils

Pupils stated the importance of having a special space for those children who might be injured or ill in school. This item has 1.5 weighting.

3.8 There are indoor spaces designed especially for play

Children enjoy play at break time, while during rainy days having indoor spaces for play seems reasonable. It was a quite important item for pupils. Weighting of 1 should be considered.

3.9 There are spaces for physical activities for pupils

Pupils need spaces for sports, art related activities in schools. Provision for these spaces was found to be quite important. Weighting of 1 should be considered.

3.10 The school grounds are suitably equipped for play

This item was highlighted as important by teachers; therefore, it has weighting of 1.5. Related to pupils' health, it was reported that the majority of schools that have improved their grounds report increases in healthy, active play. Furthermore, the majority of schools that have improved their grounds report improved behaviour and reduced bullying. Also, children who play regularly in natural environments show more advanced motor fitness, including coordination, balance and agility, and they are sick less often.

3.11 The physical environment helps easy talk between pupils and staff in the assembly area

Assembly space should ease the talk between pupils and staff which was stated to be quite important. Weighting of 1 should be considered.

3.12 There are meeting spaces for teachers

Teachers would like to have a space for meeting and gathering at break time. It was highlighted as important; therefore, a weighting of 1.5 should be considered.

4. Nature & Outdoors

This section deals with the extent to which pupils and staff have contact with the natural world both around and inside the school building.

4.1 There is access to landscaped areas

Access to usable landscaped areas such as trees, garden, mazes, grass and ponds emerged from children's voices as quite important for pupils. This item was important for teachers. A weighting of 1.5 should be considered. Research shows exposure to natural environments improves children's cognitive development by improving their awareness, reasoning and observational skills

4.2 There is a pets' corner or bird boxes

Pupils are curious to see wildlife in their school. This item was found to be something nice to have for pupils; therefore, it has only 0.5 weighting.

4.3 The outdoors looks interesting and versatile

Interesting and versatile outdoor areas, which exhibit some degree of change and unpredictability, are attractive for pupils. This item was defined as quite important. The weighting of 1 should be considered.

4.4 The outdoors looks relaxing

Although pupils prefer interesting scenes, relaxing outdoor spaces might be useful for some children with particular behaviour problems or in stressful situations. This item has only 0.5 weighting. Research shows nature buffers the impact of life's stresses on children and helps them deal with adversity.

4.5 There are quiet areas for working outside

This item was identified as nice to have for teachers and has only 0.5 weighting. A study conducted with teachers shows that adequate outdoor space where people could relax and socialise was a key issue for a large number of them.

4.6 Outdoor spaces are defined by the elements

Designing outdoor spaces that are not too exposed or open and are defined by design elements was a quite important item for pupils. The weighting of 1 should be considered.

4.7 There is a view to nature (when you are inside the building)

Natural scenes are known to be calming. A view to nature to see seasons changing, plants and trees was quite important for pupils who spend a long time indoors, while nice to have for teachers. It has a weighting of 1. Research shows that children with

views of and contact with nature score higher on tests of concentration and self-discipline.

4.8 There is a garden (plants & flowers) inside the building

An indoor garden was desirable for teachers. A weighting of 0.5 could be considered.

5. Exterior

This section deals with the way a school building appears externally.

5.1 The exterior (building) is colourful

This item was identified as quite important item for pupils and has weighting of 1.

5.2 There is a connection to the community

A connection to the community through building and landscape was found to be a quite important item for pupils. The weighting of 1 should be given.

5.3 The building acts as a landmark

It was a quite important item for pupils. The weighting of 1 should be considered.

5.4 There is a well-designed (attractive) entrance for the building

This item was important for teachers, while quite important for pupils. A weighting of approximately 1.5 should be given.

5.5 There is an attractive frontage

This item was identified as important for teachers; therefore it has a weighting of 1.5.

6. Facilities

It deals with a number of facilities that have been found to be important for pupils, teachers or both in schools.

6.1 There is easy access to drinking water inside and outside

Accessible drinking water indoors and in school grounds was identified as an important item for both teachers and pupils; therefore it has a weighting of 1.5.

6.2 The storage (cupboards) is close to classrooms

This item was identified as important by teachers. It has a weighting of 1.5.

6.3 There are appropriate lockers to store personal belongings

Pupils need properly sized, secure lockers in which to put books, bags and coats, and which look nice, are durable and graffiti-proof. Locker design should allow personalisation by children. This item has weighting of 1.5. Studies show that lockers are one of the factors which are positively related to student achievement scale scores.

6.4 There are shaded/ covered outdoor areas

A waterproof covered shelter for eating, resting and socialising was quite important for both school users. A weighting of 1 should be considered.

6.5 There are easy access fire exits for every space

This item was identified as important for pupils; therefore it has weighting of 1.5.

6.6 There is an easy access to the media and technology space

This item was highlighted as quite important. A weighting of 1 should be considered.

6.7 There is scanning of handprints or swipe cards at the school gate

Security was identified as a quite important issue as was the design of security systems at the school gate. A weighting of 1 should be considered.

6.8 There are appropriate chairs

Appropriate chairs are needed, which should be soft cushioned, with adjustable height and variation for different body sizes. A weighting of 1 should be given for this item which has been quite important for pupils. A study on classrooms shows that children showed a significant improvement in on-task behaviour and a marked change in sitting positions following the introduction of newly (ergonomically) designed furniture.

6.9 There are appropriate tables or desks

There is a need for appropriate tables in school which are adjustable, movable, and foldable with holders, and which do not scrape pupils' knees. This item has been identified as important with weighting of 1.5. Studies show that lack of 'a proper desk and chair' inhibits a teacher's ability to do their job.

6.10 There is seating in the school grounds

Seating (benches) outside for eating or resting was stated as quite important. A weighting of 1 should be considered.

6.11 There are picnic tables outside

Providing picnic tables for eating outside was quite important for pupils. A weighting of 1 should be considered.

6.12 There is provision for an audio system

Playing gentle music seems desirable for pupils and providing an audio system for this purpose was identified as quite important. A weighting of 1 should be given.

6.13 There is choice of cold snacks or drinks

Providing space for vending machines helps pupils have choice of more types of snacks and drinks, which was highlighted as important by pupils. This item has weighting of 1.5.

6.14 There are appropriate toilets

Appropriate toilets in schools were identified as a main concern. Easy access toilets should be designed. The materials need to be graffiti-proof. Basins for rinsing off mud and adequate hand dryers should be provided for pupils. This was an important item for both users and should be given a weighting of 1.5. There are common, consistent findings that using substandard toilet facilities during the school day has a negative impact on children's and young people's health and development. Evidence emerging from studies also shows that toilets were one of the key factors which teachers felt had a negative impact on pupil behaviour, are seen by many as small, confined spaces, and often unsupervised by teachers: making them hot spots for pupil misbehaviour.

6.15 Toilets are accessible from classrooms

Accessibility of toilets from classrooms was stated as important by teachers. This item has weighting of 1.5.

6.16 There is warm water for washing

This item was identified as important for teachers; therefore it has double weighting. This item has weighting of 1.5.

6.17 There is enough room for cloakrooms

The design of cloakrooms with adequate space should be considered and was a quite important item for teachers. A weighting of 1 should be considered.

6.18 There are electronic doors

This is a quite important consideration for teachers. A weighting of 1 should be given.

6.19 There is equipment for various activities in the school grounds suitable for different age groups

Children would like to be active at break time and at different ages they enjoy different activities. Providing age appropriate equipment for pupils such as space for ball games was identified as quite important. A weighting of 1 should be considered.

6.20 There is space for a child with particular behaviour problem

This item was important for teachers; therefore, a weighting of 1.5 should be given.

6.21 There is a welcoming place for parents

Designing a space for meeting and greeting pupils' parents was important for teachers. This item has weighting of 1.5.

6.22 There are parking area for visitors or parents

This item was important for teachers; therefore, it has weighting of 1.5.

This 'guidance layer' alongside this defined evaluative tool would help school designers to evaluate the quality of an existing school or a new school by consideration of the given scores and the weighting that each item obtained according to school users' opinions. It is hoped it would be led to design of more satisfactory schools for both children and teachers. Further research is needed to develop this tool by involving other school users' opinions for informing the design process.

Chapter 8 – Discussion and conclusion

8.1. Overview

In this chapter, the research thesis will be discussed in relation to previous research findings. Implications will then be outlined in terms of research design, school design process and research methodology to involve school users in the design process. The chapter highlights the limitations of this research and ends with concluding comments.

8.2. Summary of findings

The research has shown that the two groups of participants have different priorities in terms of the types of things (issues) in their environment that are more important to them. This is perhaps not surprising because of their different roles within the school environment and their different age groups. In comparing the overall importance of categories for the two user groups, all categories were rated higher by teachers except Nature and Outdoors, which was rated equally by both users and became the least important category for them. The most important category for children was Facilities and for teachers was Comfort and Control. The relative importance of the remaining categories for the two user groups is reported below (see 8.3).

In addition, comparison of school users' 'satisfaction' shows that the new schools are not necessarily perceived to be better. Children were not very satisfied with their schools in the two cases explored and mean scores of 1.95 - 2.50 (out of 4) for the new school may show that architects might have failed to design a completely satisfactory school for children; however, based on the results on overall satisfaction for six categories in each school, they were more satisfied than their teachers with their schools (the highest mean score is 2.1 for teachers). Overall, among all the categories, Comfort and Control is the category that teachers are least satisfied with though it seems difficult to find the least satisfactory category for children in two schools as their views are different.

8.3. Relationship to previous research findings

This section will present a number of areas in which the current work relates to previous findings by other researchers. Overall, the number of studies involved both teachers and pupils being questioned on their opinions about their school environment has been very

small; however, a number of issues that Sanoff et al. (2001) found out in his study with both the school users were similar with what participants highlighted as important in this research. In addition, about different opinions' of school users, the finding of this study is supported by a study conducted by Ahrentzen and Evans (1989) in five elementary schools revealed that teachers' and children's prioritising of these needs differ considerably though that study was only about classrooms.

Moreover, as far as the knowledge extended, both the opinion-based and evidence-based literature reviewed are discussed in relationship to the findings of this research. Although linking the findings to the previous findings has been a challenge because of the originality of this research and lack of similar studies, the current work in general is found to support and extend previous work, especially through the contribution of school users' views organised around six defined categories and related items (issues).

- **Indoor Spaces**

From school users' views related to this category, 17 items emerged and it was the third most important category for teachers and the fourth for children. Interior (indoor spaces) includes six sub-categories - safety, circulation, use, appearance, material and character.

Safety was identified as an important item in this study. Previous research findings and design guidance have also emphasised the importance of safety. It was stated by Dudek (2007) to be a vital factor which affects students' learning. It also was highlighted as one of the design principles fundamental to developing a school building assessment programme (Lackney, 1998) and mentioned by Sanoff et al. (2001) as one of the main components of any assessment tool for schools.

In addition, four items related to 'circulation' and wayfinding emerged in this study as being important for school users. This importance was also reflected in the literature, with Dudek (2007) claiming that well designed circulation will promote a positive ethos and make sense of a building as a coherent public institution. Other research findings stated that circulation patterns surrounding activities encourage children to look around and see what is available; and fluid traffic patterns provide a means for better communication (Loughlin and Suina, 1982; Moore and Lackney, 1995). Circulation and wayfinding were described by Sanoff et al. (2001) as one of the main components of the assessment tool for schools.

'Colour' was another relevant issue; 'colourful walls and floor' were identified as a 'nice to have' item for both users in this study. Also, 'colourful and attractive décor' was stated as quite important by teachers. There has been a considerable amount of research and many suggestions about this issue in schools. The effects of colour on creating a comfortable and relaxed atmosphere (Hathaway, 1987) on blood pressure (Taylor and Gousie, 1988), on productivity and accuracy (Engelbrecht, 2003), on students' achievements (Tanner and Lackney, 2006) and on 'children's cooperative behaviour' (Read et al., 1999) were specified. In addition, consideration of appropriate colours for different age groups (Engelbrecht, 2003; Pile, 1997), for different activity spaces (Pile, 1997) and for protecting eyesight and in promoting physical and mental health (Mahnke, 1996) were emphasised.

'Means to display art work' was another issue in this category that was identified as important for teachers, but something nice to have from pupils' points of view. In another study, teachers mentioned the decorative function of display in creating more attractive learning spaces (Teacher Support Network, 2007). Other researchers also emphasised its importance to the classroom environment (Dudek, 2000) and its potential to make the school more welcoming (Maxwell, 2000); and a correlation between inclusive artwork and positive attitude (Killeen et al., 2003) was found. It was, moreover, one of the defined patterns for design of schools (Nair & Fielding, 2005) and one of the design principles fundamental to development of a school building assessment programme according to Lackney (1998).

The need for having an 'inviting, attractive and inspiring interior' in schools was important for teachers, while quite important for children. Other researchers stated the importance of providing attractive modern environments (Dudek, 2007). Attractive and friendly rooms were also found to increase student participation (Sommer and Olsen, 1980).

'Flexibility' and 'variety' were other emergent issues related to character of indoor spaces. The findings of this study identified both of them as important for teachers although quite important for pupils. Flexibility and spatial variety were highlighted as design principles fundamental to developing a school building assessment programme (Lackney, 1998). Dudek (2007) points out the increasing need for flexibility in today's schools; and it was also included as a pattern for design of schools (Nair & Fielding, 2005).

'Welcoming and light entrance area' was identified as important for teachers though there has not been much further evidence to support this issue; however, a welcoming entrance was named as one of the proposed patterns for design of schools (Nair & Fielding, 2005). 'Calm and relaxing interior', and 'light and airy interior' were two important items for teachers, whilst 'softly textured interior' was only 'nice to have' for pupils: in the literature reviewed, these items were not highlighted by other researchers in the context of schools. Moreover, usability of buildings by everyone, including people with disabilities, was identified as important for pupils, although very little detailed relevant evidence was found in the research, except for a general emphasis on designing inclusive schools (Gathorne-Hardy, 2001) . Finally, 'durable finishes', which were important for teachers and quite important for children, have rarely been mentioned specifically in the context of school design perhaps because it is taken for granted that this will be a requirement.

- **Comfort and Control**

With 10 related items emerging from school users' views, Comfort and Control was the most important category for teachers and the third most important category for children. It has four sub-categories in this study - temperature, ventilation, lighting, and acoustics.

Comfort was stated to be one of the key elements in school building assessment (Sanoff et al., 2001); and some findings emphasised amalgamations of several comfort issues. It was found that inadequate temperature control, lighting, air quality and acoustics have detrimental effects on teachers and learners: in particular, on concentration, mood, well-being, attendance and, ultimately, attainment (Higgins et al., 2005). Illumination, temperature and ventilation were also seen as criteria essential for meeting the demands of learning based schools (Lang, 1996).

Provision and control of 'ventilation' was important to teachers and pupils in this study. Other findings confirm its importance in educational establishments (Kimmel et al., 2000; Khattar et al., 2003), and link inadequacy of ventilation to ill-health (Ahman et al., 2000). 'Natural ventilation' was also included as one of the patterns for design of schools (Nair & Fielding, 2005).

Provision and control of appropriate 'lighting' were important to teachers and pupils in this study. Previous design guidance and research has also emphasised the importance

of direct and indirect lighting, adjustable lighting controls and blinds to provide greater options in lighting levels in the classroom (Barnitt 2003; Butin, 2000). Other research findings have shown a relationship between lighting quality and type and student well-being and attention levels (Ott, 1976; London, 1988; Harmon, 1991; Dunn et al., 1985), suggesting that very real concerns support the users' innate knowledge and views on this matter. Moreover, daylight and full-spectrum lighting were included as patterns for design of schools (Nair & Fielding, 2005)

Finally, 'acoustics' was a very important issue for teachers, while it was quite important for pupils. Evidence shows that noise interferes with learning (Gifford, 1987); therefore, good acoustics are fundamental to good academic performance (Schneider, 2002): especially in classrooms for all age groups (Dudek, 2007), as activities within the classroom contribute considerably to the ambient sound level (Wohlwill and Heft, 1991). It is regarded as one of the criteria essential for meeting the demands of learning-based schools (Lang, 1996).

- **Activity Spaces**

With 12 related items emerging from this study, Activity Spaces was the second most important category for both school user groups. This heading was divided into sub-headings of 'use', 'character' and 'appearance'.

Among the items, 'provision for outdoor learning' was found to be quite important for pupils. Other research findings confirmed its importance (Casey, 2003) and its correlation with students' test scores (Tanner and Lackney, 2006). 'Spaces for physical activities for pupils' was found to be a quite important item, whilst 'art, music and performance' and 'physical fitness' were identified in style guidelines as patterns for design of schools (Nair & Fielding, 2005). Furthermore, it is stated that physical activity can enhance learning (Jensen, 1998) and is essential to the well-being of students (Schneider, 2002).

In addition, with regard to dining spaces, 'the layout of the dining spaces prevents crowding' and 'creating warm atmosphere by furniture in the dining spaces' were identified as important and quite important for pupils respectively: although 'decoration' was only a 'nice to have' item. Previous findings also highlighted dinner halls and

canteens as frequently raised issues among pupils (Sorrell, 2005); and 'casual eating area' was included as one of the patterns for design of schools (Nair & Fielding, 2005).

There are, however, a number of items that this study found important or quite important, which expose a lack of research on the specific activity spaces identified by pupils and teachers; for example, 'space for caring for sick pupils' and 'meeting spaces for teachers' were identified by both as important. 'School grounds are suitably equipped for play' and 'indoor spaces designed especially for play' were highlighted as important and quite important respectively. Moreover, 'physical environment that helps easy talk between pupils and staff in the assembly area', 'spaces for an administrative hub and for meeting or greeting', and 'places for rest and meditation' were stated to be quite important for pupils. However, there has been little research into the use and impact of these spaces, which mostly belong to children: perhaps because research is so often driven by adult concerns and agendas rather than children's. Therefore, this could suggest areas for further research.

- **Nature and Outdoors**

Some literature does exist in relation to the issues which emerged for this category: although this category was identified as the least important for both school users. Although there might be various reasons for this perceived lack of importance, some research has indicated that more often than not school grounds have been identified as meeting neither the social, play nor educational needs of their users (Adams 1989, Denton-Thompson 1989, Department of Education 1990, Sutton-Smith 1990). There is therefore a strong case for changing outdoor spaces. This category was divided into 'access, 'view', 'use', 'vegetation', 'character' and 'appearance' for the purposes of this study.

Among the eight items belonging to this category, 'access to landscaped areas' was identified as the most important. Other research findings claim that exposure to natural environments improves children's cognitive development (Pyle, 2002), buffers the impact of life's stresses on children (Wells, 2003) and stimulates social interaction between children (Moore, 1986; Bixler et al., 2002).

Three items were identified as quite important: 'outdoor spaces are defined by the elements', 'interesting and versatile outdoors' and 'a view to nature'; however, in

previous findings, only 'view' was mentioned. It was stated that children with views of nature score higher on tests of concentration and self-discipline (Wells, 2000, Taylor, 2002), whilst in Heshong's (2003) study, teachers showed a preference for classrooms with windows and views.

In addition, 'a pets corner or bird boxes', 'relaxing outdoors', 'quiet areas for working outside' and 'a garden inside the building' were the other issues that exposed a lack of relevant research. Although these items have been identified as 'nice to have' in this study, further research could highlight their impact on children or teachers.

- **Exterior**

With only five items, this category was among the least important categories for school users. There has been a lack of literature connected to the way a school building appears externally. The only two items that could be found in previous studies are 'connection to community' and 'local signature' (making school a landmark in the community), which are included as patterns for design of schools (Nair & Fielding, 2005).

- **Facilities**

'Facilities' was identified as the most import category for children but one of the least important categories for teachers. Relating to the 22 items emerging from this category, very little evidence could be found in previous studies.

'Easy access to drinking water' was identified as an important item for both teachers and pupils. The importance of access to drinking water was verbalised as 'fresh, clean drinking water is essential to maintain good health, especially in children' (Walters & Cram, 2002). In another study, teachers expressed their desire to have water in the classroom (Heshong, 2003).

'Appropriate toilets' and 'accessible toilets' were identified as important issues. Other studies show that teachers felt that 'toilets' had a negative impact on pupil behaviour (Teacher Support Network and the British Council, 2007). The impact on pupils' health and development was emphasised (Children's Commissioner for Wales, 2004). Toilets

were highlighted as a concern of almost every child in the School I'd Like competition (Burke and Grosvenor 2003), and were one of the common issues for pupils in joinedupeschoolsfordesign (Sorrell, 2005).

'Storage close to classrooms' and 'appropriate lockers' were found to be important items. Other studies also show teachers' desire to have lots of storage in the classroom (Heshong, 2003). Accessible, well thought out storage can lead to more time spent learning (Gump, 1987; Loughlin & Suina, 1982). Storage (lockers) was one of the common issues for pupils in 'joinedupeschoolsfordesign' (Sorrell, 2005), and lockers were one of the factors related to student achievement scale scores (Cash, 1993). Moreover, 'individual storage' was included as one of the patterns for design of schools (Nair & Fielding, 2005).

Having appropriate 'tables or desks' and 'chairs' were identified as important and quite important issues respectively for pupils. Previous findings show the link between on-task behaviour and a marked change in sitting positions following the introduction of newly (ergonomically) designed furniture (Knight and Noyes,1999). In addition, the provision of adjustable furniture is suggested: to cater for different sizes of children (Zandvliet & Straker, 2001). 'Soft seating' was named as one of the patterns for design of schools (Nair & Fielding, 2005). These two issues also arose from the voices of children in the School I'd Like competition (Burke and Grosvenor 2003).

There are, however, other important or quite important items emerging from the findings of this study on which there is lack of research. This might be because they were mostly concerns of children and research so often is driven by adult concerns and agendas rather than children's. In terms of specific items, 'easy access to fire exits', 'access to warm water', 'parking area for visitors or parents' were identified as important: yet research is lacking. That these three items have rarely been mentioned, is probably due to them being taken for granted as requirements. However, two items which were identified as important remain unexplored by researchers, namely, 'space for a child with a particular behaviour problem' and 'a welcoming place for parents'. Further research is suggested to find their impact on school users.

8.4. Implications and further research

According to the literature review, there have been few studies directly exploring children and teachers' views about their school environments. Previous studies highlighted some of the physical and psychological aspects of schools which affect students' health, behaviour, well-being and achievement in schools; however, majority of them have not asked children or teachers about their opinions of their physical environment. Also, although certain published studies gathered children voices (The School I'd Like, Joinedupdesignforschools and Young Design Programme) and highlighted a number of issues; however, a rigorous classification of the issues highlighted was not carried out with a view to informing school design. Furthermore, the issues raised by those studies were not tested with a large number of children in the way that this study has tried to accomplish.

This research has some implications for research methodology. This study carried out two qualitative exploratory studies with children to gather their voices. It also analysed and categorised the various items which emerged from the three major studies in the UK (indirect voices of children) to make an evaluative tool (questionnaire) based on them. It also conducted an exploratory study to gather teachers' voices and make a similar evaluative tool to be applied to them. Therefore, these evaluative tools were original and emerged from analysis of the issues raised by pupils and teaching staff themselves.

The questionnaires were tested in two schools with significant numbers of the relevant school users. By including both viewpoints, the findings were useful for assessing the success of the questionnaires as evaluative tools and in turn, for making a generative tool (framework) for school design. The findings also helped in adding a weighting to each category and to individual items based on their importance for users. In addition, this study introduced some new issues that both users identified in their questionnaires.

The findings of this study therefore have implications for research design and school practice. This study aimed to gain a unique perspective on the experience and views of school users. Of relevance to the architecture of school environments, this study demonstrated how research can be embedded in the schools to find school users' opinions about the success of their schools. Furthermore, it expanded the potential for the researcher's role and it provided a new 'evaluative' tool (questionnaire) for school

design assessment which can be applied by school authorities to investigate children's and teachers' satisfaction with physical features and special qualities of their schools or the relative importance of various issues for them. Therefore, the tool can be used as a whole or in part, depending on the aim of its application, and it can be tested in a wide range of schools across the country (the UK), so that the evidence gained in this study can be developed.

Another implication for school design is, that research which generates first hand accounts of people (users), facilitates knowledge transfer of findings. For school practice, a 'generative' tool (framework) may facilitate the initiation of the work of tailoring the school design to individual (users') needs. This framework can therefore be extended and improved by further research in both primary and secondary schools. Over time, research involving school users and its associated methods can contribute to theory-building and hopefully to improving the design of the built environment of schools for both pupils and teachers.

Finally, the findings helped to make a tool for evaluating the quality of staff and pupil environments. This may be a useful tool for assessment of the whole school environment by non-school users such as architects, planners or designers: in order to discover the extent to which the school is fulfilling users' expectations by involving the users in assessing their own environments. There are also environmental design implications for schools based on the findings. But, since a school environment has human and social as well as built and physical aspects, environmental design needs to address both to create a desirable place for both users. The results could inform the long-term programme for the renovation or replacement of school buildings currently being undertaken in the UK.

8.5. Limitations

There have been limitations to this study. One of the limitations is the small number of schools participating in this study, as pupils and teachers in only two schools have been involved; however, the number of participants has been significant. Also the two schools were in one city (Sheffield) in England with two different location and socioeconomic status. Each of these factors could potentially bias results, although there is no evidence to suggest that the participating schools were not typical of state-funded schools around England. The other limitation is the age issue. This study gathered opinions from

children aged 11-12 years, for reasons which have been explained, but it is acknowledged that the issues raised and their relative importance could potentially change according to age group. Further study is recommended for development of the 'evaluative tool', as well as the testing of the 'generative framework' in a greater number of schools in different locations in the UK, with teaching staff and children from different age groups, in order to make school design more age-appropriate.

In addition, this study was also limited to two main users of schools, though there are other user groups whose voices might constitute valuable input to school design. Further research could be carried out to explore these other user voices. The response rates from teachers were low compared with those of pupils and might not be representative of all the teaching staff in those two schools. Also the majority of teachers were female that took part in this study whereas participating pupils were equal in numbers for each gender.

Another limitation of those taking part was intrinsic to their views; they could only draw on their own experience; however, there might be issues that they have not included because they are beyond their experience. It is possible therefore, that the results reflect a relatively traditional vision of school and education. Therefore, it might be questionable whether the developed tools allow for new visions of learning approaches and environments or not. To counter this potential weakness, it is suggested that the tools be used as just one part of an over all strategy for visioning future school environments. However, despite this lack, the findings are valuable to bridge the gap that exists between designers and the addressed school users, as their views - fundamental for a design of school - can be heard. Moreover, if the proposed questionnaire were to be refined and developed over a number of years to reflect the broadening experiences of teachers and pupils engaging in school design and using new schools, continued use of the questionnaire could also inform the proposed generative and evaluative tools, reducing their potentially conservative nature.

Finally, this study was unable to test the tools with architects and designers and discover how useful the generative tool might be for them and to what extent the scoring approach would be useful for assessing the quality of school environments. Further research is suggested to develop the findings and resolve the unexplored issues.

8.6. Conclusion

A problem identified from the literature review was that there appeared to be gaps between school users and designers. This thesis is an effort to bridge that gap by involving school users in the design process by making a framework based on their voices to inform architects and designers about the issues that need to be considered in design of a school. The research objective required three separate studies to be undertaken: analysis of secondary data, exploratory and empirical studies, each leading to the next one. This thesis has attempted to understand the views and expectations of pupils and teachers about their school environments.

In assessing what this research found and how successful it has been, the research questions and aims are reviewed.

The first question of this research was:

- What are children's and teachers' concerns about physical features and spatial qualities of their schools?

The research reveals a number of issues that are concerns for both user groups. It has shown that there are issues in the schools that children or/and teachers are not satisfied with. The findings show that teachers and pupils are not necessarily more satisfied with recently built schools as compared with much older schools.

It has also been revealed the two groups of participants have different priorities in terms of the types of things (issues) in their environment that are more important to them. In comparing the overall importance of categories for teachers and pupils, 'Nature and Outdoors' became the least important category for both school users. 'Facilities' was the most important category for pupils though 'Comfort and Control' was the most important category for teachers.

The second research question was:

- Are there any consistencies in the voices of users about their school environments that could inform the school design process?

In response, it needs to be said that there have been clear patterns in their responses suggesting that the pupils surveyed had similar views and teachers had similar views about design issues of their school environment. There have also been consistencies among the voices of pupils and teachers as the findings have shown, especially about the importance of various design issues in their schools.

The findings, which highlighted the importance of various issues to each user, can help designers to consider the priorities of various issues in the design process; however, their different views about common issues also reveal the complexity of satisfying both perspectives in terms of school design.

The evidence of this study indicates that pupils and teachers are sensitive to and articulate about their architectural environment in school. They are able to differentiate between poor and good environments and to express clearly what they like and dislike about them. Most of the architectural features rated by school users seem important for them and apparently to have a bearing on improving the atmosphere and quality of schools. Evidence also shows the importance of a great number of emergent issues in connection with the well-being of school users.

The sub-questions related to methodology have been as follows:

- How could the school users' opinions about their schools be gathered?
- How could pupils and teaching staff be involved in this research?

Regarding pupils, findings show different methods can be used for different age groups. Visual methods proved especially effective qualitative research methods for small scale research with children of 5-7 years although the children of 6-7 years old also showed their capability to write their views briefly. However, when a significant number of older pupils are involved in research, questionnaires could be a useful method for gathering their voices and work well with the school schedule's serious time constraints.

For teachers, open-ended questionnaires and interviews proved to be practical for gathering their voices directly in small numbers, though the closed questionnaire also could work well at this small scale; however, their willingness to fill in their questionnaire was not enormous which could be related to their freedom to fill them in during a week, as opposed to children who were given a specific time to complete their questionnaires.

Perhaps headteachers could help to arrange meeting to gather teachers' views in a more organised way in schools.

Moreover, concerning the use of questionnaires, it can be argued that the questionnaire as a research tool can help to promote children's and teachers' participation in research especially if its content (questions) is based on their voices (and not policy makers/ architects' voices). However, questionnaires are not suggested to be used instead of face-to-face contact – especially with pupils. Ideally, questionnaires would be used in combination with qualitative, face-to-face methods with children and teachers.

It can be suggested questionnaires can be more interesting for participants to respond to when 1) it has been based on other pupils or teachers' views 2) an open section of questionnaires is included to allow both pupils and teachers to include their additional views/ comments about their school environment that are not included in the questionnaires 3) school users are informed their voices are important and would be included in future design of schools.

Questionnaires as an evaluative tool has been suggested and tested previously based on the Technical Report, Evaluation of Building Schools for the Future (Price Waterhouse Coopers, 2007), and the views of Pupils and headteachers pupils' about different aspects of schools including 'school buildings' asked and analysed; however, the design of these questionnaires can be developed and be user-based instead. In this respect, the designed evaluative tools (questionnaires) for both pupils and teachers can be suggested to be as part of this programme (BSF) for evaluation.

Generally, questionnaires help researchers to save time to gather a large amount of data in a short time. Perhaps, if used carefully, this method could allow almost all pupils or teaching staff to participate in research about schools across England. This could have benefits for the success of Building Schools for Futures (BSF) and Capital Primary Programmes (CPC) and the success of UK Government policies that spend such a significant amount of money on school buildings. The analysis of data collected by means of questionnaires also could help policy makers to be convinced by the statistical reports and observe the areas that need change or improvement in the existing BSF and CPC programmes.

Overall, the research has been successful to meet the thesis' main aims; it could 'identify, clarify and compare aspects of school design that concern teachers and pupils'

and 'present this information in a format that might inform designers and architects involved in school design' by developing design tools which are based on the gathered views of pupils and teachers.

Finally, involving school users, especially children and teaching staff, in the design process of schools seems to have a particular importance in producing greater satisfaction and improving school design, especially in the context of the Building Schools for the Future (BSF) and Primary Capital Programme (PCP) that aim to rebuild or renew schools in the UK. Therefore, the need for a framework for school design is more obvious than before. This is an area which needs more exploration and research is essential in order to move that work forward.

Appendices

Appendix 4A: The briefs extracted from 'The School I'd Like' project

Birkett (2001a) unveils 'The Children's Manifesto' as follows:

> "We, the schoolchildren of Britain, have been given a voice. This is what we say:
>
> **The school we'd like is:**
>
> **A beautiful school** with glass dome roofs to let in the light, uncluttered classrooms and brightly coloured walls.
>
> **A comfortable school** with sofas and beanbags, cushions on the floors, tables that don't scrape our knees, blinds that keep out the sun, and quiet rooms where we can chill out.
>
> **A safe school** with swipe cards for the school gate, anti-bully alarms, first aid classes, and someone to talk to about our problems.
>
> **A listening school** with children on the governing body, class representatives and the chance to vote for the teachers.
>
> **A flexible school** without rigid timetables or exams, without compulsory homework, without a one-size-fits-all curriculum, so we can follow our own interests and spend more time on what we enjoy.
>
> **A relevant school** where we learn through experience, experiments and exploration, with trips to historic sites and teachers who have practical experience of what they teach.
>
> **A respectful school** where we are not treated as empty vessels to be filled with information, where teachers treat us as individuals, where children and adults can talk freely to each other, and our opinion matters.
>
> **A school without walls** so we can go outside to learn, with animals to look after and wild gardens to explore.
>
> **A school for everybody** with boys and girls from all backgrounds and abilities, with no grading, so we don't compete against each other, but just do our best."
>
> **"At the school we'd like, we'd have:**
>
> Enough pencils and books for each child.
>
> Laptops so we could continue our work outside and at home.
>
> Drinking water in every classroom, and fountains of soft drinks in the playground.

School uniforms of trainers, baseball caps and fleece tracksuits for boys and girls.

Clean toilets that lock, with paper and soap, and flushes not chains.

Fast-food school dinners and no dinner ladies.

Large lockers to store our things.

A swimming pool.

This is what we'd like. It is not an impossible dream."

Birkett (2001b) reports children's voices with slightly different headings (two joined headings) and with more details which are as follows:

A beautiful and comfortable school

"Crumbling Victorian edifices, damp 60s structures, flimsy cabin classrooms. Our poorly designed schools are in utter disrepair."

"Most entrants wanted to change this element of their education first, and their fresh designs ranged from the practical to the fantastical."

"Domes were very popular - the larger the better, usually made of glass. Many children complained of not enough light, or the wrong kind ("hell with strip lighting") in which to work. Inside was just as important as outside."

"Other spaces were called for - quiet study rooms, common rooms, and chill-out rooms. Seats should be softer, tables higher. Overheated classrooms were uncomfortable."

"Drink machines or fountains spouting fizzy drinks as well as water should be dotted about. Children are sick of being thirsty. Lockers should be provided (because "curvatures of the spine at our age are not good")."

"Nearly every entry talked about toilets. They were dirty, smelly and neither the chains nor the locks worked. There were pleas for paper and soap. This is not a trivial issue."

A respectful and listening school

""Respect" was the single word that occurred most; it was what the children wanted, yet felt they didn't get. They were cajoled into doing work they weren't interested in, made to fit into someone else's ideal curriculum, and most of all not listened to. They were treated like kids. Few objected to rules - in fact, most children wanted clear guidelines. It was unfair rules, written only for the benefit of the adults, that they objected to. Some had a few kind words for the rule enforcers - the teachers; many felt they were bound by

Sats results and league tables. But no one was hated as much as a bad, boring teacher. Some suggested they should be eliminated altogether, replaced by machines ("telly teachers"). But most argued that they should be retrained to become more flexible, understanding and enthusiastic."

"How should pupil power and opinion be exercised? There were many suggestions: pupils on the board of governors; voting for teachers; a school board with a girl and boy from each class (equal representation of the sexes was a concern); replacing school assemblies with debates; five minutes' feedback after daily register. The physical environment should reflect this new openness, with rows abolished in favour of circles."

A relevant and flexible school

"The message was clear: school is boring, but it doesn't have to be that way. If only lessons were made more relevant, learning could be fun. Subjects should be explored through experience, by doing rather than being shown."

"The suggestions were innovative, from school dinners themed on space food or second world war rationing, to geography trips to tropical rainforests."

"Children were against the strictures of the national curriculum, which prevented them tackling subjects in depth. Technology was an aid to more flexible study, allowing teachers and pupils to work from home. They embraced it, often wanting more computers, used more imaginatively."

A school without walls

"Trees, animals and grass should be part of every school landscape. Primary school pupils in particular wanted the natural world to intrude into their school, rather than be fenced off from it, suggesting pet corners, zoos and wild gardens instead of playgrounds. There could be bird boxes and picnic tables to eat outside in the summer."

"Nature and technology could complement each other; pupils could use their laptops outside. These demands for more outside areas are not being met; school playing fields continue to be sold and grass areas built over by classrooms." "Some pupils imagined schools that took place entirely in the open air, or even underwater."

A safe school

"Many children were concerned for their safety. They wanted the school grounds to be protected by scanning handprints at the school gate, an intercom, or swipe card. They wanted fire exits in every room, first-aid classes (many drawings of accidents waiting to happen were submitted), and holes in the playground to be filled in so they didn't fall."

"Other children could also make them feel secure. "Buddy systems", where older children look out for younger, especially in the first year of secondary, were suggested. Bullies were to be dealt with. But, perhaps sensing that sometimes they themselves

might be on the wrong side of the rules, they had novel ways of punishing those who misbehaved."

A school for everybody

"The children wanted everyone, girls and boys, to be able to go to their ideal school - whatever their background, beliefs, abilities or disabilities." "School buildings should be open to anyone who wanted to use them. Perhaps there could even be a universal language that everybody could learn at school."

In their book, Burke and Grosvenor (2003) have reported the main issues raised by pupils. The extracted written texts by researcher for this study are as follows:

> "Comfort, privacy, space for social activity and rest, and colourful, softy textured inviting interiors are called for by countless numbers of participants in the 2001 archive." In addition, "toilets continue to be an appealing problem in many schools,... and there were very few ideal schools, whether in essay,..., that did not feature strongly a major criticism of the school toilets. Many suggest practical ways they can be improved but most wanted them to be less institutional, more comfortable and accessible. For many children, not being able to lock the toilet door safely causes distress" (Burke and Grosvenor, 2003, p. 21).
>
> "Distressed about the poor state of the fabric of their schools, most want more space and recognise the limitations of school design in relation to inclusive school policies. Young people in special schools who have difficulty just getting around the inadequately designed school spaces, take the opportunity to recommend change." (Burke and Grosvenor, 2003, p. 21) "They [children] want to feel proud of the school to which they belong but many feel embarrassed by their surroundings. The extracts here show how clearly children regard the built environment as 'the third teacher'" (Burke and Grosvenor, 2003, p. 21).
>
> "The cry for 'comfy' chairs was accompanied by design solutions – egg shaped, dome shaped, chairs 'enclosing the head and waist', Swedish style, chairs 'with pockets and holders... [for] pencils, lunch, homework, diary etc'" (Burke and Grosvenor, 2003, p. 136).
>
> "The 'feel' of the classroom was also an issue. Floors should have carpets, brick walls should be covered, 'gentle music should be played' to help concentration and 'aromatherapy essences of grapefruits, lemon, orange and lime' should be sprinkled from above to stimulate and keep 'students awake in lessons'" (Burke and Grosvenor, 2003, p. 137).
>
> "Computers feature regularly in pupils' descriptions of both contemporary and future classrooms" (Burke and Grosvenor, 2003, p. 137) "...many students still saw computers as mechanised teachers or robots, reflecting their experience of their use in schools." (Burke and Grosvenor, 2003, p. 138) "Teachers bring tools together in simple systems for teaching and learning. An awareness of this process, of the classroom as a social technology, is evidence in the School I'd Like archive. Children identified the connections between artefacts, the teacher

and a system whereby learning can take place" (Burke and Grosvenor, 2003, p. 139).

"Consistent is the call for more time to consume and enjoy food and drink, a more pleasant environment in which to eat and socialise and the need to be consulted as to their preferences. However, also evident in the 2001 archive are the many voices who argue that food is significant in representing and acknowledging diversity among the school community. Indeed, there is evidence of a strong recognition that respect of differences in eating habits associated with culture and belief can be a sign of a caring and inclusive school committed to tackling injustices of all kinds" ... "The demand comes time and again for unrestricted access to drinking water. Carefully positioned and meticulously drawn water coolers appear in many plans of schools and classrooms" (Burke and Grosvenor, 2003, p. 33).

"...children have readily associated the serving of school food with institutions such as hospitals and prisons which emphasise authority, control and the regulation of bodies. Dining areas, since they usually occupy large open spaces, are often noisy and hectic. For many children, this represents a particular area of discomfort. ...They want to be able to sit with their friends, not be forced to eat and have ample time to play and prepare for the afternoon lessons" (Burke and Grosvenor, 2003, p. 34). "Children and young people have described here the kind of space for eating they would prefer. Having some choice over seating arrangements, whether in a large or small space, is important and better furnishing to create a warm, quieter and calmer atmosphere is called for" (Burke and Grosvenor, 2003, p. 34).

"The majority of entries to 'The School I'd Like' 2001 competition mention the outside environment of school, and most find it wanting. Children have stated clearly here, in their words and in their designs, that they want more space but they also want the space to be filled with things: objects, mazes, ponds, swings, gardens, slides and swimming pools. Their material visions range from tree-houses and forts, pirate ships and adventure playgrounds (presumably made from scrap materials), to full-scale theme parks with motorised rides and all fun of their fair. We can observe how the concerns of younger children, for more space and equipment, compare with those of older children, for storage facilities and social spaces." (Burke and Grosvenor, 2003, p. 45)

"Certain themes emerge, the strongest among the younger children being a need for more equipment and objects to play with: swings and climbing apparatus are the most popular. However, while children are certainly concerned with meeting their needs, there is evidence, expressed through a desire for the school grounds to cater for a variety of activities, of consideration for others of different ages and different temperaments. Related to this is a concern for comfort and safety: school yards are in the main colourless, hard spaces and children feel their own vulnerability and that of others in such an environment. Colourless, empty school yards surrounding the outside of a school are what the outside world sees first of a school and children express a concern here that this greyness reflects upon themselves and the way that the school regards them" (Burke and Grosvenor, 2003, p. 45, 46).

"A further theme expressed by younger children and adolescents is the need for more natural features: water, wildlife and animals are commonly called for" (Burke and Grosvenor, 2003, p. 46).

"The comments of children about their ideal learning environment unite across time with the cry 'let us out!'. For some this means having more opportunity to learn outside of school boundaries, to see, touch, smell and feel real artefacts or nature. Many children dream of escaping the conflicts of the walled and windowed classrooms to learn in the school grounds or in special open-air classrooms designed for the purpose". "The idea of the school as a 'city of learning' is captured in many of the images which form a large part of the 2001 'School I'd Like' archive" (Burke and Grosvenor, 2003, p. 69).

"...many write about the stress they experience arising from a number of school-based factors. There are environmental factors; the built environment is found to inhibit freedom of movement, dull the senses and allows no privacy. Furniture is poorly designed, is uncomfortable and its uniformity makes no allowance for difference in body size. Computers and their associated accessories take up large amounts of space in schools not built for them and children feel pushed out and cramped." (Burke and Grosvenor, 2003, p. 108)

"There are many source of stress which are directly to do with the physical environment and the material world of the school and these are referred to repeatedly in the 'School I'd Like" designs offered by children here. Many make a connection between a visually and pleasing environment and a sense of well being." (Burke and Grosvenor, 2003, p. 108)

"..., there appeared to be, in this collection of thoughts on 'The School I'd Like', a greater awareness among the participants of the need for schools to provide resources to counter the effects of too much stress in the lives of pupils and teachers. ... there are many examples given here arguing for rest rooms, meditation rooms, and school counsellors to help support children in their lives." (Burke and Grosvenor, 2003, p. 110)

"In reading these texts, what is strongly conveyed is a sense of vulnerability. Children feel small; the school environment is hard, especially when you fall; space is limited; toilets are unwelcoming or inaccessible; sick bays are inadequate; buildings are noisy; corridors are hectic; the school;... bullies threaten; ... belongings can be lost or stolen; bags are heavy; lockers are damaged;... There is enormous pressure to conform; to be different is dangerous." (Burke and Grosvenor, 2003, p. 108, 109)

"Here, children and young people have provided evidence of how all aspects of school and schooling interrelate from their perspective and, indeed, how the school and its immediate landscape connect with the community. They reveal, in their passionate responses in words and images, a dynamic which is missing from much exploration into the nature of schooling. How school feels, smells, tastes, its rhythms and rituals, its meaning and significance are revealed all at once in writing, drawing, modelling and planning, which attempt to capture whole school visions."... "In their words and images describing school as they experience it, they reveal their priorities for change. In sum, they do not want something that was designed for a different time" (Burke and Grosvenor, 2003, p. 151-152).

Burke and Grosvenor (2003) argue several issues in more detail related to school buildings and reveal their understanding about children voices which are as follows:

"...the preference for dome –like features in the recently collected archive can be explained simply through acknowledgement of the fact that domes are features of leisure environments that children and young people frequent. These features are representative of enjoyment, freedom, play and excitement. They are semi – permanent structures that are literally here today, gone tomorrow. They are 'light' in both senses of the word " ..."Traditionally the school room is square, has corners and contains rows of bodies in disciplined rank. The comments of children about the significance of this in contrast to their preferred spherical arrangements betray an understanding that a shift occurs in the organisation of authority and control in moving from rectangular to the circular" ... "A recurring theme of liking school to a prison is found in competition entries, both past and present, suggesting that, from the point of view of those compelled to attend, little has altered in the basic character of school in spite of the vast extent of policy intervention over the intervening period" (Burke and Grosvenor, 2003, p. 20).

Appendix 4B: The briefs from joinedupdesinforschools

The common issues that have been reported by Sorrell (2005) are as follows:

1. **Colour;** 'They want to brighten up their schools and use colour to enhance atmosphere and mood.'
2. **Communication;** 'They want to tell pupils, teachers, parents and the community what is going on.'
3. **Dinner Halls and Canteens;** 'They want a civilized lunch time with less chaos and more time to relax.'
4. **Learning Spaces;** 'They want modern, inspiring places to learn.'
5. **Reception Areas;** 'They want parents, new pupils, the local community and visitors to feel welcome.'
6. **Reputation and Identity;** 'They want to be proud of their school and sure of what it stands for.'
7. **Sixth-Form Spaces;** 'They want rooms where they can socialise and work on their own.'
8. **Social Spaces;** 'they want shelter spaces to "chat and chill" during break.'
9. **Storage;** 'They want secure places to put their books, stationary, equipment, bags and coats.'

   ""Better Lockers" is the simple title to the brief written by the client team". "They're too small to share and they need to be graffiti-proof", and "They look ugly. We need a way to personalize them without damaging them."" (Sorrell, 2005, p. 136)

10. **Toilets;** 'They want toilets to be clean, hygienic and safe.'
11. **Uniform;** 'They want comfortable, smart, cool looking clothes that they will be proud to wear.'
12. **Whole school plan;** 'They want to contribute to a vision for a new school.'

However, detailed briefs that were extracted by researcher from the joinedupdesignforschools book (Sorrell, 2005) and classified related to each common issue are as follows:

- **Colour**

  "...most client teams we spoke to in our workshops said they wanted "bold, modern colours", "cheerful colours" and "more colours everywhere!"... Often the

colours were selected to "make the space calm", in particular with older pupils." (Sorrell, 2005, p. 36)

- **Communication**

"There is not a lot communication between parents, teachers and pupils, and there should be." ... "The school websites were the subject of much discussion in our workshops...the client team that focused on communication wanted modern, well-designed school magazines, new sign systems and environmental installations." (Sorrell, 2005, p. 42)

- **Dinner Halls and Canteens**

"Most of the pupils we spoke to expressed concern about the décor, layout, queuing system and food and hygiene standards in their school canteens. Many felt that the lunch time lunch-time experience was a period of rushed, noisy chaos. They wanted to turn lunch into a relaxing break with time to socialize. They didn't want to waste their precious free time queuing, they wanted more food options, for example, a choice between cold snacks and hot meals, they wanted options to serve themselves, they wanted the environment to be more appealing." (Sorrell, 2005, p. 52)

- **Learning Spaces**

"Pupils felt very strongly about the rooms they learn in... they needed plenty of light, and "fresh and clean air" that wasn't "smelly". They also said they found it hard to concentrate in temperature extremes and wanted their rooms warm in winter and cool in summer. Some said they should have air-conditioning. They wanted their learning places to be decorated in cheerful, calming colours." (Sorrell, 2005, p. 60)

"They wanted variety; they didn't like having lots of classrooms that looked the same. Views were important to them to see the seasons changing outside their window. Storage was a big issue; they said they needed space for their bags, coats and wanted a place to store their work safely." ... "They also wanted the means to display their work. In summary they wanted spaces they would want to go to and learn in; spaces that would help them concentrate." (Sorrell, 2005, p. 60)

"They wanted "lots of natural light via large windows", and preferred spotlights to strip-lights," "which are too harsh". They wanted "roller blinds" rather than curtains or vertical blinds because they could easily be rolled out of the way, and wanted bold and bright colours that "work well with natural light". They also wanted coloured flooring – in fact they said that "colour could be used to separate areas"." (Sorrell, 2005, p. 66)

"They had sophisticated ideas about furniture too, arguing that ergonomic furniture aids concentration: "We don't like hard plastic chairs, dirty desks and wobbly legs." They wanted the seating to be "more comfortable, with adjustable height, and able to recline", with soft cushioned seats". They insisted that "tables should be adjustable" and proposed "folding tables, which can be easily moved

around, with storage beneath them". They suggested that desks should be easy to "move into a semi-circle to encourage discussion". On the subject of storage they wanted to "maximize wall space", create display cabins and give more storage to pupils and teachers." (Sorrell, 2005, p. 66)

- **Reception Areas**

"... Primary and secondary school reception areas...in both cases they usually provide space for the school's administrative hub, act as the meeting and greeting area, and where sick pupils are cared for. Many pupils we spoke to said their reception spaces were too poorly designed to offer these facilities efficiently. "There isn't enough signage, and it's short of space. And the gate outside make it feel like a prison." "...many pupils felt their reception areas are "drab" and "boring". Pupils wanted the reception area to express their school's values in a cheerful, welcoming way." (Sorrell, 2005, p. 76)

- **Reputation and Identity**

"We want to improve the reputation of our school for ourselves and for the wider community." "Many pupils expressed how they were proud of their school but frustrated at how it was perceived by others." (Sorrell, 2005, p. 90)

""The client team...wanted their school to fell more welcoming. Their brief spelled out the problem: "New children and visitors get confused and lost. We have some scrappy signs."" (Sorrell, 2005, p. 90)

- **Sixth-Form Spaces**

"With exam pressures at their peak, they needed common-room spaces to be inspiring, social and suitable for study. They also felt that an attractive common room would act as a real incentive to stay in school during the day, rather than "bunking off into town"."

"...the client team wanted "a flexible sixth form space attractive to new pupils". They wanted a space that helped them deal with academic pressures by developing new ways of working and learning" (Sorrell, 2005, p. 102). "They wanted to work in a relaxed way. They also wanted their own place to eat their lunch, away from the younger pupils," (Sorrell, 2005, p. 102)

- **Social Spaces**

"...they need space to relax away from the pressure of the classrooms; somewhere with shelter from the weather, somewhere to sit down. They want a place in which they feel secure, but that also feels more like their own space that the teachers'. At the very least they want shelter and seating during their break time; they feel their playgrounds are too exposed, too open to the elements and too drab." (Sorrell, 2005, p. 110)

- **Storage**

  ""Better Lockers" is the simple title to the brief written by the client team". "They're too small to share and they need to be graffiti-proof", and "They look ugly. We need a way to personalize them without damaging them."" (Sorrell, 2005, p. 136)

- **Toilets**

  "...they typically found their toilets unhygienic, full of dirt traps and often dingy." ""Make the school toilets cleaner and safer," said the brief from pupils."

  "The client team said the toilets are too small and there are some major plumbing problems. The cubicle lockers get vandalized and so do the hand-driers, so the pupils use toilet paper to dry their hands. This often ends up blocking the basins, which also get blocked when pupils rinsing off mud from their sports boots."

  "The brief reported problems with graffiti and with secret smoking. The school put in smoke alarms, but the pupils put plastic bags on the sensors. Some pupils said they didn't go in because they found the gangs of older pupils too intimidating." (Sorrell, 2005, p. 144)

Appendix 4C: The briefs from The Young Design programme (pilot study)

The result of 'pilot' study - the highlighted 'themes' and related details about pupils' briefs based on the report by the Sorrel Foundation (2006) are presented as follows:

'A new school and identity. Telling our story'
"The client team's brief asked the designers to help them do just that: to *'design how our new school should feel.'* The clients were from four different primary schools, and will be among the first students at The Elmgreen School...There were three elements to the brief: a graphic identity, a social space, and a way of telling the story of moving to a new school."

'Rethinking our school hall'
"The Grade Two listed Victorian school building at Charles Edward Brooke Girls' School in Camberwell looks impressive from the outside, but its design and listed status restrict what pupils can do inside. The pupil clients were particularly unhappy about their hall, which is used for many different activities: assembly, dance classes, concerts, choir practice, break times, as well as a canteen and changing room. The frequent changes mean a lot of moving furniture around, and pupils often have dance classes amid bits of food left from lunch-time."

'Finding our way and places to play'
"Torriano Junior School in Kentish Town has a problem shared by many schools: a new, enlarged school building is planned, but an interim solution is needed to tackle lack of space. The main concerns identified in the client team's brief were crowding in corridors and insufficient indoor social space. A rainbow-themed room much loved by the pupils at break times is only half the size of a normal classroom, and gets very full."

'A new technology block'
"Pupils at Langdon Secondary School in East Ham wanted more dynamic technology classrooms. The current facilities are at different ends of one of the largest schools in Europe, and it can take 15 minutes to walk between them. The pupils said their classrooms are drab, uninspiring and crumbling."

'An outside quiet space and an online student zone'
"While the Kings Avenue School is popular with its pupils, the client team said the building didn't offer enough places to go at break time, and that the existing places got crowded and noisy. They asked design team Dear Sting to produce a concept for a quiet, relaxing social space. They also wanted the designers to create a website specially for pupils."

'Places to eat and socialise'
"When Pimlico Secondary School was built in the 1960s, its design was innovative. There was no main canteen: instead, food was delivered to three dining rooms using dumb waiters. Because this system has fallen into disrepair, many students leave school at lunch-time in order to get hot food. The pupil

client team's brief asked for more social space and places to eat lunch, and they also wanted to improve the school's identity and reputation – *'we want people to say our school is* the *school to be in.'"*

'Respecting other people's stuff'

"The client team at Colvestone Primary School in Dalston was made up of members of the student council. They identified several problems for the design team to address: messy toilets, noise made in quiet spaces, a cloakroom where coats get knocked down and trodden on, running in the corridors, and murals the pupils thought were too babyish.

Appendix 4D: The briefs from The Young Design programme (study)

In University of the Arts London, the student design teams worked with five primary and secondary schools including 69 pupils on projects united by a common issue: the need for inspiring, exciting places to go during lunch time. A new dimension was added to the programme through the project at the Woodside Inclusive Learning Campus, in which the client team included pupils with special needs. The main highlighted themes in each school and the brief details are as follows:

'Bringing colour to our playground'
"'A sea of concrete with barely a glimpse of colour' was how one student design consultant described the playground at the Charles Edward Brooke Girls' School in Camberwell, South London. Pupil clients complained of a lack of colour, shelter, seating and space to play ball games."

'Brightening up our break times'
"Although the pupil client team from St John's Church of England Primary School, south London, was from different year groups, the pupils all agreed on one thing: break times in their school were boring. They asked their student designers to come up with a concept that would transform their concrete playground into a versatile, interesting outside social space."

'A social space where everyone is included'
"A new secondary school is being built in Haringey, north London, to replace three existing schools, two of which are for young people with special needs. How will pupils with very different abilities integrate on one site? The pupil client team, which included pupils with severe physical and learning disabilities, showed 3C Design the kind of objects and environments they enjoy."

'A fluid identity and social spaces'
"Water was the central inspiration for the concept produced by student designers Young Imaginations for Pimlico School, which is near the River Thames in central London. Pupil clients wanted a new identity that would reflect the school's Performing Arts specialisation, and also wanted more places to go at break time.

'Making our school a nicer place to be'
"The pupil client team from Ernest Bevin College, a large boys' school in Tooting, knew they wanted to make their school a better place to be. The lack of social space, grey exterior and crowded, overused dinner hall was part of the problem, but so was some pupils' disrespectful behaviour, which the client team were anxious to address. The student design team

In addition, the first year of the Young Design Programme at University College Falmouth, Cornwall, introduced new issues and attitudes. 37 pupils in four schools posed new challenges for student designers, including how to announce a school's

presence from the road, and how to ward seagulls away from playgrounds.' The main themes and briefs in details are as followings:

'Urban Salon'
Pupils asked student design team to "'re-interpret, re-order and re-design our sixth-form space and identity, reflecting the key values of pride, presence and community'. There was very little to distinguish the sixth form from the rest of the school, with no independent identity, signage or separate entrance to their spaces. The pupil clients were also concerned about their common room and study area, because of uncomfortable furniture, harsh lighting and a lack of privacy."

'Symbolising what we do'
Launceston College, Cornwall were so pleased with the "design proposals that they have already implemented their identity concept, three colourful scribbles containing the symbols to represent the actions think, learn and grow. The concept was produced in response to the brief, written by pupil clients studying Design and Technology in the school's sixth form, which asked for a reinvigorated sixth form space with a greater sense of fun."

'Sharing our school with the community'
"Reaching out to the community was an important part of the design brief produced by the pupil client team from Bosvigo School, Truro... The client team, which was made up of children from Year 5... wanted a more clearly defined identity to announce the school's presence, including a landmark building that would be visible from the street."

'Taking ownership of our school'
"Penryn College, Cornwall, is undergoing a major rebuilding project, involving the construction of a new school building and the demolition of several older blocks. The client team, a group of ten pupils studying for GCSEs in art, design and technology, was keen that mistakes from the old school shouldn't be repeated. They wanted more seating, shelters and rubbish bins in their social spaces, and a greater feeling of ownership."

Finally, student design team in Leeds College of Art and Design worked with 30 pupils in four secondary schools, including three that are Private Finance Initiative (PFI) buildings, opened 2006. Through listening carefully to the pupil clients, the student design teams realised there were plenty of issues around identity, social space, colour and dinner halls. The main themes rose in each school and the brief details are as follows:

'Personalising a new school'
Student design team was asked to work with a group of 9 students from Year 11 at the Primrose High School, Leeds. "The pupil clients told their design team that, although the school had everything they needed, the interior was quite bland and it was easy to get lost."

'Creating order at lunch time'
South Leeds High School which was a new PFI building had a modern, spacious interior. However, the pupil client team of 8 students from Year 10 explained the problems in the school that were not immediately visible: "the dining hall had insufficient seating and a chaotic queuing system, and the outside eating space had a leaky shelter, a litter problem and not enough seating."

'Creating something to do and somewhere to sit'
"Pupils from the City of Leeds School thought the outside social space at their 15-year old school was lacklustre. Although the playground covered a large area, the pupil client team of 8 students from Years 7 and 9 reported that the space was under-used because there wasn't much to do outside; in particular, there was no shelter or seating."

An owl-inspired identity and navigational system
The Carr Manor High School in Leeds moved into a new building funded through a Private Finance Initiative (PFI) scheme. "The pupil client team, three Year 11 students, explained: 'We want our school to have an identity and to be unique.' They were concerned that the school felt anonymous, was easy to get lost in and didn't reflect its pupils' achievements and personalities."

Appendix 5A: Questionnaire - Pupils' views about school

Hello! As a student you spend a lot of your time in school. Last year you were in a different school and now you will have been in this school for a while; so you have experienced at least two different school environments. You know lots of things about schools which are important for architects and designers to find out about so that they can design better schools. We would like to know what you think a good school should be. **Thank you for taking part.**

Below is a list of different issues that lots of children in different schools around the UK have raised about school buildings and their grounds. All of the issues have been categorised and put into the tables below (they have numbers in each table). We would like to know your opinion about them. There are no right or wrong answers. Each table shows a category of similar issues, e.g. Indoor Spaces, Comfort and Control. The guidance note (separate sheet) helps to explain some of the items. You need to rate **all** of the items in the tables twice. The first time you have to rate how satisfied you are with your school and the second time you have to rate how important each item is to make your school a better place. In this survey, we would like to know:

(1) How **satisfied** are you with your school? Please rate each item on the following scale.

1. **It's Awful**
2. **It's OK.**
3. **It's Very Good**
4. **It's Fantastic**

(2) How **important** is each item for the school you would like to have? Please rate each item on the following scale.

1. **Does Not Matter**
2. **Nice to have**
3. **Important**
4. **Essential**

When you identify the importance of each item for the school you would like, please tell us how **confident** you are about your answers by choosing Low or High **level of confidence**. To help you do this look at the example below. For example, about the item "*The walls and floors are colourful*" if you think your school is *very good*, then you put a cross in the relevant column. If you think this item is *Nice to have* in the school you would like, please put a cross in the relevant column and if you are very confident about your answer, please choose *High* level of confidence.

	Indoor Spaces (interior)	**Your school**				**The school you would like**					
		How **satisfied** are you with each item?				How **important** is each item?				**Confidence**	
		 It's Awful 1	 It's OK. 2	 It's Very Good 3	 It's Fantastic 4	Does **Not** Matter 1	Nice to Have 2	Important 3	Essential 4	Low	High
	The walls and floors are colourful			X			X				X

- Please feel free to include comments at the end of this questionnaire
- Please rate your comments (your raised issues) to show their importance

	Indoor Spaces (interior)	Your school				The school you would like					
		How **satisfied** are you with each item?				How **important** is each item?				Confidence	
		It's Awful	It's OK.	It's Very Good	It's Fantastic	Does Not Matter	Nice to Have	Important	Essential	Low	High
1	The interior is softly textured										
2	Interior finishes are durable										
3	The walls and floors are colourful										
4	The interior provides flexible spaces										
5	The interior has a variety of spaces										
6	The interior looks inviting, attractive and inspiring										
7	The interior provides means to display art work										
8	It is easy to find your way around										
9	The building is usable by everyone with different abilities										

	Comfort and Control	Your school				The school you would like					
		How **satisfied** are you with each item?				How **important** is each item?				Confidence	
		It's Awful	It's OK.	It's Very Good	It's Fantastic	Does Not Matter	Nice to Have	Important	Essential	Low	High
1	There are satisfactory levels of natural light										
2	There are appropriate types of artificial lights										
3	Students can easily control natural and artificial lighting										
4	There are blinds to control sunlight										
5	There are good acoustics										
6	There is natural ventilation										
7	Students can easily control ventilation system										
8	Air-conditioning is provided										
9	Room temperature is appropriate in different seasons										
10	Students can easily control the temperature										

Activity Spaces		Your school				The school you would like					
		How **satisfied** are you with each item?				How **important** is each item?				Confidence	
		 It's Awful	 It's OK.	 It's Very Good	 It's Fantastic	Does Not Matter	Nice to Have	Important	Essential	Low	High
1	There is provision for outdoor learning										
2	There are places for rest and mediation										
3	There is some decoration in the dining spaces										
4	The layout of the dining spaces prevents crowding										
5	The furniture in the dining spaces creates a warm atmosphere										
6	There are spaces for an administrative hub and for meeting or greeting										
7	There is space for caring for sick pupils										
8	There are indoor spaces designed especially for play										
9	There are spaces for art performances or physical activities										
10	There is plenty of room for movement in circulating areas										
11	The physical environment helps easy talk between pupils and staff in the assembly area										

Nature and Outdoors		Your school				The school you would like					
		How **satisfied** are you with each item?				How **important** is each item?				Confidence	
		 It's Awful	 It's OK.	 It's Very Good	 It's Fantastic	Does Not Matter	Nice to Have	Important	Essential	Low	High
1	There is access to the landscape										
2	There is a pet corner or bird boxes										
3	The outdoor looks interesting and versatile										
4	The outdoor looks relaxing										
5	Outdoor spaces are defined by the elements										
6	There is a view to nature (when you are inside the building)										

Facilities		Your school				The school you would like					
		How **satisfied** are you with each item?				How **important** is each item?				Confidence	
		It's Awful	It's OK.	It's Very Good	It's Fantastic	Does Not Matter	Nice to Have	Important	Essential	Low	High
1	There is provision for an audio system										
2	There are appropriate chairs (seats)										
3	There are appropriate tables or desks										
4	There are appropriate lockers to store personal belongings										
5	There is an easy access to the media and technology space										
6	There are easy access fire exits for every space										
7	There are scanning handprints or swipe card at the school gate										
8	There is a water-proof shelter outside										
9	There is seating in the school ground										
10	There are picnic tables outside										
11	There is easy access to drinking water										
12	There is choice for cold snacks or drinks										
13	There are appropriate toilets										
14	There is equipment for various activities in the school ground suitable for different age groups										

Exterior		Your school				The school you would like					
		How **satisfied** are you with each item?				How **important** is each item?				Confidence	
		It's Awful	It's OK.	It's Very Good	It's Fantastic	Does Not Matter	Nice to Have	Important	Essential	Low	High
1	The exterior (building) is colourful										
2	There is a connection to the community										
3	The building acts as a landmark										
4	There is a well-designed gate for the building										

Comments: Can you think of any more items to add? If you can then write them down in the boxes below and remember to rate them too.		**The school you would like**					
		How **important** is each item?				**Confidence**	
		Does Not Matter	**Nice to Have**	**Important**	**Essential**	**Low**	**High**
1							
2							
3							
4							
5							

About yourself: girl ☐ boy ☐ your age .....

Thank you

Guidance notes for pupils' questionnaire

Indoor Spaces (interior)	
1	e.g. carpet
2	----------
3	bold and cheerful colours
4	e.g. large spaces can be divided
5	----------
6	up to date, tidy and clean spaces
7	e.g. display cabins on walls
8	e.g. signage, navigational system
9	----------

Activity Spaces	
1	open designed space
2	chill out spaces for break time
3	----------
4	e.g. fast food or self-service, enough places with sufficient seats
5	e.g. flexibility for seating arrangement
6	----------
7	----------
8	----------
9	----------
10	to prevent crowding
11	e.g. circular form or arrangement

Facilities	
1	for playing gentle music
2	soft cushioned , adjustable height, to be reclined, variation for different body size
3	adjustable, movable, folding tables with holders, which do not scrape your knees
4	secure to put books/ bags and coats, to look nice, be durable, graffiti -proof, proper size, able to personalise lockers
5	e.g. computer room
6	----------
7	----------
8	for eating, resting and socialising
9	for eating, resting
10	for eating
11	In school ground, classrooms
12	e.g. vending machines
13	easy access, lockable doors, toilet flushes (not chain), graffiti-proof materials, basins for rinsing off mud, adequate hand dryers
14	e.g. space for ball games, swimming pool

Comfort and Control	
1	windows, sky/ roof light
2	e.g. spot lights
3	----------
4	e.g. roller/ vertical blinds
5	to control noise
6	e.g. Fresh air through windows
7	----------
8	----------
9	----------
10	----------

Nature and Outdoors	
1	e.g. trees, garden, mazes, grass, wild garden, ponds
2	----------
3	----------
4	----------
5	not too exposed or opened
6	to see seasons changing ; e.g. plants, trees

Exterior	
1	----------
2	through building & landscape
3	visible from the street, announcing the school's presence
4	----------

Appendix 5B: Letter to Headteacher

The University Of Sheffield.

School Of Architecture.

The Arts Tower
Western Bank
SHEFFIELD
S10 2TN

Telephone: 0114 2220335
Mobile: 07932 043683
Email: arp04rg@sheffield.ac.uk

18 February 2008

To Headteacher

Dear sir/madam

I am writing to you concerning the research I am doing for my PhD in the School of Architecture at the University of Sheffield. The title of the research is : 'Exploring users' views about their school environments'. This research explores the views of teachers who spend a lot of time in their school in order to find out what teachers think of their school buildings and grounds. This research includes children's views in secondary schools as well. The age groups that are taking part are 11-12 year olds. The findings will help to make a framework for school design as a reference for architects and designers.

In the information sheet included, there are more details about the research methods and consent forms for teachers (and children) who will be involved in this research. The ethics of this project have been checked by a University of Sheffield Committee. Also the researcher has been checked by CRB. I would very much appreciate your help to support this research. I would be very thankful if you let me come to your school sometime in March/ April 2008.

Yours sincerely,
Rokhshid Ghaziani

R. Ghaziani

PhD Candidate
School of Architecture
University of Sheffield

Appendix 5C: Information sheet for the headteacher

18.02.2008

Information sheet for the headteacher

Exploring teachers' and pupils' views about their school environments

Children are being invited to take part in a research project.
Before you decide if you will consent to them taking part, it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully and discuss it with others if you wish. Please ask us if there is anything that is not clear or if you would like more information. **Thank you for reading this.**

What is the project's purpose?
This research explores what teachers and children think of their school buildings and grounds. It involves all teachers in secondary schools, while only children in year 7 who are 11-12 year olds. The findings will help to make a framework for school design as a reference for architects and designers.

What are the possible benefits of taking part?
Whilst there are no immediate benefits by taking part in the project, teachers (and children) may learn and think more about architecture and the impact school design can have on both teachers and pupils. It is hoped this work will lead to a better understanding of how to design good schools in the future.

What will happen to a teacher if s/he takes part?
There will be a questionnaire to be filled in. If teachers would like to talk in details about their schools, it might be a short follow-up discussion with me and some other teachers in the normal school day. We will talk about the different places in the school.

What will happen to a child if s/he takes part? (only in secondary schools)
If a child takes part in the research there will be a questionnaire to be filled in about the different places in the school. The children will be asked what they think about them and they will do some writing. We might also take photographs of the some spaces. There are no photographs of children. The questionnaire would take about 45 minutes to be filled in by pupils.

Will our taking part in this project be kept confidential?
It is up to you and your management board/group whether or not the name of your school is identified in the write-up of this research. All the information that we collect about children during the course of the research will be kept strictly confidential. All of the data will be anonymous before analysis and children will not be able to be identified in any reports or publications. Original photographs and film footage (hard copies and digital files) will be kept by the project coordinator who will delete anything that accidentally shows someone whose photographs or film footage we do not have permission to use. This will happen before the analysis. Original photos and digital files will then be available to the Headteacher, but no other parties. Project photographs and film footage will not be used on websites or in any other form of electronic media.

What will happen to the results of the research project?
The research findings will be written into a report and a copy will be given to the headteacher. This work will contribute to a PhD thesis, which will be stored by the University. Academic articles will be written and presentations will be made about the research. The data collected during the course of the project might be used for additional or subsequent research; however, this research will be subject to the same restrictions as those detailed here.

For further information please contact:
Professor B. R. Lawson (Project Supervisor), Tel: +44 (0) 114 2220303,
Fax: +44 (0)114 222 0315, Email: B.lawson@sheffield.ac.uk, also Dr. Rosie Parnell (Project Supervisor), Tel: 0114 2220327 e-mail: r.parnell@sheffield.ac.uk; School of Architecture, University of Sheffield, Western Bank, Sheffield, S10 2TN.

If you are unhappy with the research in any way you can contact the researcher to raise your concerns:

Researcher: Rokhshid Ghaziani. Contact: 0114 2220335. If you do not feel that your complaint was handled effectively you have the right to contact the Project Supervisor or the University's Registrar and Secretary. University Registrar: Dr David Fletcher. Contact: 0114 222 0000

*** The project has gained ethical approval through the University's Ethics Review Procedure.**

If you decide to give consent for your school to take part in this research project, please sign the consent form provided.

Thank you

Appendix 5D: Consent form for headteacher

Exploring teachers' and pupils' views about their school environments

CONSENT FORM FOR HEADTEACHER

Please tick boxes if you agree

Taking part in the project

1. I confirm that I have read and understand the information sheet dated 18.02.2008 for the above project and have had the opportunity to ask questions. ☐

2. I agree for children in this school to take part in the above project (providing their consent and parental consent is given) by answering questions in a group discussion and doing writing and/or drawing with the approved researcher and teacher. ☐

3. I agree for the name of the school to be mentioned in the thesis or articles related to this research. ☐

4. I understand that if there is any part of the films or any photographs that I do not want to be shown or shared, then they will be deleted on my request. ☐

5. I understand that children will not be named in any report, presentation or any other context related to telling others about the above project. ☐

6. I have read this letter and I agree with coming to this school ☐

Your name .....Date..... Signature.....

[Researcher..... .....Date.....Signature.....]

School of Architecture
University of Sheffield

Appendix 5E: Information sheet for children

Information sheet for children participating in the research 18.02.2008

Exploring pupils' views about their school environments

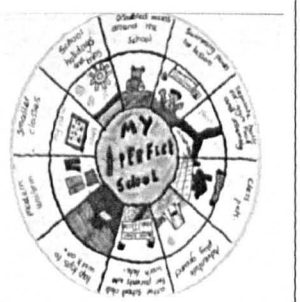
Hello! This is a letter from Rokhshid from the School of Architecture at Sheffield University. I am doing a project to find out what you and other children think about your school building. Before you decide if you want to join in, it is important that you know what the project is all about. Please read this leaflet to find out. If you do not understand anything, please ask your parents/carers or your teacher.

Why have I been chosen? Because you spend lots of time in your school building and know lots about it.

Do I have to join in? It is up to you and your parents/carers. If you decide to say yes, you can still stop at any time and you do not have to give a reason.

What will happen to me if I join in? One day soon in class, your teacher and I will ask some questions. We want to find out what you and your classmates think about your school. We will all fill in a questionnaire. This will take 1-1.5 hour and will be in the normal school day.

What are the benefits of joining in? You might learn something about architecture and the impact school design have on you. You also would think and discuss about your ideas. Your voice would be heard as we hope this project will help make school buildings better in the future.



Will my taking part in this project be kept confidential? At the end of this project, we will tell other people about it, but we will never use your name. Original photos and films might be given to your Headteacher, but nobody else. Project photographs and films will not be used on websites or in other electronic media. People at the University called ethics reviewers have checked that it is okay to do this project.

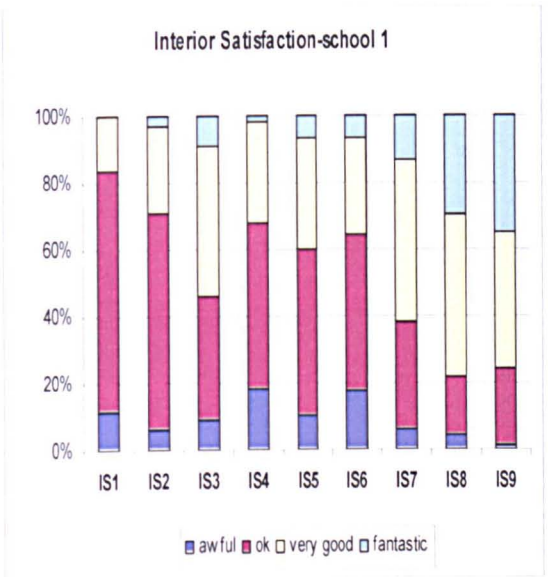
What if something goes wrong? If you want to complain about me for any reason, or anything else to do with the project, then please tell your teacher or a parent/carer. If you have any questions, please ask your parents/carers or teacher. I can be contacted by telephone: 0114 2220335, or e-mail: arp04rq@shef.ac.uk

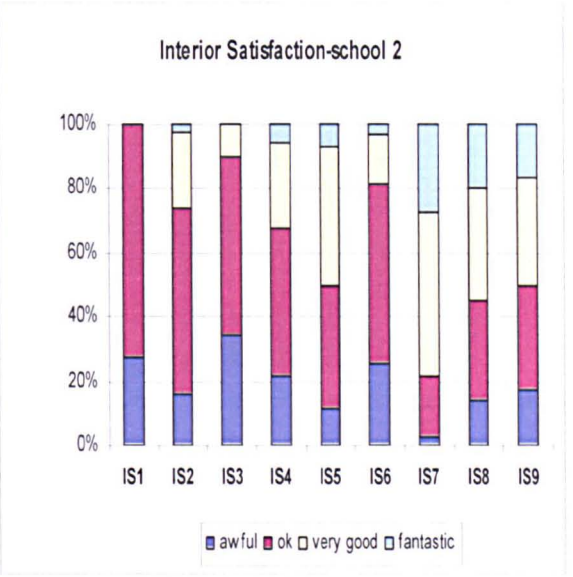
If you decide you want to join in this project, please sign the attached form and take it back to your class teacher. Keep this leaflet for yourself.

Thank you!

Appendix 5F: Children's Satisfaction

- **Indoor spaces (Interior)**

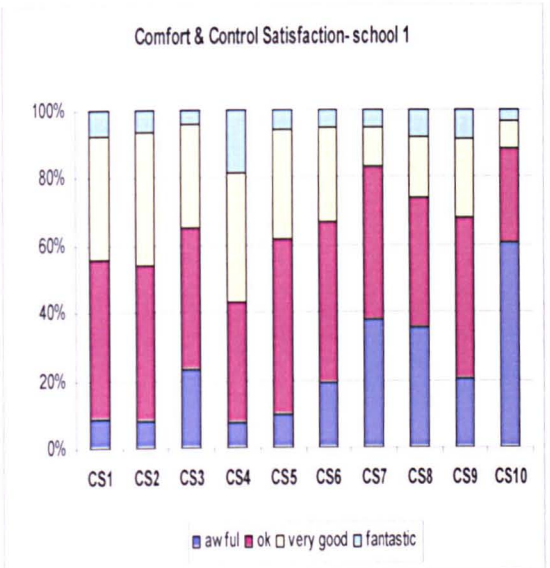


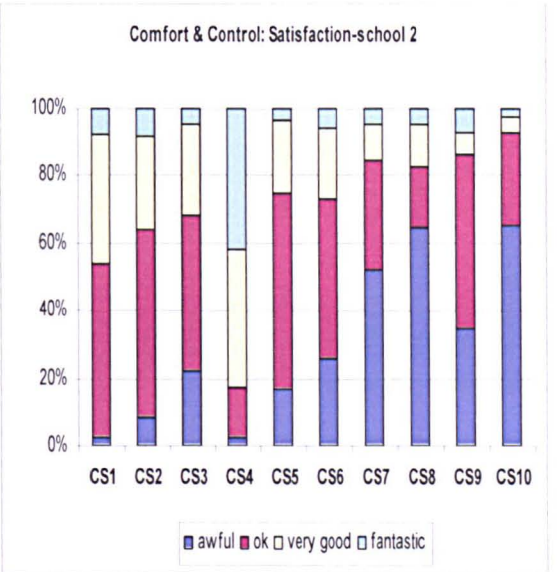


ID	Interior items	Satisfaction: valid percentage-School 1					Total No.
		awful	ok	very good	fantastic	Total percent	
IS1	The interior is softly textured	11.24	72.19	16.57	0.00	100	169
IS2	Interior finishes are durable	6.21	64.60	26.09	3.11	100	161
IS3	The walls and floors are colourful	9.25	36.99	44.51	9.25	100	173
IS4	The interior provides flexible spaces	18.13	49.71	30.41	1.75	100	171
IS5	The interior has a variety of spaces	10.06	49.70	33.73	6.51	100	169
IS6	The interior looks inviting, attractive and inspiring	17.44	47.09	29.07	6.40	100	172
IS7	The interior provides means to display art work	5.85	32.16	48.54	13.45	100	171
IS8	It is easy to find your way around	4.07	18.02	48.26	29.65	100	172
IS9	The building is usable by everyone with different abilities	1.18	22.94	40.59	35.29	100	170

ID	Interior items	Satisfaction: valid percentage-School 2					Total No.
		awful	ok	very good	fantastic	Total percent	
IS1	The interior is softly textured	27.27	72.73	0.00	0.00	100	88
IS2	Interior finishes are durable	15.91	57.95	23.86	2.27	100	88
IS3	The walls and floors are colourful	34.09	55.68	10.23	0.00	100	88
IS4	The interior provides flexible spaces	21.84	45.98	26.44	5.75	100	87
IS5	The interior has a variety of spaces	11.49	37.93	43.68	6.90	100	87
IS6	The interior looks inviting, attractive and inspiring	25.29	56.32	14.94	3.45	100	87
IS7	The interior provides means to display art work	2.27	19.32	51.14	27.27	100	88
IS8	It is easy to find your way around	13.95	31.40	34.88	19.77	100	86
IS9	The building is usable by everyone with different abilities	17.44	32.56	33.72	16.28	100	86

- **Comfort and Control**

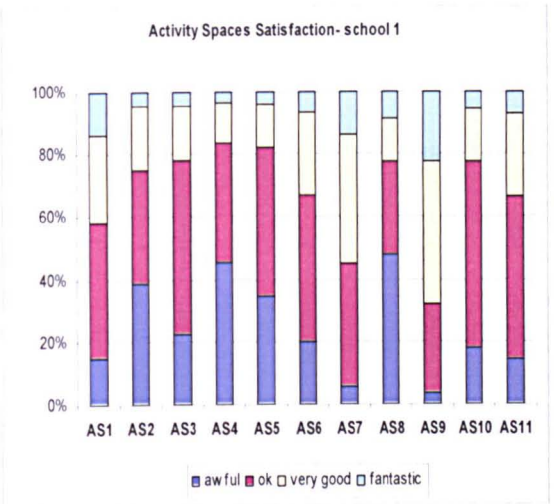


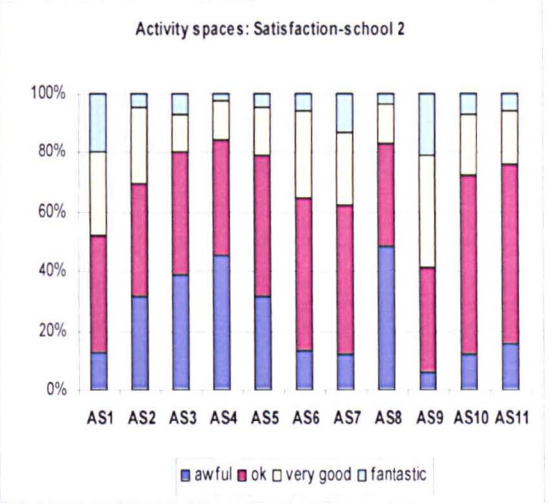


ID	Comfort and Control items	Satisfaction: valid percentage-School 1					Total No.
		awful	ok	very good	fantastic	Total percent	
CS1	There are satisfactory levels of natural light	8.88	46.75	36.69	7.69	100	169
CS2	There are appropriate types of artificial lights	8.28	45.56	39.64	6.51	100	169
CS3	Students can easily control natural & artificial lighting	23.17	42.07	30.49	4.27	100	164
CS4	There are blinds to control sunlight	7.74	35.12	38.69	18.45	100	168
CS5	There are good acoustics	9.62	51.92	32.69	5.77	100	156
CS6	There is natural ventilation	19.02	47.85	27.61	5.52	100	163
CS7	Students can easily control ventilation system	37.89	45.34	11.80	4.97	100	161
CS8	Air-conditioning is provided	35.37	38.41	18.29	7.93	100	164
CS9	Room temperature is appropriate in different seasons	20.48	47.59	23.49	8.43	100	166
CS10	Students can easily control the temperature	60.24	28.31	7.83	3.61	100	166

ID	Comfort and Control items	Satisfaction: valid percentage-School 2					Total No.
		awful	ok	very good	fantastic	Total percent	
CS1	There are satisfactory levels of natural light	2.30	51.72	37.93	8.05	100	87
CS2	There are appropriate types of artificial lights	8.14	55.81	27.91	8.14	100	86
CS3	Students can easily control natural & artificial lighting	22.35	45.88	27.06	4.71	100	85
CS4	There are blinds to control sunlight	2.33	15.12	40.70	41.86	100	86
CS5	There are good acoustics	16.67	58.33	21.43	3.57	100	84
CS6	There is natural ventilation	25.88	47.06	21.18	5.88	100	85
CS7	Students can easily control ventilation system	52.38	32.14	10.71	4.76	100	84
CS8	Air-conditioning is provided	64.71	17.65	12.94	4.71	100	85
CS9	Room temperature is appropriate in different seasons	34.88	51.16	6.98	6.98	100	86
CS10	Students can easily control the temperature	65.12	27.91	4.65	2.33	100	86

- **Activity Spaces**

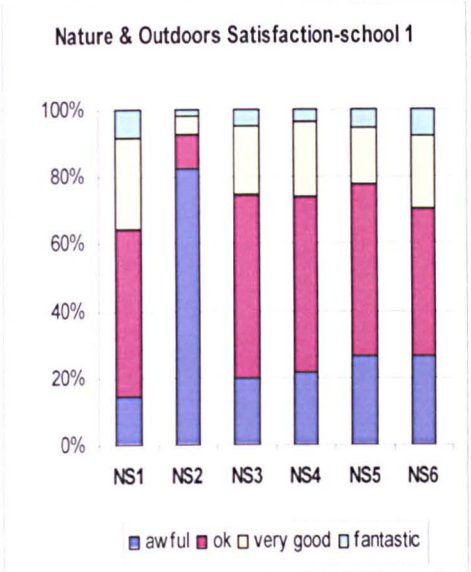


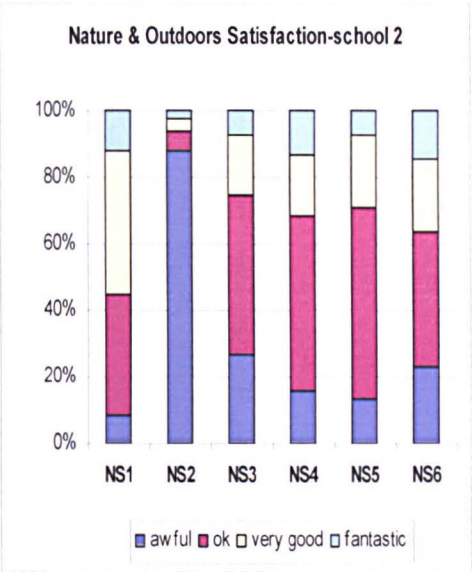


ID	Activity Spaces items	Satisfaction: valid percentage-School 1					Total No.
		awful	ok	very good	fantastic	Total percent	
AS1	There is provision for outdoor learning	15.03	43.14	28.10	13.73	100	153
AS2	There are places for rest and mediation	38.56	36.60	20.26	4.58	100	153
AS3	There is some decoration in the dining spaces	22.37	55.92	17.11	4.61	100	152
AS4	The layout of the dining spaces prevents crowding	45.58	38.10	12.93	3.40	100	147
AS5	The furniture in the dining spaces creates a warm atmosphere	34.69	47.62	13.61	4.08	100	147
AS6	There are spaces for an administrative hub and for meeting or greeting	19.86	46.81	26.95	6.38	100	141
AS7	There is space for caring for sick pupils	5.56	39.58	40.97	13.89	100	144
AS8	There are indoor spaces designed especially for play	47.89	29.58	14.08	8.45	100	142
AS9	There are spaces for art performances or physical activities	3.52	28.87	45.07	22.54	100	142
AS10	There is plenty of room for movement in circulating areas	17.73	59.57	17.02	5.67	100	141
AS11	The physical environment helps easy talk between pupils and staff in the assembly area	14.39	51.80	26.62	7.19	100	139

ID	Activity Spaces items	Satisfaction: valid percentage-School 2					Total No.
		awful	ok	very good	fantastic	Total percent	
AS1	There is provision for outdoor learning	12.79	39.53	27.91	19.77	100	86
AS2	There are places for rest and mediation	31.76	37.65	25.88	4.71	100	85
AS3	There is some decoration in the dining spaces	38.82	41.18	12.94	7.06	100	85
AS4	The layout of the dining spaces prevents crowding	45.24	39.29	13.10	2.38	100	84
AS5	The furniture in the dining spaces creates a warm atmosphere	31.76	47.06	16.47	4.71	100	85
AS6	There are spaces for an administrative hub and for meeting or greeting	12.94	51.76	29.41	5.88	100	85
AS7	There is space for caring for sick pupils	11.76	50.59	24.71	12.94	100	85
AS8	There are indoor spaces designed especially for play	48.24	35.29	12.94	3.53	100	85
AS9	There are spaces for art performances or physical activities	5.88	35.29	37.65	21.18	100	85
AS10	There is plenty of room for movement in circulating areas	11.90	60.71	20.24	7.14	100	84
AS11	The physical environment helps easy talk between pupils and staff in the assembly area	15.48	60.71	17.86	5.95	100	84

- **Nature and Outdoors**

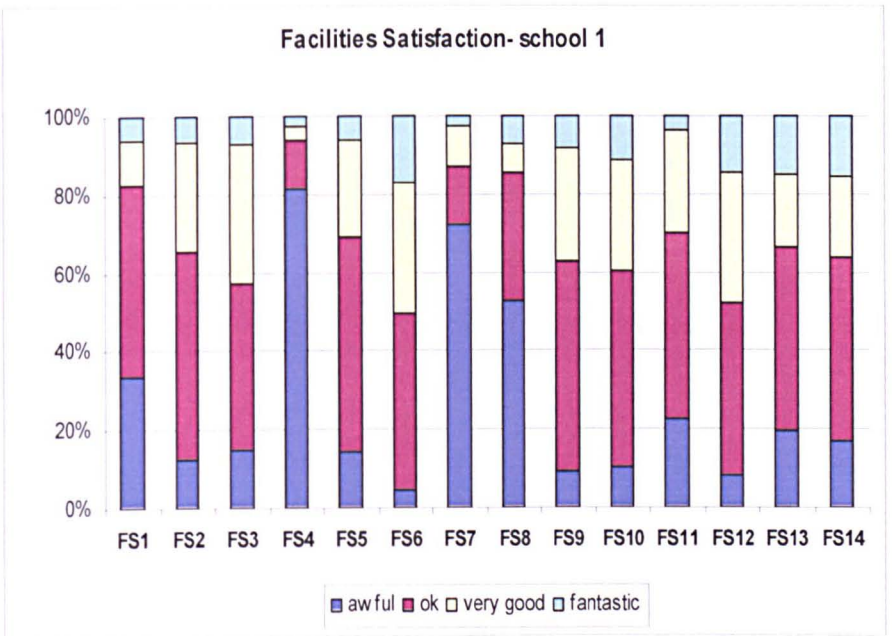


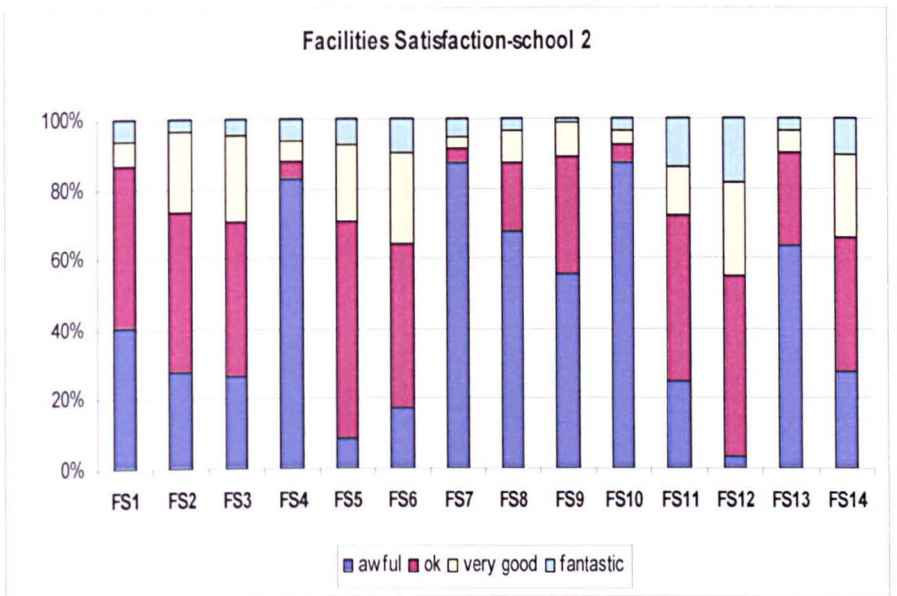


ID	Nature and Outdoor items	Satisfaction: valid percentage-School 1					Total No.
		awful	ok	very good	fantastic	Total percent	
NS1	There is access to the landscape	14.73	49.61	27.13	8.53	100	129
NS2	There is a pet corner or bird boxes	82.81	10.16	5.47	1.56	100	128
NS3	The outdoor looks interesting and versatile	20.00	54.62	20.77	4.62	100	130
NS4	The outdoor looks relaxing	21.54	52.31	22.31	3.85	100	130
NS5	Outdoor spaces are defined by the elements	26.61	50.81	16.94	5.65	100	124
NS6	There is a view to nature (when you are inside the building)	26.56	43.75	21.88	7.81	100	128

ID	Nature and Outdoor items	Satisfaction: valid percentage-School 2					Total No.
		awful	ok	very good	fantastic	Total percent	
NS1	There is access to the landscape	8.43	36.14	43.37	12.05	100	83
NS2	There is a pet corner or bird boxes	87.95	6.02	3.61	2.41	100	83
NS3	The outdoor looks interesting and versatile	26.83	47.56	18.29	7.32	100	82
NS4	The outdoor looks relaxing	15.66	53.01	18.07	13.25	100	83
NS5	Outdoor spaces are defined by the elements	13.41	57.32	21.95	7.32	100	82
NS6	There is a view to nature (when you are inside the building)	22.89	40.96	21.69	14.46	100	83

- **Facilities**

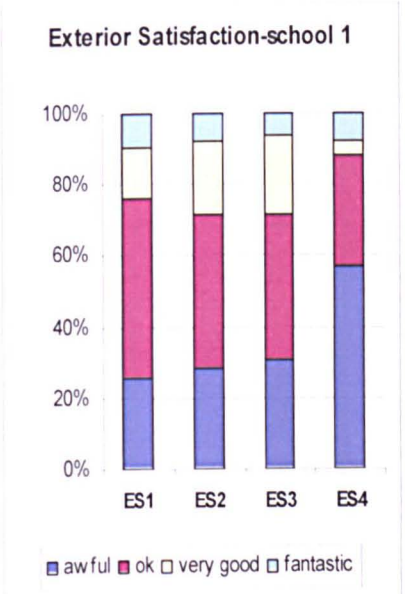

Facilities Satisfaction- school 1
100%
80%
60%
40%
20%
0%
FS1 FS2 FS3 FS4 FS5 FS6 FS7 FS8 FS9 FS10 FS11 FS12 FS13 FS14
awful ok very good fantastic

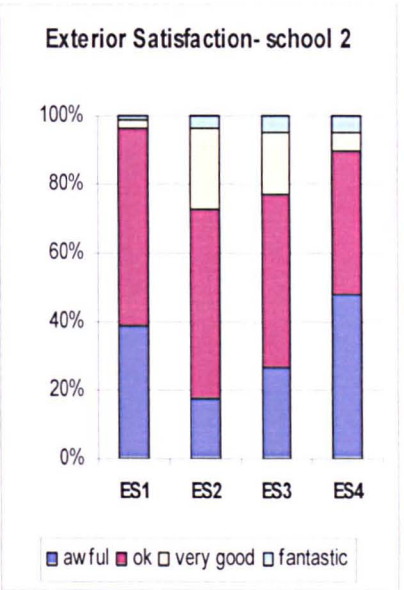

Facilities Satisfaction-school 2
100%
80%
60%
40%
20%
0%
FS1 FS2 FS3 FS4 FS5 FS6 FS7 FS8 FS9 FS10 FS11 FS12 FS13 FS14
awful ok very good fantastic

ID	Facilities' items	Satisfaction: valid percentage-School 1					Total No.
		awful	ok	very good	fantastic	Total percent	
FS1	There is provision for an audio system	33.63	48.67	11.50	6.19	100	113
FS2	There are appropriate chairs (seats)	12.17	53.04	27.83	6.96	100	115
FS3	There are appropriate tables or desks	14.91	42.11	35.96	7.02	100	114
FS4	There are appropriate lockers to store personal belongings	81.42	12.39	3.54	2.65	100	113
FS5	There is an easy access to the media and technology space	14.55	54.55	24.55	6.36	100	110
FS6	There are easy access fire exits for every space	4.50	45.05	33.33	17.12	100	111
FS7	There are scanning handprints or swipe card at the school gate	72.22	14.81	10.19	2.78	100	108
FS8	There is a water-proof shelter outside	52.73	32.73	7.27	7.27	100	110
FS9	There is seating in the school ground	9.26	53.70	28.70	8.33	100	108
FS10	There are picnic tables outside	10.19	50.00	28.70	11.11	100	108
FS11	There is easy access to drinking water	22.73	47.27	26.36	3.64	100	110
FS12	There is choice for cold snacks or drinks	8.26	44.04	33.03	14.68	100	109
FS13	There are appropriate toilets	19.63	46.73	18.69	14.95	100	107
FS14	There is equipment for various activities in the school ground suitable for different age groups	17.14	46.67	20.95	15.24	100	105

ID	Facilities' items	Satisfaction: valid percentage-School 2					Total No.
		awful	ok	very good	fantastic	Total percent	
FS1	There is provision for an audio system	40.24	46.34	7.32	6.10	100	82
FS2	There are appropriate chairs (seats)	27.71	45.78	22.89	3.61	100	83
FS3	There are appropriate tables or desks	26.83	43.90	24.39	4.88	100	82
FS4	There are appropriate lockers to store personal belongings	82.93	4.88	6.10	6.10	100	82
FS5	There is an easy access to the media and technology space	8.54	62.20	21.95	7.32	100	82
FS6	There are easy access fire exits for every space	17.28	46.91	25.93	9.88	100	81
FS7	There are scanning handprints or swipe card at the school gate	87.50	3.75	3.75	5.00	100	80
FS8	There is a water-proof shelter outside	67.50	20.00	8.75	3.75	100	80
FS9	There is seating in the school ground	55.56	33.33	9.88	1.23	100	81
FS10	There are picnic tables outside	87.50	5.00	3.75	3.75	100	80
FS11	There is easy access to drinking water	25.00	47.50	13.75	13.75	100	80
FS12	There is choice for cold snacks or drinks	3.75	51.25	26.25	18.75	100	80
FS13	There are appropriate toilets	63.75	26.25	6.25	3.75	100	80
FS14	There is equipment for various activities in the school ground suitable for different age groups	27.85	37.97	24.05	10.13	100	79

- **Exterior**



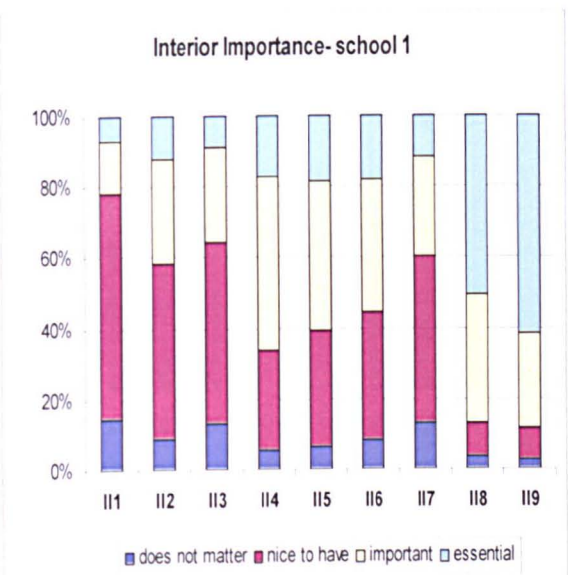


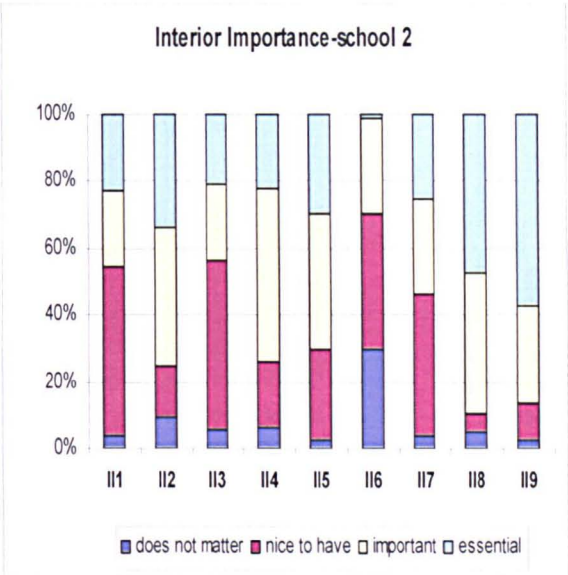
ID	Exterior items	Satisfaction: valid percentage-School 1					Total No.
		awful	ok	very good	fantastic	Total percent	
ES1	The exterior (building) is colourful	25.74	50.50	13.86	9.90	100	101
ES2	There is a connection to the community	28.57	42.86	20.41	8.16	100	98
ES3	The building acts as a landmark	30.61	40.82	22.45	6.12	100	98
ES4	There is a well-designed gate for the building	56.57	31.31	4.04	8.08	100	99

ID	Exterior items	Satisfaction: valid percentage-School 2					Total No.
		awful	ok	very good	fantastic	Total percent	
ES1	The exterior (building) is colourful	38.75	57.50	2.50	1.25	100	80
ES2	There is a connection to the community	17.50	55.00	23.75	3.75	100	80
ES3	The building acts as a landmark	26.58	50.63	17.72	5.06	100	79
ES4	There is a well-designed gate for the building	48.10	41.77	5.06	5.06	100	79

Appendix 5G: Children Views on Importance

- **Interior**

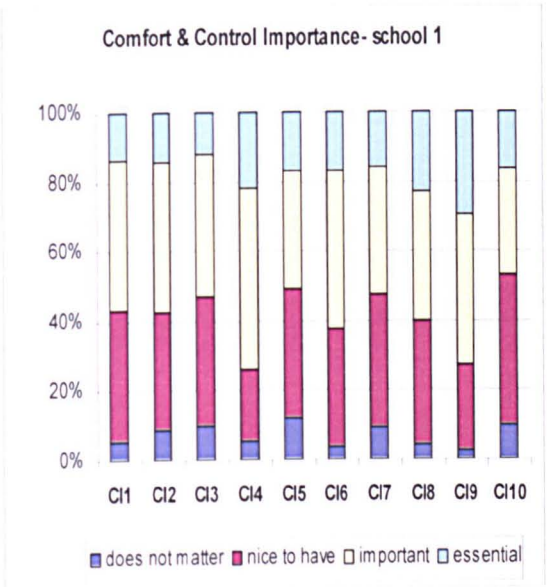


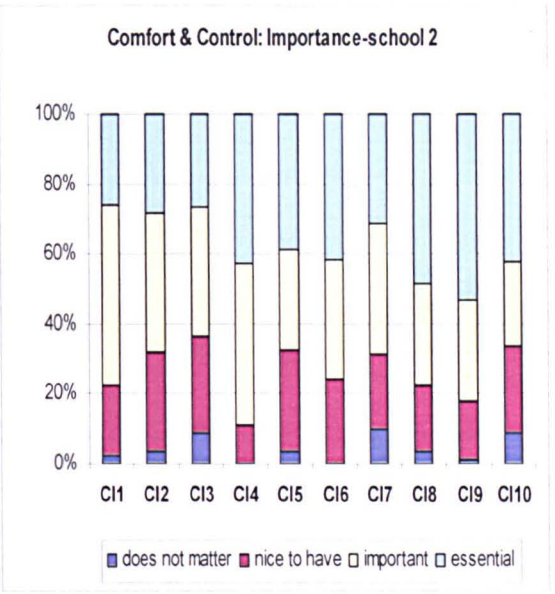


ID	Interior items	Importance: valid percentage- school 1					Total No.
		does not matter	nice to have	important	essential	Total percent	
II1	The interior is softly textured	14.29	63.98	14.91	6.83	100	161
II2	Interior finishes are durable	8.72	49.66	29.53	12.08	100	149
II3	The walls and floors are colourful	13.13	51.25	26.88	8.75	100	160
II4	The interior provides flexible spaces	5.77	28.21	48.72	17.31	100	156
II5	The interior has a variety of spaces	6.58	32.89	42.11	18.42	100	152
II6	The interior looks inviting, attractive and inspiring	8.39	36.13	37.42	18.06	100	155
II7	The interior provides means to display art work	12.82	47.44	28.21	11.54	100	156
II8	It is easy to find your way around	3.85	8.97	36.54	50.64	100	156
II9	The building is usable by everyone with different abilities	2.56	8.97	26.92	61.54	100	156

ID	Interior items	Importance: valid percentage- school 2					Total No.
		does not matter	nice to have	important	essential	Total percent	
II1	The interior is softly textured	3.45	50.57	22.99	22.99	100	87
II2	Interior finishes are durable	9.30	15.12	41.86	33.72	100	86
II3	The walls and floors are colourful	5.75	50.57	22.99	20.69	100	87
II4	The interior provides flexible spaces	5.88	20.00	51.76	22.35	100	85
II5	The interior has a variety of spaces	2.27	27.27	40.91	29.55	100	88
II6	The interior looks inviting, attractive and inspiring	29.89	40.23	28.74	1.15	100	87
II7	The interior provides means to display art work	3.41	43.18	28.41	25.00	100	88
II8	It is easy to find your way around	4.76	5.95	41.67	47.62	100	88
II9	The building is usable by everyone with different abilities	2.30	11.49	28.74	57.47	100	87

- **Comfort and Control**

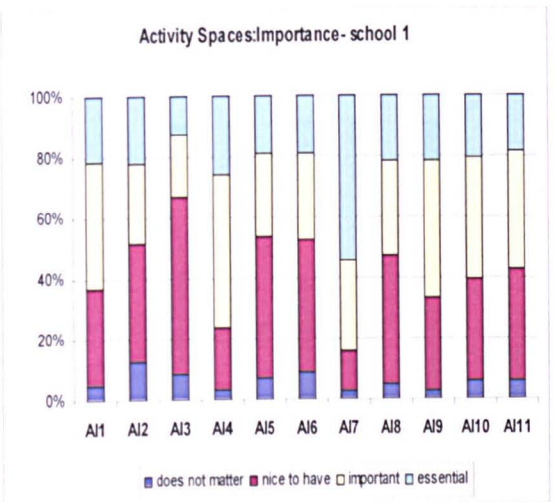


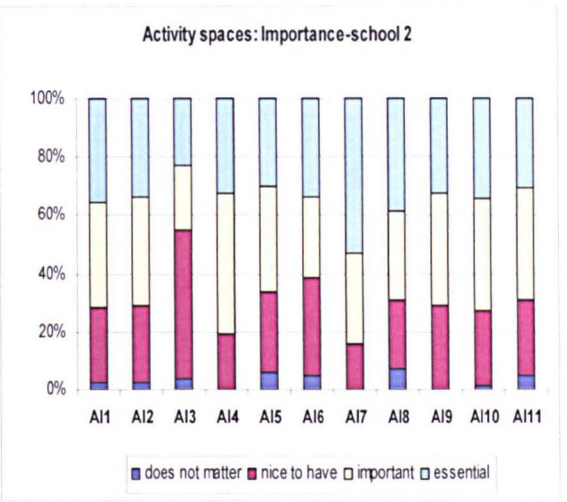


ID	Comfort and Control items	Importance: valid percentage- school 1					Total No.
		does not matter	nice to have	important	essential	Total percent	
CI1	There are satisfactory levels of natural light	5.48	37.67	43.15	13.70	100	146
CI2	There are appropriate types of artificial lights	8.84	34.01	42.86	14.29	100	147
CI3	Students can easily control natural & artificial lighting	10.00	37.14	40.71	12.14	100	140
CI4	There are blinds to control sunlight	5.63	20.42	52.11	21.83	100	142
CI5	There are good acoustics	11.94	37.31	33.58	17.16	100	134
CI6	There is natural ventilation	3.57	34.29	45.00	17.14	100	140
CI7	Students can easily control ventilation system	9.35	38.13	36.69	15.83	100	139
CI8	Air-conditioning is provided	4.20	35.66	37.06	23.08	100	143
CI9	Room temperature is appropriate in different seasons	2.82	24.65	42.96	29.58	100	142
CI10	Students can easily control the temperature	9.86	42.96	30.99	16.20	100	142

ID	Comfort and Control items	Importance: valid percentage- school 2					Total No.
		does not matter	nice to have	important	essential	Total percent	
CI1	There are satisfactory levels of natural light	2.35	20.00	51.76	25.88	100	85
CI2	There are appropriate types of artificial lights	3.53	28.24	40.00	28.24	100	85
CI3	Students can easily control natural & artificial lighting	8.43	27.71	37.35	26.51	100	83
CI4	There are blinds to control sunlight	0.00	10.98	46.34	42.68	100	88
CI5	There are good acoustics	3.75	28.75	28.75	38.75	100	80
CI6	There is natural ventilation	0.00	24.39	34.15	41.46	100	82
CI7	Students can easily control ventilation system	9.64	21.69	37.35	31.33	100	83
CI8	Air-conditioning is provided	3.57	19.05	28.57	48.81	100	84
CI9	Room temperature is appropriate in different seasons	1.20	16.87	28.92	53.01	100	83
CI10	Students can easily control the temperature	8.43	25.30	24.10	42.17	100	83

- **Activity Spaces**

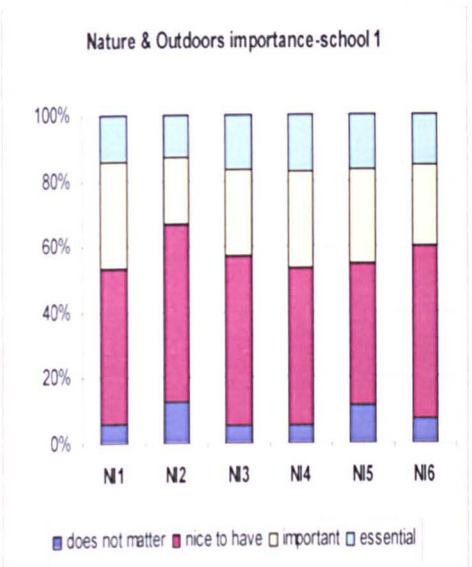


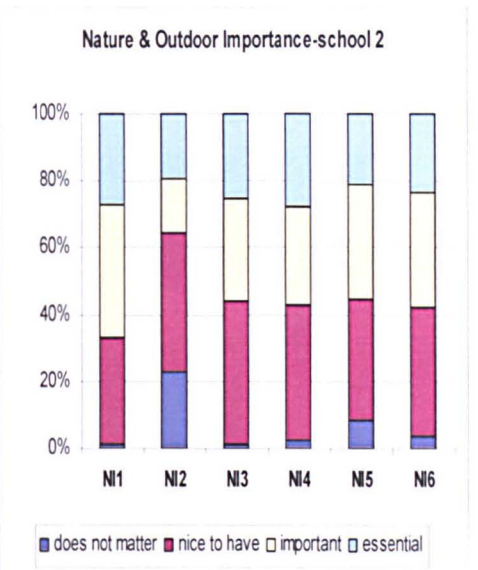


ID	Activity Spaces items	Importance: valid percentage- School 1					Total No.
		not matters	nice to have	important	essential	Total percent	
AI1	There is provision for outdoor learning	4.58	32.06	41.98	21.37	100	131
AI2	There are places for rest and mediation	12.88	38.64	26.52	21.97	100	132
AI3	There is some decoration in the dining spaces	8.53	58.14	20.93	12.40	100	129
AI4	The layout of the dining spaces prevents crowding	3.15	20.47	50.39	25.98	100	127
AI5	The furniture in the dining spaces creates a warm atmosphere	7.09	46.46	27.56	18.90	100	127
AI6	There are spaces for an administrative hub and for meeting or greeting	9.17	43.33	28.33	19.17	100	120
AI7	There is space for caring for sick pupils	2.46	13.11	30.33	54.10	100	122
AI8	There are indoor spaces designed especially for play	5.00	42.50	30.83	21.67	100	120
AI9	There are spaces for art performances / physical activities	2.48	30.58	45.45	21.49	100	121
AI10	There is plenty of room for movement in circulating areas	5.74	33.61	40.16	20.49	100	122
AI11	The physical environment helps easy talk between pupils and staff in the assembly area	5.83	36.67	39.17	18.33	100	120

ID	Activity Spaces items	Importance: valid percentage- School 2					Total No.
		not matters	nice to have	important	essential	Total percent	
AI1	There is provision for outdoor learning	2.44	25.61	36.59	35.37	100	82
AI2	There are places for rest and mediation	2.41	26.51	37.35	33.73	100	83
AI3	There is some decoration in the dining spaces	3.66	51.22	21.95	23.17	100	82
AI4	The layout of the dining spaces prevents crowding	0.00	19.28	48.19	32.53	100	83
AI5	The furniture in the dining spaces creates a warm atmosphere	6.02	27.71	36.14	30.12	100	83
AI6	There are spaces for an administrative hub and for meeting or greeting	4.82	33.73	27.71	33.73	100	83
AI7	There is space for caring for sick pupils	0.00	15.66	31.33	53.01	100	83
AI8	There are indoor spaces designed especially for play	7.41	23.46	30.86	38.27	100	81
AI9	There are spaces for art performances/ physical activities	0.00	28.92	38.55	32.53	100	83
AI10	There is plenty of room for movement in circulating areas	1.22	25.61	39.02	34.15	100	82
AI11	The physical environment helps easy talk between pupils and staff in the assembly area	4.88	25.61	39.02	30.49	100	82

- **Nature and Outdoor**

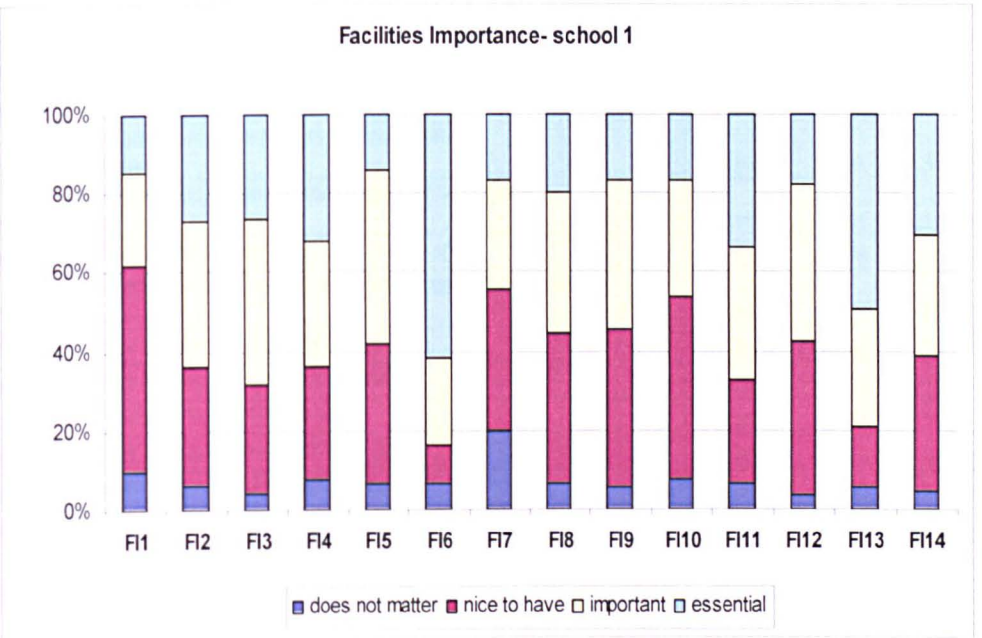


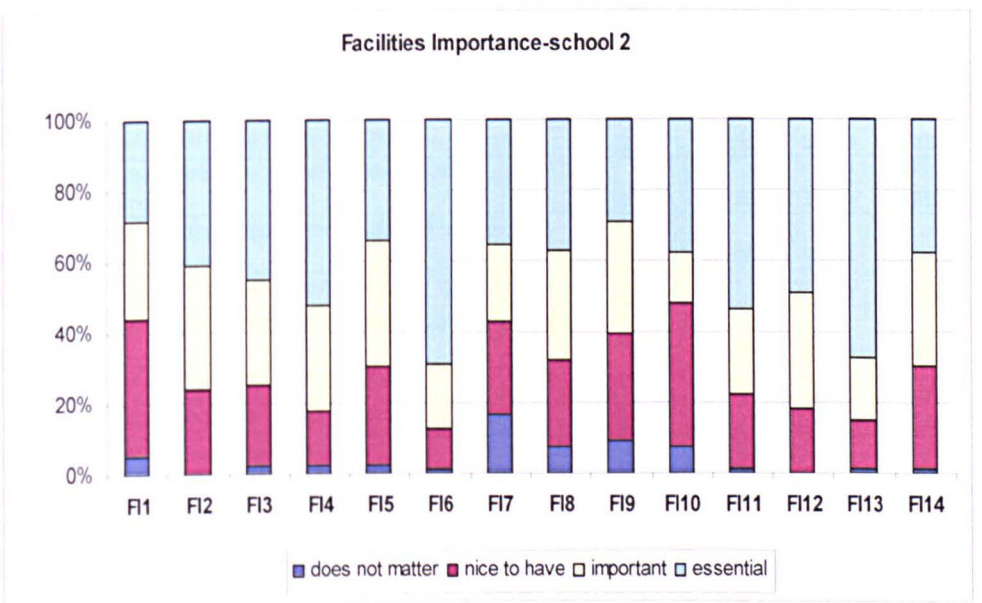


ID	Nature and Outdoor items	Importance: valid percentage- School 1					Total No.
		not matters	nice to have	important	essential	Total percent	
NI1	There is access to the landscape	6.25	47.32	32.14	14.29	100	112
NI2	There is a pet corner or bird boxes	12.61	54.05	20.72	12.61	100	111
NI3	The outdoor looks interesting and versatile	5.50	51.38	26.61	16.51	100	109
NI4	The outdoor looks relaxing	5.50	47.71	29.36	17.43	100	109
NI5	Outdoor spaces are defined by the elements	11.76	43.14	28.43	16.67	100	102
NI6	There is a view to nature (when you are inside the building)	7.62	52.38	24.76	15.24	100	105

ID	Nature and Outdoor items	Importance: valid percentage- School 2					Total No.
		not matters	nice to have	important	essential	Total percent	
NI1	There is access to the landscape	1.22	31.71	40.24	26.83	100	82
NI2	There is a pet corner or bird boxes	23.17	41.46	15.85	19.51	100	82
NI3	The outdoor looks interesting and versatile	1.25	42.50	31.25	25.00	100	80
NI4	The outdoor looks relaxing	2.27	36.36	27.27	25.00	100	80
NI5	Outdoor spaces are defined by the elements	8.64	35.80	34.57	20.99	100	81
NI6	There is a view to nature (when you are inside the building)	3.70	38.27	34.57	23.46	100	81

- **Facilities**

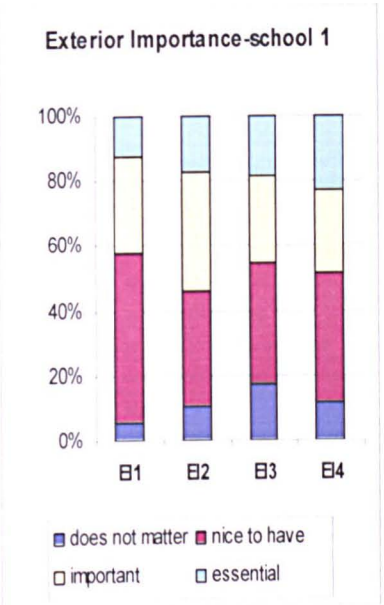

Facilities Importance- school 1
100%
80%
60%
40%
20%
0%
FI1
FI2
FI3
FI4
FI5
FI6
FI7
FI8
FI9
FI10
FI11
FI12
FI13
FI14
does not matter
nice to have
important
essential

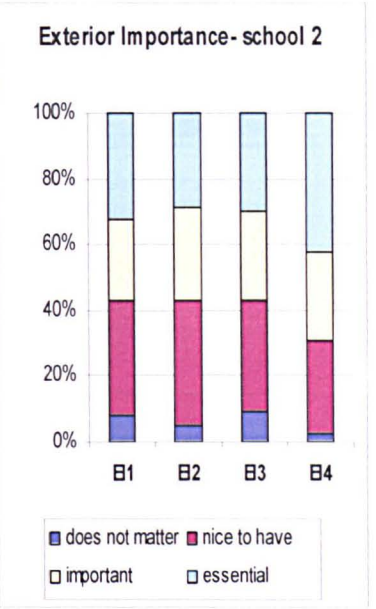

Facilities Importance-school 2
100%
80%
60%
40%
20%
0%
FI1
FI2
FI3
FI4
FI5
FI6
FI7
FI8
FI9
FI10
FI11
FI12
FI13
FI14
does not matter
nice to have
important
essential

ID	Facilities' items	Importance: valid percentage- School 1					Total No.
		not matters	nice to have	important	essential	Total percent	
FI1	There is provision for an audio system	9.57	52.13	23.40	14.89	100	94
FI2	There are appropriate chairs (seats)	6.19	29.90	37.11	26.80	100	97
FI3	There are appropriate tables or desks	4.21	27.37	42.11	26.32	100	95
FI4	There are appropriate lockers to store personal belongings	7.45	28.72	31.91	31.91	100	94
FI5	There is an easy access to the media and technology space	6.59	35.16	43.96	14.29	100	91
FI6	There are easy access fire exits for every space	6.59	9.89	21.98	61.54	100	91
FI7	There are scanning handprints or swipe card at the school gate	20.00	35.56	27.78	16.67	100	90
FI8	There is a water-proof shelter outside	6.67	37.78	35.56	20.00	100	90
FI9	There is seating in the school ground	5.68	39.77	37.50	17.05	100	88
FI10	There are picnic tables outside	7.78	45.56	30.00	16.67	100	90
FI11	There is easy access to drinking water	6.52	26.09	33.70	33.70	100	92
FI12	There is choice for cold snacks or drinks	3.33	38.89	40.00	17.78	100	90
FI13	There are appropriate toilets	5.49	15.38	29.67	49.45	100	91
FI14	There is equipment for various activities in the school ground suitable for different age groups	4.55	34.09	30.68	30.68	100	88

ID	Facilities' items	Importance: valid percentage- School 2					Total No.
		not matters	nice to have	important	essential	Total percent	
FI1	There is provision for an audio system	5.00	38.75	27.50	28.75	100	80
FI2	There are appropriate chairs (seats)	0.00	23.75	35.00	41.25	100	80
FI3	There are appropriate tables or desks	2.50	22.50	30.00	45.00	100	80
FI4	There are appropriate lockers to store personal belongings	2.56	15.38	29.49	52.56	100	78
FI5	There is an easy access to the media and technology space	2.53	27.85	35.44	34.18	100	79
FI6	There are easy access fire exits for every space	1.23	11.11	18.52	69.14	100	81
FI7	There are scanning handprints or swipe card at the school gate	16.46	26.58	21.52	35.44	100	79
FI8	There is a water-proof shelter outside	7.41	24.69	30.86	37.04	100	81
FI9	There is seating in the school ground	8.86	30.38	31.65	29.11	100	79
FI10	There are picnic tables outside	7.59	40.51	13.92	37.97	100	79
FI11	There is easy access to drinking water	1.25	21.25	23.75	53.75	100	80
FI12	There is choice for cold snacks or drinks	0.00	18.52	32.10	49.38	100	81
FI13	There are appropriate toilets	1.25	13.75	17.50	67.50	100	80
FI14	There is equipment for various activities in the school ground suitable for different age groups	1.27	29.11	31.65	37.97	100	79

- **Exterior**





ID	Exterior items	Importance: valid percentage- School 1					Total No.
		not matters	nice to have	important	essential	Total percent	
EI1	The exterior (building) is colourful	5.75	51.72	29.89	12.64	100	87
EI2	There is a connection to the community	10.59	35.29	36.47	17.65	100	85
EI3	The building acts as a landmark	17.44	37.21	26.74	18.60	100	86
EI4	There is a well-designed gate for the building	11.49	40.23	25.29	22.99	100	87

ID	Exterior items	Importance: valid percentage- School 2					Total No.
		not matters	nice to have	important	essential	Total percent	
EI1	The exterior (building) is colourful	7.79	35.06	24.68	32.47	100	77
EI2	There is a connection to the community	5.06	37.97	27.85	29.11	100	79
EI3	The building acts as a landmark	9.09	33.77	27.27	29.87	100	77
EI4	There is a well-designed gate for the building	2.56	28.21	26.92	42.31	100	78

Appendix 5H: Children's Comments

Category	Children's Comments	Frequency of Repetition
Interior	clean school grounds/floors	4
	having more room in corridors	2
	colourful rooms, more colour	2
	more interesting architecture	1
	more space on stairs	1
Comfort & Control	air conditioning	3
	heating in classrooms	1
	windows in classrooms	1
	blinds	1
Activity Spaces	sport centre/ Gym	3
	activities for anyone to do	2
	more outdoor playing space	2
	more areas to gather at break time	1
	better dining space	1
	better classrooms	1
	relaxing space	1
	a place for girls to rest	1
	games room	1
	club room	1
Nature & Outdoors	a pet corner/ zoo	4
	more trees and natural landscape in the yard	2
	large yard	1
Facilities	lockers	20
	swimming pool	19
	proper P.E/ sport equipment	12
	toilets (no smoking- in toilets, new, better/nicer, enough toilets, better toilet locks)	12
	bike sheds	10
	benches outsides/ outdoor seats	9
	security system, hand prints, swipe card/ CCTV cameras	7
	more food choice, Snack/ vending machines	7
	skate park	6
	ice-skating rink	5
	shelters outsides	5
	food stand (e.g. on site MacDonald's /candy shop)	4
	comfortable chairs/seats	4
	football pitch	4
	water/drinking fountain	4
	more computer rooms	3
	laser zone	2
	facility to listen to music in all rooms	2
	more lift facilities	2
	enough places/ fields to sit outside	2
	disabled ramps	1
	TV for after lessons on walls	1
	cinemas	1
	high tech automatic doors	1
	a bully/ bad people room	1
	nice tables	1
	picnic tables	1
	good resources	1
Exterior	----------	-

Appendix 6A: Exploratory study: Teacher's view about their schools

Good things:

- The art work and displays around school
- The enthusiasm of the teaching staff
- The child-friendly learning environment
- The amount of creativity that goes on
- The positive relationship between children and teachers

- Accessibility to all areas (interview)
- Natural light
- Relaxed atmosphere
- The children's behaviour is good
- Good open spaces-green land-lots of room
- Belief in creativity and its importance
- Free to change rigid plans to adapt to unexpected situations
- Supportive staff
- Friendly learning environment
- Colourful interesting displays
- Size of classroom (space around school)
- Large playground/grass area
- Classroom toilet and storage space
- Natural light
- Separate dining room/hall
- Large airy space in and out
- Good use of colour in décor
- Varied outdoor spaces, lots of green space, trees, planting
- Spider (climbing) frame
- Attractive frontage
- Size of the playground (good size)
- Light in classrooms
- Computer suite
- Green open space around the school
- A garden in centre of the building
- Friendly atmosphere
- Space- inside and out- variety of different spaces
- Adaptable resources
- New classroom area- purpose built
- Plenty of outdoor space
- Small
- Open plan
- Surrounded by green fields
- Local
- Well maintained
- Good environmental location
- Good working relationship between staff
- Plenty of space outside
- Enclosed outdoor play area
- View over the city
- Appearance at main entrance

- Friendly, sociable children- community feeling
- Multi cultural-rich culture
- Covered in external area
- Good working relationship with colleagues
- The environment is improving, but could be more welcoming
- Committed staff – experienced
- Welcoming staff/environment
- Focus on the well-being of the child create environment happy, children learn and develop
- Inclusion terms of parental support and involvement in child's learning
- The children
- The new outside area in the foundation stage
- The staff
- The child centre approach to learning
- The welcoming attitudes to children and parents
- Large basement area for acting or music
- Quite area for working outside
- Space for all our pupils

Main problems:

- The space restrictions inside and outside
- The lack of greening outside school
- The separation of the Y5/ Y6 classrooms from the main school building
- Close to traffic (noise)
- Behaviour problems of children
- The amount of differentiation needed

- Lack of teaching space (interview)
- Lack of storage space
- Limited Toilets and access to hot water
- Terrapin 'temporary' classrooms
- Heat or cold variants
- Lack of resources
- Negative attitude to 'change'
- Lack of creative thinking
- Poor condition of the fabric of the building
- 'Targets' at the expense of teaching and learning
- Behaviour problems
- Differentiated pupils-abilities
- Lack of outdoor covered area (shelter) for children to play
- Entrance area is unwelcoming and dark
- Long corridors
- Lack of parking for visitors/parents
- Empty spaces that are dull and need more colour
- Poor ventilation
- No drama space/ specialized out room
- Storage areas not near classrooms
- Cloakrooms-coats
- Staff toilets smells (not good ventilation)
- Space

- Storage
- Light in classrooms (glare and no blinds)
- Corridors are cluttered (untidy and like storage)
- Dining room is not attractive place for children to eat; not calm; dump
- Poor heating system
- Windows-plastic material- now cloudy
- Spaces- small and not useable
- Stairs- difficult moving for pupils
- Poor ventilation
- Central hall- constant traffic through
- 70th building- worse for wear-polystyrene tiles
- Lack of creative areas in yards
- Poor facilities for staff- pokey rooms
- Distances between areas-outside and inside
- Too close to a motorway- noise and pollution
- Not air heating system
- Not built to last (1960's build)
- Too many 'small' spaces that have had to be adopted for teaching
- Poor overall layout-some areas used for teaching also act as thoroughfares to hall etc.
- Play ground is too small
- Fields are very hilly and inaccessible
- Cold in winter, hot in summer
- Not enough space for meeting, planning and training
- The ever changing population
- The central hall-bad planning
- Some classrooms are too small
- Old fashioned, badly designed
- Hall-old, cold
- Playground- not user friendly
- Layout- square chase, staff around
- No shaded area outside for summer heat
- Access to water-drinking outside-water play or cleaning
- Not enough meeting spaces and areas for small groups
- Dirty and not well maintained
- Dilapidated building-forever needing decoration and maintenance
- Not much space to welcome parents
- Lack of space (storage)
- Too small classrooms- key stage
- Not enough green spaces in the environment
- Crumbling walls/plaster
- The age of the school
- Size of the classrooms
- The environment surrounding the school
- The level of crime
- Large areas to decorate/display
- Crumbling building (a hundred years old build)
- Dining room- unattractive, not big environment
- No grass
- Hall not big enough to fit everyone in

What a 'good school' would be?

- Calm and welcoming
- Spacious
- Where children are 'happy' and 'relaxed' and feel 'able to express themselves' in open ended creative situations
- One that is accessible to both adults and children to learn positively alongside each other.
- One which successfully balanced creativity with good skills progression for the children
- Take everyone's ideas into consideration
- Listen to views of pupils
- No right and wrong way of working
- Build on strengths of all staff and pupils
- Spacious
- welcoming
- Child orientated to 'encourage independence' (among children)
- A place where children feel 'safe' and 'happy'
- Water dispensers
- Electronic doors
- Lots of different spaces for learning (T.V room/library/music room)
- Versatile spaces
- adequate accommodation
- Green spaces
- Attractive décor
- Appropriate resources
- A light, friendly building
- Adequate storage and space for staff and pupils to work and play
- With a garden area and grass
- Versatile spaces
- Places for storage and equipment
- Friendly for adults/staff
- Well built, bright, user-friendly
- Simple, practical, strong building
- Designed by children and teachers
- Good mix of useful space(s) indoors and outdoors
- With accessible and well used green spaces
- Extra rooms inside for training, meeting, flexible teaching
- Designed by children and staff
- Child friendly and adult friendly
- Light/ bright, green
- Natural looking as well as modern
- Light, clean, open areas and quiet areas internal and external
- Shaded areas outdoors
- Maintained and cleaned
- Inviting and accessible
- Somewhere with more 'homely', quiet areas
- A building with lots of natural light
- Good quality resources/environment
- A child- friendly area that is welcoming to parents
- The school involving the staff/children in its design
- a school that is open to new ideas and approaches

- Comfortable, draft proof
- Spacious enough for the number of children (we have)
- Colourful and light
- Durable
- Surrounded with greenery as well as tarmac

Appendix 6B: Questionnaire - Teachers' views about school

Your opinion about your school environment (building and grounds) is important to be heard by architects and designers. It is valuable to know as teaching staff what your needs are and what you think a good school should be. **Thank you for your participation.**

In a small scale study done with a number of teachers, some issues emerged that have been classified in the following tables. In this survey, we would like to know:

(1) How **satisfied** are you with <u>your school</u>? Please rate each item on the following scale.

1. It's Awful
2. It's OK.
3. It's Very Good
4. It's Fantastic

(2) How **important** is each item for <u>the school you would like</u> to have? Please rate each item on the following scale.

1. Does <u>Not</u> Matter
2. Nice to have
3. Important
4. Essential

- When you identify the importance of each item for the school you would like, please tell us how **confident** you are about your answers by choosing Low or High **level of confidence**. To help you do this look at the example below.

For example, about the item "*The walls and floors are colourful*" if you think your school is *very good*, then you put a cross in the relevant column. If you think this item is *Nice to have* in the school you would like, please put a cross in the relevant column and if you are *very confident* about your answer, please choose *High* level of confidence.

Indoor Spaces (interior)	Your school				The school you would like					
	How **satisfied** are you with each item?				How **important** is each item?				Confidence	
	It's Awful 1	It's OK. 2	It's Very Good 3	It's Fantastic 4	Does Not Matter 1	Nice to Have 2	Important 3	Essential 4	Low	High
The walls and floors are colourful			X			X				X

Please feel free to include comments at the end of this questionnaire

Please rate your comments (your raised issues) to show their importance

Indoor Spaces (interior)		Your school				The school you would like					
		How **satisfied** are you with each item?				How **important** is each item?				Confidence	
		It's Awful	It's OK.	It's Very Good	It's Fantastic	Does Not Matter	Nice to Have	Important	Essential	Low	High
1	The interior looks calm and relaxing										
2	Interior finishes are durable										
3	The walls and floors are colourful										
4	There are colourful and attractive décors										
5	The interior has a variety of spaces										
6	The interior looks attractive, inviting and friendly										
7	The interior provides means to display art work										
8	The interior looks light and airy										
9	The interior provides flexible spaces										
10	Indoor spaces are safe										
11	The entrance area is welcoming and light										
12	The circulation area is short										
13	Corridors are not cluttered										

Activity Spaces		Your school				The school you would like					
		How **satisfied** are you with each item?				How **important** is each item?				Confidence	
		It's Awful	It's OK.	It's Very Good	It's Fantastic	Does Not Matter	Nice to Have	Important	Essential	Low	High
1	There are meeting spaces for teachers										
2	There is a special area for physical activities										
3	The school ground is suitably equipped for play										

Exterior		Your school				The school you would like					
		How **satisfied** are you with each item?				How **important** is each item?				Confidence	
		It's Awful	It's OK.	It's Very Good	It's Fantastic	Does Not Matter	Nice to Have	Important	Essential	Low	High
1	There is an attractive frontage and entrance										

Comfort and Control		Your school				The school you would like					
		How **satisfied** are you with each item?				How **important** is each item?				Confidence	
		It's Awful	It's OK.	It's Very Good	It's Fantastic	Does Not Matter	Nice to Have	Important	Essential	Low	High
1	There is adequate natural light										
2	There are appropriate types of artificial lights										
3	Sun light & day light can easily be controlled										
4	Ventilation can easily be controlled by opening windows/ doors.										
5	There is enough fresh and clean air indoors										
6	There is good ventilation for toilets										
7	There is appropriate temperature in different seasons										
8	Room temperature can easily be controlled										
9	There is appropriate heating system										
10	There are good acoustics to minimise unwanted noise in different spaces										

Nature and Outdoors		Your school				The school you would like					
		How **satisfied** are you with each item?				How **important** is each item?				Confidence	
		It's Awful	It's OK.	It's Very Good	It's Fantastic	Does Not Matter	Nice to Have	Important	Essential	Low	High
1	There is access to usable landscaped area/ grass										
2	There is a garden (plants & flowers) inside the building										
3	There is quiet areas for working outside										
4	There is a view (when you are inside the building) to green fields/ greenery										

	Facilities	Your school				The school you would like					
		How **satisfied** are you with each item?				How **important** is each item?				Confidence	
		It's Awful	It's OK.	It's Very Good	It's Fantastic	Does Not Matter	Nice to Have	Important	Essential	Low	High
1	Toilets are accessible from classrooms										
2	There is warm water for washing										
3	There are water drinking/ dispensers inside and outside										
4	The storages (cupboards) are close to classrooms										
5	There is enough room for cloakrooms										
6	There is shaded/covered outdoor areas										
7	There are electronic doors										
8	There is space for a child with particular behaviour problem										
9	There is a welcoming place for parents										
10	There are parking area for visitors/ parents										

	Comments: Can you think of any more items to add? If you can then write them down in the boxes below and remember to rate them too.	The school you would like					
		How **important** is each item?				Confidence	
		Does Not Matter	**Nice to Have**	**Important**	**Essential**	**Low**	**High**
1							
2							
3							
4							
5							

About yourself: Male ☐ Female ☐

For which year do you teach? ..... How long have you taught in this school? .....

Appendix 6C: Information sheet for the teachers

18.02.2008

Information sheet for teachers participating in the research

Exploring teachers' views about their school environments

You are being invited to take part in a research project.
We very much hope you will agree to take part and this document is intended to help you to decide.
Thank you for your time.

What is the project's purpose?
This research explores what teachers think of their school buildings and grounds. The findings will help to make a framework for school design as a reference for architects and designers. You spend a great deal of time in school and your knowledge and expertise are extremely important to us.

What are the possible benefits of taking part?
You may learn more about architecture and the impact school design can have on both teachers and pupils. It is hoped that this work will lead to a better understanding of how to design good schools in the future.

What will happen to me if I take part?
There will be a questionnaire to be filled in. It might be a short follow-up discussion with me and some other teachers in the normal school day. We will talk about the different places in the school. We might also take photographs of some spaces. This will take between 1/2 and 1 hour. If you give consent on the forms provided, the discussion will be sound recorded or filmed so that the researcher can listen to and analyse what was said later on. If you do not want to be recorded or photographed or filmed you can tell us on the consent form.

Will our taking part in this project be kept confidential?
It will not be possible to identify you or your contribution in any reports or publications. Original photographs and film footage (hard copies and digital files) will be kept by the project coordinator who will delete anything that accidentally shows someone whose photographs or film footage we do not have permission to use. This will happen before the analysis. Original photos and digital files will then be available to the Headteacher, but no other parties. Project photographs and film footage will not be used on websites or in any other form of electronic media.

What will happen to the results of the research project?
The research findings will be written into a report and a copy will be given to the headteacher. If you would like to see the report you can ask the headteacher. This work will contribute to a PhD thesis, which will be stored by the University. Academic articles will be written and presentations will be made about the research. The data collected during the course of the project might be used for additional or subsequent research; however, this research will be subject to the same restrictions as those detailed here.

For further information please contact:
Rosie Parnell (Project Supervisor), School of Architecture, University of Sheffield, Western Bank, Sheffield, S10 2TN. Tel: 0114 2220327 e-mail: r.parnell@sheffield.ac.uk

If you are unhappy with the research in any way you can contact the researcher to raise your concerns:
Researcher: Rokhshid Ghaziani
Contact: 0114 222 0335

If you do not feel that your complaint was handled effectively you have the right to contact the Project Supervisor or the University's Registrar and Secretary.
University Registrar: Dr David Fletcher
Contact: 0114 222 0000

The project has gained ethical approval through the University's Ethics Review Procedure.

If you decide to give consent to take part in this research project, please:

1) sign the consent form provided
2) keep this information sheet
3) return the consent form to school

Thank you.

Appendix 6D: Consent form for teachers

Exploring teachers' views about their school environments
CONSENT FORM FOR TEACHERS

Please tick boxes if you agree

Taking part in the project

1. I confirm that have read and understand the information sheet dated 18.02.2008 for the above project and have had the opportunity to ask questions. ☐

2. I agree to taking part in the above project by answering questions in a group and doing some writing and/or interview with the approved researcher (Rokhshid). ☐

3. I agree to allow the research team to look at, talk and write about the things I say. ☐

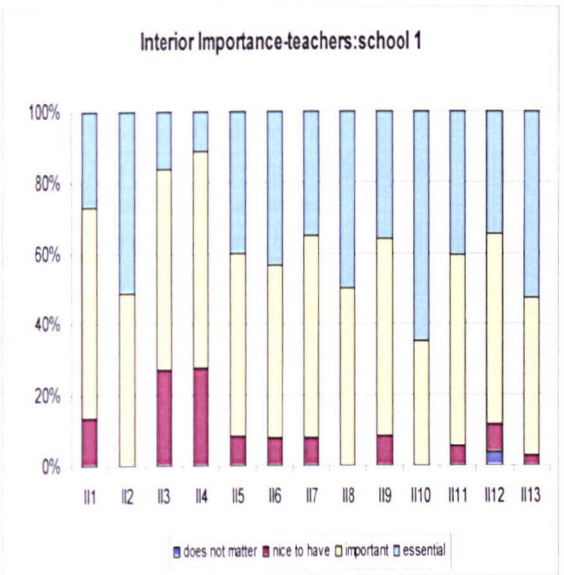
Your name .....Date..... Signature.....

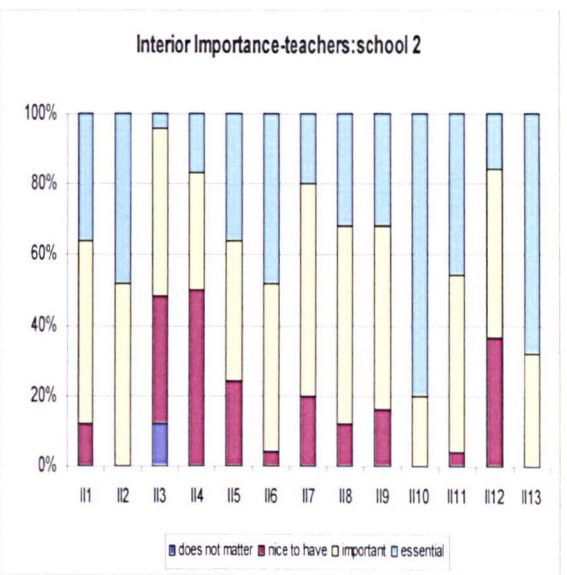
[Researcher..... .....Date.....Signature.....]

School of Architecture
University of Sheffield

Appendix 6E: Teachers' Views on Importance

- **Indoor spaces (Interior)**

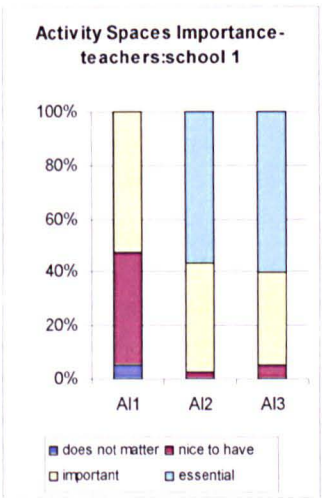


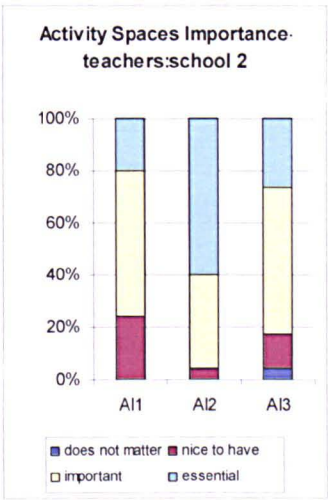


ID	Interior items	Importance: valid percentage- school 1					Total No.
		does not matter	nice to have	important	essential	Total percent	
II1	The interior looks calm and relaxing	0.0	13.5	59.5	27.0	100	37
II2	Interior finishes are durable	0.0	0.0	48.0	52.0	100	37
II3	The walls and floors are colourful	0.0	27.0	56.8	16.2	100	37
II4	There are colourful and attractive décors	0.0	27.8	61.1	11.1	100	36
II5	The interior have a variety of spaces	0.0	8.6	51.4	40.0	100	35
II6	The interior looks attractive, inviting and friendly	0.0	8.1	48.6	43.2	100	37
II7	The interior provides means to display art work	0.0	8.1	56.8	35.1	100	37
II8	The interior looks light and airy	0.0	0.0	50.0	50.0	100	36
II9	The interior provides flexible spaces	0.0	8.3	55.6	36.1	100	36
II10	Indoor spaces are safe	0.0	0.0	35.1	64.9	100	37
II11	The entrance area is welcoming and light	0.0	5.4	54.1	40.5	100	37
II12	The circulation area is short	3.8	7.7	53.8	34.6	100	26
II13	Corridors are not cluttered	0.0	2.6	44.7	52.6	100	38

ID	Interior items	Importance: valid percentage- school 2					Total No.
		does not matter	nice to have	important	essential	Total percent	
II1	The interior looks calm and relaxing	0.0	12.0	52.0	36.0	100	25
II2	Interior finishes are durable	0.0	0.0	52.0	48.0	100	25
II3	The walls and floors are colourful	12.0	36.0	48.0	4.0	100	25
II4	There are colourful and attractive décors	0.0	50.0	33.3	16.7	100	24
II5	The interior have a variety of spaces	0.0	24.0	40.0	36.0	100	25
II6	The interior looks attractive, inviting and friendly	0.0	4.0	48.0	48.0	100	25
II7	The interior provides means to display art work	0.0	20.0	60.0	20.0	100	25
II8	The interior looks light and airy	0.0	12.0	56.0	32.0	100	25
II9	The interior provides flexible spaces	0.0	16.0	52.0	32.0	100	25
II10	Indoor spaces are safe	0.0	0.0	20.0	80.0	100	25
II11	The entrance area is welcoming and light	0.0	4.2	50.0	45.8	100	24
II12	The circulation area is short	0.0	36.8	47.4	15.8	100	19
II13	Corridors are not cluttered	0.0	0.0	32.0	68.0	100	25

- **Activity Spaces**

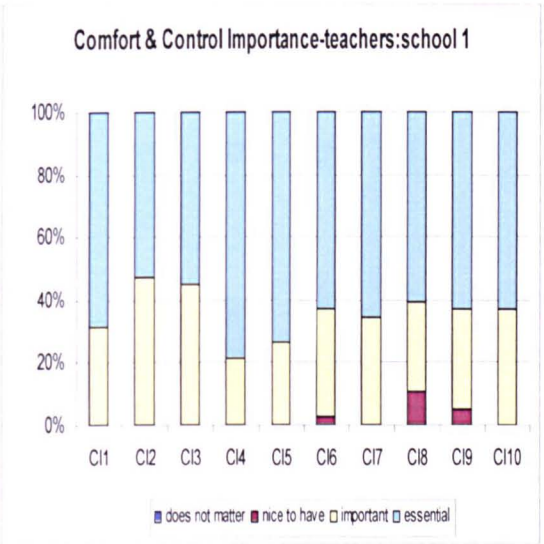


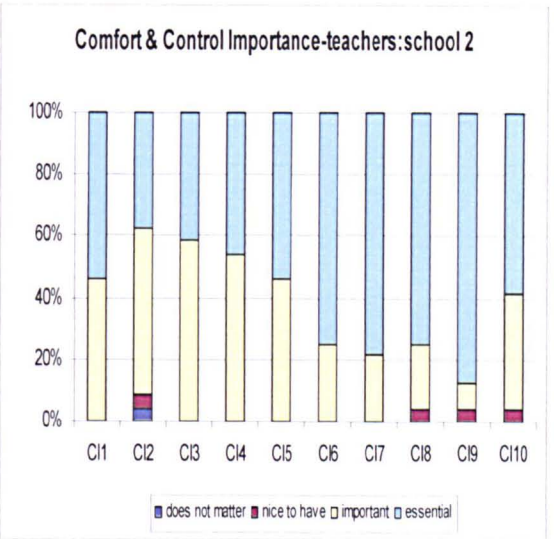


ID	Activity Spaces items	Importance: valid percentage- School 1					Total No.
		not matters	nice to have	important	essential	Total percent	
AI1	There are meeting spaces for teachers	5.3	42.1	52.6	0.0	100	38
AI2	There is a special area for physical activities	0.0	2.7	40.5	56.8	100	37
AI3	The school ground is suitably equipped for play	0.0	5.3	34.2	60.5	100	38

ID	Activity Spaces items	Importance: valid percentage- School 2					Total No.
		not matters	nice to have	important	essential	Total percent	
AI1	There are meeting spaces for teachers	0.0	24.0	56.0	20.0	100	25
AI2	There is a special area for physical activities	0.0	4.0	36.0	60.0	100	25
AI3	The school ground is suitably equipped for play	4.3	13.0	56.5	26.1	100	23

- **Comfort and Control**

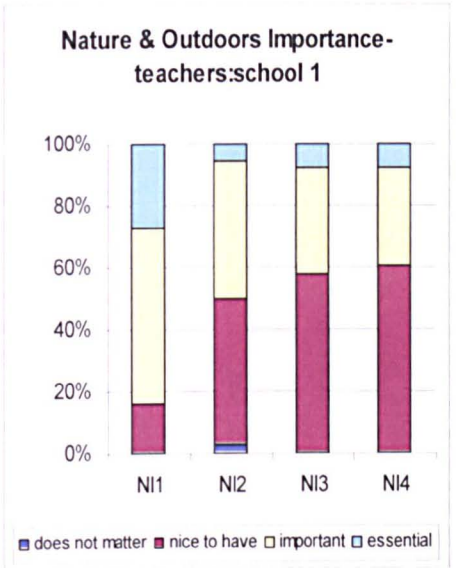


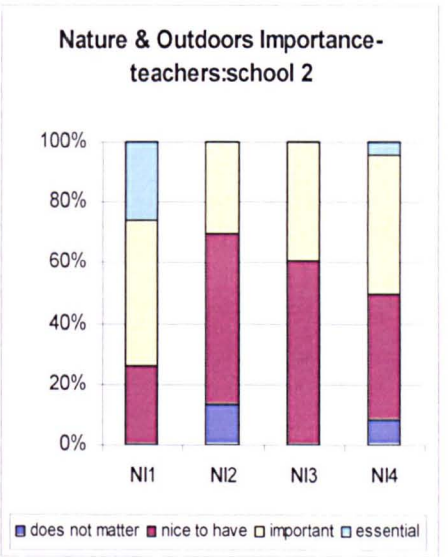


ID	Comfort and Control items	Importance: valid percentage- school 1					Total No.
		does not matter	nice to have	important	essential	Total percent	
CI1	There is adequate natural light	0.0	0.0	31.6	68.4	100	38
CI2	There are appropriate types of artificial lights	0.0	0.0	47.4	52.6	100	38
CI3	Sun light & day light can easily be controlled	0.0	0.0	44.7	55.3	100	38
CI4	Ventilation can easily be controlled by opening windows/ doors.	0.0	0.0	21.1	78.9	100	38
CI5	There is enough fresh and clean air indoors	0.0	0.0	26.3	73.7	100	38
CI6	There is good ventilation for toilets	0.0	2.6	34.2	63.2	100	38
CI7	There is appropriate temperature in different seasons	0.0	0.0	34.2	65.8	100	38
CI8	Room temperature can easily be controlled	0.0	10.5	28.9	60.5	100	38
CI9	There is appropriate heating system	0.0	5.3	31.6	63.2	100	38
CI10	There are good acoustics to minimise unwanted noise in different spaces	0.0	0.0	36.8	63.2	100	38

ID	Comfort and Control items	Importance: valid percentage- school 2					Total No.
		does not matter	nice to have	important	essential	Total percent	
CI1	There is adequate natural light	0.0	0.0	45.8	54.2	100	24
CI2	There are appropriate types of artificial lights	4.2	4.2	54.2	37.5	100	24
CI3	Sun light & day light can easily be controlled	0.0	0.0	58.3	41.7	100	24
CI4	Ventilation can easily be controlled by opening windows/ doors.	0.0	0.0	54.2	45.8	100	24
CI5	There is enough fresh and clean air indoors	0.0	0.0	45.8	54.2	100	24
CI6	There is good ventilation for toilets	0.0	0.0	25.0	75.0	100	24
CI7	There is appropriate temperature in different seasons	0.0	0.0	21.7	78.3	100	23
CI8	Room temperature can easily be controlled	0.0	4.2	20.8	75.0	100	24
CI9	There is appropriate heating system	0.0	4.2	8.3	87.5	100	24
CI10	There are good acoustics to minimise unwanted noise in different spaces	0.0	4.2	37.5	58.3	100	24

- **Nature and Outdoor**

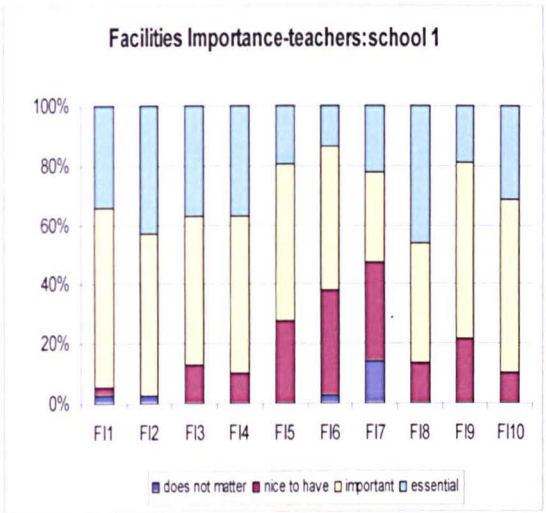


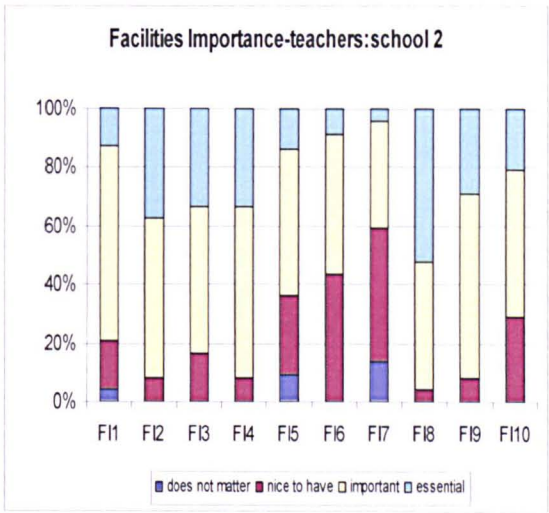


ID	Nature and Outdoor items	Importance: valid percentage- School 1					Total No.
		not matters	nice to have	important	essential	Total percent	
NI1	There is access to usable landscaped area/ grass	0.0	16.2	56.8	27.0	100	37
NI2	There is a garden (plants & flowers) inside the building	2.8	47.2	44.4	5.6	100	36
NI3	There is quiet areas for working outside	0.0	57.9	34.2	7.9	100	38
NI4	There is a view (when you are inside the building) to green fields/ greenery	0.0	60.5	31.6	7.9	100	38

ID	Nature and Outdoor items	Importance: valid percentage- School 2					Total No.
		not matters	nice to have	important	essential	Total percent	
NI1	There is access to usable landscaped area/ grass	0.0	26.1	47.8	26.1	100	23
NI2	There is a garden (plants & flowers) inside the building	13.0	56.5	30.4	0.0	100	23
NI3	There is quiet areas for working outside	0.0	60.9	39.1	0.0	100	23
NI4	There is a view (when you are inside the building) to green fields/ greenery	8.3	41.7	45.8	4.2	100	24

- **Facilities**

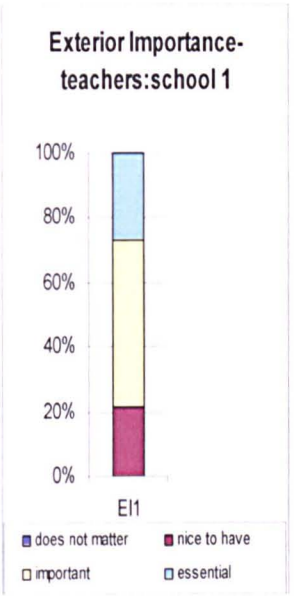


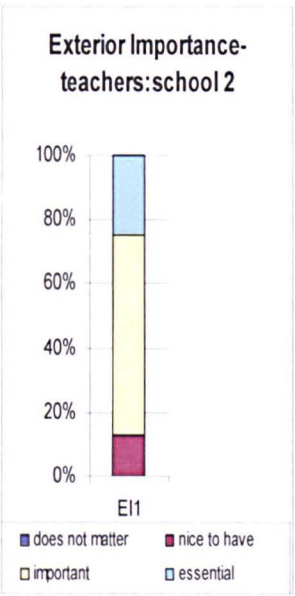


ID	Facilities' items	Importance: valid percentage- School 1					Total No.
		not matters	nice to have	important	essential	Total percent	
FI1	Toilets are accessible from classrooms	2.6	2.6	60.5	34.2	100	38
FI2	There is warm water for washing	2.7	0	54.1	43.2	100	37
FI3	There are water drinking/ dispensers inside and outside	0.0	13.2	50.0	36.8	100	38
FI4	The storages (cupboards) are close to classrooms	0.0	10.5	52.6	36.8	100	38
FI5	There is enough room for cloakrooms	0.0	27.8	52.8	19.4	100	36
FI6	There is shaded/covered outdoor areas	2.7	35.1	48.6	13.5	100	37
FI7	There are electronic doors	13.9	33.3	30.6	22.2	100	36
FI8	There is space for a child with particular behaviour problem	0.0	13.5	40.5	45.9	100	37
FI9	There is a welcoming place for parents	0.0	21.6	59.5	18.9	100	37
FI10	There are parking area for visitors/ parents	0.0	10.5	57.9	31.6	100	38

ID	Facilities' items	Importance: valid percentage- School 2					Total No.
		not matters	nice to have	important	essential	Total percent	
FI1	Toilets are accessible from classrooms	4.2	16.7	66.7	12.5	100	24
FI2	There is warm water for washing	0.0	8.3	54.2	37.5	100	24
FI3	There are water drinking/ dispensers inside and outside	0.0	16.7	50.0	33.3	100	24
FI4	The storages (cupboards) are close to classrooms	0.0	8.3	58.3	33.3	100	24
FI5	There is enough room for cloakrooms	9.1	27.3	50.0	13.6	100	22
FI6	There is shaded/covered outdoor areas	0.0	43.5	47.8	8.7	100	23
FI7	There are electronic doors	13.6	45.5	36.4	4.5	100	22
FI8	There is space for a child with particular behaviour problem	0.0	4.3	43.5	52.2	100	23
FI9	There is a welcoming place for parents	0.0	8.3	62.5	29.2	100	24
FI10	There are parking area for visitors/ parents	0.0	29.2	50.0	20.8	100	24

- **Exterior**



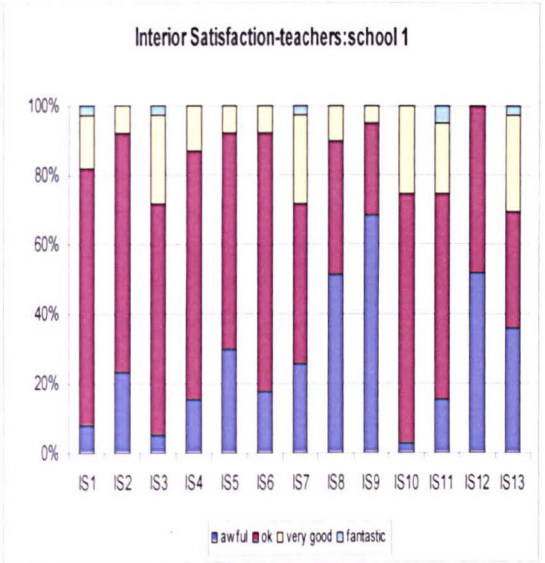


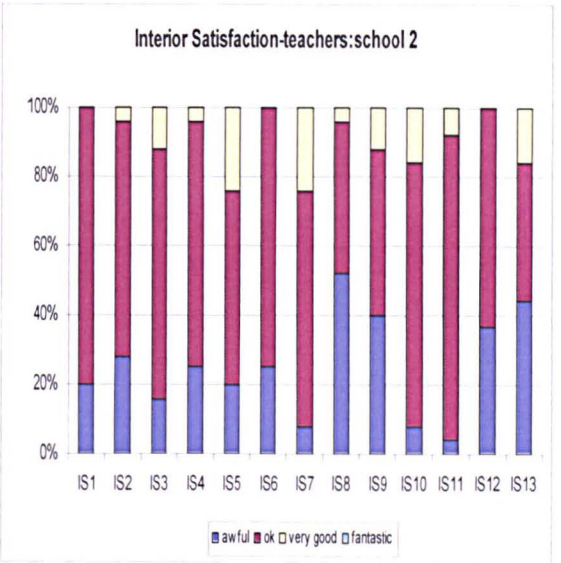
ID	Exterior items	Importance: valid percentage- School 1					Total No.
		not matters	nice to have	important	essential	Total percent	
EI1	There is an attractive frontage and entrance	0.0	21.6	51.4	27.0	100	37

ID	Exterior items	Importance: valid percentage- School 2					Total No.
		not matters	nice to have	important	essential	Total percent	
EI1	There is an attractive frontage and entrance	0.0	12.5	62.5	25.0	100	24

Appendix 6F: Teachers' Satisfaction

- **Indoor spaces (Interior)**

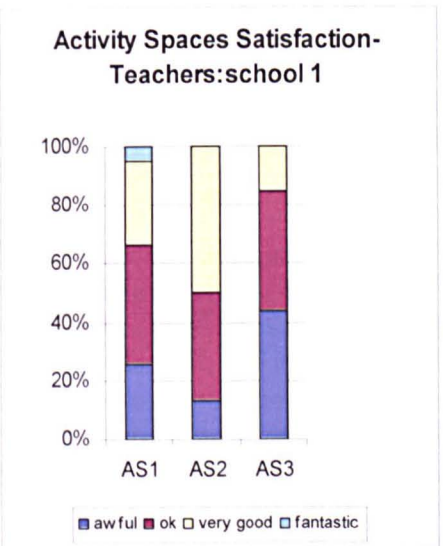


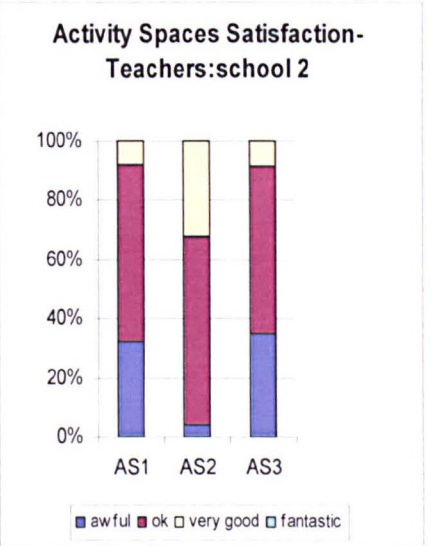


ID	Interior items	Satisfaction: valid percentage-School 1					Total No.
		awful	ok	very good	fantastic	Total percent	
IS1	The interior looks calm and relaxing	7.7	74.4	15.4	2.6	100	39
IS2	Interior finishes are durable	23.1	69.2	7.7	0.0	100	39
IS3	The walls and floors are colourful	5.1	66.7	25.6	2.6	100	39
IS4	There are colourful and attractive décors	15.4	71.8	12.8	0.0	100	39
IS5	The interior have a variety of spaces	29.7	62.2	8.1	0.0	100	37
IS6	The interior looks attractive, inviting and friendly	17.9	74.4	7.7	0.0	100	39
IS7	The interior provides means to display art work	25.6	46.2	25.6	2.6	100	39
IS8	The interior looks light and airy	51.3	38.5	10.3	0.0	100	39
IS9	The interior provides flexible spaces	68.4	26.3	5.3	0.0	100	38
IS10	Indoor spaces are safe	2.6	71.8	25.6	0.0	100	39
IS11	The entrance area is welcoming and light	15.4	59.0	20.5	5.1	100	39
IS12	The circulation area is short	51.7	48.3	0.0	0.0	100	29
IS13	Corridors are not cluttered	35.9	33.3	28.2	2.6	100	39

ID	Interior items	Satisfaction: valid percentage-School 2					Total No.
		awful	ok	very good	fantastic	Total percent	
IS1	The interior looks calm and relaxing	20.0	80.0	0.0	0.0	100	25
IS2	Interior finishes are durable	28.0	68.0	4.0	0.0	100	25
IS3	The walls and floors are colourful	16.0	72.0	12.0	0.0	100	25
IS4	There are colourful and attractive décors	25.0	70.8	4.2	0.0	100	24
IS5	The interior have a variety of spaces	20.0	56.0	24.0	0.0	100	25
IS6	The interior looks attractive, inviting and friendly	25.0	75.0	0.0	0.0	100	24
IS7	The interior provides means to display art work	8.0	68.0	24.0	0.0	100	25
IS8	The interior looks light and airy	52.0	44.0	4.0	0.0	100	25
IS9	The interior provides flexible spaces	40.0	48.0	12.0	0.0	100	25
IS10	Indoor spaces are safe	8.0	76.0	16.0	0.0	100	25
IS11	The entrance area is welcoming and light	4.0	88.0	8.0	0.0	100	25
IS12	The circulation area is short	36.8	63.2	0.0	0.0	100	19
IS13	Corridors are not cluttered	44.0	40.0	16.0	0.0	100	25

- **Activity Spaces**

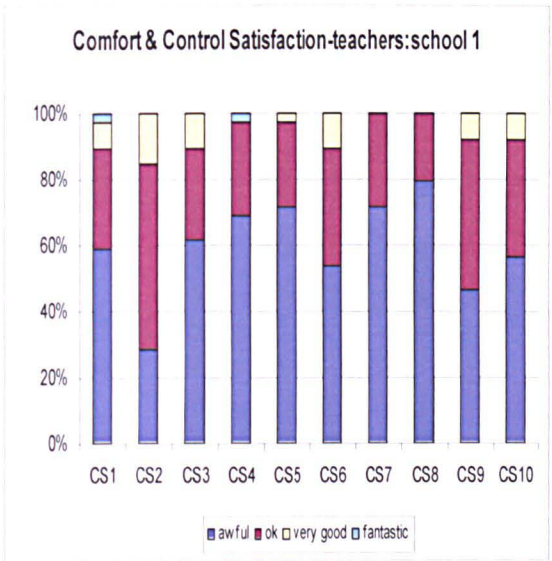


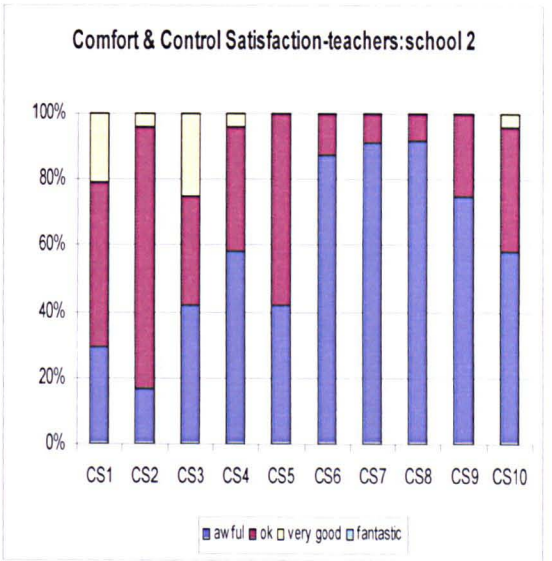


ID	Activity Spaces items	Satisfaction: valid percentage-School 1					Total No.
		awful	ok	very good	fantastic	Total percent	
AS1	There are meeting spaces for teachers	25.6	41.0	28.2	5.1	100	39
AS2	There is a special area for physical activities	13.2	36.8	50.0	0.0	100	38
AS3	The school ground is suitably equipped for play	43.6	41.0	15.4	0.0	100	39

ID	Activity Spaces items	Satisfaction: valid percentage-School 2					Total No.
		awful	ok	very good	fantastic	Total percent	
AS1	There are meeting spaces for teachers	32.0	60.0	8.0	0.0	100	25
AS2	There is a special area for physical activities	4.0	64.0	32.0	0.0	100	25
AS3	The school ground is suitably equipped for play	34.8	56.5	8.7	0.0	100	23

- **Comfort and Control**

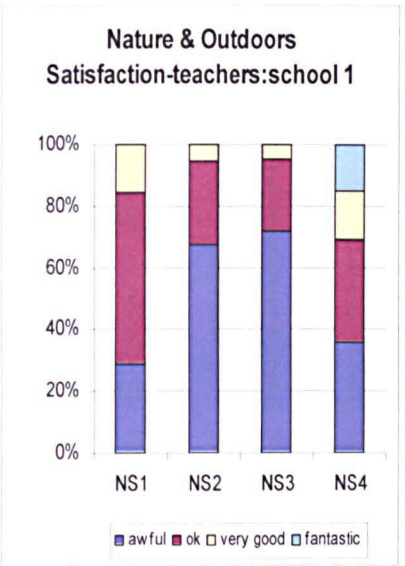


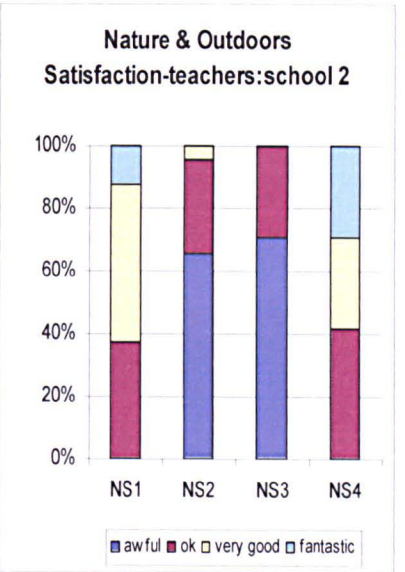


ID	Comfort and Control items	Satisfaction: valid percentage-School 1					Total No.
		awful	ok	very good	fantastic	Total percent	
CS1	There is adequate natural light	59.0	30.8	7.7	2.6	100	39
CS2	There are appropriate types of artificial lights	28.2	56.4	15.4	0.0	100	39
CS3	Sun light & day light can easily be controlled	61.5	28.2	10.3	0.0	100	39
CS4	Ventilation can easily be controlled by opening windows/ doors.	69.2	28.2	0.0	2.6	100	39
CS5	There is enough fresh and clean air indoors	71.8	25.6	2.6	0.0	100	39
CS6	There is good ventilation for toilets	53.8	35.9	10.3	0.0	100	39
CS7	There is appropriate temperature in different seasons	71.8	28.2	0.0	0.0	100	39
CS8	Room temperature can easily be controlled	79.5	20.5	0.0	0.0	100	39
CS9	There is appropriate heating system	46.2	46.2	7.7	0.0	100	39
CS10	There are good acoustics to minimise unwanted noise in different spaces	56.4	35.9	7.7	0.0	100	39

ID	Comfort and Control items	Satisfaction: valid percentage-School 2					Total No.
		awful	ok	very good	Fantastic	Total percent	
CS1	```	29.2	50.0	20.8	0.0	100	24
CS2	There are appropriate types of artificial lights	16.7	79.2	4.2	0.0	100	24
CS3	Sun light & day light can easily be controlled	41.7	33.3	25.0	0.0	100	24
CS4	Ventilation can easily be controlled by opening windows/ doors.	58.3	37.5	4.2	0.0	100	24
CS5	There is enough fresh and clean air indoors	41.7	58.3	0.0	0.0	100	24
CS6	There is good ventilation for toilets	87.5	12.5	0.0	0.0	100	24
CS7	There is appropriate temperature in different seasons	91.3	8.7	0.0	0.0	100	23
CS8	Room temperature can easily be controlled	91.7	8.3	0.0	0.0	100	24
CS9	There is appropriate heating system	75.0	25.0	0.0	0.0	100	24
CS10	There are good acoustics to minimise unwanted noise in different spaces	58.3	37.5	4.2	0.0	100	24

- **Nature and Outdoors**

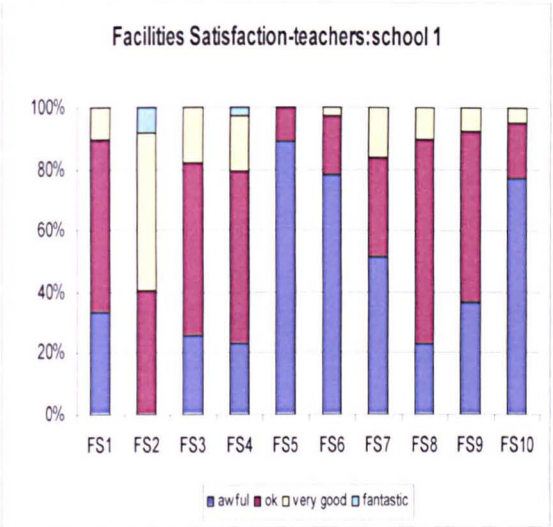


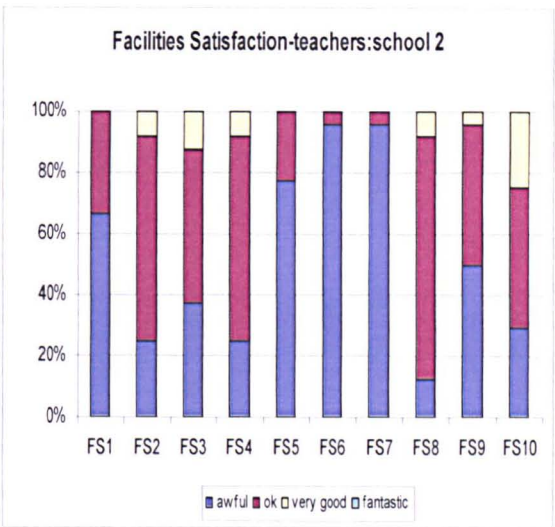


ID	Nature and Outdoor items	Satisfaction: valid percentage-School 1					Total No.
		awful	ok	very good	fantastic	Total percent	
NS1	There is access to usable landscaped area/ grass	28.9	55.3	15.8	0.0	100	38
NS2	There is a garden (plants & flowers) inside the building	67.6	27.0	5.4	0.0	100	37
NS3	There is quiet areas for working outside	71.8	23.1	5.1	0.0	100	39
NS4	There is a view (when you are inside the building) to green fields/ greenery	35.9	33.3	15.4	15.4	100	39

ID	Nature and Outdoor items	Satisfaction: valid percentage-School 2					Total No.
		awful	ok	very good	fantastic	Total percent	
NS1	There is access to usable landscaped area/ grass	0.0	37.5	50.0	12.5	100	24
NS2	There is a garden (plants & flowers) inside the building	65.2	30.4	4.3	0.0	100	23
NS3	There is quiet areas for working outside	70.8	29.2	0.0	0.0	100	24
NS4	There is a view (when you are inside the building) to green fields/ greenery	0.0	41.7	29.2	29.2	100	24

- **Facilities**

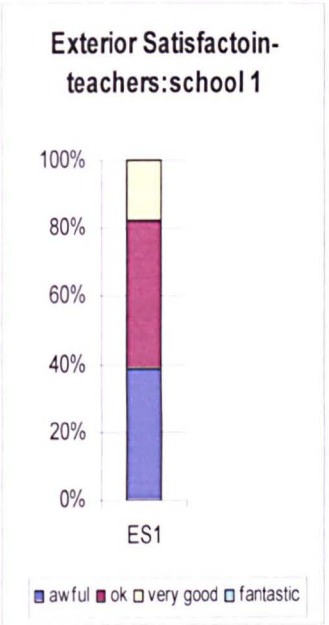


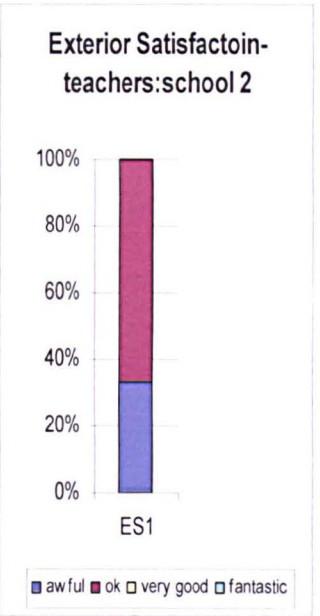


ID	Facilities' items	Satisfaction: valid percentage-School 1					Total No.
		awful	ok	very good	fantastic	Total percent	
FS1	Toilets are accessible from classrooms	33.3	56.4	10.3	0.0	100	39
FS2	There is warm water for washing	0.0	40.5	51.4	8.1	100	37
FS3	There are water drinking/ dispensers inside and outside	25.6	56.4	17.9	0.0	100	39
FS4	The storages (cupboards) are close to classrooms	23.1	56.4	17.9	2.6	100	39
FS5	There is enough room for cloakrooms	89.2	10.8	0.0	0.0	100	37
FS6	There is shaded/covered outdoor areas	78.4	18.9	2.7	0.0	100	37
FS7	There are electronic doors	51.4	32.4	16.2	0.0	100	37
FS8	There is space for a child with particular behaviour problem	23.1	66.7	10.3	0.0	100	39
FS9	There is a welcoming place for parents	36.8	55.3	7.9	0.0	100	38
FS10	There are parking area for visitors/ parents	76.9	17.9	5.1	0.0	100	39

ID	Facilities' items	Satisfaction: valid percentage-School 2					Total No.
		awful	ok	very good	fantastic	Total percent	
FS1	Toilets are accessible from classrooms	66.7	33.3	0.0	0.0	100	24
FS2	There is warm water for washing	25.0	66.7	8.3	0.0	100	24
FS3	There are water drinking/ dispensers inside and outside	37.5	50.0	12.5	0.0	100	24
FS4	The storages (cupboards) are close to classrooms	25.0	66.7	8.3	0.0	100	24
FS5	There is enough room for cloakrooms	77.3	22.7	0.0	0.0	100	22
FS6	There is shaded/covered outdoor areas	95.8	4.2	0.0	0.0	100	24
FS7	There are electronic doors	95.5	4.5	0.0	0.0	100	22
FS8	There is space for a child with particular behaviour problem	12.5	79.2	8.3	0.0	100	24
FS9	There is a welcoming place for parents	50.0	45.8	4.2	0.0	100	24
FS10	There are parking area for visitors/ parents	29.2	45.8	25.0	0.0	100	24

- **Exterior**





ID	Exterior items	Satisfaction: valid percentage-School 1					Total No.
		awful	ok	very good	fantastic	Total percent	
ES1	There is an attractive frontage and entrance	38.5	43.6	17.9	0.0	100	39

ID	Exterior items	Satisfaction: valid percentage-School 2					Total No.
		awful	ok	very good	fantastic	Total percent	
ES1	There is an attractive frontage and entrance	33.3	66.7	0.0	0.0	100	24

Appendix 6G: Teachers' Additional Comments

Category	Teachers' Comments		Frequency of repetition	
Interior	Corridors with adequate width		3	
	big display boards in rooms and corridors		2	
	windows from classrooms onto corridors		1	
	building to be suitable for visually impaired students (floors, walls, ..)		1	
	multi purpose flexible use		1	
Comfort & Control	building material (roof) which affects heat observe or loss		1	
	Good quality of plumbing in classroom (drains not smelly)		1	
	Fans in classrooms because of heat		2	
	Windows can be open enough for ventilation		1	
	enough natural light		2	
	Workable blinds for windows		2	
	Quiet from electronic noises and high-pitched bugging noises from lights etc.		1	
	Good acoustics at stairs/ corridors		1	
Activity Spaces	Dining space	a separate dining room	2	4
		Sufficient, effective dining facilities to cope with numbers in school	2	
	rooms for examinations that do not effect day to day running of the school		3	
	quiet areas/relaxing room in school		2	
	Admin areas to be central		1	
	more work space for teachers		2	
	'social' areas away from 'quiet' areas		1	
	Central meeting area (covered)		1	
	Areas for year groups to go at break/ lunchtime		1	
	lecture/drama theatre that can hold all the staff or a year group		1	
	lunchtime recreation area		1	
	space for post -16 private study		1	
	departmental office		1	
	lecture theatre (large capacity)		1	
	performance space for dance/drama		1	
	suitable and sufficient inside space for physical activity		1	
Nature & Outdoors	garden		1	
	a working school garden		1	
	creative use of outside spaces		1	
Facilities	Car Parking	secure car parking spaces for staff (CCTV)	5	7
		better parking facilities for staff	2	
	Toilet	toilets for students need improvement	5	
		staff toilets on all floors		
		toilets near to classrooms		
		toilets for both men and women in all floors		
	lockers for students		5	
	Enough usable storage in classrooms		4	
	Cloakroom for pupils		1	
	Cycle/bike store for pupils/staff		2	
	Indoor areas for pupils when it is raining		1	
	Staff changing/shower/cloaks		1	
	sink in every resource area		2	

	Benches outside	1
	lots of covered seating areas outside	2
	ICT facilities	1
	big enough classrooms to seat students comfortable without cramming	1
	swimming pool	1
	Stall room to be central	1
	gallery	1
	Pegs for staffs' coats/ umbrellas	1
	Renewable energy incorporated at the planning stage	1
	Facilities to cope with A+E and medical	1
	sockets in accessible places	1
	User friendly changing area for PE.	1
	climbing wall for PE	1
	permanent sports pitches	1
	information screens around school	1
Exterior	obvious entrance to the drive way and to school	1

References

Adams E. (1990) Learning through landscapes: a report on the use, design, management and development of school grounds. Winchester: Learning through Landscapes Trust.

AEDET Evolution. (n.d.). Achieving Excellence Design Evaluation Toolkit. Department of Health. Available from: http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_082089. [Accessed 25 February 2008].

Ahman, M., Lundin, A., Musabasic, V. and Soderman, E. (2000). Improved Health After Intervention in a School with Moisture Problems, Indoor Air, 10, 57–62.

Ahrentzen, S. and Evans, G. (1989) Architects and School Children: In Touch or Out of Focus? Arch. & Comport. / Arch. Behaviour., Vol. 5, no. I, p. 17-28.

Alderson, P., and Arnold, S. (1999). Civil Rights in Schools. ESRC Children 5-16 Programme Briefing no. 1: 1-4.

Alexander, R. (1992). Policy and Practice in Primary Education, Routledge.

Apple, M. (1995). Education and Power. London: Routledge.

ASPECT (2008). A Staff and Patient Environment Calibration Tool. Department of Health. Available from: http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_082087. [Accessed 10 February 2008].

Barnitt, H. (2003). Lighting for the Future, Building Services Journal: The magazine for the CIBSE, 25, 1, 38-39.

Baumann, D. and Niederstatter, C. (2007). in Dudek, M., Schools and Kindergartens: A Design Manual. Berlin: Birkhauser Verlag AG.

Birkett, D. (2001a). The Education Guardian. The School We'd Like. Guardian Unlimited. Available from: http://www.guardian.co.uk/guardianeducation/story/0,3605,501372,00.html. [Accessed 20 October 2007].

Birkett, D. (2001b). The Education Guardian. Future perfect. Guardian Unlimited. Available from: http://education.guardian.co.uk/schools/story/0,5500,501387,00.html [Accessed 20 October 2007].

Bixler, R., Floyd, M. and Hammutt, W. (2002). Environmental Socialization: Qualitative Tests of the Childhood Play Hypothesis, Environment and Behaviour, 34(6), 795-818.

Bryman, A. 1992. Quantity and Quality in Social Research. London : Routledge

Burke, C. and Grosvenor, I. (2003). The School I'd Like - Children and Young People's Reflections on an Education for the 21st Century. London: Routledge Falmer.

Butin, D. (2000). Classrooms: Educational Facilities. Thomas Jefferson Centre for Educational Design, University of Virginia.

CABE (2002). Client Guide: Achieving well designed schools through PFI, Available at: http://www.cabe.org.uk. [Accessed 18 November 2008].

CABE (2002). The value of good design: How buildings and spaces create economic and social value. Available at:http://www.cabe.org.uk/pdf/The%20Value%20of%20Good%20Design.pdf. [Accessed 8 November 2005].

CABE/RIBA (2004). 21st Century Schools: Learning environments of the future. Available at: http://www.building futures.org.uk. [Accessed 10 January 2009].

CABE (2005). Picturing School Design: a visual guide to secondary school buildings and their surroundings using the Design Quality Indicator for Schools. Commission for Architecture and the Built Environment. Available at: www.cabe.org.uk. [Accessed 20 December 2007]

CABE (2007). Creating excellent secondary schools: a guide for clients. Commission for Architecture and the Built Environment. Available at: www.cabe.org.uk. [Accessed 21 November 2008].

Canter, D. (1984). Way-finding and Signposting: Penance or prosthesis? in R Easterby and H Zwaga (eds), Information Design, Wiley.

Canter, D. (1977). The Psychology of Place. St. Martin's Press. New York.

Casey, T. (2003), Inclusion, Friendship and Play, Play Inclusive Briefing Paper, Edinburgh: The Yard.

Cash, C. S. (1993). Building Condition and Student Achievement and Behaviour. Unpublished doctoral dissertation, Virginia Polytechnic Institute and State University, Blacksburg, Virginia.

Ceppi, G. and Zini, M. (1998). Children, Spaces, Relations: metaproject for an environment for young children. Riggio Children. Domus Academy Research Centre. Italy.

Chan, T. C. & Petrie. (1998). The brain learns better in well-designed school environments. Classroom leadership. Association for Supervision and Curriculum Development. from http://www.ascd.org/publications/class_lead/199811/chan.html. [Accessed 10 May 2004].

Charmaz, K. (2006). Constructing grounded theory: a practical guide through qualitative analysis. London: Sage.

Chawla, L., ed. (2001). Growing Up in an Urbanizing World. London, Earthscan/ UNESCO.

Children's Commissioner for Wales (2004). Lifting the lid on the nation's school toilets. Available at: http://www.wateriscoolinschool.org.uk/toilet_campaign.html. [Accessed 20 December 2008].

Christensen,P. and James A. eds. (2008). Research with Children: Perspectives and Practices. London: Routledge.

Clark, H. (2002). Building Education: The role of the physical environment in enhancing teaching and research, Institute of Education.

Clark, A. & Moss, P. (2001). Listening to young children. The mosaic approach. London: National Children's Bureau.

Coates, E. (2004). I Forgot the Sky! Children's stories contained within their drawings'. In The Reality of Research with Children and Young People, ed. V. Lewis, M. Kellett, C. Robinson, S. Fraser, and S. Ding, London: Open University / Sage Publications: 5-126.

Cox, S. & Robinson-Pant, A. (2003). Empowering Children through Visual Communication. A research project funded by CFBT. School of Education and Professional Development. University of East Anglia. Available at: www.uea.ac.uk. [Accessed 10 September 2005].

Creig, A. and Taylor J. (1999). Doing Research with Children. London: Sage Publications Ltd.

CYPU (2001). Learning to Listen: core principles for the involvement of children and young people. Available at: http://www.everychildmatters.gov.uk/_files/1F85704C1D67D71E30186FEBCEDED6D6.pdf. [Accessed 24 April 2009].

DCSF (2008). An introduction to Building Schools for the Future. Department for Children, Schools and Families. Available at: http://www.partnershipsforschools.org.uk/documents/BSF_Guidance_Documents/BSF%20Introductory%20Guide%202008.pdf. [Accessed 20 April 2009].

Denscombe, M. (1998). The Good Research Guide: for small-scale social research projects. Buckingham: Open University Press.

Denton-Thompson, M. (1989) New horizons for education. Landscape Design, No. 181, p.11.

Department for Education (1990). Building Bulletin 71, the Outdoor Classroom, London: HMSO.

DFES (2004). Building Bulletin 98: Briefing Framework for Secondary School Projects. Department for educational and skills. Available at: http://www.partnershipsforschools.org.uk/documents/Design/BB98.pdf. [Accessed 8 April 2009].

Do K-12 School Facilities Affect Education Outcomes? (2003). A Staff Information Report Tennessee Advisory Commission on Intergovernmental Relations.

DQI. Design Quality Indicator. Available at: http://www.dqi.org.uk/dqi/overview.htm. [Accessed 10 December 2005].

DQI and DQI for Schools leader guidance notes, created 23.09.2005 (c) 2003 – 2005 Construction Industry Council. Available at: http://www.dqi.org.uk/dqi/Common/DQILeaderGuidence.pdf, [Accessed 11 November 2005].

Dudek, M., (2000). Architecture of Schools: The New Learning Environments. Oxford: Architectural Press.

Dudek, M., (2007). Schools and Kindergartens: A Design Manual. Berlin: Birkhauser Verlag AG.

Dunn, R., Kiimsky, J., Murray, J., and Quinn, P. (1985). Light up their lives: A review of research on the effects of lighting on children s achievement and behaviour. The Reading Teacher, (39) 19, pp. 863-869.

Earthman, G. (1997). Making a World of Difference: Elementary Schools. Impact on Education series. Virginia Polytechnic Institute & State University. Available from: www.eric.ed.gov. [Accessed 25 October 2005].

Earthman, G. (2004). Prioritization of 31 Criteria for School Building Adequacy, available at: http://www.aclu-md.org/facilities_report.pdf. [Accessed 1 December 2004].

Engelbrecht, K. (2003). The Impact of Colour on Learning, available at: www.merchandisemart.com/neocon/NeoConConfPro/W305.pdf. [Accessed 30 November 2004].

Evans G. and Stecker, R. (2004). Motivational Consequences of Environmental Stress, Journal of Environmental Psychology, 24, 143–165.

Every child matters: Primary capital programme. Building primary schools at the heart of the community. (2006). Department for Education and Skills, available from: http://www.teachernet.gov.uk/_doc/9606/Primary%20Capital%20Programme%20-%20Final.pdf. [Accessed 20 June 2008].

Fisher, K. (2001). Building Better Outcomes: The impact of school infrastructure on student outcomes and behaviour, Department of Education, Training and Youth Affairs (Australia).Evaluation of Building Schools for the Future – Technical Report. (2007). Department for Children Schools and Families.

Fraser, C. (2002). CABE, Education Guardian, 30 September 2002. in Burke and Grosvenor (2003). The School I'd Like - Children and Young People's Reflections on an Education for the 21st Century. London: Routledge Falmer.

Galton, M., Hargreaves, L., Comber, C., Wall, D., and Pell, A. (1999) Inside the Primary Classroom: 20 years on, Routledge.

Gardiner, B. (2003). in Burke and Grosvenor (2003). The School I'd Like - Children and Young People's Reflections on an Education for the 21st Century. London: Routledge Falmer.

Gathorne-Hardy, F. (2001). Inclusive Design in Schools. Support for Learning, Vol. 16, Nor 2., pp. 53-55(3).

Ghaziani, R. (2008). Children's Voices: Raised Issues for School Design. CoDesign, Vol. 4, No. 4., pp. 225-236.

Gifford, R. (1987). Environmental Psychology: Principles and Practice. Newton, MA: Allyn and Bacon, Inc.

Greenland, S. & McGoldrick, P. (n.d.). Measuring the Atmospheric Impact on Customers. Working paper. Available at: http://www.londonmet.ac.uk/londonmet/library/u70103_3.pdf. [Accessed 20 June 2006].

Greenman, J. (1988). Caring spaces, learning spaces: Children's environments that work. Redmond VA: Exchange Press.

Grounds for Learning (n.d.) Scottish programme of Learning through Landscapes. Scottish Natural Heritage. Available at: http://www.feva-scotland.org/files/library/file/ snhschoolgrounds.pdf. [Accessed 27 December 2008].

Gump, P. (1987), School and Classroom Environments, in D. Stockol and I. Altman (eds),Handbook of Environmental Psychology, Vol. 1 Wiley.

Harmon, D. (1991). The coordinated classroom: in Light: Medicine of the Future. J. Lieberman, Sante Fe, Bear & Co. Publishing. Quoted in Tanner, C.

Harrison, S & Dourish P (1996). Re–Place–ing Space: The Roles of Place and Space in Collaborative Systems, In Proceedings of Conference on Computer Supported Cooperative Work, ACM Press.

Hart, R. (1997). Children's Participation: The Theory and Practice of Involving Young Citizens in Community Development and Environmental Care. London, Earthscan/UNICEF.

Hastings, N. (1995). Seats of Learning. Support for Learning, 10, 1, 8-11.

Hathaway, W. E. (1982). Lights, windows, colour: Elements of the school environment. Scottsdale, AZ: Council of Educational Facility Planners. (Eric Reproduction Service No. EA013547).

Heschong Mahone Group (2003). Windows and Classrooms: As Study of student performance and the indoor environment. California Energy Commission.

Higgins, S., Hall, E., McCaughey, C., Wall, K. and Woolner, P. (2005, February). The Impact of School Environments: A literature review. Produced for the Design Council. The Centre for Learning and Teaching School of Education. University of Newcastle. Sponsored by

CfBT. Available at http://www.designcouncil.org.uk/resources/assets//pdf/Publications/ [Accessed 8 November 2005].

Horne-Martin, S. (2002). The Classroom Environment and its Effects on the Practice of Teachers, Journal of Environmental Psychology, 22, 1-2, 139-156.

House of Commons Education and Skills Committee (2007). Sustainable Schools: Are we building schools for the future? London: The Stationery Office Limited. Available at: http://www.publications.parliament.uk/pa/cm200607/cmselect/cmeduski/140/140.pdf. [Accessed 28 April 2009].

Ittelson, W. (1973). Environment perception and contemporary perceptual theory. Environment and Cognition. W. H. Ittelson. New York, Seminar: 1-19.

Jensen, E. (1998). Teaching with the brain in mind. Alexandria: VA: Association for Supervision and Curriculum Development.

Kennedy, M. (2002). By design [Electronic version]. American School and University. Retrieved from http://asumag.com/mag/university_design/. [Accessed 29 July 2004].

Khattar, M., Shirey, D. and Raustad, R. (2003). Cool & Dry - Dual-path approach for a Florida school, Ashrae Journal, 45, 5, 58-60.

Killeen, J.P., Evans, G.W, and Danko, S. (2003). The Role of Permanent Student Artwork in Students' Sense of Ownership in an Elementary School. Environment and Behaviour, 35, 2, 250-263.

Kimmel, R., Dartsch, P., Hildenbrand, S., Wodarz, R. and Schmahl, F. (2000).Pupils' and Teachers' Health Disorders after Renovation of Classrooms in a Primary School, Gesundheitswesen, 62, 12, 660-664.

Lackney, J. (1998). 12 Design Principles Based on Brain-Based Learning Research. DesignShare. Quoted in Butin, D., 2000 .Available from:http://www.designshare.com/ Research/BrainBasedLearn98.htm, [Accessed 9 November 2005].

Lackney, J. (1998). CEFPI conference. in Sanoff et al. (2001). School Building Assessment.

Lackney, J. (1999). The relationship between environmental quality of school facilities and student performance. Energy smart schools: Opportunities to save money, save energy and improve student performance. Environmental Energy Study Institute. (ERIC Document Reproduction Service No. ED439594) Available at: http://www.tennessee.gov/ tacir/PDF_FILES/Education/SchFac.pdf, [Accessed 10 December 2005].

Lang, D. (1996). Essential Criteria for an Ideal Learning Environment. New Horizons for Learning: Teaching and Learning Strategies (2,1). Available at: http://www.newhorizons.org/strategies/learning_environments/lang.htm, [Accessed 25 December 2008].

Lawson, B. (1997). How Designers Think: The Design Process Demystified. Oxford: Architectural Press.

Lawson, B. (2005). Evidence Based Design for Healthcare. Hospital Engineering and Facilities Management 2005 W. Swaby. London, International Federation of Hospital Engineering. 2005: 25-27.

Lawson, B. (2007). Design indicators. UK Healthcare Design Review. D. Stark. Glasgow, Keppie Design: 88-95.

Lawson, B. (2001). The Language of Space. Oxford: Architectural Press.

Lewis, A. & Lindsay, G. (Eds) (1999) Researching Children's Perspectives. Open University. Scott, J. (2008). In Christensen, P. and James, A. (Eds), Research with Children: Perspectives and Practices. New York: Routledge.

Linton, S., Hellsing, A., Halme, T. and Åkerstedt, K. (1994). The effects of Ergonomically Designed School Furniture on Pupils' Attitudes, Symptoms and Behaviour, Applied Ergonomics, 25, 5, 299-304.

London, W. (1988). Brain/Mind Bulletin Connections: New Sense Bulletin. Los Angeles, April, v. 13, 7c. Quoted in Tanner, C.

Loughlin, C. and Suina, J. (1982). The Learning Environment: an Instructional Strategy. New York: Teachers College Press.

Mahnke, F. (1996). Colour, Environment, and Human Response: An Interdisciplinary Understanding of Colour and its Use as a Beneficial Element in the Design of the Architectural Environment, U.S.A: ITP.

Malone, K. & Tranter, P. (2003). Children's Environmental Learning and the Use, Design and Management of School Grounds, Children, Youth and Environments, 13(2), from cye.colorado.edu, [Accessed 9 June 2004].

Malsguzzi, L. (1984). cited in Edwards et. al, 1993. The hundred languages of children: the Reggio Emilia approach to early childhood education. Ablex Publishing Corporation, United States of America.

Marx, A., Fuhrer, U., Hartig, T. (2000). Effects of Classroom Seating Arrangements on Children's Question-asking, Learning Environments Research, 2, 249-263.

Maxwell, L. (2000). Quoted in Marberry, S., 2004. Designing Better Buildings: What Can Be Learned from Offices, Factories & Schools. Available from:http://www.rwjf.org/files/ publications/other/MarberryPaper.pdf. [Accessed 19 June 2008].

Maxwell, L. and Evans, G. (2000). The Effects of Noise on Pre-school Children's Pre-reading Skills, Journal of Environmental Psychology, 20, 91-97.

McIver, J. & Carmines, E. (1981) Unidimensional scaling. Beverly Hills; London : Sage Publications.

Miller G. (1956). The Magical Number Seven, Plus or Minus Two: Some Limits on Our Capacity for Processing Information. The Psychological Review, 1956, vol. 63, pp. 81-97. Reproduced by Stephen Malinowski. available at http://cogprints.org/730/0/miller.html. [Accessed 25 February 2008].

Moore, G. (1986) Effects of the Spatial Definition of Behaviour Settings on Children's Behaviour: A Quasi-Experimental Field Study, Journal of Environmental Psychology, 6, 205-231.

Moore, R. (1996). Compact Nature: The Role of Playing and Learning Gardens on Children's Lives, Journal of Therapeutic Horticulture, 8, 72-82.

Moore, G. & Lanckney, J. (1995). Design patterns for American schools: responding to the reform movement. In A. Meek (ed.), Designing Places for Learning (pp. 11-22). Alexandria, VA: ASCD.

Nair, P. & Fielding, R. (2005). The Language of School Design: Design Patterns for 21st Century Schools. Clearinghouse for Educational Facilities. The Knowledge Works Foundation. Available at: Desingshare.com. [Accessed 17 December 2008].

National Curriculum Framework (2005). Chapter 4: School and Classroom Environment. Available from:

http://www.ncert.nic.in/sites/publication/schoolcurriculum/NCFR%202005/ncfr_final/School%20and%20Classroom%20environment.pdf. [Accessed 7 November 2005].

Ott, J. (1976). Influence of fluorescent lights on hyperactivity and learning disabilities. Journal of Learning Disabilities, 9(7), 22-27.

Parnell, R., Cave, V. and Torrington, J. (2008). School Design: Opportunities through Collaboration. CoDesign, Vol. 4, No. 4., pp. 211-224.

Phipps, C. (2001). The Education Guardian. Tender loving care. Available from: http://education.guardian.co.uk. [Accessed 30 December 2008].

Pile, J. (1997). Colour in Interior Design, New York: McGraw-Hill.

Price Waterhouse Coopers (2007). Evaluation of Building Schools for the Future – Technical Report. Department for Children Schools and Families. Available at: http://www.teachernet.gov.uk/_doc/12317/BSF%20Evaluation%201st%20Annual%20Technical%20Report%20final%20.pdf [accessed 10 April 2008]

Price Waterhouse Coopers (2008). Evaluation of Building Schools for the Future – 2nd Annual Report Department for Children, Schools and Families. Available at: http://www.teachernet.gov.uk/doc/13240/2ndannualreport.pdf. [Accessed 18 April 2009]

Prosser, J., ed. (1998). Image-Based Research: a sourcebook for qualitative researchers, London: Falmer Press.

Prosser, J. (1992). Personal reflections on the use of photography in an ethnographic case study' British Educational Research Journal 18(4): 397-411

Pyle, R. (2002). Eden in a Vacant Lot: Special Places, Species and Kids in Community of Life. In: Children and Nature: Psychological, Sociocultural and Evolutionary Investigations. Kahn, P.H. and Kellert, S.R. (eds) Cambridge: MIT Press.

Read, M., Sugawara, A.I. and Brandt, J.A. (1999). Impact of Space and Colour in the Physical Environment on Pre-school Children's Cooperative Behaviour, Environment and Behaviour, 31, 3, 413-428.

Roberts, H. (2000). Listening to Children: and Hearing them. In Research with Children: perspectives and practices, ed. P. Christensen, and A. James. London: Falmer Press. 225-240

Salame, P. and Wittersheim, G. (1978). Selective Noise Disturbance of the Information Input in Short-term Memory, Quarterly Journal of Experimental Psychology, 30, 693-704.

Sanoff, H. (1992). School design. North Carolina State University. New York: Van Nostrand Reinhold.

Sanoff, H., AIA, Pasalar, C. and Hashas, M. (2001). School Building Assessment Methods. School of Architecture, College of Design, North Carolina State University with support from the National Clearinghouse for Educational Facilities. Available at: http://www.edfacilities.org/pubs/sanoffassess.pdf, [Accessed 26 February 2008].

Schneider, M. (2002). Public school facilities and teaching: Washington DC and Chicago. Commissioned by the 21st Century School Fund.

Schneider, M. (2003). Linking School Facility Conditions to Teacher Satisfaction and Success. Washington DC: National Clearing House for Educational Facilities.

Scott, P. & Spencer, C., eds. (1998). Psychology: A contemporary Introduction. Oxford: Blackwell.

Siegel, S., & Castellan, N. (1988). Nonparametric statistics for the behavioural sciences. New York: McGraw-Hill Book Company.

Simmons, I. (1993). Interpreting Nature: cultural constructions of the environment, Routledge, London.

Sommer R. and Olsen, H. (2004). The Soft Classroom, Environment and Behaviour, 12, 1, 3-16, 1980.

Sorrell, J. (2005). Joinedupdesignforschools. London: Merrell Publishers Ltd.

Strauss, A. & Corbin, J. (1990). Basics of qualitative research: Grounded theory procedures and techniques. Newbury Park, CA: Sage.

Strauss, L. & Corbin, J. (1998). Basics of qualitative research: techniques and procedures for developing grounded theory. London: Sage.

Student Outcomes, available at: http://www.coe.uga.edu/sdpl/research/SDPLStudiesInProgress/criann02elem.html. [Accessed 1 November 2004].

Sutton-Smith B. (1990) School playground as festival, Children's Environments Quarterly, Vol. 7, No. 2, pp. 3-7.

Tanner, C., & Lackney, J. (2006). Educational facilities planning: Leadership, architecture, and management. Boston: Pearson Education. Allyn & Bacon.

Tanner, C. & Langford, A. (2002). The Importance of Interior Design Elements as they Relate to Student Outcomes. Faculty of Engineering. University of Georgia. Available from: http://www.coe.uga.edu/sdpl/sdpl.html. [Accessed 19 July 2006].

Taylor, A. (2002). The Ecology of the Learning Environment. New Horizons for Learning. Available at http://www.newhorizons.org/future/Creating_the_Future/crfut_taylor.html. [Accessed 27 August 2006].

Taylor, A. & Gousie, G. (1988). The Ecology of Learning Environments for Children. Educational Facility Planner, 26(4).

Taylor, A., Kuo, F. and Sullivan, W. (2002). Views of Nature and Self-Discipline: Evidence from Inner City Children, Journal of Environmental Psychology, 22, 49-63.

Taylor, A. & Vlastos, G. (1975). School Zone: Learning Environments for Children. New York. Litton Educational Publishing, Inc.

Teacher Support Network and the British Council for School Environments (2007). Report on the School Environment. Available at:http://www.teachersupport.info/files/upload/docs/0607_School_Environments_Report.pdf, [accessed 19 December 2008].

The Sorrell Foundation (2006). The Young Design Programme. Available from: http://www.thesorrellfoundation.com/pdf/ydp_magazine_05_06.pdf. [Accessed 10 July 2007].

The Sorrell Foundation (2007). The Young Design Programme. Available from: http://www.thesorrellfoundation.com/pdf/ydp_magazine_06_07.pdf. [Accessed 29 July 2007].

Titman (1994) Special Places, Special People: the Hidden Curriculum of School grounds, Godalming: World Wide Fund for Nature/Learning through Landscapes.

UN (1989) Convention on the rights of the Child, Geneva: UN.

Walters, K. and Cram, G. (2002). Drinking Water in Schools: Hygiene standards at fountains, Nutrition and Food Science 32(1): 9-12.

Wells, N. (2000). At Home with Nature, Effects of "Greenness" on Children's Cognitive Functioning, Environment and Behavior, 32(6), 775-795.

Wells, N. and Evans, G. (2003). Nearby Nature: A Buffer of Life Stress Among Rural Children. Environment and Behaviour, 35(3), 311-330.

Wheldall, K. and Lam, Y. (1987). Rows Versus Tables II: The effects of two classroom seating arrangements on classroom disruption rate, on-task behaviour and teacher behaviour in three special school classes, Educational Psychology, 7, 4, 303-312.

Wheldall, K., Morris, M., Vaughan, P. and Ng, Y. (1981). Rows Versus Tables: An example of the use of behavioural ecology in two classes of eleven-year-old children, Educational Psychology, 1, 2, 171-184.

Wohlwill, J and Heft, H. (1991). The physical environment and the development of the child. In Spencer C. P. and Blades, M. (2006). Children and Their Environments: Learning, Using and Designing Spaces. Cambridge University Press.

Woolner, P., Hall, E., Higgins, S., McCaughey, C., Wall, K. (2007a). A sound foundation? What we know about the impact of environments on learning and the implications for Building Schools for the Future. Oxford Review of Education, 33(1), 47-70.

Woolner, P., Hall, E., Wall, K., Dennison, D. (2007b). Getting together to improve the school environment: user consultation, participatory design and student voice. Improving Schools 2007; 10 (3); p. 233-248. Sage publication. Available at: http://imp.sagepub.com/cgi/reprint/10/3/233.pdf. [Accessed 10 April 2009].

Zandvliet D. and Straker, L. (2001). Physical and Psychosocial Aspects of the Learning Environment in Information Technology Rich Classrooms, Ergonomics, 44, 9, 838-857.