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10 out of 10 for Scottish School Design?

Embedding the social model of disability in the school design process.

By

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A thesis presented in fulfilment of the requirements for the degree of Doctor of Philosophy

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Author's Declaration

This thesis is the result of the author's original research. It has been composed by the author and has not been previously submitted for examination which has led to the award of a degree.

Signed: Date:

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Abstract

This thesis explores standards of accessible design in Scotland's new and refurbished schools with the aim of suggesting practical steps towards creating school environments which actively promote inclusion of people with impairments and provide positive learning environments for children with additional support needs. Existing research of new and refurbished Scottish school buildings is inconclusive with regards to accessible design and at the midpoint of the largest school building programme in the history of Scotland, it is crucial that accessible design processes and practices be evaluated in order to inform future building projects.

The research explores the relationship between impairment, disability and the built environment and the impact that the disability movement and its associated social model of disability on contemporary architectural profession. This allows a vision for architecture to be proposed through a 'social model of disability' which is used as a basis for examining school design issues. The inclusive education discourse and current research examining standards of new school design in Scotland are used to determine the parameters for practical investigations, which use a variety of quantitative and qualitative research methods and involve a wide variety of stakeholders.

Results are used to establish the extent to which 'the social model of architecture' is embedded within the school design process and give practical recommendations as to how this can be better achieved, including a proposed overlay to the RIBA Plan of Work 2013. This study highlights the need for a paradigm shift in the architectural design ethos and contributes towards the creation of an inclusive, inspirational and sustainable learning environment for current and future generations.

Chapter 1: Introduction

1.1. Motivation and Problem Statement

This thesis investigates standards of accessible design for people with impairments and children with additional support needs in new and refurbished school buildings in Scotland in order to inform future school building design. The main motivation for this research comes from the author's experience working as an assistant to Dr Robert White, who investigated the barriers inherent to the design of urban environments for individuals with different types and degree of visual field loss. Dr White not only made the author acutely aware of the numerous barriers inherent within the built environment for people with different types of impairment, but also the immense opportunity that presents itself to architects of design environments which can enable rather than disable. Dr White inspired the author to view accessible design not as a requirement imposed by building legislation but as a main design concept which can help to create beautiful places that facilitate greater ease of use by all people.

As well as this personal experience, the research is further motivated by issues relating specifically to accessible design in Scotland's schools. It is 30 years since Finkelstein (1980) marked the beginning of a new era, calling for people to question, research, analyse and focus upon disability from a new standpoint. Michael Oliver (1983) developed the social model of disability in order to help people understand this new perspective. The social model of disability places an emphasis not on the limitations of the individual but on the way physical and social environments disable rather than enable. The biggest school building programme in the history of Scotland has taken place to extensively refurbish or replace 21% of the entire local authority school estate

(Scottish Government, 2009) and the coming years will see the replacement or extensive refurbishment of 19% which remain in poor or bad condition. Inclusive education is key to improving the quality of life of people with impairments, however no conclusive research investigating standards of accessible design in Scotland's new schools has been undertaken. In response to this the following research question has been set: "To what extent is the social model of disability embedded within the school design process in Scotland?". This thesis hypothesises that although much progress has been made in recent years towards the creation of more accessible environments through the development of policy documents and design guidelines, there is a tendency to build towards minimum standards and more needs to be done to promote better knowledge and application of best practice guidelines. A paradigm shift is required in our design ethos in order to move from policy to practice and create truly inclusive places which improve the quality of life for all.

1.2. Research Objectives

This thesis aims to examine issues of accessible design in new and refurbished schools in Scotland, with the specific intent of improving accessible design standards in the following phase of the school design programme. In order to do this, it sets out by exploring the relationship between societal perceptions of disability and architecture and the influence that the disability movement and associated social model of disability have had on architecture and education. Using school design as a context, the study aims to measure progress towards embedding the social model of disability within architectural practice and suggest practical steps towards achieving this. In order to achieve this ambition the following objectives are detailed below:

- Explore the history of disability and impairment and the relationship between disability and the built environment in order to place current-day design ethos within a wider context.
- Investigate the complex issues associated with accessible design, with a particular focus on the Scottish situation, in order to understand the socio-political context of school design and how the built environment can support inclusive education.
- Determine the extent to which best practice guidelines are met in new and refurbished schools, identifying if certain areas of existing guidelines are met to a greater extent than others.
- Measure levels of user satisfaction with building design in order to identify gaps within existing guidelines and suggest areas for further research.
- Explore the extent to which accessible design is embedded throughout each stage of the design process from the initial outset of the project to post occupancy in order to make recommendations for improvement.

1.3 Methodology

In order to address the research problem and achieve the objectives set out above, a methodology has been devised that consists of the following components:

- A literature review of the relationship between disability, impairment, architecture and education. The review places an emphasis on societal perspectives of disability throughout key periods of Western history in order to fully understand the significance of the disability movement and suggest how the

architectural profession can respond to this. Contemporary aspects of theory and legislation in architecture and education are also explored and the review analyses current research that has been undertaken exploring standards in Scottish school design.

- A detailed study which involves visual surveys and user consultation within new and refurbished schools in order to measure levels of user satisfaction and identify the extent to which accessible design guidelines are met.
- A large-scale investigation involving consultation with local authorities, architects and head teachers with the aim of identifying whether the findings of the detailed study regarding design standards are applicable on a larger scale, exploring the extent to which accessible design is considered at each stage of the design process from the project outset to post occupancy and finally, how the three main stakeholder groups would like to improve accessible design.

The results of the detailed study are used to create a set of matrices which summarise mandatory and best practice design guidelines and use a simple tick and cross method to measure the extent to which these are implemented in each of the 10 schools, providing a quantitative representation of the findings. This is used to establish which guidelines are well met and those which do not tend to be implemented. The results of user consultation and relevant research publications are used to establish any gaps in accessible design guidelines. Recommendations are then made for actions which should be undertaken during the design process in order to improve certain underperforming areas, improvements to design guidelines and future areas of research. The results of the large-scale study are used to suggest practical ways in which the social model of disability can be embedded within the design process. The

results from both investigations are used to propose an overlay to the new RIBA Plan of Work 2013 and suggest ways in which accessible design can be embedded within existing mechanisms and exist within this.

1.3.1 Ethical Approval

The University of Strathclyde requires that research investigations receive ethical approval before taking place. All research was undertaken between April 2011 and August 2013 and was granted full ethical approval by the Departmental Ethical Committee in Architecture through a series of applications made individually for each type of investigation. These applications detailed the research methods and procedure for contacting local authorities, architects and schools, undertaking visual surveys of school premises, and consulting with building users through questionnaires and focus groups. The ethical procedure requires that information sheets are given to each participant and participant consent forms are signed by every person taking part in the study. Children under the age of 12 must also have their parent's consent to take part in any investigation and this was sought for all primary and secondary school pupils. Although the secondary school pupils were old enough to give permission it is considered good practice to request parental consent. When a person was to be photographed or audio recorded this was made clear on the consent form and their consent was indicated by checking a box. Only pupils whose parents gave specific consent were photographed. Information and consent forms were provided for local authorities, architects, head teachers, members of school staff, pupils, and parents. A sample information and consent form is presented in Appendix A.

1.4 Contributions

This thesis contributes directly to the improvement of accessible design in new and refurbished schools in Scotland and on a wider scale, to both architectural practice and theory. In more detail:

- This thesis contributes to a greater understanding of the role of the built environment in reinforcing societal perceptions regarding disability and impairment and the particular way in which Western society's responses to impairment have been manifest in prominent art and architecture throughout key historical periods.
- Through placing the disability movement and the social model of disability in a historical perspective the thesis highlights the importance of the era established 30 years ago which called for societal structures and processes to be reconceived based on the divergent capacities of the individual. This theoretical analysis allows for a 'social model of architecture' to be conceived detailing how architectural practice, research and education can respond to this opportunity. This provides a method by which to measure accessible school design.
- On a practical level, the production of matrices to measure the extent to which mandatory and best practice guidelines are met provides a quantitative tool that can be used as a basis for measuring accessible school design in individual or multiple access audits. The use of these matrices to evaluate the extent to which individual design guidelines are met allows firm conclusions to be made regarding areas of design guidelines which are consistently not met.

- The proposal to develop an Inclusive Overlay to the new RIBA Plan of Work 2013 emphasises the need for the architectural profession to advance the accessible design agenda from the top down. The suggested action points are directly related to the results of investigations based on school design in Scotland but serve as a basis for the development of practical steps towards embedding the social model of architecture with the design process.

1.5. Chapter Plan

The remainder of this thesis is organised in seven chapters as follows:

- Chapter 2, “Disability and Architecture”, discusses the development of the disability movement in Britain and the associated theories which can be explained by the individual model, the social model and the social-relational model. This is followed by an exploration of the experiences of people with impairments across the globe and a historical analysis of disability and impairment perspectives. This analysis explores how Western society’s views of disability have been manifest in prominent art and architecture throughout key historical periods and identifies two key themes. This analysis is then used to propose a ‘social model of architecture’ which serves as a basis for discussing progress that has been made towards achieving this model in practice.
- Chapter 3, “Inclusive Education in Scotland”, explores the inclusive education discourse, specifically making reference to global and local educational initiatives, the development of the education system in Scotland and relevant legislation and inclusive education in practice. This is followed by a detailed

analysis of the Scottish school building programme focusing on school estate statistics and design guidelines. A review is undertaken of existing research investigating standards in Scotland's new and refurbished schools and the main conclusions are analysed with reference to accessible design.

- Chapter 4, "Detailed Study", describes the analytical methods used to undertake an in-depth investigation of 10 schools in the Glasgow Local Authority Area. The results of visual surveys and user consultation are brought together to form conclusions regarding standards of accessible design in each area of the building interior, exterior and surrounding.

- Chapter 5, "Matrix Analysis", uses the findings of the detailed study to produce a series of matrices which summarise the mandatory and best practice standards relevant to school design and use a simple tick and cross system to establish the extent to which these are met across the 10 schools involved in the study. Results from the matrices are used to establish which guidelines are well met and those which do not tend to be implemented. User consultation and relevant publications are used to make recommendations which relate to design guidelines, the design process and areas of future research.

- Chapter 6, "Large-Scale Study", describes the analytical methods used and reports on the findings of a study involving architects, head teachers and local authorities in the 7 cities of Scotland. Results are used to establish if strengths and weaknesses identified in the detailed study are common across the board and discuss each stage of the design process including user consultation, site selection, the brief, design and construction and post occupancy. An exemplar project of an inclusive school is discussed and recommendations are made

regarding stakeholders' preferred methods of improving accessible school design.

- Chapter 7, "A RIBA Plan of Work for Accessibility", discusses the progress made towards embedding the social model of disability in school design, specifically making reference to the inclusive education debate, legislation, accessible design guidelines, future research, and the consultation process. It is proposed that one way in which to ensure the architectural profession move toward the social model is the development of an Inclusive Overlay to the RIBA Plan of Work 2013.
- Chapter 8 concludes this work with a summary of the research objectives and significant findings as well as detailing contributions to architectural research and theory and outlining directions for future research.

Chapter 2: Disability & Architecture

2.1 Introduction

This chapter explores the relationship between impairment, disability and the built environment from a variety of perspectives, including the global, contemporary and historical context. It is comprised of three main sections, the first of which explores the emergence of the disability movement in Britain. The theories and associated models of disability associated with this movement are summarised with specific reference to the individual, social and social relational models. The second section briefly examines global perspectives of disability, and looks in detail at how Western society's historical views of disability have been manifest in the built environment. This study of global and historical perspectives is intended to contribute towards a deeper understanding of the relationship between impairment, disability and the built environment and also emphasises the historical significance of the disability movement on contemporary architecture. The third section responds to the disability movement's call to re-imagine societal structures and processes based on the divergent capabilities of the individual, and argues the need for change in the architectural discipline. The theories emerging from the disability movement are used to conceive a 'social model of architecture', which points towards objectives for architectural practice, education and research. This section then examines the progress the architectural profession has made in responding to the disability movement, exploring changes in the way the human body is perceived as well as the emergence of accessible design standards, changes to mandatory regulations and the relevance of accessible design to the sustainability agenda. The studies undertaken in this chapter are intended to contribute towards a greater

understanding of the relationship between impairment, disability and architecture and emphasis the need for a paradigm shift in our design ethos.

2.2 Disability Movement & Emerging Models

2.2.1 Disability Movement

The disability movement has grown globally during the last century as a reaction to the inequality that has been, and continues to be, faced by people with impairments all over the world. For the first time in history a serious challenge is being presented to this bias and across the globe people are uniting to change their experiences of injustice. This section explores the emergence of the disability movement in Britain, which put down its roots in the late 1800s and grew throughout the 1900s, particularly after the Second World War. The disability movement fully emerged in the 1960s when self-organised groups of people with impairments began to politicise issues of income, employment, rights and community living.

In Britain, the roots of the disability movement can be traced back to the setting up of the National League of the Blind (NLB) and the British Deaf Association (BDA) which date back to the 1890s (Barnes, 2002). The activity of the National League of the Blind led to the passing of the Blind Persons Acts of 1920 and 1938 (Campbell & Oliver, 1996). However, the attitude of the British state to people with impairments remained overtly paternalistic until the Disabled Persons (Employment) Act of 1944. This Act of Parliament was the first to treat people with impairments as a single group, however although it acknowledged the rights of people with impairments to economic and social inclusion they were never fully implemented (Barnes, 1991; Barnes 2002). The Second World War led to an increase in the number of people with impairments (Finkelstein, 1980) and an especially large number of institutions

for people with impairments were established in 1948. In the 1960s the new disability movement began to emerge due to a number of factors (Campbell & Oliver, 1996; Barnes, 2002). At this time British society had recovered from the devastation of the Second World War and was entering an age of affluence. However, the majority of people with impairments, whether they lived in their own home or an institution, remained poor and segregated from society and were beginning to realise this injustice (Campbell & Oliver, 1996). There was increasing frustration with traditional approaches which focused on rehabilitation or treatment of the individual rather than attitudes expressed within the external world (Barnes, 2002). People with impairments began to self-organise and during the 1960s and the following decades there was a dramatic increase in the number of groups which were organised and run by people with impairments rather than for people with impairments.

The self-organisation of people with impairments led to a raised consciousness of the discrimination that was being faced by individuals, who were either incarcerated in an institution or lived a solitary life within the community with little service input. In 1961, the Government decided to half the number of beds in mental hospitals, however it is argued that this was more to do with economic gain, than any humanitarian motivation (Barnes, 1991). The majority of services, whether for healthcare of education, viewed people with impairments as subjects who had no say in the organisation. There are examples of children who were removed from their families in order to be educated or hospitalised. The focus of the debate began to move from institutional care to issues of income, employment, rights and community living (Campbell & Oliver, 1996). Disability activists and organisations began to politicise these issues, making politicians and policy makers at national and international levels take notice (Barnes, 2002). The Local Authority Act 1970 and the

Chronically Sick and Disabled Persons Act 1970 led to the establishment of social service departments which provided options other than segregated accommodation and institutions for people with impairments which were not available before the Second World War. However, these services were not run or controlled by people with impairments and therefore created a culture of dependence, premised on the belief that people with impairment cannot make their own decisions and choose exactly which kind of aid they require (Barnes, 1991).

The 1970s saw the formation of several disability organisations which were overtly political from the start, of which the best known is probably the Union of Physically Impaired Against Segregation (UPIAS) (Barnes, 2002). UPIAS was founded in 1972 and began when Paul Hunt, who had spent many years living in an institution and had battled against authorities along with other residents to have control of their lives, wrote a letter to the Guardian Newspaper inviting people with impairments to organise a group to tackle disability (Campbell & Oliver, 1996). Discussions at a meeting between the UPIAS and the Disability Alliance (DA) concerning the Fundamental Principles of Disability led to two distinct descriptions of the way in which society views disability. The meeting clearly defined the difference between impairment, which is related to the individual, and disability, which is a social construct:

> In our view, it is society which disables physically impaired people. Disability is something imposed on top of our impairments, by the way we are unnecessarily isolated and excluded from full participation in society. Disabled people are therefore an oppressed group in society. It follows from this analysis that having low incomes, for example, is only one aspect of our oppression. It is a consequence of our isolation and segregation, in every area of life, such as education, work, mobility, housing, etc.
>
> (UPIAS & DA, 1976, p.3-4)

These contrasting perceptions of disability can be explained through two models of disability, the individual model and what Mike Oliver (1983) termed the social model, both of which are discussed in later sections. The terminology throughout this thesis is based on this statement and the term “people with impairments” replaces “disabled people”, as the condition of being “disabled” is dependent on the exterior world and not the sensory, cognitive or physical impairment.

The United Nations Declaration of the Rights of Disabled People (1975) sought to ensure full economic and social integration of people with impairments and a breakthrough came when 1981 was declared International Year of Disabled People by the United Nations. At this time the UPIAS invited organisations controlled by people with impairments to form a council which became the British Council of Organisations of Disabled People (BCODP) (Campbell & Oliver, 1996). The BCODP has been at the forefront of the campaign for the rights of people with impairment, influencing disability campaigning organisations as well as existing disability establishment organisations. There emerged two types of organisation, those which were made up ‘of’ people with impairments and those who worked ‘for’ people with impairments (Barnes, 2002). The former, newly emerging organisations were struggling to survive, while the latter rich and non-accountable organisations enjoyed a comfortable relationship with the state (Campbell & Oliver, 1996). The BCOPD was one of the founding members of Disabled People’s International (DPI) which emerged in the same year of 1981 (Barnes, 2002). DPI was formed due to the anger of 200 delegates with impairments, at a decision not to ensure the representation of people with impairments on the International Year of Disabled Peoples’ (1981) organising committee (Campbell & Oliver, 1996). The DPI is the international

equivalent of the BCODP, which was later renamed the British Council of Disabled People in 1998. The self-organisation which was supported through BCODP and DPI, prompted many people with impairments to become politically active and this resulted in various national and local campaigns on a whole range of issues, as well as the foundations for a network of organisations and services controlled and used by people with impairments (Barnes, 2002). The organisations also grew in the face of chronic underfunding, a lack of faith of many politicians, policy makers and professionals, opposition from traditional voluntary organisations and disabling environments which created logistical problems in meeting, communicating and organising (Campbell & Oliver, 1996). Towards the late 1980s, a new method of consciousness raising known as Disability Equality Training emerged which helped to further promote the disability equality agenda and activate increasing numbers of people with impairments to take political action. Several traditional, paternal organisations have since adopted the 'of' rather then 'for' approach, as the issue of disability rights has gained greater prominence within politics and society (Barnes, 2002).

A campaign to persuade the British Government to introduce anti-discrimination legislation grew throughout the 1980s (Barnes, 1991), however this was vehemently opposed by the Thatcher government and it was not until 1995 that the first legislation was passed in the form of the Disability Discrimination Act, 1995. The Disability Rights Commission (DRC) set up to enforce the Act was not formed until a further four years later (Barnes,2002). Furthermore, the government did not originally include education within the remit of the DDA 1995 did not originally cover education providers and education was only included in 2001 (Riddell, 2009). The DDA 1995 and more recent disability legislation is explored in more detail, within the context of

education, in Chapter 3, Section 3.2.3. The achievement of the disability movement in the passing of anti-discrimination legislation cannot be underestimated, however Campbell and Oliver (1996) remark that it is important to remember that legislation is a means to an end and does not guarantee an end to discrimination, let alone ensure inclusion into society. The disability movement has changed the way in which people with impairments are portrayed within society and the concept of disability has been redefined from an individual issue to a problem that lies within society. The various models of disability that have emerged as a result of the disability movement and can help to understand the changing definition of disability are explored in the following sections.

2.2.2 Individual model

Finkelstein (1980) describes the paradoxical nature of the impression of disability, which is viewed on one hand as a personal tragedy, in which the person with an impairment is passive and dependant, and on the other as a form of group discrimination involving conflict and independent action. The individual model stems from the imagination of non-impaired professionals. This model locates the problem of disability within the individual and views the limitations of disabled individuals as being a direct result of their impairment, rather than due to limitations created by society. It is therefore the responsibility of the individual to make personal adjustments and society is free of responsibility (Oliver, 1981; Oliver, 1983). An ideology of normality and normalisation takes precedence in the medical and rehabilitation enterprise, meaning that surgical intervention and physical rehabilitation are always justified, in spite of the pain and suffering of individuals (Oliver, 1996). There are two methods by which an individual can adjust to their condition; physical adjustment and psychological adjustment (Barnes, 1983; Oliver,

1983). Psychological adjustment is intended to help the individual realise their limitations, which happens through a set of pre-determined psychological adjustment stages. Non-impaired professionals have imagined what it would be like to be disabled, presuming it would be a tragedy which would require difficult psychological mechanisms of adjustment, rather than a phenomenon that can be explained in a number of ways (Barnes, 1983). If a disabled person disputes the limitations imposed by their impairment, they are viewed as being 'in denial'. It has been assumed that an individual with a disability surely has psychological problems and to deny these problems is in itself a psychological problem (Trieschmann, 1980).

The individual model of disability has been critiqued on many levels, primarily because it is has originated and been premised on the professional imagination and not the real-life experiences of people with impairments (Oliver, 1981; Oliver, 1983). Barnes (1991) identifies five problems with the individual model. Firstly, the ideology of normality is problematic in that psychological and physical normality is not easily defined and varies depending on cultural and situational factors. Secondly, the impaired individual is perceived as flexible and alterable, while the surrounding social and physical environment are portrayed as fixed and immutable, which is clearly unrealistic since human beings have always constructed their environment in order to suit their needs (Barnes, 1991). Thirdly, because the root of the problem is seen as being a person's impairment, rehabilitation is deemed necessary regardless of whether this will improve quality of life. Fourthly, because the hostile environment to which people with impairments must adapt is viewed as unchangeable, people with impairments are put under immense emotional strain during the process of adaptation. Fifthly, medical definitions portray impairment, disability and handicap as static states, which is inaccurate and helps to enforce artificial distinctions between

people with impairments and the rest of society which can compound ancient fears and prejudices of the abnormal or unknown (Barnes, 1991). Since the beginning of the 20th Century the number of people working in the field of disability has dramatically increased and almost every aspect of the life of a person with an impairment has its equivalent professional or voluntary organisation. The potential and real control of these organisations over the life of people with impairments is a fact of modern life (Finkelstein, 1980). The failure of the traditional, individual approach led to the emergence of the social model which has been premised on the experiences of, and developed by, people with impairments.

2.2.3 Social Model

The social model (Oliver, 1983) represents a radically different view of disability to that of the individual model. The emphasis lies not in the physical limitations of the individual, but in the way physical and social environments impose limitations upon certain groups of people. For the professions, this approach involves a change in focus away from personal aids and remedial therapy towards adapting environments so that they do not restrict people with functional limitations (Oliver, 1981, Oliver, 1983). Finkelstein (1980) describes this as a phase which follows the segregation of people with impairments from the roots of their community. The challenge is to question, research, analyse and focus upon disability from this different standpoint in order to remove the barriers to the reintegration of people with impairments into society. This will require changes to society, the built environment, environmental control systems, social roles, and attitudes of individuals and society as a whole (Finkelstein, 1980). These changes will come about through the political empowerment of people with impairments as a group and not through policies and programmes run by politicians and policy makers or through individualised

treatments and interventions provided by the medical professions (Oliver, 1996). The social model has had enormous success in providing a common focus for individuals with impairments and organisations which used it as a premise for self-organisation which was crucial to the disability movement. By creating a radical new conceptualisation of disability, the social model has been fundamental to carrying the disability movement forward at such a rapid pace (Campbell & Oliver 1996).

The social model is not without critique. A number of people including medical sociologists and policy researchers have questioned the distinction between illness and disability, suggesting that they are related. However, Oliver (1996) argues that the real debate may be to do with terminology rather than epistemology, in the distinction between impairment, which has to do with the functional limitations of the individual, and disability which has to do with society. The social model does not deny the significance of impairment in a person's life, but neither does it attempt to deal with this issue; rather emphasising economic, political and cultural barriers encountered by people with cognitive, sensory or physical impairments in an attempt to identify and address issues which can be changed through collective action rather than medical intervention (Oliver, 1996; Barnes, 2002). The social model has also been critiqued for a failure to incorporate the way in which people experience multiple discrimination, in order to provide an inclusive analysis (Oliver, 1983). Oliver (1983) argues that the social model is intended to be used to understand a range of different experiences within different cultural and social settings relating to class, race, gender etc. Furthermore, the binary distinction of the individual and social models of disability were originally devised as a simple method of explaining the world of social work to a class of students. He argues that the social model should not be mistaken for social theory which would contain a theory of impairment and

suggests developing a social model of impairment to stand alongside the social model of disability:

> "The social model of disability does indeed avoid mention of the personal experience because this belongs within the social model of impairment. So let's develop a social model of impairment to stand alongside a social model of disability but let's not pretend that either or both are social theory".
>
> (Oliver, 1996, p.42)

2.2.4 Social Relational Model

The social relational model responds to the tendency within disability studies to reject what is seen as personal or private for fear of diverting attention from the real extrinsic social barriers and opening up opportunities for the personal tragedy theory of disability to re-dominate the debate. Although the social interpretation perceives impairment to be a prerequisite of disability, at its core is a separation between any causal link between impairment and disability (Thomas, 2004). However disability is social discrimination based on the grounds of impairment (Thomas, 2004). The social relational model (Thomas, 2004; Reindal, 2008) is aligned with the original interpretations of disability formed by the UPIAS (1976) and aims to develop the social model which the organisation inspired. This model acknowledges that an impairment has both personal and social implications for an individual (Thomas, 2004). However, it also maintains the important element of oppression and discrimination of the social model, as opposed to disadvantage due to restriction of activity (Reindal, 2008). Reindal (2008) suggests that the distinction between a necessary condition, which is a prerequisite, and a sufficient condition, which is one that when met will guarantee that whatever is in question will be satisfied, might clarify the links between reduced function and the phenomenon of disability within a

social relational model. An impairment is a necessary condition for experiencing disablement, but it is not a sufficient condition because an impairment will only results in disablement depending on certain circumstances. From this perspective, an impairment is a necessary condition which has both personal and social implications for the individual, whether or not the impairment becomes a disability, is dependent on restrictions imposed by society, as shown in Image 2.1 (Reindal, 2008). New treatment and technology should be able to modify the necessary condition of impairment, and alterations within society should remove the barriers which create disability (Reindal 2008).

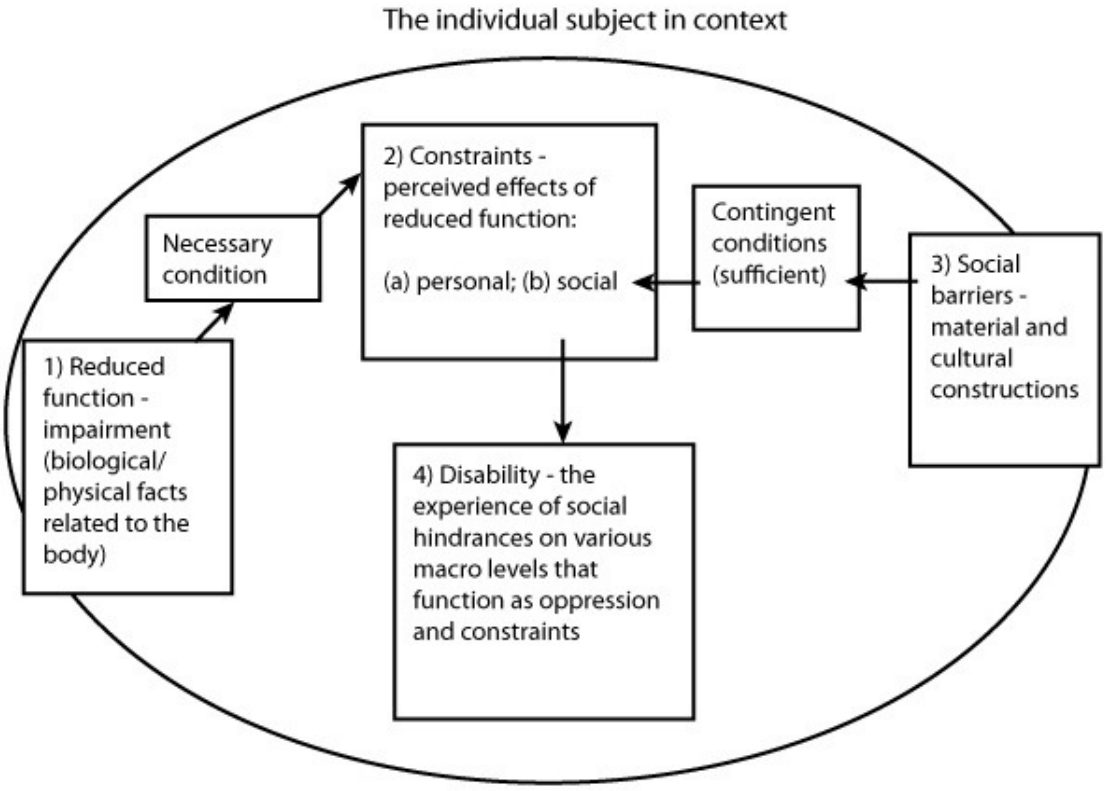


Image 2.1: Diagram showing the social relational model of disability. Author's reproduction of Reindal's diagram (2008).

The important distinction between the social relational model and the social model is the possibility of including both personal experiences and social restrictions and distinguishing between these, without embracing an individual approach (Reindal 2008). In some respects this responds to Oliver's (1996) suggestion to develop a social model of impairment which can sit alongside the social model of disability. This enables people with impairments to narrate their personal experiences, but still maintains the social model premise that disability is imposed by the society (Reindal, 2008). In this way it is possible to distinguish between personal restrictions in social settings and barriers that are imposed on top of these which restrict the individual (Reindal, 2008).

2.2.5 Summary

The disability movement has resulted in the growth of self-organised groups run by people with impairments, the introduction of anti-discrimination legislation and the emergence of new theories describing the disability phenomenon and informing the way in which society views disability and impairment. Table 2.1 gives an overview of the three emerging models of disability which have been discussed in the previous sections. In particular, the emergence of the social model of disability which describes disability as being caused by factors unrelated to the individual and their impairment, influenced the disability movement and led to a changing focus from the adaptation of the individual which was prominent during the 18th and 19th centuries, to the identification and removal of the social, political, environmental and cultural causes of disability. Charlton (1998) argues that the disability movement marks a turning point in the history of people with impairments who, despite resistance, are breaking the barriers of social, political, economic and cultural oppression. The following section explores global experiences of people with impairments, how

Western society has perceived disability throughout history and how this has been manifest in the built environment.

Table 2.1: Overview of the three models of disability (Author's own table).

Model	Description	Action
Individual Model	Disability is caused by the **functional limitations of an individual** which are a direct result of an impairment.	The individual should respond or adapt to the environment.
Social Model	Disability is caused by the **failure of the environment** to consider the needs of people with an impairment.	Societal structures and processes should be reconceptualised based on the divergent capacities of the individual.
Social Relational Model	**Impairment** is necessary condition which has personal & social implications. Whether or not impairment becomes **disability** is dependent on restrictions imposed by society.	Impairment – New treatment & technology Disability – alterations to societal structures & processes

2.3 Disability Manifest in Architecture

In order to fully understand the relevance of the disability movement on the built environment and act upon the disability movement's call to reimagine societal structures and processes, it is necessary to examine disability, impairment and architecture on a larger scale. This section firstly examines cultural perspectives of disability examining commonalities and difference across the globe. Using Stiker's "A history of disability" (Stiker, 1999) as a main reference point. It then explores how Western society has conceptualised disability through key historical periods,

examining how these views have been manifest in the art and architecture of the time, citing particular examples where relevant. Although the architectural discipline has had little or no concern for the inclusion of people with impairments until recent times (Imrie & Street, 2011) the social mores of the time have always been interconnected with design (Lawson, 1997). Examining these issues allows our contemporary design ethos to be viewed within a global and historical context, helping to form a deeper understanding of the important impact of the disability movement and changing socio-political views have had on design and conversely, how design can impact upon the ability of people with impairments to fully participate in society.

2.3.1 Global Perspectives

There are more than 1 billion people with impairments in the world, the equivalent to around 15% of the entire population (WHO & World Bank, 2011), which has increased since the 1980s when the World Health Organisation (WHO) reported a world prevalence of around 10% (WHO, 1981). This increase can be attributed to an ageing population, who are more likely to have impairments, and a global increase in chronic health conditions such as and diabetes, cardiovascular disease, cancer and mental health conditions (WHO & World Bank, 2011). Charlton (1998) argues that throughout the world people with impairments are invisible and anonymous. He attributes this phenomenon to three main factors: the tendency of families and communities to abandon, hide and shun people with impairments; barriers of segregation and inaccessibility which prevent people with impairments from participating fully in public, and finally, the sociocultural stigmas which cause people who have impairments which are not readily apparent to feel the need to conceal their impairment (Charlton, 1998). The issue of life and death is a reality for people

with impairments in both the developed (minority) world and developing (majority) world. Various policies and practices across the globe mean that people with impairments have decreased life chances and life expectancy (Priestley, 2003). In some parts of Latin America and Africa, the brutal treatment of people with mental health conditions, including harassment, rape, physical violence and public mocking, in many cases leads to the mercy killing of children with mental health conditions (Charlton, 1998). The struggle for life is also an issue in the Western world, where it is commonly perceived that impaired lives are not worth living, leading to practices of abortion and euthanasia and in some cases a the denial of the right to life-saving procedures (Campbell, 2002; Riddell 2009). An additional common experience of people with impairments across the globe is that of poverty. This problem has worsened with the increasing polarisation of wealth and the widening gap that is emerging between rich and poor, a phenomenon which has been exacerbated by globalisation and the social change it has brought (Swain, 2004). In all countries, people with impairments are far more likely to live in poverty than their non-impaired counterparts (Charlton, 1998; WHO, 2001; Priestley, 2003; Stone, 2003; Barnes, 2002; Swain, 2004).

The phenomenon of disability is a global issue and there are similar reasons for its presence throughout the world, however the experiences of people with impairments in different regions can be strongly affected by cultural, social, economic, political and environmental factors. Two individuals with the same impairment living in the same country can also have vastly different life experiences depending on their social status. Ghai (2003) demonstrates this point, quoting an Indian woman with an impairment who contrasts her privileged life, with access to the internet and a hand driven car, to that of other people with impairments in the same country who are

fighting for survival. Immense disparities exist in economic and political development between the world's rich, minority, and poor, majority, populations. Therefore the issues facing people with impairments in the rich developed world with advanced technology and highly developed welfare provision generally take a distinct form to the problems facing those in the developing world, where daily survival can be a struggle. Worldwide, the vast majority of people with impairments face both disabling barriers and barriers to basic resources. The focus of the disability agenda in rich countries is equality, independence and the escape from segregated welfare institutions, however for people with impairments in the majority of the world survival comes first (Priestley, 2003). People living in poverty suffer from malnutrition, and a lack of access to basic resources such as food, water and healthcare (Stone, 2001). In developing countries like India, where 65-80% of the population live in rural areas or urban slums with few facilities, impairment is largely caused by poverty. Lack of access to civic amenities such as water, sanitation and electricity as well as a lack of immunisation create the perfect conditions for ill health and diseases which can lead to permanent impairment, such as polio. Severe malnutrition, which is particularly the case for women in India, and difficult birth deliveries, also lead to a higher prevalence of impairment (Ghai, 2003). The chance of escaping poverty is made almost impossible due to the denial of access to basic education, employment, training and so on. A chain reaction therefore exists whereby, poverty leads to an increased prevalence of impairment, which in a disabling society, leads once again to poverty (Ghai, 2003; Priestley, 2003; Stone, 2003).

People with impairments may face multiple discrimination, being unfairly disadvantaged due to their impairment as well as factors such as, gender, age and race (for example: Charlton, 1998; Priestley, 2003; Ghai 2003; Stone, 2001; Swain,

2004). As mentioned, in the majority world, a main issue is access to basic resources and this can be more difficult for women, children and elderly people with impairments (Priestley, 2003). Social status and economic position can greatly affect the extent to which a person is disabled and people with a lower social status, such as women, may experience more barriers than their male counterparts (Charlton, 1998). For example, in India women are routinely fed last and least leading to severe malnutrition. It is also common to experience too many pregnancies without gaps in between and there is evidence to suggest that females are given poorer medical care than males. When a mother is malnourished or in ill health, the chances of her giving birth to a child who is also malnourished, in ill health, or who has an impairment, greatly increase (Ghai, 2003). It is not uncommon for a family to abandon a child with an impairment in apprehension of social exclusion and ridicule, the financial strain of caring for a dependant, and the belief that the child will not be able to provide for the family or maintain the family line (Charlton, 1998). Children with impairments are particularly vulnerable to maltreatment, such as rape and abuse, and their testimonies are often disregarded due to their condition. Furthermore, disability programmes tend to focus on adults, and children's aid agencies tend to focus on non-impaired children, meaning that children with impairments are often excluded by both (Philpott & Sait, 2001). Political instability can create and increase poverty, making it dangerous to access vital resources. In many parts of the world, armed conflict is a major cause of impairment (Priestley, 2003).

Cultural aspects of a society can impact upon the definitions of impairment and disability, and also the way in which society views people with an impairment. Western, bio-medical methods of defining impairment are not universal. The idea of

what constitutes a normal mind and body, the reasons for impairment and the response to an impaired person, can be specific to a certain period of time and culture (Oliver, 1983). Certain societies may be more accepting of difference and in some cases even see it as a cause for celebration. Responses to specific impairments can vary from one extreme to another in some cases provoking acceptance or celebration, and at other times, rejection or extermination (Stone, 2001). In many cases cultural or religious beliefs connect a person's impairment with a wrongdoing by themselves or an ancestor (Swain, 2004). This belief was dominant throughout various periods of Western history, examined in the following sections. Ghai (2003) analyses historical perspectives of disability in the dominant Hindu mythology of India and identifies primary themes. These consist of the perception of impairment as a lack or a flaw, the association of impairment with deceit and evil, impairment as a punishment by God for wrongdoing by the person with an impairment or their family, and finally that of impairment as eternal childhood with the impaired person's survival being dependant on care and protection. There are also less common historical narratives which depict people with impairments as having been chosen by God, for example the renowned scholar, Ashtvakra, depicted in Image 2.2, who had 8 deformities, is taken to be a sign of strength and the ability to fight oppression. However, contemporary illustrations of people who have an impairment, are of a negative identity and perceived from a predominantly medical angle. Ghai also points out the difficulties in disability being perceived as a social construct in a culture where pain and suffering are so often accepted as karma (Ghai, 2003).

Image 2.2: Picture of Ashtavakra, a Hindu sage. Sourced from: http://devdutt.com/articles/leadership/insecure-mentors.html

It is clear that the experiences of people with impairments vary across the world depending on social, cultural, economic, political and environmental circumstances. Recurring themes can be identified from the experiences of people with impairments throughout the world, such as the struggle to survive, living in poverty in both rich and poor countries, exclusion from the rest of society, the denial of the right to access the same resources as others, and multiple discrimination based on aspects such as age, gender and race (Charlton, 1998). The following sections examine the roots of Western society's attitudes towards disability from ancient times and the way in which these perceptions have been manifest in the built environment.

2.3.2 Old & New Testament

There are two contrasting perceptions of impairment which have derived from the Old Testaments and Gospels and have shaped Western society's views of disability throughout history. Stiker (1999) argues that the Judaism of the Old Testament, or Tanakh, was shaped by two opposing tendencies; that of sacral order and religious prohibition which tends to make the person with an impairment a cast-out victim, and that of ethical logic and social justice, which attempts to situate people with

impairments within society. The Old Testament makes many references to impairment. The book of Leviticus details the physical and mental perfections deemed necessary for all aspects of religious ritual (Barnes, 1991). People with impairments or disease were prohibited from entering the temple and excluded from the congregation (Stiker, 1999; Covey, 2005) and sinners who disbelieved in God were threatened with 'madness' or 'blindness' (Covey, 2005). In Leviticus blindness appears as a method by which to admonish Israelites for not paying attention or to indicate fulfilment of the end-times (Berlin, 2011). In Deuteronomy, blindness is one of the punishments for not observing the commandments and is present in all lists disqualifying individuals from sacred areas (Berlin, 2011). Temples were the centre of the community in ancient Israel and were viewed as the paramount achievement during a King's reign (Lundquist, 1984). One of the most prominent examples of this building type is King Herod's temple in Jerusalem, shown in Image 2.3, which was unparalleled in size and beauty (Josephus, 2009). Prohibition from such prominent public buildings reflects the exclusion of people with impairments from the heart of the community. Throughout much of history, and in certain cultures today, impairment and disease have been attributed to a punishment administered by God as retribution for a sin, committed by the person with the impairment, or an ancestor.

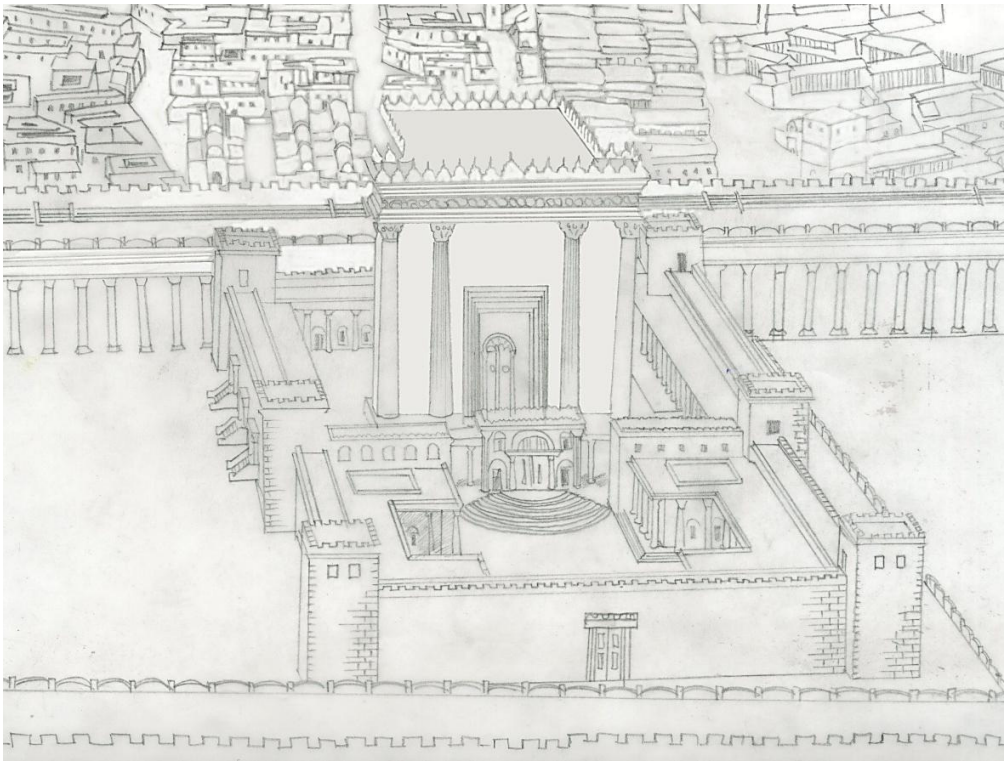


Image 2.3: Sketch of King Herod's temple in Jerusalem. (Author's own sketch, based on a model in the Israel Museum).

The New Testament broke the direct connection between impairment and individual fault, removing religious prohibition and introducing a new system in which there were no pre-established dictates regarding people with impairments (Stiker, 1999). This system removed the element of personal blame, portraying people with impairments as innocent victims of misfortune and Christianity's role as that of protector and benefactor. However, rather than being viewed as being able to participate equally in society with an existing impairment, people are healed and made better. This perception of a person with an impairment as a tragic victim of misfortune maintains the social hierarchy which places people with impairments on a lower social scale than their non-impaired counterparts. These two systems are one of many factors which have shaped Western society's attitudes towards disability throughout history (Covey, 2005). Society's response to these perspectives varies

between punishment as reaction to wrongdoing, and healing as reaction to tragedy, however the responses of society during particular eras of time can rarely be placed squarely within one of these two contrasting themes. These complex societal perceptions regarding disability and impairment, are reflected in the built environment at different periods in the history of Western architecture and these are investigated in detail throughout the following sections.

2.3.4 Classic Antiquity

The period of Greco-Roman antiquity is widely accepted to be of great significance to the development of Western civilization, influencing politics, language, education, architecture, philosophy, art and science. Ancient Greece was the first society to believe that equality and freedom of the people could be realised without chaos, breaking away from the forms of autocratic rule typical of previous empires, to establish democracy. This revolutionary concept established the roots of the ideals of individual freedom and equality, which are deeply rooted in modern Western society (Buitron-Oliver, 1992). Stiker (1999) describes two distinct Greek hypotheses regarding impairment. The first views impairment as a superior destiny preordained by the gods and the second views impairment as a natural disorder, opening the way to scientific research on physical and biological rationality in the form of Hippocratic medicine, which formed the premise for Western medicine. The majority of people with impairments or deformations existed on the margins of Greek and Roman society however they did not constitute a single group (Garland, 1995). The Greeks and Romans quite clearly distinguished between congenital and adventitious impairment, mental health conditions and illness (Stiker, 1999). As opposed to Judaism, in Classic Antiquity, the blind, deaf and feeble-minded were not considered deformed, however the distinction between malformation and deficiency is not

always clear (Stiker, 1999). Greek philosophers believed that people with physical impairments should be treated with compassion when their impairment was not a result of their wrongdoing (Garland, 1995) and people with illness or adventitious impairment were generally cared for by the family (Stiker, 1999). The ancient Greeks and Romans greatly respected those injured on the battle-field (Barnes, 1991) and veterans were given an annual grant by the city (Stiker, 1999).

In contrast, congenital malformation was viewed as a punishment by the gods for an ancestor's wrongdoing. Infanticide or exposure was commonplace in Greek and Roman society and sometimes enforced by law (Barnes, 1991; Garland, 1995; Stiker, 1999; Covey, 2005). This involved taking the infant to an unknown place and allowing them to die due to exposure, abandoning the infant to die in a hole in the ground or drown in water. The procedure of infanticide was viewed not as execution but a method of returning the child to the gods. Around the middle of the 5th century B.C. a Roman law was passed which insisted on the killing of the severely deformed. Despite the existence of this law, there are no records of the prosecution of parents who permitted a defective infant to live, and it is known that some congenitally deficient infants were raised, such as the Emperor Claudius (Garland, 1995). However, Claudius belonged to the topmost stratum of Roman society and much presumably depended on the disposition of the parents and the social group to which they belonged (Garland, 1995). It seems that by the 1st century A.D. the elimination of deformed children had become an option, rather than a requirement (Garland, 1995). The more compassionate view towards impairment professed in the Gospels, influenced ancient society, helping to eliminate the practice of infanticide (Covey, 2005).

Early Greek and Roman civilizations believed that 'madness' was caused by evil spirits entering a person's body or soul, which should be exorcised through ritual and magic (Vaughan, 1919; Masters, 1977). The mysterious unknown power was expulsed through sacrifice, purificatory rites, flight from the country where the spirit originated, wearing amulets and the use of quasi-medical preparations (Vaughan, 1919). Treatments included purges, hot and cold baths, bleeding and restraint, which remained in use until the middle of the 19th century. This primitive view contrasts with the more organic attitude influenced by Greek philosophers of the 6th and 7th Century. However, it was common for people with mental health conditions to be openly mocked by Greek and Roman society (Masters, 1977), shunned and abused by stone throwing or spitting (Stiker, 1999). Plato developed a theory which distinguished specific types of madness in which common madness which was associated with wrongdoing, was separated from poetic or erotic madness (Stiker, 1999). However, as the connection between insanity and unknown forces or Gods decreased so did the sanctity of the 'mad person' and their status in society, which was sometimes considered as being protected by the gods, fell to that of beggar (Vaughan, 1919). People with mental health conditions were openly mocked by Greek and Roman society (Masters, 1977).

2.3.5 Architecture of Antiquity

The revolutionary Greek concept of democracy inspired the production of architecture and art which has rarely since been equalled. As opposed to religious leaders in the East whose search for truth was sought by distancing themselves from the physical towards a more mystical world, the Greeks believed that divinity can be found within each human making the human form the perfect subject for the artist. The idea of human proportion as a basic unit permeated Greek art and architecture.

Mortals became the standard by which to judge and measure art and architecture. Buildings were built at a human scale, contrasting with those of previous civilizations such as the Egyptian pyramids. Gods were portrayed as resembling human beings, not fantastic creatures (Buitron-Oliver, 1992). The primary artistic inspiration throughout antiquity was the physically perfect human body. Beauty and wholeness were regarded as a mark of divine favour, whereas ugliness and deformity were interpreted a sign of the opposite (Garland, 1995).

"De architectura" or the "Ten Books on Architecture" (Vitruvius, 1960), is one of the earliest architectural texts, written by the Roman Architect Vitruvius who was influenced by Greek architectural orders. The work is divided into ten sections, or books, and covers almost every aspect of Roman architecture. Vitruvius explains that the ancient rule of perfect buildings is derived from the natural composition of the human body. A detailed description of a 'well-shaped man' (Vitruvius, 1960, Book 3, Chapter 1, p72) is used as an exemplar of order in composition as a basis for the geometry of buildings and towns (Tadgell, 2007). The man is described in an upright position with his arms outstretched on a grid and enclosed in a square and circle, the bodily proportions described in intricate detail from the top of his forehead to the tips of his toes, with the central point being the navel. Vitruvius recommends that temples be placed at the very highest point of the city in order to achieve a better view and afford greater devotion through a difficult ascent (Book 1, Chapter 7 & Book 3, Chapter 4), a legacy which can be seen in Church buildings throughout Europe. Vitruvius also makes mention of healing places for the sick, suggesting that temples built to Aesculapius (Greek god of medicine and healing) and Hygeia (Greek goddess of health) are built in healthy environments with fresh water from health-giving springs so that people can be more speedily cured (Book 1, Chapter 2).

Greek sculptures gradually developed over time from stiff, stylized portraits to perfect human forms which became the centre piece of buildings rather than adornment (Buitron-Oliver, 1992). These sculptures portray the tendency to equate moral good with physical perfection. The God Apollo, for example, is normally depicted as a young man at the peak of physical fitness. There was a tendency to depict the human figure free from the bonds of space and time, from the constraints of the natural or built environment, genre depictions of social professional and private life, and the rendering of old age and infancy (Delivorrias, 1993). The human form was represented through sculptures which depicted muscular men and shapely females as clichés of perfection. A prominent female example of this is the Hellenistic statue of Aphrodite (the Venus de Milo), shown in Image 2.4, who is considered to represent a timeless ideal of female beauty.

Image 2.4: Aphrodite from Melos (Venus de Milo), (Author's own sketch).

Greek and Roman artists fixated on idealised physical perfection and rarely depicted deformity, the only exceptions to this being found in the humble artwork of vase painting and miniature statuary (Garland, 1995). In a similar way to modern culture, deformity was not depicted even when it existed. As a child Claudius was treated with distain by his own mother who was said to describe him as a 'monster…not finished by nature but only half-done' (Garland, 1995). Claudius was concealed from the public, and would appear in the amphitheatre wrapped in a cloak to hide him from onlookers to protect him and the family from ridicule. He was so monstrous in appearance that even Hercules, famous for his strength and for fighting fierce creatures, was aghast at the sight of him (Garland, 1995). However, statues of Claudius portrayed him with a strong muscular body without any imperfections, such as the statue shown in Image 2.5, which shows Claudius as the embodiment of the god, Jupiter.

Image 2.5: Emperor Claudius (Author's own sketch).

2.3.6 Middle Ages & Renaissance

Initially Medieval society was tolerant of people with impairments, influenced by the spread of the gospels and almsgiving, however as the Middle Ages unfolded religious and magical dogma obscured the earlier Greek philosophers' organic attitude to impairment and primitive beliefs once again came to the fore (Masters, 1977). The Gospels brought a new perspective to poverty and suffering in the form of charity and almsgiving (Stiker, 1999). However, from the beginning of the 14th Century, the era of epidemics and wars caused significant demographic and hierarchical upheaval and this prompted an increase in poverty and the numbers of people seeking alms. Roving bands of beggars were formed and professional imposters disguised themselves as cripples, paralytics and blind people (Barnes, 1991; Stiker, 1999). Authorities were forced to make provision for those who were dependant on charity and increasingly responded by institutionalizing people in houses and facilities (Covey, 2005). However, until the 17th century the primary source of care continued to be provided by an individual's family or through the Church, in small hospices, where people with impairments were cared for along with the sick and the poor (Barnes, 1991).

Christianity was initially tolerant of people with conditions thought to be associated with mental health conditions and viewed all people as creations of God, however as the Middle Ages unfolded society increasingly associated mental illness conditions with evil (Covey, 2005). As in Graeco-Roman times, people with mental and physical impairments were primary targets for amusement and ridicule during the Middle Ages (Barnes, 1991; Stiker, 1999). It was common for members of the aristocracy such as Kings and Princes to keep a dwarf, hunchback, or an idiot as part of their entourage who would serve as entertainment (Barnes, 1991; Stiker, 1999). There

was a widespread belief in Europe from the Middle Ages to the Enlightenment that a child born with a deformity was a 'changeling', the child of demons which lived under the earth or in water and sought to steal human children, replacing them with one of their own kind (Haffter, 1968). Children with mental health conditions were often taken for changelings. The reaction of parents towards changeling children varied. In Ireland they were taken as a symbol of good luck and treated well. In other countries, various methods were employed to reverse the change in order that the human child would be replaced. Some of these were seemingly harmless such as tricking the child to laugh or talk, and others involved more torturous methods including exposure, beating, burning and poisoning, in an effort to treat the child so badly that the human child would be returned (Haffter, 1968; Covey, 2005).

The themes of fear, divine anger and monstrosity which recurred throughout the late Middle Ages and Renaissance were further compounded by the plagues, famines, epidemics and wars of the 14th and 15th centuries (Stiker, 1999). The belief that outside forces were the cause of 'madness' again prevailed, for example one of the primary influences on 'mad' people's behaviour was thought to be the moon, leading to the term lunacy. At a time of considerable instability it was essential for the Church, feudal overlords and the monarchies to get together to prevent social breakdown and overthrow. The Malleus Maleficarum, published in 1487, saw the beginning of witch-hunting on a large scale and contributed to the mass persecution of those deemed 'insane'. While any disease could be attributed to witchcraft, people with diseases of the nervous system, apoplexy, partial and general paralysis, epilepsy, hysteria, stones of any kind and a full range of mental health conditions were especially victimised (Covey, 2005; Masters, 1977). There was a strong misogynistic belief that females were more likely to be witches (Masters, 1977;

MacCulloch, 2004). The Malleus Maleficarum legitimised torturous interrogation methods and the drowning of witches or possessed children (Haffter, 1968; MacCulloch, 2004). Blame was often laid with the parents and women were sometimes burnt at the stake purely on the basis of having borne a deformed child (Haffter, 1968). Isolation, which had not previously been used, was introduced during this time (Masters, 1977). Prisoners were confined within cells, walls and gatehouses and entire ships were sometimes sent away to faraway lands (Markus, 1993).

A slow change from medieval to modern world came with the Renaissance, which began in Italy in the 15th century but didn't spread to other European countries until the 16th century (Masters, 1977). However the association of 'madness' with wrongdoing continued and did not change with the 16th Century Reformation (Haffter, 1968; MacCulloch, 2004). The Protestant reformer, Martin Luther's ideas were well aligned with the Malleus Maleficarum (Haffter, 1968; MacCulloch, 2004). Although the Renaissance began a return to rational scientific thought and the human body became the subject of intensive research, many physical and mental health conditions still remained a mystery (Masters, 1977). The fear that had surrounded death was now transferred to 'madness' (Markus, 1993). Witch-hunting continued on a greater scale and reached its peak in the 16th and 17th centuries, when witches were thought to cause victims to have fits. Over 100,000 people, mainly women, are thought to have been executed during the inquisition (Masters, 1977).

2.3.7 Symbolism in Medieval Architecture & Art

The art and architecture of the late middle ages portray society's fear of monstrosity and association of deformity with evil. This distinct period in architectural history separates ancient and modern times and was distinguished by the Renaissance,

when the term Gothic was coined. At this time, decorative elements were used precisely, to describe a building's intention, it's meaning, and its symbolism. The architectural structure of the church was intended to express heaven and earth (Coldstream, 2002) and sculpture served not only to ornament the architectural fabric but to convey stories of heaven and hell to the illiterate (Bridaham, 1967). The north French region produced what was to become the language of late medieval architecture and the finest Gothic cathedrals were built in France during the 12th and 13th centuries. Pre-Christian beliefs influenced medieval society and culture and this can be seen on the mythological sculpture of medieval cathedral facades, for example in the form of chimeras and gargoyles such as those shown in the sketch in Image 2.6. The souls of the dead were portrayed as nude figures. Male devils are men with deformed features and anatomy, normally with a head on the belly. Female devils have animal heads as breasts with the wings of some having descended to the lower portions of the body to denote fallen angels (Bridaham, 1967).

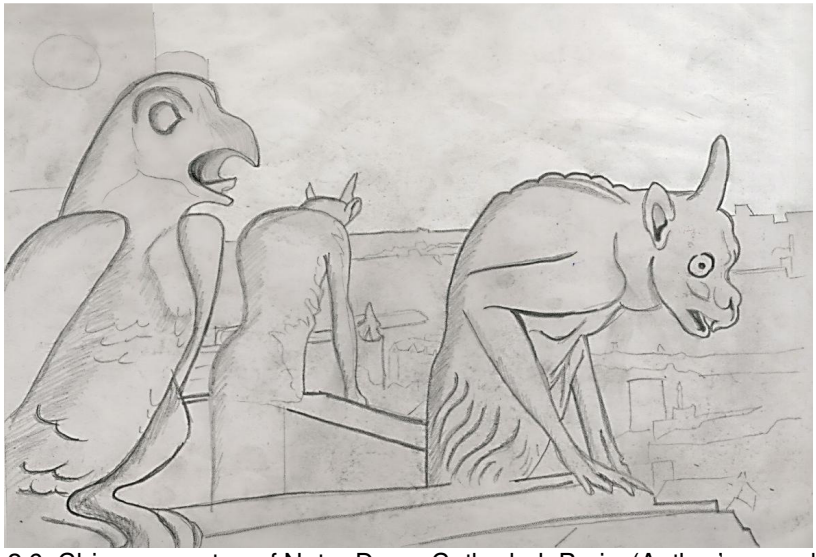


Image 2.6: Chimeras on top of Notre Dame Cathedral, Paris, (Author's own sketch).

Paintings of saints also used exterior beauty to describe their inner morality and goodness. When associated with martyrdom and torture, mutilation of the human

body was viewed in awe. Iconography was commonly used to identify specific saints and martyrs who were often depicted in the act of being tortured, holding the torture device which had been used against them or the mutilated part of their body. Image 2.7 shows a grotesque medieval engraving of St. Agatha having her breasts removed. Many other painting depict her either holding her breasts or being held in order for her breasts to be removed, sometimes with one breast already removed. Image 2.8 shows a medieval print which depicts two apostles, St. Peter on the left holding the keys to the kingdom of heaven, and St. Andrew on the right holding the Saltire Cross on which he was crucified.

Image 2.7: The Martyrdom of St Agatha.. Sourced from: http://www.britishmuseum.org/system_pages/beta_collection_introduction/beta_collection_object_details.aspx?objectId=3047004&partId=1&searchText=st%20agatha

Image 2.8: St Peter and St Andrew. Sourced from: http://www.britishmuseum.org/system_pages/beta_collection_introduction/beta_collection_object_details.aspx?objectId=1361814&partId=1&searchText=st%20andrew

Artists such as Breugel and Velazquez were distinct to other artists of the 14th and 15th centuries in that they painted ordinary people rather than concentrating purely on wealthy aristocracy which would be more lucrative. Breugel's 'Battle of the Carnival and Lent' (1559), shown in Image 2.9, presents the contrast between two factions of society, the inn on the left associated with the carnival and the church on the right associated with Lent. The carnival scene depicts people with impairments

dressed in carnival clothes as part of the entertainment and the church scene shows almsgiving to the poor. His later works, “The Parable of the Blind” (1559) and “The Cripples” (1568) focus solely on people with impairments. Breugel’s paintings demonstrate scenes which were common at the time (Hagen & Hagen, 2007) and illustrate groups of people with impairments roaming the countryside, begging amongst crowds of people and serving as serving as entertainment in the carnival.

Image 2.9: ‘Battle of the Carnival and Lent’. Breughel. 1559. Sourced from: http://www.wikipaintings.org/en/pieter-bruegel-the-elder/the-fight-between-carnival-and-lent-1559-1

Velazquez was paid to portray life in the Habsburg court in 17th century Spain and was unique in painting the jesters and dwarfs with just as much humanity and sensitivity as he did the royal infantas and generals. Velazquez has a series of paintings of jesters in the court, an example of which is "Niño de Vallecas" (1645), a

portrait of Francisco Lezcano, a jester who was said to be physically or cognitively impaired, shown in Image 2.10.

Image 2.10: 'Francisco Lezcano, "el Niño de Vallecas"'. Velazquez. 1635-1645. Sourced from: http://es.wikipedia.org/wiki/Francisco_Lezcano,_el_Ni%C3%B1o_de_Vallecas

2.3.8 Renaissance Architecture

Renaissance is the term used to describe the period when classical culture was reintroduced into Europe after the Middle Ages (Coldstream, 2002). The Renaissance emerged in Italy and spread to the rest of Europe, aided by improved methods of travel and increased trade which helped to mix cultures and shed a light

upon medieval European society. The classical architecture of Greece and Rome was of great inspiration to Renaissance architects who strove to replicate the symmetry and carefully proportioned buildings of this era. The human body described by the Roman architect Vitruvius would be the inspiration for the renowned 15th century painting by Leonardo da Vinci, known as the "Vitruvian Man", a sketch of which is shown in Image 2.11. Vitruvius would also be of great inspiration to the Renaissance Architect Palladio, one of the most famous and influential architects of all time (Placzek, 1965). The essential factor in Palladio's architecture which embodies the classical tradition is a sense of order, of the relationship of parts among themselves and to the whole (Ackerman, 1966). Palladio's writings in the "Four Books of Architecture" (Palladio, 1965), published in 1570, were influenced by Vitruvius and have had a profound and widespread impact, particularly on European countries (Placzek, 1965). Palladio reinforces many of Vitruvius' ideas such as using the male geometry to order the building, as well as placing temples at the highest points in the city and raising the temple floor (Book 4, Chapter 1). Palladio makes explicit the link between the human body and the social hierarchy of society at the time which was present in the order of the building:

> "…as in the human body there are some noble and beautiful parts, and some rather ignoble and disagreeable… …But as our Blessed Creator has ordered these our members in such a manner, that the most beautiful are in places most exposed to view, and less comely more hidden; so in a building also, we ought to put the principal and considerable parts, in places the most seen, and less beautiful, in places as much hidden from the eye as possible…I approve therefore that in the lowest part of the fabric, which I make somewhat underground, may be disposed the cellars, the magazines for wood, pantries, kitchens, servants-halls, wash-houses, ovens, and such like things necessary for daily use."
>
> (Palladio, 1965, Book 2, Chapter 2)

He also states that the principal floor of a dwelling should be raised for services to be located underneath, to avoid damp and offer views, forming the precedent for European domestic architecture. Palladio reaffirms Vitruvius' guidance that temples should be positioned at the highest points in the city and if there are no elevated places, the floor of the temple should be raised, as the ascent to the temple affords greater devotion and majesty (Palladio, 1965, Book 4, Chapter 1), a rule which has been followed in the design of most churches since. He makes one reference to those who may have weaker bodies, with specifications given for the maximum amount of steps, 11 or at most 13, which should be ascended before creating a resting place (Palladio, 1965, Book 1, Chapter 18) When describing ideal sites for temples, Palladio follows Vitruvius' guidance regarding temples to Aesculapius (Greek god of medicine and healing) and Hygeia (Greek goddess of health), stating that they should be situated in healthy surroundings near wholesome waters, so that visitors coming from bad and pestilent air to clean, and drinking pure water, might be cured more easily and quickly and religious zeal increased (Palladio, 1965, Book 4, Chapter 1).

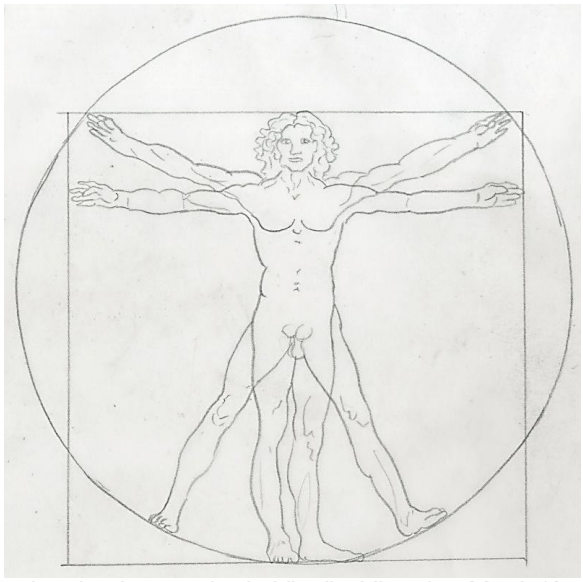


Image 2.11: Sketch showing Leonardo da Vinci's 'Vitruvian Man'. (Author's own sketch).

2.3.9 The Age of Enlightenment & Industrial Revolution

The centuries after the Middle Ages saw medical thought of a more scientific kind and more effective medical treatment, which overtook the imaginary world of monsters and demons which had pervaded Medieval times. The power of the Church, and therefore the funds for charitable hospices, had been diminished through a series of wars and Christianity's role as provider was replaced by control of the state (Covey, 2005). The 17th century unfolded under the rule of social order and the practice of interning the poor and insane (Stiker, 1999). During the 1660s Louis XIV of France locked up anyone who opposed him in an immense police operation referred to by Foucault as 'the Great Confinement', when over 6,000 people were incarcerated in the Hôpital Général (Arnold, 2008; Stiker, 1999). The focus of the Hôpital Général was not to cure and treat people with impairments as the hospices of medieval times, but as a method of internment and concentrating numbers. The practice of interning people in large institutions soon spread across Europe (Arnold, 2008) and society increasingly turned to confinement to address the needs of poverty, disability and illness (Covey, 2005). The numbers of wounded and impaired war veterans had also risen and rather than being housed in abbeys, special invalid hospitals were established where they would be put to work, producing shoes and cutting material for clothing (Stiker, 1999).

The Age of Enlightenment was concerned more with education and rehabilitation of people with impairments than the ideas of monstrosity which permeated the middle ages and this led to new ideas of formal organisation of people with impairments, along with appropriate technologies and specialized institutions (Stiker, 1999; Covey, 2005). The Great Confinement, which did not distinguish between different types of impairment was transformed with the new ideas of the 18th century, however the

Hôpital Général was only to be replaced by the asylum (Stiker, 1999) and a variety of institutions emerged to deal with different categories of people. Markus (1993) describes three reactions to insanity during this period: the first places responsibility on the individual, the reaction being punishment through penal institutions; the second views the individual as unwell and makes them the subject of clinical experimentation and cure; the third, which has ancient roots and was revived during the Enlightenment, is the idea that an individual which cannot partake in rational discourse is not a human and can be treated like an animal (Markus, 1993). The numbers of people with impairments and other disadvantaged groups which were segregated into hospitals, asylums, workhouses and prisons increased. Separating the poor and people with impairments into institutions offered advantages to domestic relief, as it was more economic. Furthermore workhouses and other institutions were so horrific that people did not generally enter willingly and this acted as a deterrent to imposters who had previously deceived people to receive charity (Barnes, 1991).

An upsurge in Christian morality and humanitarian values in the 19th century led many Victorians to question the harsh treatment of people who were considered incapable of work. These ideals, along with a mistrust of people seeking charity, saw people with impairments differentiated from other disadvantaged sections of the community and categorised into specific groups with differing treatment for each (Barnes, 1991). Although not entirely new, the idea of training and rehabilitation put down solid roots throughout this era and specialised institutions were created for people with sensory impairments. While these institutions were dedicated to rehabilitation and accomplished developments such as sign language and the Braille alphabet, there was little attempt made to integrate people with impairments into

ordinary life and work (Stiker, 1999). There were also numerous private services where the main objective was rehabilitation, such as orthopaedic treatment for physical impairment, however this was dependant on individual means (Stiker, 1999). A psychological approach to mental health was conceived during the 19th century when great advances in knowledge allowed people to realise that mental health conditions were not inexplicable and were in many cases caused by as yet unknown areas of the subconscious mind (Masters, 1977).

The economic and social upheavals of industrialisation saw discrimination towards people with impairments, which had previously been fragmented, becoming increasingly institutionalised throughout society. It has been suggested that this new phenomenon may be in part due to industrialisation and the changes this brought to work ethic, from flexible, individualised patterns and slower production rates, into which people with impairments had been integrated, to high-speed factory work and production norms and waged labour (Finkelstein, 1980; Barnes, 1991). The importance of individualism and medical science throughout this period provided intellectual justification for the systematic removal of people with impairments from mainstream economic and social life (Barnes, 1991). The segregation and isolation of so many people on such a large scale led to the socio-political phenomenon of institutionalisation. Since the middle ages, people deemed ‘insane’ had been kept in isolation and disconnected from the rest of society. Masters (1977) argues that isolation of the ‘insane’ is an attempt to repress society’s anxieties and fear of insanity. People who do not conform to society are punished until they accept the values of a world which claims to be ‘sane’ but is in itself politically devious, overtly materialistic and whose inhabitants have already killed many of their own kind. He argues that institutionalisation of patients who are held in mental hospitals for long

periods of time is inevitable because of the structure imposed by various administrations throughout the centuries. The very nature of the institution makes the patient unable to face the outside world (Masters, 1977).

2.3.10 Institutional Architecture

During the two centuries which followed the 1656 decree setting up the landmark Hôpital Général in Paris, the programme of confinement consumed by far the greatest slice of public building resources in the construction of poorhouses, workhouses, orphanages, almshouses, prisons, hospitals and asylums (Markus, 1993). By 1950 a whole series of new industrial building types had been created, with greatly expanded prisons and hospitals giving rise to the development of asylums and work houses (Markus, 1993). Many of these new building functions had existed on a smaller scale within the remits of older building types, but it was after the late 18th century that they began to take on their own forms (Bergdoll, 2000). There was a belief that these new institutions could reform people affected by physical or mental disease and could right the moral wrongs of crime or vagrancy (Markus, 1993).

During the 17th century work houses which had previously offered civilised working conditions were viewed as being too desirable and new work houses were designed to resemble penal institutions in order to deter people from entering. The shift to incarceration demanded tighter control and design elements changed accordingly, for example open courts became enclosed and multiple entries were eliminated. In his theory of the 'Great Confinement' of the 18th century, Foucault places asylums in the same category as prisons and hospitals. The asylum is related to both; patients were cut off from the outside world and from one another and categorised in terms of gender, behaviour and class. The design focus towards the penal model of formal

classification and surveillance during the 18th century was a reaction to people with mental health conditions rather than physical impairments (Markus, 1981). However, the classification and diagnosis of mental health conditions and physical impairments was not an exact science and many people were locked away for reasons of convenience rather than medical care (Markus, 1993).

At the end of the 18th century the idea of moral treatment in asylums and hospitals had arrived and architects and doctors created tailored environments for specific types of patients. People with depression would have access to gardens, maniacs would require silent, shady spaces on the periphery, and both should be separated from those who displaced idiotism and senility (Markus, 1993). Hospital design was reformed and the modern hospital was the subject of much debate. The old overcrowded hospitals had housed a random mixture of those deemed sick, mad, criminal and destitute. The new buildings embraced the revolution in medical thinking and sought to achieve classification and political control. The asylum cut patients off from the outside world and from one another and categorised people in terms of gender, behaviour and class.

At the beginning of the 19th century purpose built asylums were not always designed to be penal institutions and observation was achieved through more subtle means than in prisons, however this changed during the first half of the 19th century. At this time there was a belief in the case of 'insanity' that contact with the home should be severed and only resume when the person was well on the road to recovery (Masters, 1977). The increasing control of the medical profession coupled with a scarcity of resources saw asylums take on surveillance features of penal institutions in order to cope with increasing numbers and poor patient to staff ratio. The number of large, overcapacity asylums grew and even small rural asylums doubled or tripled

their capacity, growing increasingly more penal in their design and use (Markus, 1993).

Jeremy Bentham's Panopticon 'inspection house' offers a perfect example of surveillance-orientated building design. Image 2.12 shows a sketch of the blue-print for his prison design. Bentham's concept was to reverse the idea that the centre is the focal point, making this the viewpoint for panoramic surveillance. A control tower at the centre was designed to be invisible whilst the prisoners were always visible, the cells being lit from behind. His plans included descriptions for one-way controlled lighting, one-way listening, iron construction and individual cell sanitation. Classification was on terms of ability to work rather than crime committed and greater labour would offer profits to prison keepers. His influential ideas were to leave three lasting legacies: central surveillance, individual segregation and productive labour (Markus, Buildings & Power: Freedom & Control in the Origin of Modern Building Types, 1993).

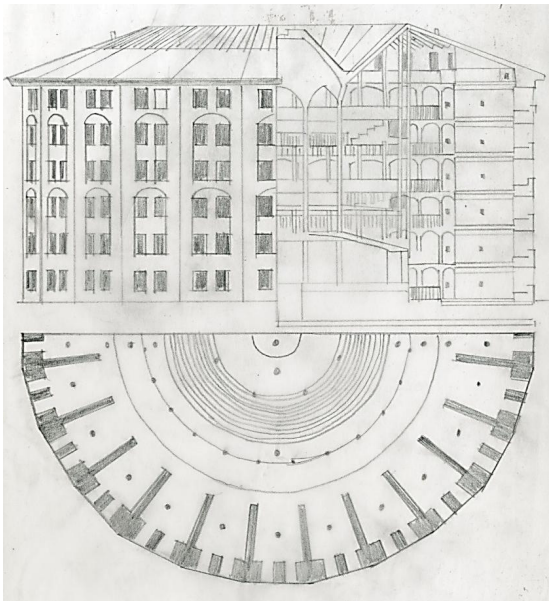


Image 2.12: Sketch showing the elevation, section & plan of Jeremy Bentham's Panopticon 'inspection house' (Author's own sketch, based on drawing by Willey Reveley, 1791).

In the late 18th century punishments such as public execution and flogging were being replaced by solitary confinement and the presence of the city prison was intended to fill the gap left by public punishment. Jacques-François Blondel advocated the use of an architecture 'terrible' so terrifying as to repulse the onlooker. This was achieved by exaggerating the scale and mass of the classical orders to achieve a domineering style. These ideas influenced many new purpose-built prison designs (Bergdoll, 2000). A new building for Newgate Prison was commissioned and completed in 1775 by George Dance, who took great influence from these ideas. Image 2.13 shows a sketch of the prison based on George Dance's perspective drawing. He created an impression of strength and severity through the use of deliberately inelegant form and proportion, walls which appeared to be virtually unbroken by windows, rusticated masonry and obvious symbolism such as the carved chains over the entrances (Bergdoll, 2000).

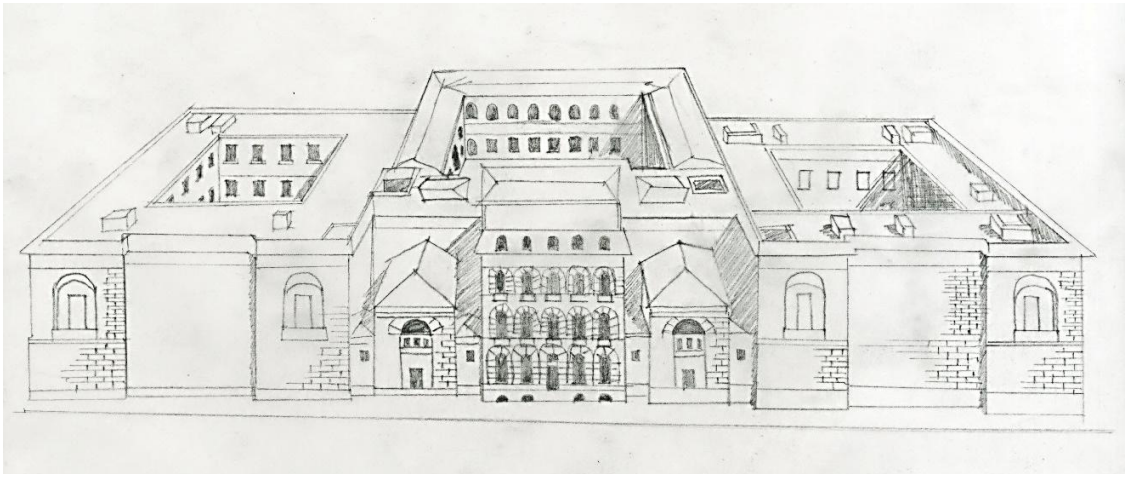


Image 2.13: George Dance the younger. Newgate Prison. Author's own sketch. Based on image sourced from: http://www.londonlives.org/static/Prisons.jsp © Sir John Soane's Museum, London.

Institutions such as Bethlem Hospital in London represent the optimism of 18th century scientists who believed they could cure the 'insane'. They also demonstrate

the greater purpose of social control, disguised prisons where the poor, incurable and sometimes inconvenient, could be locked up and forgotten about (Arnold, 2008) and lower classes were treated far more brutally than the rich (Masters, 1977). Bethlem was so notorious during the mid 1700s that its Cockney name, Bedlam, became used to describe general mayhem (Andrews, 1997; Arnold, 2008). Bethlem was rebuilt in 1676, designed by the architect Robert Hooke. His design, shown in Image 2.14, was influenced by medical advice and intended to contribute towards the rehabilitation of the patients through, for example, maximising fresh air and light. However the building came to be more closely associated with the brutal treatment of inmates than rehabilitation. Windows from the cells to the galleries were unglazed in order to maintain extremely cold temperatures which were considered to clear the head. The galleries, which were intended to allow non-violent patients to see visitors, were used to allow paying visitors to flood in during the holidays and laugh at the 'freak show' (Arnold, 2008; Masters, 1977). William Hogarth depicts fashionable ladies visiting the prison to view the patients in 'The Madhouse', the last in his series of paintings entitles 'A Rake's Progress' which depict the downfall of the character Tom Rakewell whose immoral behaviour leads his to be incarcerated in Bethlem. Two enormous symbolic statues of a pair of 'brainless brothers', shown in Image 2.15, were placed above the entrance gate. 'Acute Mania', bound by chains, represents anger and menace and his brother 'Dementia' lay beside him, his face depicting a blank expression, associated with the cerebral deterioration of tertiary syphilis (Arnold, 2008).

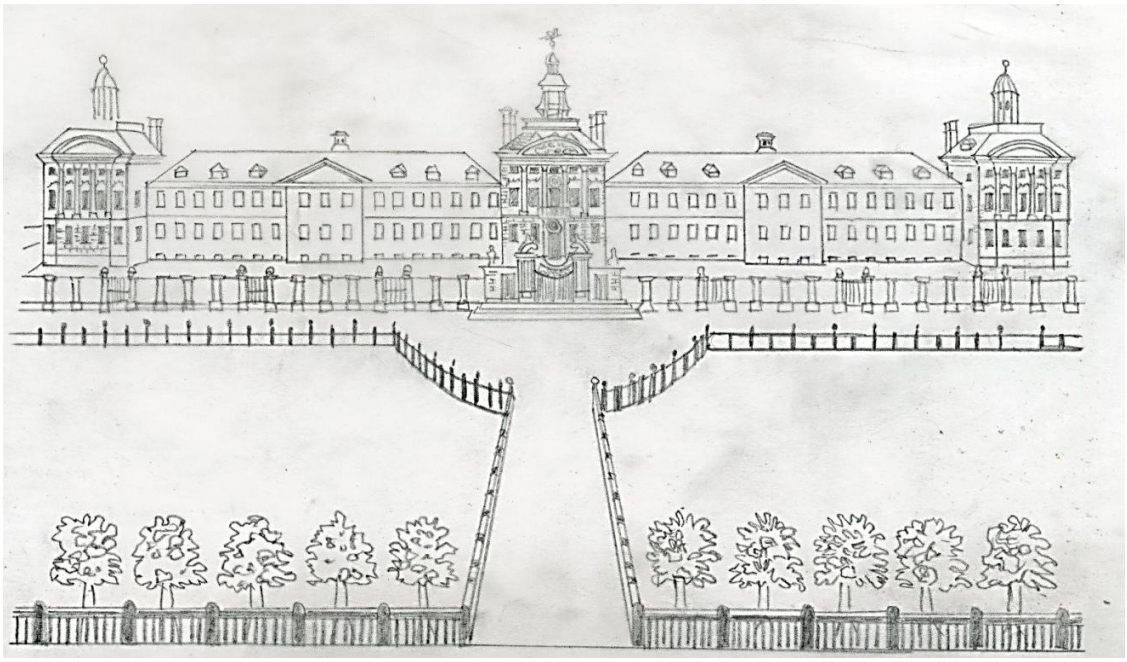


Image 2.14: Sketch of the new Bethlem Hospital designed by Robert Hooke (Author's own sketch, based on engraving by Robert White).

Image 2.15: Sketch of the figures, Raving & Melancholy Madness, sculpted by Caius Gabriel Cibber for the entrance to Bethlem Hospital (Author's own sketch, based on engraving drawn by Charles Warren for Dr Hughson's 'Description of London').

2.3.11 Modernism

Throughout the 20th century the idea of rehabilitation became more widespread and for the first time, society intended to relocate people with impairments within the community (Stiker, 1999). The birth of the welfare state during the 1940s encouraged the development of a paternalistic approach to people with impairments which replaced the extremes of earlier eras. Reasons for this include the humanitarian influence of Victorian philanthropists, the rehabilitation of those impaired by the First and Second World Wars, changing politics and the prospect of a buoyant economy (Barnes, Disabled people in Britain and discrimination: a case for anti-discrimination legislation, 1991). The expansion of social service departments and services have had many positive effects in reversing the segregation of people with impairments from society, and reduced the numbers of people with impairments consigned to live in segregated residential settings that were seen before the Second World War. However, their effects are limited, as they are founded on antiquated perceptions of disability and have not eliminated discrimination but have transformed it to take less obvious and recognisable forms (Barnes, 1991). Almost all aspects of daily life of people with impairments lives are controlled by organisations which are largely run by non-impaired individuals. This has created a perception of the person with an impairment as passive, the object of research and help (Finkelstein, 1980). A culture of dependence has been created, whereby people with impairments are categorised, labelled and told what help they require, based on the premise that they are needy and will be unable to take their own decisions (Barnes, 1991).

Masters (1977) argues that despite improvements and moves away from institutionalisation, people with mental health conditions are still treated as a society apart in the 20th century (Masters, 1977). The requirement for the use of physical

restraint, such as chains etc. was removed as a result of considerable psychiatric growth with the introduction of the National Health Service which brought with it advances in understanding the treatment of psychiatric conditions, and the development of 'questionable' drugs to tranquilise patients, however the same system of segregation still exists. This isolation has been aided by the urban growth of the 19th and 20th centuries and the loss of small, close-knit communities which accepted people as they were. Finally, he remarks that the persona which characterised Bethlem is still with us, despite the changes that have been undertaken to its physical environment (Masters, 1977). In particular, he cites the report of the Committee of Inquiry into South Ockendon Hospital published in 1974, which highlighted appalling evidence of abuse. Other examples can be found in more recent reports of mis-management in mental hospitals, an example of which is Ashworth Special Hospital in England, with allegations of misuse of drugs and alcohol, financial irregularities and possible paedophile activity highlighted in the "Report of the Committee of Inquiry into the Personality Disorder Unit, Ashworth Special Hospital (Fallon et al, 1999). Stiker (1999) argues that while the welfare state has slightly raised the quality of life for people with an impairment, it does not succeed in achieving equality. It is paradoxical that a society which claims to strive for equality, pays money to institutions or individuals in order to make social misery disappear, but does not tackle the social structures on which these inequalities are based.

"In our Western society, the desire to integrate rises out of the incapacity of the social fabric to permit the disabled person to live there."

(Stiker, 1999, p.159)

Our present day society has also become less plural and more rigid, with less tolerance for difference or deformity. The impossible expectation is that people with impairments will be rehabilitated or reintegrated into a society which remains static (Stiker, 1999).

2.3.12 Modernist Architecture

Lawson (1997) describes how the modernist movement contrasts with earlier eras, placing an emphasis on the formal rather than the symbolic. He places the modernist movement within the historical cycle of alternating periods of formalist and expressionist design. This movement came as a result of changes to Western society during the 19th and 20th centuries, including the trend towards urbanisation, the development of modern industrial societies, the chaos and need to rebuilt caused by the First and Second World Wars. Corbusier is probably the most famous architect of the 20th century, his architectural philosophy profoundly impacting the urban fabric and the way we live today (Frampton, 2001). Architects have traditionally looked toward the human body as a basis for proportional systems of spaces, some examples of which are discussed in previous sections which look at the work of the Roman architect Vitruvius and the Renaissance architect Palladio. Corbusier completed this circle by devising proportional systems based on the human body (Lawson, 1997). He related the new style of architecture to the human form, in a system he developed which was known as The Modular (Corbusier, 1961). The Modular system was intended to resolve the conflict between metric and imperial units of measurement and was to serve as a basis for mass prefabrication of building structures. It was centred around a strong man with arm upraised and 2.2m in height, sculpted on the façade of his famous Unité d'Habitation, as shown in Image 2.16. Corbusier based his designs on basic functional requirements which he

took to be constant and universal (Jencks, 1975). The premise on which architectural forms were evolved until this point is taken to be a strong, adult, able-bodied male, with no reference to the natural variations which are intrinsic to the human body.

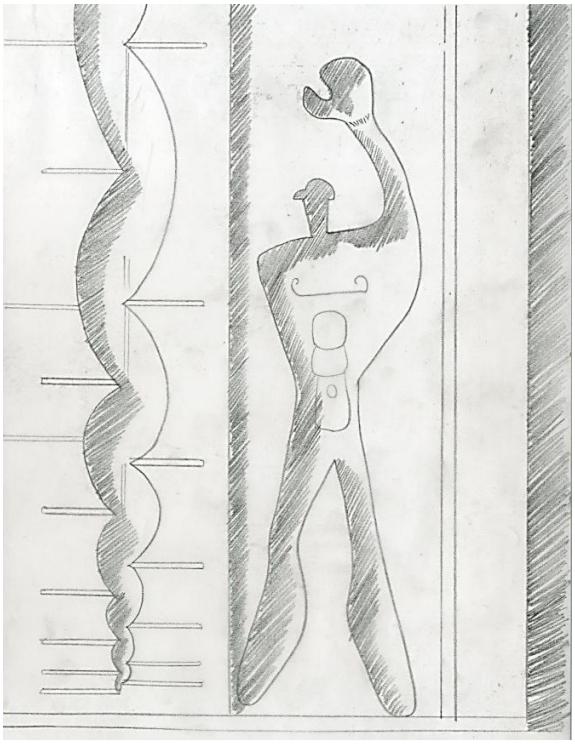


Image 2.16: Sketch of Corbusier's Modular Man from the façade of the Unité d'Habitation (Author's own sketch).

Modernist architects looked towards mass production to provide buildings for the growing urban population in the post-war era and discussed how these vast cities should be planned. The reaction to the Industrial Revolution provoked consideration for health and prevention of disease and for clean air and light to be brought into dark, smoky industrial cities. Ebenezer Howard's 'Garden City Movement' called for self-contained cities surrounded by green belts of land. Modernist architects designed buildings with simple, light, easy-to-clean surfaces. Alvar Aalto's Paimio Sanatorium, shown in Image 2.17, which he likened to a medical instrument, offers a

perfect example of ‘healing architecture’, positioned in a forest landscape and environment with ribbon windows to maximise daylight and clean, simple surfaces.

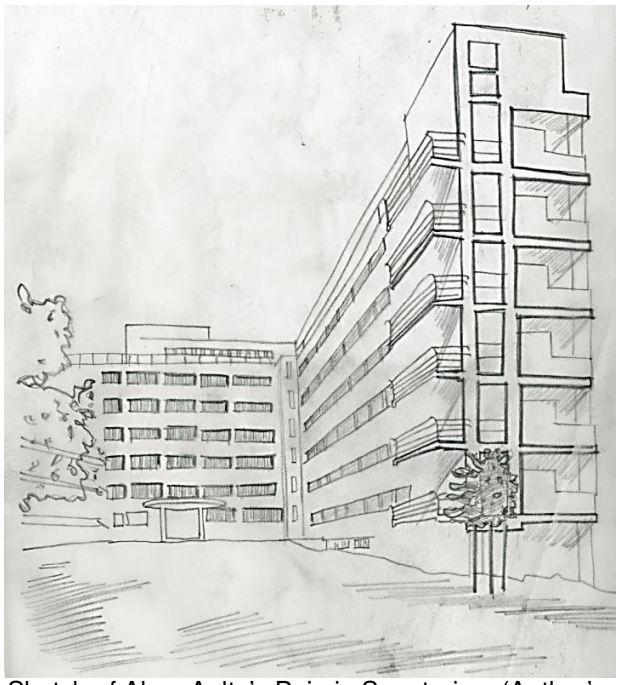


Image 2.17: Sketch of Alvar Aalto’s Paimio Sanatorium (Author’s own sketch).

Corbusier had strong ideas on city design. He was obsessed by straight lines and viewed curved lines, jagged surfaces, and unclear decoration as inferior to the classical equilibrium of rectangles and pure volumes. Corbusier’s contemporary city had the business elite at its centre rather than a town hall or cathedral. He also planned to create more open, green space with his vision of the ‘City in the Park’; the idea that through building multi-storey blocks, or complex setbacks, high urban densities could be achieved with the benefits of nature. The city was planned around speed and allowed all sorts of traffic on varying levels of circulation in order to decrease congestion in the centre (Jencks, 1975).

2.3.14 Summary of Disability Manifest in Architecture

Stiker (1999) argues that throughout history disability has been seen as alien or the exception to the norm and that in each of the key Western epochs disability has been viewed as something which must be assimilated or made to disappear. He argues that the ideology underwriting these eras and present day is of erasure rather than being premised on the acknowledgement of physical and cognitive differences as intrinsic to the human condition, and that the world is organised for an average person, designated normal. He also remarks that it is imperative that society stops removing people with impairments from their homes and communities (Stiker, 1999). Masters (1997) argues that there are three basic approaches to madness: magical, organic and psychological. The magical approach views mental health conditions as resulting from unknown exterior forces which invade the body or mind and require expulsion. The organic approach was developed by Greek philosophers who formulated an empirical, speculative approach which would form the basis of modern science. This approach began to diminish the belief that madness was caused by the paranormal, however, the middle ages saw a return to the magical approach. The psychological approach was developed in the 19th century when advances in knowledge allowed people to better understand mental health conditions and realise that they were not inexplicable. Finkelstein (1980) describes three phases in the recent of history of people with impairments which relate to the previous sections. The first perceives the cause of impairment as wrongdoing and sees people with impairments positioned at the bottom of the social scale, but they are not generally segregated from the rest of the society. The second phase, which can be understood through the individual model, views disability as a personal tragedy and involves the growth of the medical profession and the creation of asylums and institutions which segregated people with impairments from the rest of the community. The third phase

is just beginning and will set the context for the generation of new attitudes. In this phase the focus is the nature of society which disables impaired people and marks the beginning of the struggle for 'reintegration'. These two historical phases described by Finkelstein (1980) compliment the two themes identified in Section 2.2.1 Old Testament and Gospels, both of which have been clearly manifested in the built environment. The first is the idea that impairment is a result of wrongdoing, the reaction to which was punishment, the second is the idea of impairment as tragedy, the reaction to which is healing. These two themes are chronologically interchangeable and can be identified throughout each of the historical eras studied, one sometimes stronger than the other.

This investigation has informed the creation of a timeline diagram, shown in Image 2.18, which gives an overview of social perceptions of impairment aligned with relevant architectural trends. This study demonstrates that segregation has not only been the result of neglect to consider the needs of people with impairments but has in some cases been actively implemented through the design of the built environment. The strongest example of this are the institutions such as asylums and prisons built from the 17th century onwards which played an active role in the mass segregation of people with impairments, however there are other examples such as exclusion from temples in the times of the Old Testament and places of torture used in the Middle Ages. It is clear that throughout each period of Western history societal perceptions of impairment have been strongly manifest in the built environment. Two themes are identified as recurring throughout Western history: the first views impairment as a result of wrongdoing and results in punishment, the second views impairment as tragedy and results in healing. Sometimes the link between is clear, such as with Vitruvius and Palladio's guidance regarding temples built to the gods of

hygiene and health, which can be clearly linked to healing, and the overt symbolism on medieval church facades, which can be related to wrongdoing and punishment. However, in other aspects the boundaries of these two themes overlap, for example with institutions such as Bethlem which assumed role of 'healer' but had a darker role of social control more closely associated with 'punishment'. Both themes of healing and punishment place people with an impairment at the lower end of the social scale. This illustrates how important the social model of disability is in arguing that society should adjust to meet the needs of the individual and that the individual is equal as they are without the presumption that they will adjust or adapt. Stiker (1999) concludes that there is no historical era which can be held as an exemplar for achieving equality for people with impairments, but that the task now is to re-imagine modern societal structures and processes premised on the recognition of the varying capabilities that are intrinsic to the human being. In 1980 Finkelstein described the struggle for reintegration as just beginning. The significance of this third phase to contemporary designers becomes clearer when placed in this historical context. Designers are accustomed to using scale to view an idea from a different perspective and placing our current societal perceptions and design ethos within this historical timeline may help to evaluate the progress we have made since Finkelstein (1980) marked the beginning of this era 30 years ago. This provides a basis on which to imagine a social model of architecture and evaluate progress towards achieving this in research, education and practice.

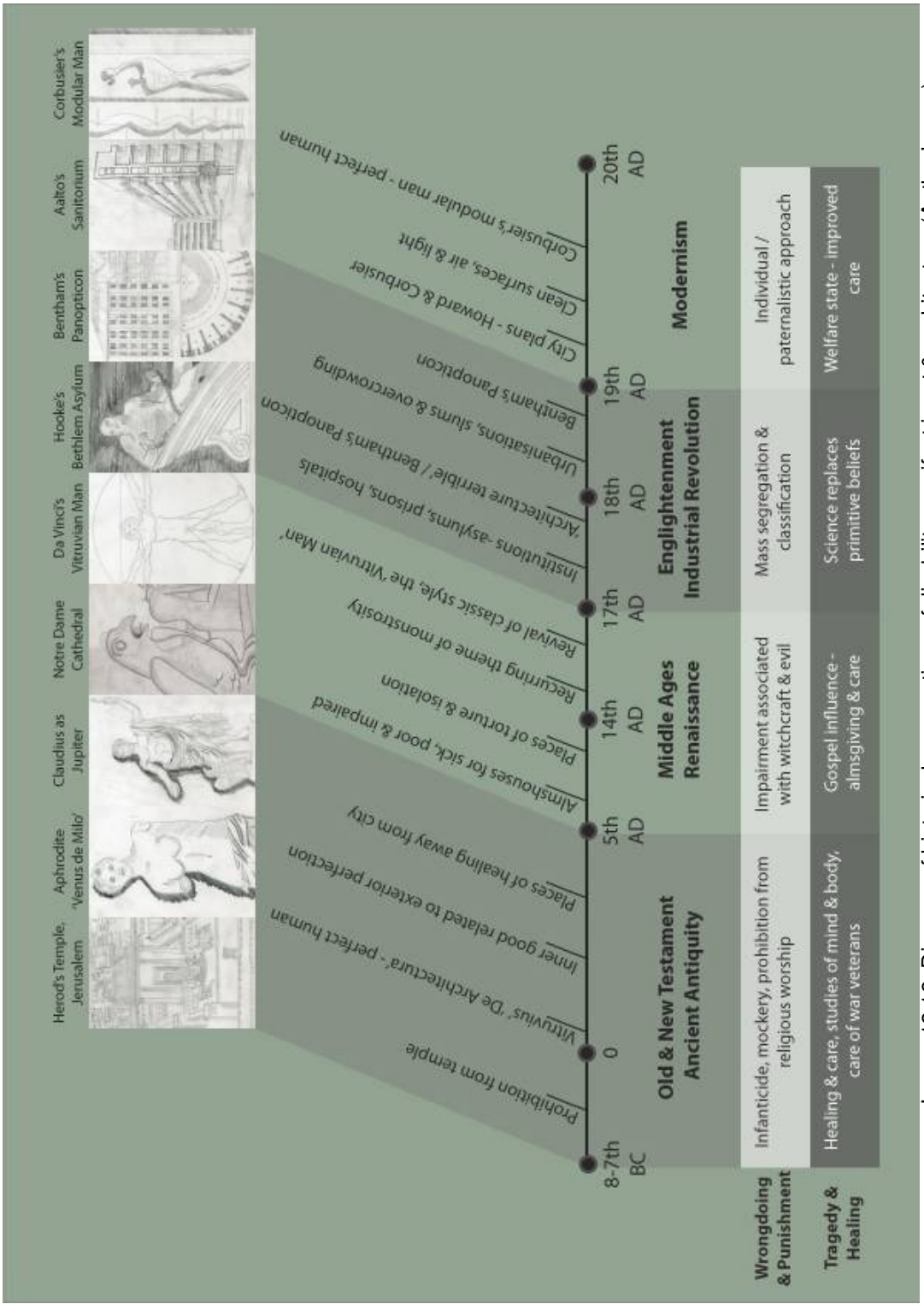


Image 12.18: Diagram of historical perspectives of disability manifest in art & architecture (Author's own).

2.4 A Social Model of Architecture

The previous sections have established the profound relevance of the disability movement and emerging models of disability on the built environment. In addition it has been established that there is strong connection between societal constructs of disability and the built environment. This section builds on these findings and argues that a paradigm shift is required in architectural research, education and practice. The social model of disability is used as a basis for conceiving a 'social model of architecture' which outlines how the profession can instigate the required change. Finally, progress that has already been made in the architectural field of practice in response to the disability movement is discussed in terms of building regulations and guidelines and sustainable design.

2.4.1 The Need for Change

The previous sections show that throughout history the built environment has been designed with no consideration for the needs of, or input from, people with impairments of any kind. Imrie (1996) argues that the architectural profession has always taken influence from the human body but until recently the body has been conceptualised as static and unchanging, and the diversity which is intrinsic to the human body has not previously taken into consideration. The three historical examples of influential Western architects, Vitruvius, Palladio and Corbusier, discussed in the previous sections, demonstrate the tendency of the architectural professional to fixate on the 'ideal' human form and a general lack of reference to impairment. It is no wonder then that the majority of the built environment caters predominantly for the needs of the able-bodied and is hostile towards people with impairments (White, 2010). It is generally presumed that a person with an impairment will rely on help from others, as well as physical and more recently,

technological aids. Any adjustments to the built environment have generally been made through personal adaptations. The built environment therefore disables the impaired individual and confounds the problem of segregation from the community, restricting the areas of the built environment than can be accessed and negotiated with help and independently. A simple diagram to explain this scenario is shown in Image 2.19.

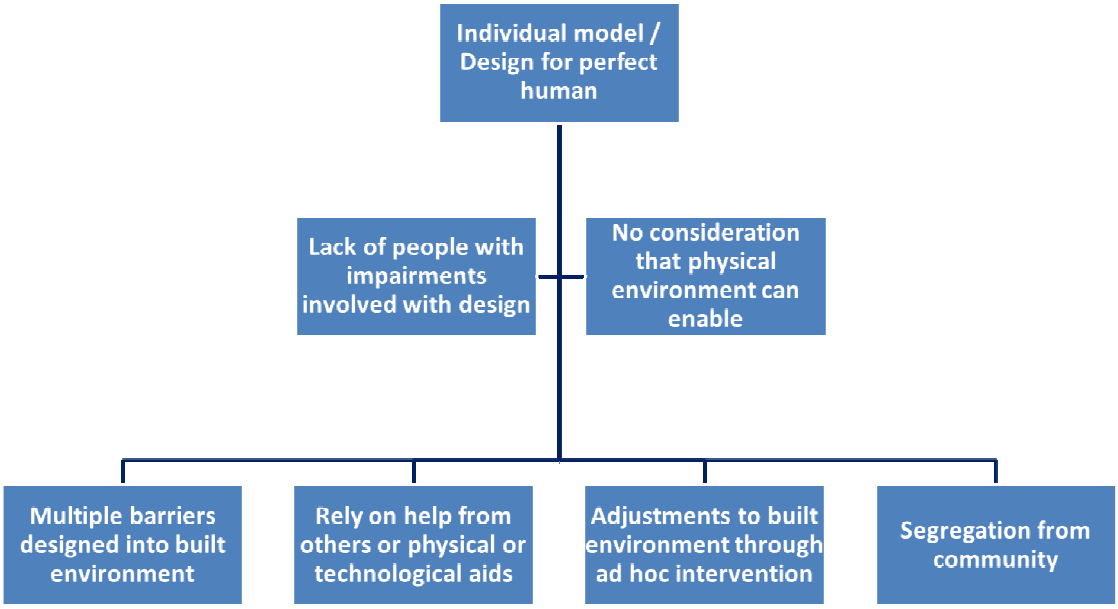


Image 2.19: Diagram illustrating the effects of designing for the perfect human being & the impact this can have on people with impairments

2.4.2 The Vision

The disability movement and theory surrounding the social model of disability were ground-breaking in introducing the hypothesis that disability is caused not by an individual's impairment but on restrictions imposed on the individual by the external environment. Stiker (1999) argues that in order to achieve equality for people with impairments modern societal structures and processes should be re-imagined, premised on the recognition that the human being has varying capabilities. This

section proposes an outline for ‘a social model of architecture’ which suggests how the architectural profession might respond to this call. The diagram in Image 2.20 proposes an overview of a social model of architecture. This would have implications for practice, research and education. The process involved in this model is one of continuous appraisal and improvement and not a checklist of actions which must be undertaken. The benefits would include making the built environment easier for all to use, minimising future intervention, increasing people’s confidence to negotiate the built environment, promoting inclusion rather than segregation through the shared use of space, and increasing independence for people with impairments. The following paragraphs describe the ideas behind this model in more detail.

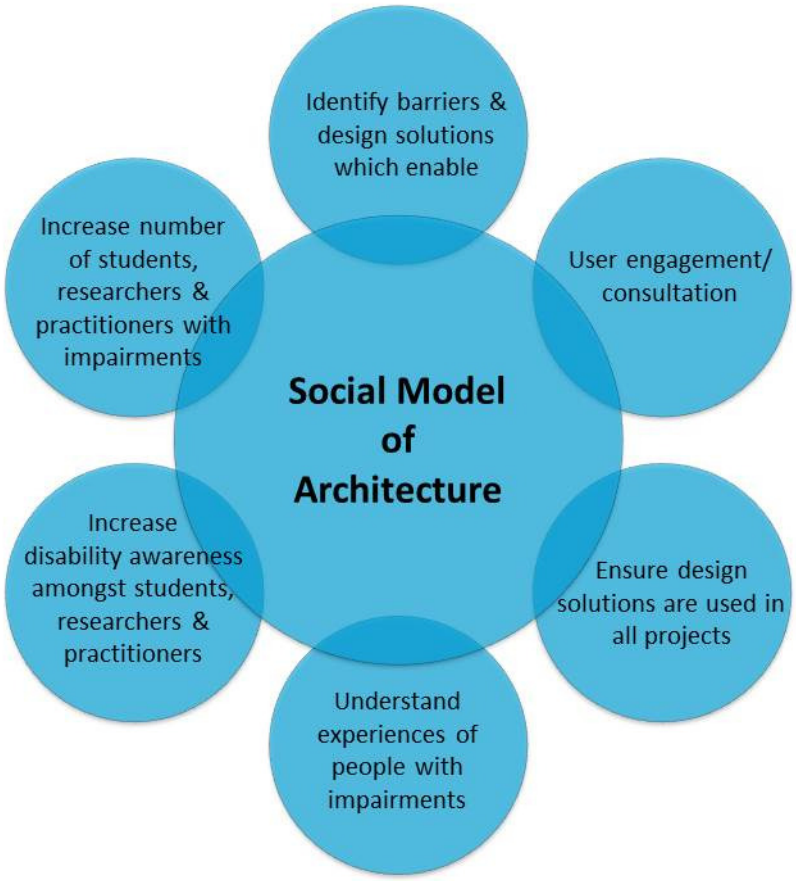


Image 2.20: Diagram illustrating the social model of architecture.

Increase number of students, researchers and practitioners with impairments:

One of the main reasons that enabling features have not been considered in the built environment could be due to a lack of people with impairments in the design professions. This requires educational institutions to increase the number of students with impairments and architectural practices to employ more individuals with impairments.

Increase disability awareness amongst students, researchers & practitioners:

Education for both students and professionals should increase disability awareness and help to change the view that accessible design is an add-on subject or only relevant to specific buildings or projects. As well as physical barriers, a person with an impairment may face attitudinal barriers (Charlton, 1998). Attitudinal barriers may lead to discrimination such as exclusion from society or the workplace that comes about a result of society's misconceived perceptions or ignorance about the abilities of people with impairments. For example, prejudice may result in people having false misconceptions about the abilities of people with impairments, or being more reluctant to make friends or employ someone with an impairment. Attitudinal barriers can also affect the extent to which accessible requirements are considered during the design process. Changing attitudes and raising awareness in the profession is therefore a major part of a social model of architecture. The attitude with which an architect approaches accessible design, whether it is viewed as an opportunity or a constraint, and the manner in which it is presented to the client has a direct impact on the success of the project in achieving an inclusive environment.

Understand experiences of people with impairments:

The individual model of disability was largely premised on the beliefs of professionals who imagined what it is like to be impaired. Goldsmith (1969) states that services and facilities are sometimes structured on what well-meaning but mis-guided people think disabled people ought to need. Design professionals should be careful not to imagine the problems faced by people with an impairment when negotiating the built environment. Research should seek to identify barriers and create solutions which are premised on the experience of people with impairments and not rely on the imagination of the architect.

Identify barriers & design solutions which enable:

A physical environment which takes into account the requirements of people with impairments can help to facilitate inclusion. The challenge for professions involved with the design of the built environment therefore, is not only to identify and remove existing barriers to make negotiation of built environment as easy as possible for all but to proactively develop design solutions which enable rather than disable. These design solutions should be tested and improved with the involvement of people with impairments.

User engagement/consultation:

Charlton (1998) says that for a profession such as architecture, it is important to keep in mind that accessibility involves a totality of life for people with cognitive, sensory and physical impairments and disability in not just an architectural construct, but a social and political one. It should be recognised that designing enabling environments is not in itself a solution to the entire phenomenon of disability, however as discussed. Architects must also consider not only building

measurements and specifications but the socio-political framework that surrounds the building they are designing. For example an architect building a school should be aware of the inclusive education agenda and be ready to ask a client how they are responding to this or suggest that accessible design be taken into consideration. Charlton (1998) also points out that an 'accessible' building may be rendered inaccessible due to the inaccessible nature of surrounding streets or the transportation network. The management of a building can also impact on design, for example accessible toilets might be used for storage and clutter in the corridors and hallways can present an obstacle for someone who is visually impaired or using mobility equipment. One implication of this for the professions involved in the design of the built environment is to work in unison, employing systems thinking throughout the design process, giving consideration to other disciplines and the environment as a whole, whether it be a building, a street or a bus stop. It is also necessary to consider how the building or space will be used and examine the success of designs when they are in use in order to inform future design. For this to happen properly it is necessary to consult the future building user about the design.

Ensure design solutions are used in all projects:

Production of best practice design guidelines does not ensure their use and many developers may only build to meet minimum standard. Incentives should be offered to clients, developers and architects to ensure that best practice design guidelines are met and that inclusive design is viewed as a design opportunity rather than a necessary requirement. Research in this area can determine the extent to which emerging design guidelines are implemented in real projects and what can be done to promote their use.

2.4.3 Architecture & the Disability Movement

This section examines how the architectural field has responded and been involved in the disability movement and emerging models of disability described in the previous section, particularly exploring developments in the building regulations and design guidance. Imrie (1996) argues that the architectural profession has been slow to respond to the changing demographics of an increasingly impaired and/or ageing population, and issues of accessible design tend not to be integrated within the core design, being treated as an add-on. The disability movement and legislation which has been passed as a result of this movement has had an impact on the way in which architects consider the human being. This can be demonstrated through data given in the "Metric Handbook: Planning and Design Data" (Metric Handbook) and the emergence of Universal Design. The Metric Handbook is a sourcebook which can help to present the principles and protocols of architectural design (Littlefield, 2007). It was first published in 1979 and has since been updated twice to reflect changing building regulations and standards of good practice as well as agendas such as environmental performance and access for people with impairments (Littlefield, 2007). Chapter 2, "Basic design data: People and space", includes a section on anthropometric data, and details the measurements of both males and females of various nationalities, children and elderly people. A separate section of the same chapter details anthropometric data for people using wheelchairs, crutches, sticks and walking frames. The data published in the Metric Handbook which acknowledges the variations of the human body is representative of a movement within the architectural community to acknowledge the varying nature of the human body. However, the Metric Handbook gives some conflicting guidance. Chapter 2, "Basic design data: People and space" states that "The principal disabilities of concern to the architect are those that mean the person has to use a wheelchair for

most or all of the time" (Littlefield, 2007, 2-8) and the majority of measurements and information are concerned with people with mobility impairments. Reference to "Provision for blind people" is only concerned with signage and lifts (Littlefield, 2007, 4.01). This contrasts with Chapter 44, "Access and inclusion" (Smith & Dropkin, 2007) which advises the reader to "Consider the needs of all disabled people not just wheelchair users, who form a small percentage of such a diverse group of people" (Smith & Dropkin, 2007, 2-1).

Although the Metric Handbook states that it is prepared as a sourcebook and should not be used in place of current building regulations and good practice standards which are revised on a continual basis, these contradicting statements reflect the tendency within society to associated disability and accessibility with wheelchair users. This point is made by White (2010) who investigated visual impairment and the built environment. White makes the point that the tendency to design with the needs of a wheelchair user in mind is reflected in the international symbol for 'accessible' facilities, which is based on a wheelchair user. Goldsmith (1969) charts the progression and variety of symbols that have been used to symbolise access for people with physical impairments and the progression towards the idea that a symbol might be used to denote facilities within buildings that are suitable for disabled people. The first important publication to draw attention to the potential of a special symbol for disabled people was the Canadian Code 'Building standards for the handicapped' published in 1965 which features a wheelchair. The majority (8 out of 11) of symbols shown in the Goldsmith's investigation are based on wheelchair users and the others are concept related. Goldsmith acknowledges that a concept related symbol is better in theory and would represent a wider section of the population and would also be better because it does not stigmatise wheelchair users. However, he

argues that the notion that an abstract symbol denoting universal accommodation can be put into practice is unsupportable.

The first ever access design standards were developed by Tim Nugent in 1956. His intention was to make the 200 buildings in the Champaign-Urbana University campus in the United States of America accessible for wheelchair users. These guidelines would become the basis of future accessible design standards throughout the world. In 1961 Nugent succeeded in implementing American Standard A117.1, “American Standard Specifications for Making Buildings and Facilities Accessible to, and Usable by, the Physically Handicapped”. This is the most significant document for accessible design guidelines and the one that has had the most impact internationally (Goldsmith, 1997). The achievement in developing these standards and getting them put into place should not be underestimated and this contributed to the development of future design guidelines. However, future guidelines did not take into account that these standards had been developed for a group of young wheelchair users on a university campus and that guidelines such as a 1 in 12 gradient for a ramp were not suitable for the majority of wheelchair users. Similar criticisms are made about the standard 1.5m turning circle used to measure accessible toilets and the 1.8m minimum which is supposed to allow two wheelchair users to pass safely.

Goldsmith paved the way towards universal design by pointing out that architecture can disable many users and not necessarily just people with impairments, citing a lack of female toilets as an example. The concept of universal design is to design the built environment to be easily used, as far as possible, by all humans, regardless of age or ability. It is one of the most widely accepted practices of architecture based on a contrasting set of beliefs about the interaction between humans and the built

environment, however a range of researchers have questioned the extent to which it is possible to achieve, when the social relations of building production are largely removed from democratic control and popular involvement (Imrie, 1996).

In Britain no statutory accessibility controls were introduced until 1984 when Part T was added on to the 1976 Building Regulations. Part T was provisional and served only until new the new-style building regulations were brought into operation in 1985, an effect of which would be to bring in a new access regulation, Part M. Part M reflected an ethos that disabled people were different, that they had special needs, and that suitable provision for them could be tacked on to whatever kind of building they were working on without unduly disturbing their design concept. Part M only covered people with a locomotor disability and was revised in 1992 to extend to include people with impaired hearing or sight (Goldsmith, 1997). In Scotland a separate set of mandatory regulations are used compared to the rest of the UK. The Building Regulations (Scotland) aim to secure the health, safety, welfare and convenience of people in or about buildings, as well as to further energy conservation and the achievement of sustainable development (SBSD, 2011). Compliance with these regulations is a statutory requirement when carrying out building work in almost any type of building and two separate handbooks cover domestic and non-domestic buildings. The Building Regulations (Scotland) changed to reflect the requirements of the DDA 1995, in 2004 when the need for safe, convenient and unassisted means of access to a building was established (Scottish Government, 2006). The DDA 1995 applies generally to all non-domestic buildings including places of education. Guidelines regarding the accessibility of buildings are covered throughout different parts of the non-domestic regulations, however the majority of accessible design requirements are covered in Part 4: Safety. Part 4 of

the Building Regulations (Scotland) acknowledges that not all issues which relate to the DDA are covered within the technical handbook and refers readers to:

- "BS 8300: 2009 – 'Design of buildings and their approaches to meet the needs of disabled people – code of practice';
- 'Inclusive Mobility' – Department for Transport, 2002;
- 'Guidance on the Use of Tactile Paving Surfaces', published jointly by The Scottish Office and the Department for the Environment, Transport and the Regions (DETR)."

(SBSD, 2011, Section 4.1.0 Introduction)

These documents provide best practice guidance and are not mandatory. Many designers and builders may only build to meet minimum requirements (Imrie, 2006) meaning that issues outwith the scope of the building regulations will not be considered. Best practice guidance on accessible design in both mainstream and special schools has also been published, in the form of "Building Bulletin 102. Designing for disabled children and children with special educational needs. Guidance for mainstream and special schools" (DCSF, 2008). The Building Regulations (Scotland) Non-Domestic Technical Handbook (SBSD, 2011) and these four best practice guideline publications will be used when developing minimum compliance and best practice standards, by which to benchmark accessible design in the schools involved within this research study.

2.4.4 Sustainable Design

Sustainable design has a profound influence and is a major driver behind the regulations and standards which shape the built environment and the practice of architecture. It is argued in this section that in order for design to be sustainable it should also be inclusive. To discuss the relationship between inclusive design and sustainable design it is first necessary to define the term 'sustainable'. 'Sustainability'

and ‘Sustainable Development’ have been given many and varied definitions, the most widely used definition of which was established in "Our Common Future” (the 1987 Report of the UN World Commission on Environment and Development – generally referred to as the Brundtland Report):

> “Humanity has the ability to make development sustainable – to ensure that it meets the needs of the present without compromising the ability of future generations to meet their own needs.”
>
> (UNWCED, 1987)

It is widely accepted that the environment, economy and society are the three pillars of sustainable development and that equal importance should be given to each. However, when referring to sustainable architecture, an emphasis is generally placed on the ecological or environmental aspects of the building design and performance, rather than the social aspects such as quality of life or human wellbeing. The Higher Education Academy’s, “Review of Education for Sustainable Development in Scotland” (HEA, 2009) found that Education for Sustainable Development (ESD) has filtered through disciplines such as environmental sciences and architecture, with a shared concern for a more efficient use of natural resources having had an impact on professional regulations and accreditation requirements, and is emerging in many other subject areas. The Scottish Government’s report “Sustainability. Building Our Future: Scotland’s School Estate” defines sustainable development as “ensuring that our actions today do not limit our quality of life in the future” (Scottish Executive, 2004b, p.1). This is important, as ‘quality of life’ is wide in scope and suggests a strong relationship with social and economic aspects as well as environmental.

Accessible architectural design can be related to sustainable development in several ways. Firstly, ensuring that new and refurbished buildings are fully accessible can

prevent unnecessary costs and energy consumption by making changes later in a building's lifespan. A building may perform well in environmental terms, such as achieving low energy consumption or Carbon Dioxide emissions, however if the economic and social aspects are not considered alongside then the building will inevitably fail in all aspects. If environmental systems put in place are too costly to run or are too complicated to be used by the building user, then they will be ineffective. Similarly, if a building fails socially to provide an adequate space for which it is designed it may become unused or poorly maintained and have a shorter lifespan than intended, becoming vacant or requiring refurbishment to change its use, and as a consequence underperforming in environmental terms. In the book, "Systems Approach to Architecture" Benjamin Handler describes the "ultimate evaluation" of buildings as being "determined by their effect on people, their behavior and performance" (Handler, 1970, Chapter 3 p.31). If a building is not accessible to the whole community which it serves, any one of which could be impaired at some point in their life, then it is not sustainable. Buildings must be fully accessible in order to promote maximum use by the entire community and therefore be valued by society as a whole.

2.4.5 Progress Towards the Social Model

The aforementioned changes in architectural reference books, practice and legislation show that to some extent, the architectural profession has slowly begun to consider the needs of users with an impairment. This reflects a seminal shift in the history of the architectural profession and should be regarded as a major achievement of the disability movement. However, progress needs to be made in various areas. There tends to be a presumption, reinforced by some guidance, that accessible design is concerned mainly with people who use wheelchairs. Certain

design guidelines have been premised on a young, more able-bodied group of people who are not representative of the majority of people with impairments and there is anecdotal evidence to suggest that certain guidelines, such as the 1.5m turning circle for people who use a wheelchair, are insufficient. There is a tendency to see access issues as an add-on or separate area of design. In Scotland, the Building Regulations acknowledge that not all issues which relate to the DDA are covered within the technical handbook and refer readers to best practice guidance. However, there is no requirement to use this and many designers and builders may only build to meet minimum requirements. A further problem is posed by the non-democratic nature of architectural practice which is removed from public participation (Imrie, 2006). These issues will be solved through a range of measures which include ensuring best practice guidelines are met, revising regulations and design guidance according to the experience of people with impairments, as well as changes to architectural education, practice and the design process. Disability should be an integral part of architectural studies and not taught as a separate area, or add-on subject. The architectural profession should include a greater number of practitioners who have impairments and current practitioners should receive training in the area of disability. The design process must also change to become more democratic and allow for best practice guidelines to be met rather than the tendency to build towards minimum requirements.

2.5 Conclusion

This chapter has examined the disability movement and emerging models of disability which are used to describe the way in which society views disability. The social model and social relational models are closely related and differ to the

individual model in separating impairment and disability. An individual may have an impairment but whether they are disabled or not depends on external factors. This important distinction has informed the terminology used in this thesis, whereby an individual with an impairment is described as such and not as 'disabled' which would be dependent on external factors. Accordingly in order to tackle disability, the focus should not be on change made by the individual but ways in which the environment can change to enable the individual.

It has been found that the experiences of people with impairments throughout the world are dependant on social, cultural, economic, political and environmental circumstances. However, there are also similar types of prejudice encountered such as the struggle to survive, living in poverty, exclusion from the rest of society, barriers to accessing resources and multiple discrimination based on aspects such as age, gender and race. A study of Western society's view of impairment throughout various key historical periods has identified two recurring themes which are manifest in the built environment: the idea of impairment as wrongdoing and the idea of impairment as tragedy. These evoked responses of punishment and healing respectively, from which emerged different types of space. Furthermore, it was found that there has been a tendency for society, and therefore the architect also, to fixate on the perfect human body. Stiker (1999) calls for us to re-imagine modern societal structures and processes premised on the recognition of the varying capabilities that are intrinsic to the human being.

In response to this a 'social model of architecture' has been developed which identifies the ways in which architectural practice, education and research should promote change. The question of tackling disability is immensely complex and involves removing social, economic, political, physical, cultural and attitudinal

barriers. It is recognised that problem will not be solved simply by making changes to the built environment, however this does not mean that the architectural profession does not have a significant role to contribute. The 'social model of architecture' calls for an increase in the number of students, researchers and practitioners with impairments; improved disability awareness among students, researchers and practitioners; a better understanding of the way in which people with impairments experience the built environment; identification of both barriers and design solutions which can enable people with impairments; assurance that design solutions are used in all projects and tests to improve design solutions with users input.

Finally it has been found that although the architectural profession has made considerable progress in responding to the disability movement's call to re-imagine societal structures and processes much still remains to be made. The architectural profession has been slow to respond to changing demographics, there is a tendency to design towards minimum requirements rather than best practice design guidance, the tendency to presume that accessible design refers mainly to wheelchair users is reinforced by some design guidance, design guidelines have evolved from standards developed for a group of young, able-bodied students and are not suitable for the majority of users, accessible design is still viewed as an add-on or only applicable to certain projects and the design process is removed from public participation. The findings of this chapter will be used to inform the investigative approach to research undertaken as part of this thesis exploring accessible design in Scotland's new and refurbished schools. The following chapter investigates the inclusive education agenda and explores the Scottish school design programme in more detail in order to establish further parameters for investigation.

Chapter 3: Inclusive Education in Scotland

3.1 Introduction

This chapter is split into three main sections. The first section explores the inclusive education discourse with specific reference to global education initiatives, legislation for inclusive education in the UK and Scotland, the importance of inclusion in the new Curriculum for Excellence and lastly how inclusive education is being implemented in practice with an emphasis on issues relevant to Scotland. The second section introduces the Scottish school building programme and uses statistical datasets for the school estate to estimate the amount of work which remains to be undertaken in order to achieve the government's aim of ensuring that all schools buildings meet the requirements of 21st century education. This section also examines the extent to which the Scottish Government's school design guidelines promote accessible design. The last section looks at existing research undertaken to examine the performance of new and refurbished school buildings in Scotland focusing on the analytical methods used and using the main findings to draw conclusions relating specifically to the performance of accessible design. The findings from this chapter will inform the parameters, objectives and analytical methods of the practical research investigations to be undertaken as part of this thesis.

3.2 Inclusive Education Discourse

For people with an impairment, education is key to opening up employment opportunities such as the chance to live independently with a reasonable wage and to have a good quality of life (EHRC, 2008). The typical educational experience of people

with impairments throughout the world is either outright exclusion or segregation. In many of the world's poorer countries children with an impairment do not have access to any form of education. In the richer countries children have access to education, however this is often segregated and of far poorer quality than mainstream education (Charlton, 1998). Statistics for Britain show that a quarter of people with impairments have no formal qualifications, compared with only one in 10 of the general population (DWP, 2011). This section explores some of the issues related to the inclusive education discourse.

3.2.1 Global Education Initiatives

Major global initiatives such as 'Education for All' and 'Education for Sustainable Development' endorse inclusive education and the provision of a suitable environment to support the education of people with impairments as an integral part of the education system. The vision of the "World Declaration on Education for All" was adopted by UNESCO in 1990 (UNESCO 1990). At the World Conference on Special Needs Education in 1994, governments and international organisations met to further this agenda in a global context. The conference statement, commonly referred to as the Salamanca statement, argued for the education of all children in an inclusive school setting that responds to the full diversity of the children's needs regardless of impairment (UNESCO, 1994). A decade later, the World Education Forum adopted "The Dakar Framework for Action, Education for All: Meeting our Collective Commitments." (UNESCO, 2000). The framework pledges to: "create safe, healthy, inclusive and equitably resourced educational environments…for all" (UNESCO, 2000 p.9).

The international Education for Sustainable Development (ESD) initiative aims to teach the values of Sustainable Development. This concept was first endorsed at the UN General Assembly in 1987 (UNGA, 1987) and thereafter, the concept of learning to support sustainable development has been widely explored and promoted. The period 2005 – 2014 has been declared as the United Nations Decade of Education for Sustainable Development (UNGA, 2002). It is argued in this thesis that inclusive education and ESD are underpinned by the same basic values. It is imperative that inclusive education be considered a requirement for any ESD initiative. "The Framework for the UN DESD International Implementation Scheme" reinforces the importance of equality:

> "The overall goal of the DESD is to integrate the values inherent in sustainable development into all aspects of learning to encourage changes in behavior that allow for a more sustainable and just society for all."
>
> (UNESCO, 2006, p4)

The framework also reinforces the importance of giving equal consideration to the three areas of economy, society and environment as key to ESD, and emphasises the importance of culture as an underlying element in each (UNESCO, 2006). It is important that the built environment in which ESD and inclusive education are taught is exemplary of the values which underpin both these initiatives.

3.2.2 Legislation for Inclusive Education

In Britain, since the 1944 Education Act, the field of education has acknowledged the benefits of integrating children with impairments into mainstream schools. However, until the mid-1980s there was a steady increase in the numbers of children being segregated into special schools (Barnes, 1991). Furthermore, education for children

with special education needs lagged behind mainstream provision and schooling for children with complex difficulties progressed far slower than education for children with sensory impairments (Riddell, 2002). Until the 1970s, responsibility for children with complex difficulties remained with the Department of Health rather than Education. The Warnock Report 1978 and the report published by Scottish HMI: 'The Education of Pupils with Learning Difficulties in Primary and Secondary Schools (SED, 1978) were critical of permanent segregation and ground-breaking in shifting the emphasis from the child's impairments to modification of the school environment to suit the child. It suggested that the medical model of disability be replaced a new category of 'special educational needs'. These recommendations were incorporated into the Education (Scotland) Act 1980. However in the late 1990s, data showed that most of the educational provision for children with impairments remained segregated and was poorly resourced (Barnes, 1991).

The "Disability Discrimination Act" (DDA) 1995 (British Government, 1995) differed from previous disability legislation in adopting an active approach, making it the duty of bodies responsible for employment, the provision of goods, facilities and services or the disposal or management of premises, to make reasonable adjustments so as not to place a person with an impairment at a disadvantage. This duty was anticipatory, meaning that adjustments should be considered before placing a person with an impairment at a disadvantage. The DDA 1995 did not originally cover education providers and was only extended to include this in 2001 with the introduction of the Special Educational Needs and Disability Act 2001. This was a great disappointment to the disability movement, with education being central to the future life chances of children and young people and breaking the barriers faced in future life (Riddell, 2002).

A reasonable adjustment to a physical feature which puts a person with an impairment at a disadvantage may involve removal, alteration or a reasonable means of avoiding the feature in question. An exemption in the DDA 1995 meant that the requirement to make reasonable adjustments to physical features did not apply to schools. However, in 2002 a duty was placed on local authorities to prepare, implement and review an 'accessibility strategy' in order to increase access to the curriculum and also the physical environment in which the pupil is educated, taking into account the views of pupils with impairments and their parents. An 'accessibility strategy', is defined as a strategy for (a) increasing the extent to which pupils with a disability can participate in the school's curriculum, (b) improving the physical environment of the school, and (c) improving communication with pupils with a disability. The DDA 1995 was amended in 2005 to introduce a new duty on public authorities and later superseded by the Equality Act (EA) 2010 (British Government, 2010), which is intended to bring together and supersede separate pieces of legislation related to people with impairments, already in force, such as the DDA 1995 and 2005, meaning that many of the requirements it makes of the bodies responsible for schools are already being undertaken. Neither of these subsequent acts have changed the exemption for schools to make adjustments to physical features, however some local authorities may consider themselves to be service providers as well as educational bodies and all should have implemented an accessibility strategy.

A number of legislative acts in Scotland have also been passed in relation to inclusive education. "The Standards in Scotland's Schools etc. Act 2000" (Scottish Government, 2000a) ascertained: (i) the right of every child to an education that will help them to develop their personality, talents, mental and physical abilities to their fullest potential,

(ii) the need to consider the views of the pupil or parent in decisions affecting their education, and (iii) the presumption that every child should have the option of receiving their education in a mainstream school, unless exceptional circumstances apply. Under these exceptional circumstances, a child may not be provided education in a mainstream school if the school is not suited to the ability or aptitude of the child or if the provision of education in a mainstream school would be incompatible with the provision of efficient education for other children or result in unreasonable public expenditure which would not ordinarily be incurred. The same act made provision for 5 "national priorities in education" (Scottish Government, 2000a, Section 4) which are: Achievement and Attainment; Framework for Learning; Inclusion and Equality; Values and Citizenship; and Learning for Life. 'Inclusion and Equality' states the intention of promoting equality and helping every pupil benefit from education, "with particular regard paid to pupils with disabilities and special educational needs" (Scottish Government, 2000b).

The "Education (Disability Strategies and Pupils' Educational Records) (Scotland) Act 2002" (Scottish Government, 2002c, Section 1) amended the DDA 1995 to place a duty on local authorities to prepare the aforementioned accessibility strategy. However, auxiliary aids and services were exempt meaning there was no legal obligation on local authorities to provide personnel or resources (Riddell, 2006). The "Education (Additional Support for Learning) (Scotland) Act 2004" (Scottish Government, 2004 amended 2009) replaced the term "Special Educational Needs" with "Additional Support Needs" in order to include a wider group of children and young people who may be entitled to additional support and placed a duty on local authorities to identify and meet the needs of all children requiring additional support.

3.2.3 Core Values & the new Curriculum for Excellence

In addition to legislative acts of parliament, the new Curriculum for Excellence strives towards the creation of a more inclusive education system. The new Curriculum for Excellence, introduced to the Scottish education system in 2010 aims to provide a framework for 21st Century Education for children and young people aged 3-18. The aspiration of the new curriculum is:

> "to enable all children to develop their capacities as successful learners, confident individuals, responsible citizens and effective contributors to society."
>
> (Scottish Executive, 2004a p.3)

The new curriculum recognises that one of the prime purposes of education is to make people aware of the values on which Scottish society is based. These values, which are inscribed on the Scottish Parliament building, are "wisdom, justice, compassion and integrity" (Scottish Executive, 2004a, p.11). The values of inclusion complement these core values for society and inclusive education should therefore be at the heart of Scottish education. The new curriculum is aligned with the five National Priorities for Education and therefore promotes 'Inclusion and Equality' in every aspect of the curriculum, emphasising that the aspirations and objectives it aims to achieve, are relevant to all children and young people (Scottish Executive, 2004a). The environment in which education is delivered is symbolic of, and should properly represent, the values of Scottish society, in facilitating access for all.

3.2.4 Inclusive Education in Practice

A central debate concerning the education of children with an impairment in the richer countries is the differentiation between segregated and inclusive education (Priestley,

2003). In Britain the compulsory education system has been gradually established since the late 19th century and alongside this a corresponding system of segregated 'special' educational facilities for children with impairments has emerged (Barnes, 1991). An ideology of 'special' education has developed which segregates children with certain impairments from their peers. However, this approach has been severely challenged by the disability movement (Priestley, 2003). The poorer level of education received by people with impairments can have an impact on employability and therefore income in later life. The exclusion of people with impairments from the education system in Britain has meant that people with impairments have much poorer educational qualifications than their non-impaired counterparts (Beckett, 2006). This in turn leads to poorer chances of gaining employment which leads to increased chances of living in poverty (Oliver, 1996). Young people with impairments are often ill-prepared for adult life because of previously disabling environments such as special schools (Oliver, 1991). Segregation within the education system also perpetuates and gives credit to discriminatory practices in all other areas of social life (Barnes, 1991). Stiker (1998) remarks that it is imperative that society stops removing people with impairments from their homes and communities and that an individual with an impairment should be schooled alongside other local children and belong to their home community.

While the principles of inclusion are agreed upon, at least rhetorically, throughout the world, practical achievements remain irregular (Priestley, 2003). While some progress has been made towards a move away from segregated education institutions, the process of inclusion has not been straightforward and what is termed inclusive education is mostly reproducing special education in a mainstream setting (French & Swain, 2004). Recent literature still refers to the experience of many children who

experience a social apartheid, being bussed away from their home area and becoming isolated from their neighbourhood (Leicester, 2008). It is important to distinguish between 'integration' and 'inclusion'. Integration expects that children with impairments will adjust to mainstream education, however inclusion involves making adjustments to mainstream education in order to properly provide for children with impairments and non-impaired children alike (French & Swain, 2004).

Riddell (2009) highlights the tensions that exist in disability theory between the politics of redistribution, emphasising sameness, and the politics of recognition, emphasising difference. Radical versions of inclusion maintain that all children should be in mainstream classes for the whole of their education, irrespective of their disabilities. Weaker versions place far less emphasis on educational location, and instead suggest that as long as the learning styles and resources are matched to the needs of the students, then inclusion may be regarded as taking place (Riddell, 2009). While some parents are fighting with local authorities for their child to have access to mainstream education, others see special education as preferable, viewing the support their child will receive as far superior. For example, some parents of children with an autistic-spectrum condition feel that mainstream or even generic special schools are unable to meet their child's needs. Some people who are hearing impaired or deaf describe their requirement for education through the sign-language medium as similar to that of, for example, Gaelic speakers who argue for Gaelic medium education. Proponents of all-inclusive education argue that parents are worried that insufficient resources and training in mainstream schools will affect their child's education. These internal divisions within the disability movement regarding special and inclusive education make it difficult to work towards a consistent position (Riddell, 2002). This debate has obvious

implications for the built environment and particularly for new school buildings in determining the level of shared facilities, from stand-alone special schools to shared campus mainstream and special school, a mainstream school with a special unit, or a fully integrated building. Riddell (2009) comments that the voices of children with impairments and their parents and a discourse of disability rights specifically, have been marginalised in deciding the type and location of education to provide. In 2008 the Equality and Human Rights Commission (EHRC) pointed out that more research is required into what happens at a local level to block progress towards inclusion. The Scottish Government Schools Directorate action plan acknowledges the need to increase involvement of users with impairments in school design; to make new buildings more accessible; and to improve teacher education and professional development to enhance teachers' knowledge and understanding of inclusion (Scottish Government, 2008a). The school building programme offers opportunities to open up this debate at a local level around the topic of new and refurbished schools which could involve those whose voices have previously been marginalised.

Riddell has written extensively on inclusive education in Scotland. She points out that compared to other European countries Scotland educates a high proportion of disabled pupils in mainstream schools (Riddell, 2006). Riddell (2009) argues that Scottish education has generally been based on values of meritocracy and universalism, with some focus on redistribution, but less on recognition. While the idea of additional resourcing for some groups of children with learning difficulties has been accepted issues still remain in terms of achieving sufficient resources to enable children to be included in mainstream schools and classes and including parents and children in decision making regarding additional resource, which still lies firmly with professionals.

Although figures in Scotland show an increase in the numbers of children with additional support needs spending all of their time in mainstream classes this is partly accounted for by a widening definition of children counted as having additional support needs rather than children who were previously in special schools being moved to mainstream. Over the last 20 years the percentage of the pupil population educated in special schools has remained static. However, children with physical or sensory impairments are now routinely educated in mainstream. Whilst some special schools have shut down, special units attached to mainstream schools have increased (Riddell, 2009) creating possible new forms of segregation (Riddell, 2002).

While progress has been made to undo the legacy of segregating it appears that much remains to be done. Intentions of inclusive education do not always translate into good practices. For people with impairments, the 20th Century has been based on exclusion, however the 21st century will see the struggle for inclusion grow far stronger (Oliver, 1996). In terms of the built environment Barnes (1991) points out specific problems including insufficient space for personal aids and equipment, classroom acoustics, unsuitable toilets and changing rooms, facilities for practical subjects such as science and safe means of escape in case of fire. However, there are success stories which give inspiration and prove that the idea of inclusive education is not unachievable. The Alliance for Inclusive Education have published a recent book documenting success stories in inclusive education (Mason & Dearden, 2004). This includes many examples of friendships being made between impaired and non-impaired children and efforts being made to employ staff with impairments. Examples are also given of imaginative design features within the school buildings, such as the use of contrasting colours and tactile surfaces to mark routes through corridors, the provision of sensory rooms, and

involvement of children in designing and painting a wall. It is argued in this thesis that the built environment should be the last barrier to prohibit a child who wishes to attend the school of their choice, or an adult who wishes to work in a particular school or visit their child at school, from fulfilling that wish and carrying out their day to day activities in the same manner as other people. New schools, whether they are special, mainstream or mixed, should therefore be exemplary of the highest standards of accessible design. Furthermore, the school building programme in Scotland offers opportunities to discuss the type of accommodation provided for children with different types of impairments at a local level with the parents and children who will be affected by school closures. The following section charts the progress of the Scottish school building programme to date.

3.2 The Scottish School Building Programme

The biggest school building programme in Scotland's history took place between the years 2000 to 2011 to extensively refurbish or replace over 570 schools, constituting 21% of the entire local authority school building stock (Scottish Government, 2009). This programme was put in place in order to improve the school building stock, which in the 1990s was in a serious state of disrepair and in need of improvement (Audit Scotland, 2008). In 2003 the Scottish Executive and the Convention of Scottish Local Authorities (COSLA) launched the School Estate Strategy, with the aim of improving and maintaining the quality of school buildings throughout 10 to 15 years in order that no school remain in unsuitable condition for 21st century education (Scottish Executive & COSLA, 2003). This section examines school estate statistics, which detail the progress of the school building programme to date, and the Scottish Government's school design guidelines.

3.2.1 School Estate Statistics

Government statistics are available which detail the condition, suitability and capacity of each school building, within three main sectors of primary, secondary and special schools. 'Condition' refers to the state of repair of features and facilities present within the existing building fabric (Scottish Executive, 2009) and 'Suitability' refers to the adequacy of the building design (Scottish Government, 2008b). Issues relating to disability discrimination requirements are dealt with under suitability. However, this section refers to statistics for both condition and suitability, as these are used as a basis on which to estimate the amount of future improvement work to be undertaken in the school estate. Each school is given a rating for condition and suitability, from A - good, to D - bad. Table 3.1 details the definitions for condition and suitability category ratings A to D.

Table 3.1: Definitions for (a) condition (Scottish Government, 2010 p.5) and (b) suitability (Scottish Government, 2008b p.5) category ratings.

Category	Condition Definition	Suitability Definition
A	Good – Performing well and operating efficiently	Performing well and operating efficiently
B	Satisfactory - Performing adequately but showing minor deterioration	Satisfactory - Performing well but with minor problems
C	Poor – Showing major defects and/or not operating adequately	Poor - Showing major problems and/or not operating optimally
D	Bad – Economic life expired and/or risk of failure	Bad – Does not support the delivery of services to children and communities

Table 3.2 details the most current statistics for the condition and suitability of the school building stock, published by the Scottish Government in 2011 (Scottish Government, 2011). At the time of writing the statistical dataset published in 2012 is incomplete due

to statistics from East Dunbartonshire being removed pending further investigation (Scottish Government, 2012b). While the majority (81%) of school buildings are categorised as being in good or satisfactory condition, almost one fifth (19%) remain in poor or bad condition. Similar statistics are recorded for the suitability of school buildings, with 76% achieving ratings of A or B, and 23% receiving ratings of C and D. This is significant as the coming years will see the replacement or extensive refurbishment of the 510 (19%) schools which remain in poor or bad condition, in order to achieve the government's aspiration of removing all schools from the poor and bad condition categories. In 2008 Audit Scotland indicated that if the programme continued at the current rate of progress it could take up to 20 years to realise this aspiration (Audit Scotland, 2008).

Table 3.2: Statistics for the condition and suitability of the building stock (Scottish Government, 2011).

Category	Condition		Suitability	
	No. of schools	Percentage of entire school stock	No. of schools	Percentage of entire school stock
A	538	21	585	22
B	1558	60	1416	54
C	479	18	543	21
D	31	1	52	2
Not Recorded	11	0%	21	1%

In 2009, the Scottish Government reaffirmed the commitment made in the School Estate Strategy 2003, to ensure that no school remain in poor or bad condition:

> "**All** children and young people will be educated in, and community users able to use, schools that are 'fit for purpose' in terms of **condition**, **suitability** and **sufficiency**"
>
> (Scottish Government, 2009 p9, emphasis added)

Many of the schools which received an A or B rating in the condition category were rated with a C or D with regards to suitability, and vice versa. The total number of schools rated as poor or bad either in the condition or suitability category is 867, indicating that around one third (33%) of all schools will require some form of improvement work in the coming years. The graph in Image 3.1 details the condition category ratings for each school sector. The number of schools in the special school sector with a condition category rating of either C or D (poor or bad condition) is 28%. This is far higher than the mainstream primary school sector which has a total of 19% of schools rated C or D and the mainstream secondary school sector which has a total of 16% of schools rated C and no schools rated D. Furthermore, a far higher percentage (7%) of special schools have not been recorded, compared to 0% in both the mainstream primary and secondary school sector.

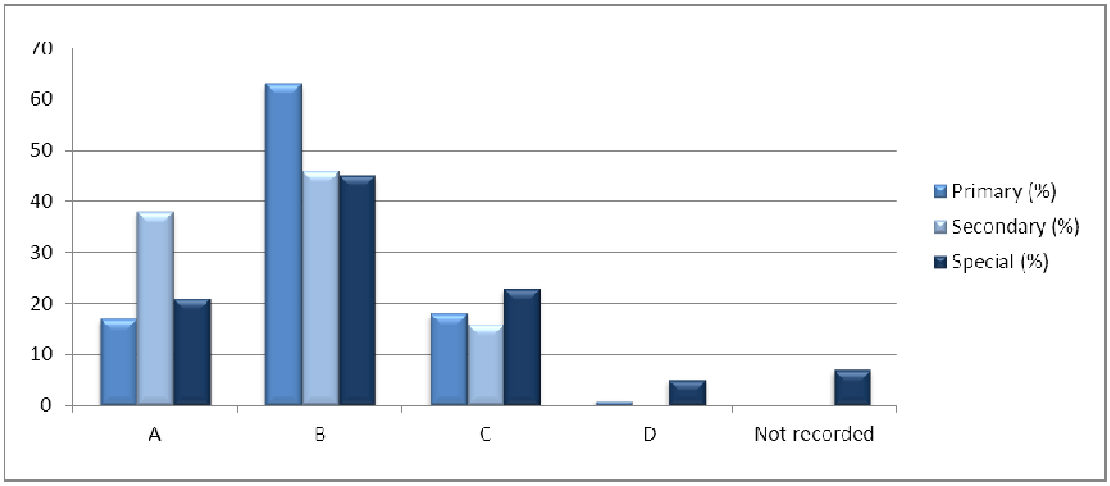


Image 3.1: Bar graph showing statistics for the condition of schools by school sector (Scottish Government, 2011).

While the School Estate Strategy has made substantial improvements to the school building stock, much work remains to be undertaken, especially in the special school sector. As the first stage in this long-term improvement programme reaches completion, it is necessary to reflect on the performance of new and refurbished school buildings in meeting the requirements of 21st century education.

3.2.2 Scottish Government School Design Guidelines

As the school building programme has progressed the Scottish Government has produced various documents clarifying their aspirations for school design, providing design guidelines, and detailing consultation events, case studies and post-occupancy evaluations in which they have invested. This section briefly summarises these documents, referring mainly to those which stipulate the design aspirations of the Scottish Government (Scottish Executive & COSLA, 2003; Scottish Executive, 2004b; Scottish Executive, 2007; Scottish Government, 2007a; Scottish Government, 2009) and drawing specifically on issues of accessible design. At the beginning of the School

Estate Strategy programme, the Scottish Executive published design guidance in the form of "School Design, Building our Future: Scotland's School Estate" (Scottish Executive & COSLA, 2003). This guidance states that school design should reflect the national priorities in education, all of which promote accessibility, and one of which is specifically titled "Inclusion and Equality" (Scottish Government, 2000b). Furthermore it is recommended that developments being made in the education system be taken into consideration in the design of a school. Accessibility formed a major part of the guidance, with the following questions posed to be used by those involved in school design:

> - "Does the design take account of the needs of children and adults with a disability?
> - Is the design of classrooms and other spaces inclusive of children with additional support needs?
> - Are external play and social areas fully accessible by all users?
> - Are entrances well positioned, safe, welcoming and attractive?
> - Does the design provide for a safe and secure environment for pupils and staff in a discrete manner, which has been considered at the initial design stage?"
>
> (Scottish Executive & COSLA, 2003 p.6)

The importance of consulting with building users throughout the design process in order to achieve full accessibility is also highlighted. The guidance refers designers to 10 key points for a good design of a school (Scottish Executive & COSLA, 2003 p.12), originally published by the Commission for Architecture and the Built Environment (CABE, 2002 p.8) and fully detailed in Table 3.3. The first of these is "Good clear organisation, an easily legible plan, and full accessibility". When evaluating design

quality, it is recommenced that the Design Quality Indicators developed by the Construction Industry Council are used, a principle component of which is access (Scottish Executive & COSLA, 2003 p.20). Another important ambition stated in design guidance is the provision of shared community services within the school campus in order to enhance the relationship between the school and the wider community. This emphasises the need for all mainstream and special school grounds and buildings, to be accessible to the entire community. The aspiration to create accessible and inclusive, interior and exterior learning environments has been reaffirmed in various guidance documents published since 2003 (Scottish Executive, 2007; Scottish Government, 2009). However accessible design received little or no mention in other publications regarding sustainable design (Scottish Executive, 2004b) and the design implications of the new Curriculum for Excellence (Scottish Government, 2007a). As mentioned in Section 3.3.3, the Curriculum for Excellence is aligned with the five National Priorities for Education and promotes 'Inclusion and Equality' in every aspect of the curriculum. Accessibility should therefore be a main implication of the new curriculum on the school building. The following section argues that accessible design is also an essential quality of sustainable design, and should therefore be a main priority in order to achieve sustainability in Scotland's schools.

Table 3.3: 10 key points for a good design of a school (Scottish Executive & COSLA, 2003 p.12)

	10 key points for a good design of a school
1	Good clear organisation, an easily legible plan, and full accessibility.
2	Spaces that are well proportioned, efficient, fit for purpose and meet the needs of the users.
3	Circulation that is well organised, and sufficiently generous.
4	Good environmental conditions throughout, including appropriate levels of natural light and ventilation.
5	Attractiveness in design, comparable to that found in other quality public buildings.
6	Good use of the site, and public presence as a civic building.
7	Attractive external spaces with a good relationship to internal spaces and offering appropriate security and a variety of different settings.
8	A layout that encourages broad community access and use out of hours, where appropriate.
9	Robust materials that are attractive, that will weather and wear well and that are environmentally friendly.
10	Flexible design that will facilitate changes in policy and technology and which allows expansion or contraction in the future, where appropriate.

3.3 Audit Scotland – "Improving the School Estate"

In March 2008 Audit Scotland prepared a report entitled "Improving the School Estate" (Audit Scotland, 2008) for the Auditor General for Scotland and the Accounts Commission with the aim of evaluating the impact of the School Estate Strategy (Scottish Executive & COSLA, 2003). This is by far the most extensive study to be undertaken of new school buildings in Scotland. One of the main objectives of this study was to evaluate the general performance of new and refurbished school buildings. The study was therefore wide in scope taking into account the many factors involved in building design and also aiming to gain an idea of the quality of school design across the board rather than draw conclusions concerning individual schools. The study involved collecting data from all 32 councils and visiting 6 of them to interview officers

and review documentation, as well as interviewing Scottish Government officials and other key stakeholders. The Building Research Establishment (BRE) was commissioned to undertake a design quality review of 18 new or refurbished schools. These schools were selected by Audit Scotland to ensure a mix of primary and secondary, both new and refurbished, PFI and non-PFI contract types, a range of sizes, and rural and urban locations. All of the schools in the study were mainstream and no special schools were included. As part of the Audit Scotland (2008) study a private company were to undertake consultation with 10 of the schools in the form of questionnaires and focus groups with staff and pupils respectively. The information gathered from the consultation and the design quality review was collated to produce the Audit Scotland (2008) report.

3.3.1 Assessment Method

The professional assessment method used in the Audit Scotland (2008) study was the Design Quality Method (DQM) (Cook, 2007). This method is used by all auditing bodies in the UK as a method of Post Occupancy Evaluation and includes various sources such as expert opinion, professional judgement, user opinion and scientific measurement (BRE, 2011). The six matrices of the DQM were used as a basis on which to establish key design elements in order to benchmark school design against good and best practice standards (BRE, 2007). These key design elements cover architecture, environmental engineering, user comfort, whole life costs, detail design and user satisfaction, each of which is described in Table 3.4. Accessible design is not explicitly mentioned within the six points of the matrix. However, the assessment method also judged the schools according to the 10 features of a well designed school, set out by the Commission for Architecture and the Built Environment (CABE, 2002)

and incorporated within the Scottish Executive's guidelines to councils (Scottish Executive & COSLA 2003), as presented in "Section 3.4.2 Scottish Government School Design Guidelines", Table 3.3. Accessibility is explicitly mentioned in the first of these key design elements: "Good clear organisation, an easily legible plan, and full accessibility" (Scottish Executive & COSLA, 2003 p.12).

Table 3.4: The six key design elements of the DQM. (Audit Scotland, 2008, Appendix 1, p.42)

	Key Design Elements Assessed Within The Design Quality Method
1	**Architecture**: Aesthetic merit, site and space planning
2	**Environmental engineering**: Lighting, noise, temperature and air pollution levels
3	**User comfort**: Summertime overheating, visual environment, heating comfort, audible and visual intrusion, acoustics quality
4	**Whole life costs:** Occupancy costs, performance of building fabric, flexibility
5	**Detail design:** External and internal detail, furniture and furnishings, fittings, safety and security
6	**User satisfaction**: Anecdotal evidence

3.3.2 Consultation

As part of the consultation process commissioned by Audit Scotland (2008), questionnaires were distributed and focus groups were held to obtain the views of pupils and staff at 10 of the 18 schools included in the study. This section describes the objectives of the consultation and the methods used to consult with both staff and pupils. The relatively small sample size of 10 schools meant that in the quantitative analysis, the data breakdowns primarily used were school type (refurbishment or new build) and funding source (traditional or PFI), as there was insufficient data to

undertake a robust analysis of other variables. The objectives of the study were to seek the opinion of pupils and staff on:

- The quality of the learning and teaching environment
- Which aspects of the school building matter most to them
- The best and worst features of the school building

3.3.2.1 Consultation with Staff

Questionnaires were distributed to all school staff in the sample schools, as well as to Parent Teacher Association (PTA) and School Board members. The majority of respondents (98%) were staff with far less response (2%) from PTA and school board members. The questionnaire was designed to be split into four sections with questions relating to (i) internal spaces, (ii) external spaces, (iii) quality of design and construction, and (iv) importance and performance of design features. Most of the questions were of a quantitative nature, asking participants about their level of agreement with statements on a rating scale with options defined as follows: Strongly agree / Agree / Disagree / Strongly disagree / Don't know / Not applicable. Participants were also asked to rate the importance of design features with options defined as follows: Very important / Important / Neutral / Not very important / Not at all important. Comment boxes were provided beside each question in order to gather qualitative data regarding the answers given. The questionnaire concluded by asking participants to remark on other areas they felt were important and asked them to specify one aspect of the school building which they would change. Only one question in the survey related to accessible design, included in the "Quality of Design and Construction" section. Teachers were asked the extent to which they agreed with the following statement:

> "The design of my workspace makes it possible to meet the needs of children with a disability or additional support needs "
>
> (George Street Research, 2007a, Appendix A, Question 4)

Accessible design for students or staff with impairments was not included as one of the options to be rated within the "Importance and Performance" section of the questionnaire.

3.3.2.2 Consultation with Pupils

Two pupil focus groups were conducted in each of the 10 sample schools. Each group contained between 6 to 10 pupils and reflected the gender mix of the year group. The focus groups were audio recorded to be later transcribed and the transcription was used alongside the moderator's notes taken throughout the focus groups in order to undertake a contextual analysis of the pupils' views. Following introductions, children were asked to list all the parts of their school building and to rank these places into top three and bottom three. They were then asked to give reasons as to why they had ranked them as they did. Children were asked prompting questions concerning different aspects of the building for example, asking them to describe their classroom. These were followed by exploratory questions for example, if there are good rooms and bad rooms. Children were asked to explain their reasons for each response given. Finally a children were asked to give their school a 'mark' from 1 – 10 and explain their reasons.

3.3.3 Main Findings

The report "Improving the School Estate" (Audit Scotland, 2008) drew conclusions from both the BRE design quality review of 18 new and refurbished schools and the consultation undertaken with users at 10 of the schools. The report highlighted that as there had been very little investment in the school estate in the years preceding the late

1990s, the majority of councils had little expertise in procuring major school building projects. The objectives of the study were wide in scope and while accessible design was touched upon in the visual survey and consultation, no firm conclusions could be reached with specific reference to accessible design. While it was found that physical accessibility for pupils with impairments almost meets best practice design standards, this did not concur with the staff survey (Audit Scotland, 2008). Over a third (36%) of staff disagreed that the design of their workspace makes it possible to meet the needs of children with an impairment or additional support needs (George Street Research, 2007a, p.17). Other results also show concern in areas related to accessible design. When asked for other comments relating to the quality of design and construction 5% of teachers commented that there was insufficient wheelchair provision (George Street Research, 2007a, p.19). Ease of movement through the school building rated highly in terms of importance, however performance was rated as poor (George Street Research, 2007a, pp. 20 & 22) and pupils also complained about a general lack of space in classrooms, corridors and social spaces (George Street Research, 2007b). These results indicate that certain areas of accessible design may be under-performing.

The report “Improving the School Estate” (Audit Scotland, 2008) found that new-build schools generally perform better than refurbished schools in all areas. New-build schools meet good practice standards for safety and security, site and space planning, internal and external design details, and choice of material and fittings. However, good practice standards for environmental conditions such as daylight levels, acoustics, air quality and temperature are not sufficiently met by either new or refurbished schools. Environmental conditions were rated as the second most important factor of school design, however they scored the lowest rating in terms of performance. Overheating

problems in the summer were mentioned frequently by staff and pupils. The mechanical and electrical engineering systems that control heating, lighting, ventilation etc. were found to be problematic. Many complained that they are unable to control their environment, for example, overheating and inadequate ventilation being worsened due to a lack of opening windows fitted in the double-glazing system. It was also found that environmental sustainability had generally not been considered as a key factor in the building design, and was often only considered when it would have minimum cost implications (Audit Scotland, 2008). The report also stressed the necessity for a meaningful consultation process with building users to be carried out from at an early stage in the design process. The quality and control of environmental aspects and importance of user consultation are investigated in the following section with specific reference made to the impact they have on people with impairments or additional support needs.

3.3.4 Impact of Identified Problems

Europeans spend around 90% of their time indoors (BRE, 2010), and the environmental quality of the indoor environment therefore impacts greatly on general health. In 1986 the World Health Organisation (WHO) officially recognised Sick Building Syndrome (SBS) as a disease, present in up to 30% of new and remodelled buildings (WHO, 1986). Research undertaken by the Commission for Architecture and the Built Environment (CABE, 2002) has found that school design can impact on teaching and learning, pupil performance, staff morale, and the relationship between the school and the wider community. The following sections examine the impact of these identified low-performing factors on all building users and particularly people with an impairment and /

or additional support needs. The importance of user-control over the environment and the benefit of implementing a meaningful consultation process are also highlighted.

3.3.4.1 Lighting

A lack of daylight can cause the human brain to produce melatonin which causes drowsiness. The amount of melatonin produced by the body can affect hormone production and state of mind, causing decreased mental and physical activity and severe fatigue. This can be demonstrated through Seasonal Affective Disorder (SAD) which describes the depression experienced by some in northern countries throughout the winter when daylight hours are very low. Using daylight as the main source of light has psychological and physical benefits for the building user. In particular, various research studies have found that students are more productive in daylight classrooms and that daylight can be beneficial in classroom learning (Tanner, 2009). Symptoms attributed to a lack of daylight are both physical and psychological. These include asthenopia (eye strain); behavioural disorders such as hyperactivity, neuroticism and an inability to concentrate, and extreme fatigue. Links have also been made to various types of depression, narcolepsy and sleeping disturbances which can be affected by the lack of control of biological functions on the cell level. Melatonin production also influences the immune system and irregular production may cause decreased immunity (Rostron, 1997).

An average daylight factor of 5% in each classroom would be needed in order not to use any artificial lighting (Scottish Executive, 2007). However, it is not always practically possible to use daylight alone due to factors such as local climate, building position, surrounding shading and room depth, and the use of artificial light must also be carefully considered. The use of artificial day lighting through the day is common in

most schools in Scotland and the minimum daylight factor of 2% at each classroom desk is normally met through means of artificial lighting (Scottish Executive, 2007). The quality of light can be just as important, if not more so, than the quantity of light. Important features of lighting are lux levels (brightness), glare index (to reduce visual discomfort), colour rendering index, and light uniformity (Scottish Executive, 2007). This involves carefully specifying interior finishes, as well as the positioning and size of windows, shading, and the location and type of artificial light fitting.

3.3.4.2 Acoustics

Children can be exposed to various noise sources, from the external environment or from within the building. External noise sources include major vehicular routes, aeroplanes passing overhead or weather conditions. Internal sources can be human-related such as talking, building-services-related such as buzzing lights and air-conditioning, or equipment-related, such as overhead projectors. Noises related to building services are generally low frequency and this can cause more discomfort than would be caused by the same level of a higher frequency noise. The acoustic design of a building involves controlling not only the background noise entering a space, but also achieving a low reverberation time within the interior of a space, in order to enable effective communication between the occupants (Scottish Executive, 2007). The effects of noise pollution are mainly related to stress and a lack of concentration (London Hazards Centre, 1990). Research studies have found that noise levels can be linked to increased stress levels (Leventhall et al, 2003) and also reduced, memory, motivation, reading ability and attainment levels in school children (Shield & Dockrell, 2008; Tanner, 2009).

3.3.4.3 Indoor Air Quality

Indoor Air Quality (IAQ) greatly impacts the health and comfort of a building's occupants. Inadequate ventilation, inefficient filtration and poor hygiene all contribute to poor indoor air quality (SBSA, 2010). Carbon Dioxide correlates with human metabolic activity and humans are the primary source of CO2. Indoor levels of CO2 are therefore commonly used to indicate the adequacy of outdoor air ventilation to occupancy levels within the building and the type of activity taking place. It is recommended that school building occupants should be able to lower concentrations of CO2 to 1000 parts per million (ppm) at any given time (DfES, 2006), however research undertaken in UK schools found some levels of CO2 concentrations to be higher than 4000ppm (Beisteiner & Coley, 2002).

Poor IAQ has been linked to Sick Building Syndrome and underperformance in school children (BRE, 2010). It can cause illness, such as asthma, which raises school absenteeism and can also prevent children from performing to their full capacity while at school (UNEPA 2000). In addition, there are multiple pollutants other than CO2 which have different effects on the human body. Chemical effects are additive and can be synergetic, and even when levels of a chemical are below toxic levels, there may still be a risk posed by exposure over the longer term or exposure to two or more pollutants at the same time (London Hazards Centre, 1990). The risk that children face from poor IAQ is greater than that of adults, as they breathe a greater volume of air in proportion to their body weight than adults (Schneider, 2002). Typical symptoms of poor IAQ are irritated eyes, nose, throat and skin, upper respiratory infections, asthma, nausea, dizziness, headaches and lethargy (London Hazards Centre, 1990; UNEPA 2000).

3.3.4.4 Temperature

Overheating is a common cause of complaint in new and refurbished school buildings. The human body attempts to maintain constant internal thermal conditions, responding to warm temperatures by sweating, decreasing clothing levels to expose more of the body to the air, increasing air movement where possible and reducing activity levels. The maximum internal air temperature recommended in schools when the space is occupied is 32℃ and the temperature should not exceed 28℃ for any longer than 120 hours. This figure is given as an absolute maximum and not as an ideal. However, even in cases when temperatures align with this guidance there have been complaints of discomfort by users and there may be some disparity between design guidance and user comfort (Scottish Executive, 2007). Relative humidity levels also affect thermal comfort, with high humidity levels causing clamminess and overheating, preventing sweat from drying on the skin. Symptoms of thermal discomfort include tiredness, irritability and loss of concentration (Scottish Executive, 2007).

3.3.5 Impact on people with an impairment or additional learning needs

This thesis argues that while all building occupants suffer due to the impact of poor environmental conditions, people with an impairment and/or additional support needs may suffer to a greater extent. This link is probably most strongly demonstrated with regards to people who have a sensory impairment. People with visual and/or hearing impairments may rely on their residual sight or hearing and this can be made far more difficult by poor lighting or acoustics. When one sense is impaired people may also rely more on another in order to compensate, and for this reason acoustics should be

considered as important to people with visual impairments, and lighting as important to people with hearing impairments (DfEE, 1999). Building Bulletin 102, “Designing for disabled children and children with special educational needs. Guidance for mainstream and special schools” includes a checklist of different types of impairment and additional support needs and the design considerations which should be taken into account for each. Good lighting and acoustics are specified in relation to learning difficulties; behaviour, emotional and social difficulties; speech, language & communication needs; autistic spectrum disorders; sensory impairments and physical impairments (DCSF, 2008, Annex F). Many hearing impaired pupils make use of low frequencies, under 500Hz, to obtain information from speech, and low frequency indoor ambient noise may therefore interfere in their communication and understanding of a lesson (DfES, 2003). Young children or children with a poor knowledge of the language may suffer more than others, as they are not as capable of guessing missing words in order to compensate throughout a lesson. In some cases the detrimental effects and symptoms caused by poor environmental conditions may be similar to those already suffered by occupants with disabilities or additional learning support needs. Children with a sensory or physical impairment, Attention Deficit Hyperactivity Disorder, autistic spectrum disorder, learning difficulties such as dyslexia, or any child with additional support needs, may have difficulty focusing their attention or concentrating for long periods of time. It could be argued that these symptoms may be further aggravated by poor indoor environmental conditions, causing either similar symptoms such as a lack of concentration, or creating additional complications such as anxiety or irritated eyes, nose or throat. Poor environmental conditions can therefore make certain tasks which are already difficult for some children, unnecessarily challenging.

3.3.6 Environmental Control & Consultation Process

The Audit Scotland report found that many occupants complained that they had poor control over the indoor environment. Studies undertaken in the UK have found that occupants who complain of symptoms of SBS tend to believe they have less control over their environment (Sykes, 1988). The importance of allowing the user control over the internal environment through manual or automatic means is preferable to fully-automated systems (Audit Scotland, 2008). This is particularly important with regard to being able to open windows for ventilation (Scottish Executive, 2007). The ability to control internal environmental conditions can be particularly relevant to people with impairments, who may require different environmental conditions depending on their needs. For example, control of lighting levels and positioning of light sources may be important for someone with a visual impairment, and the type of lighting preferred may also vary depending on the type of visual impairment. Low frequency sounds made by mechanical systems may affect a child with a hearing impairment or an inability to concentrate more than others and it is important to be able to turn these systems off when required.

The need for a proper consultation process during the school design process was highlighted by Audit Scotland (2008). This would allow building users could to express the importance they place on the quality of the indoor environment. Problems such as the inability to open windows or control radiator thermostats in the classroom, and the disparity between temperature guidelines and user comfort would be dealt with from the outset. The importance of involving users in the design process is seen as central to any inclusive design process (CABE, 2004; DCSF, 2008; SBSA, 2010).

3.4 Conclusion

This chapter has examined various issues relating to inclusive school design in Scotland, including the wider inclusive education discourse, the school building programme and existing research looking at new and refurbished school buildings in Scotland. Education is a key part of the disability movement's agenda as it can pave the way for improved income, social status and quality of life. Inclusive education is endorsed by both local and global education initiatives, such as Education for All and the new Curriculum for Excellence. However, although the inclusive education agenda is agreed on in theory throughout the world, practical achievements have been inconsistent (Priestley, 2003). In Scotland, a higher percentage of children are educated in mainstream settings than other European countries. However, there is a debate concerning special education, with people at one end of the spectrum arguing that special education is crucial and people at the other end arguing for every child to be educated in a mainstream classroom. Riddell (2009) points out that the opinions of children with impairments and their parents have not been considered fully in decisions concerning the type and location of education to provide. Attempts to move toward inclusion might be creating other types of segregation, for example main stream schools with special units. Furthermore, the Equality and Human Rights Commission (EHRC, 2008) call for more research to take place at a local level investigating the barriers to inclusion. The school building programme offers opportunities to do exactly just this and open up the debate concerning the type and location of education at a local level around new and refurbished school buildings.

The biggest school building programme in the history of Scotland has taken place. Around 21% (over 570 schools) of the school estate was extensively refurbished or

replaced during the years 2000 to 2011. However statistics for 2011 show that almost one fifth of the school estate (510 schools) remains in poor or bad condition and will need replacement or extensive refurbishment in order to achieve the Scottish Government's aspiration of removing all schools from the poor and bad condition categories. In addition, one third of the school estate (867 schools) is rated as being poor or bad either in the condition or suitability category, indicating that around one third (33%) of all schools will require some form of improvement work in the coming years. The special school sector has a far higher percentage (28%) of schools in poor or bad condition than mainstream primary (19%) or secondary (16%). The Scottish Government has produced extensive guidance concerning new school design and accessible design forms a key part of this, however accessible design is not mentioned in documents concerning sustainable design or the new Curriculum for Excellence, despite being crucial part of the both.

"Improving the School Estate" published by Audit Scotland in 2008, is the most comprehensive study of new and refurbished school buildings in Scotland. A variety of school types were involved, however all were from the mainstream sector and no schools from the special sector were involved in the study. The mix of research methods were used involving design quality review and user consultation which aimed to cover a range of design aspects. The study used the Design Quality Method (Cook, 2007) and the 10 features of a well designed school incorporated within the Scottish Executive's guidelines to councils (Scottish Executive & COSLA 2003) to benchmark school design criteria. The Design Quality Method is used by all auditing bodies in the UK as a method of Post Occupancy Evaluation (BRE, 2011). The study was wide in scope and did not draw definitive conclusions regarding accessible design. It is

recommended that Post Occupancy Evaluation methods be reviewed in order to highlight the importance of accessible design and ensure that all general evaluations undertake access audits in order to draw firm conclusions regarding accessible design.

The main findings of the report indicate that certain areas related to accessible design are underperforming, such as the design of teachers' workspace making it difficult to meet the needs of children with an impairment or additional support needs, insufficient wheelchair provision, ease of movement through the building and a general lack of space in classrooms, corridors and social spaces. Importantly the worst performing factors were lighting, acoustics, air quality, temperature and the lack of control over the indoor environment. While these are proven to have a detrimental impact on all occupants the effect can be far worse for people with an impairment and/or additional support needs. Furthermore, the need for a proper consultation process and the importance of this in achieving best practice accessible design is also highlighted. The findings of this chapter and the previous have been used to inform the parameters and criteria for the research investigations undertaken as part of this thesis. The following chapters detail the methods used and results of one detailed and one large-scale study investigating the standard of accessible design in Scotland's new and refurbished schools.

Chapter 4: Detailed Study

4.1 Introduction

This chapter describes the detailed study that took place as part of the empirical research investigations in this doctoral thesis project. The detailed study involved undertaking an in depth investigation into the standards of accessible design within a group of 10 new and extensively refurbished schools in Scotland. The aim of this study is to develop a better understanding of the complexity of the issues involved in accessible design and investigate the performance of accessible design in a local context. This allows an in depth examination of standards of accessible design to be examined in depth in order to take into account the complex nature of the school building, the way the school population uses the space and how the space could be improved. The detailed study focuses on the finished building and sits alongside a large-scale investigation, covered in Chapter 6, which looks at the school design process and satisfaction with school design in various different local authorities in Scotland. Following from the findings of Chapter 3, care was taken to investigate the type and location of provision for children with impairments and additional support needs and investigate the performance of environmental aspects of building design. This chapter explains the analytical methods used in the study, describing the local authority area and participating schools and explaining the research methods used for each part of the detailed study, which involved visual surveys and consultation with various stakeholder groups including a variety of school staff, pupils of various ages and abilities and some parents. The results from these various research activities have been drawn together in order to create an in-depth review of accessible design for

specific areas within the school building. The review is structured into two main areas, the first relating to the design of interior spaces and the second to design of exterior spaces within the school grounds and the surrounding area. The results of this investigation will be used to inform a more quantitative analysis of the extent to which the 10 schools involved in this study meet best practice design guidelines.

4.2 Analytical Methods

4.2.1 Local Authority Area

4.2.1.1 Glasgow City

The study focuses on schools in urban areas where segregation is more likely to have been an issue. Long travel distances in rural areas make special schools less viable and provisions are therefore more likely to have been made in local mainstream schools (Riddell, 2006). It was decided to undertake a detailed study of 10 schools within one local authority area in Scotland, in order to maintain, as much as possible, that same socio-political parameters. Glasgow local authority area was selected for the study for several reasons. Glasgow is the largest city in Scotland and the third largest city in the UK. Furthermore, Glasgow local authority area has the biggest population of residents with an impairment in Scotland. The registry process for people with an impairment is entirely voluntary and it is therefore difficult to accurately calculate statistics. It is estimated that just under one in five adults in Scotland have a disability and / or long-term illness (Scottish Executive, 2004c). Glasgow has an estimated population of 592,820 (GRO, 2010). Figures for 2007/08 show that 26% of adults aged 16 and over in Glasgow Local Authority have a long-standing illness, health problem or disability, compared to an average of 22% for other Local Authority areas (ScotPHO,

2010). This means that Glasgow has an estimated average disabled population of 154,133, which is the largest in Scotland. As discussed in Chapter 2, there is a close correlation between poverty and impairment and it is important to mention that Glasgow also has the highest levels of poverty in Scotland with 29.6% of Scotland's 15% most deprived datazones (Scottish Government, 2012c).

4.2.1.2 Glasgow School Population

Pupil census statistics for public funded schools in 2012 show that Glasgow is the local authority with the highest number of children 'assessed as having a disability' and 'declared as having a disability but not assessed' (a total of 2,410 pupils), as shown in the graph in Image 4.1 (Scottish Government, 2012a, Chart 2). As a percentage of the total number of pupils this figure works out at 3.3%, which is substantially higher than the average 1.7% across all local authority areas.

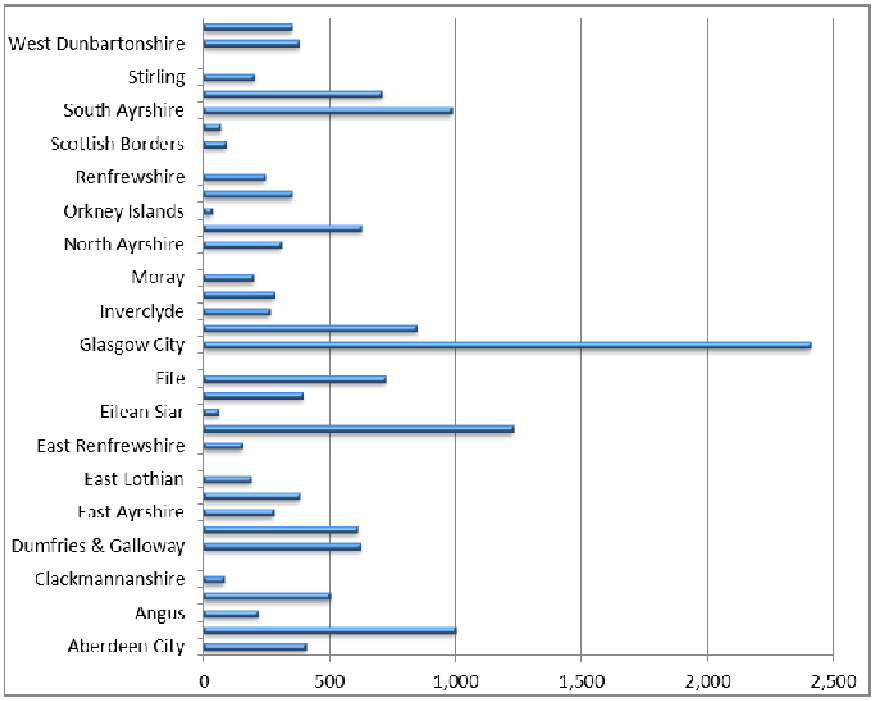


Image 4.1: Graph showing total number of pupils assessed as having a disability, or declared as having a disability but not assessed, by local authority area (Scottish Government, 2012a, Chart 2)

Glasgow also has a higher percentage of special schools when compared to other Local Authorities. The graph displayed in Image 4.2 shows that 17% of all schools in Glasgow Local Authority are classified as being within the special sector, while the percentage of special schools calculated as an average for all Local Authority areas is 5% (Scottish Government, 2012a, Table 5.3).

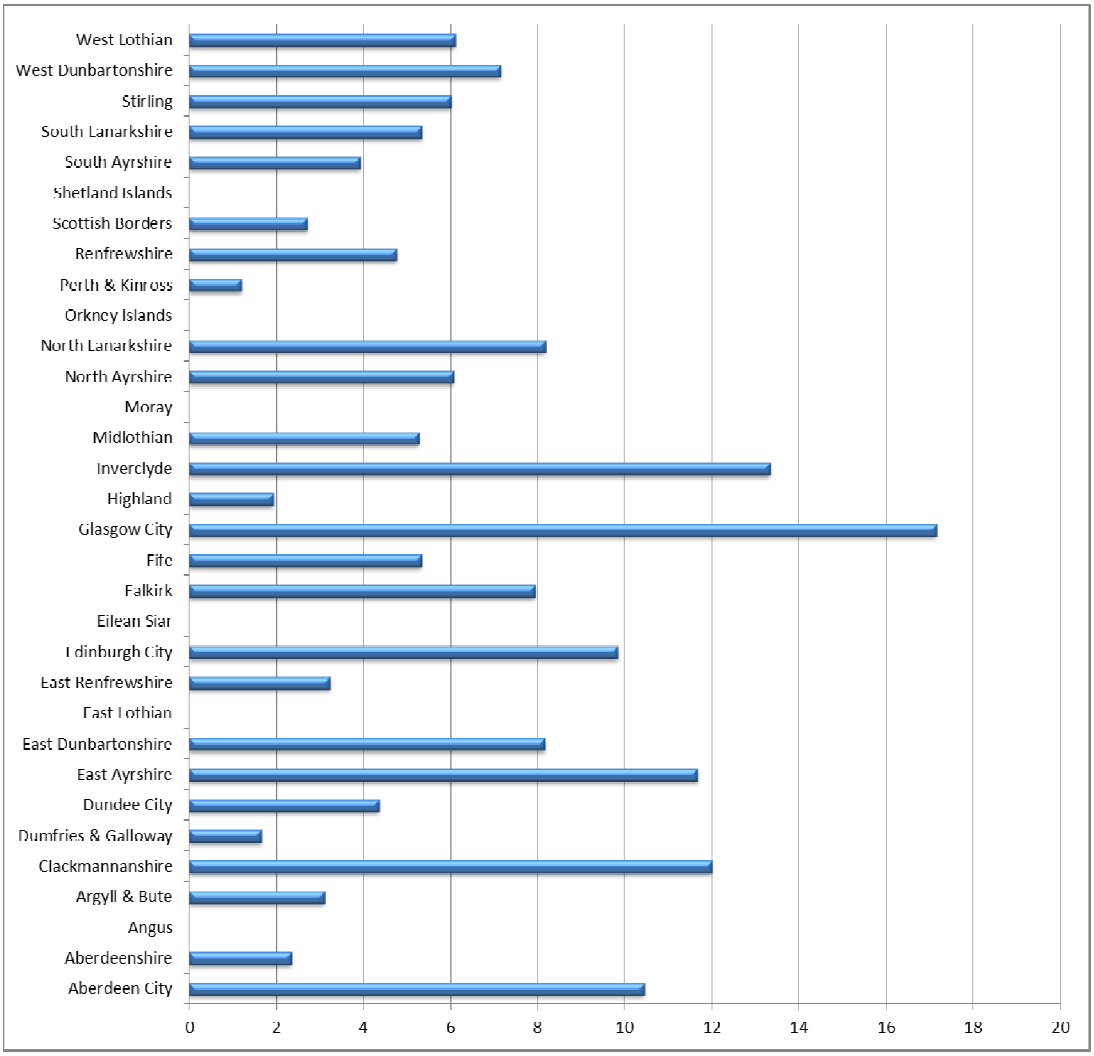


Image 4.2: Percentage of schools in the special school sector by Local Authority Area (Scottish Government, 2012a, Table 5.3)

In addition, a larger percentage of school pupils in Glasgow are educated in special education than in any other local authority. The percentage of pupils educated in special schools for each local authority area is shown in the graph in Image 4.3. More than four times as many children in Glasgow (2.9%) are educated in special schools when compared to the average for all local authority areas (0.7%) (Scottish Government, 2012a, Table 5.3).

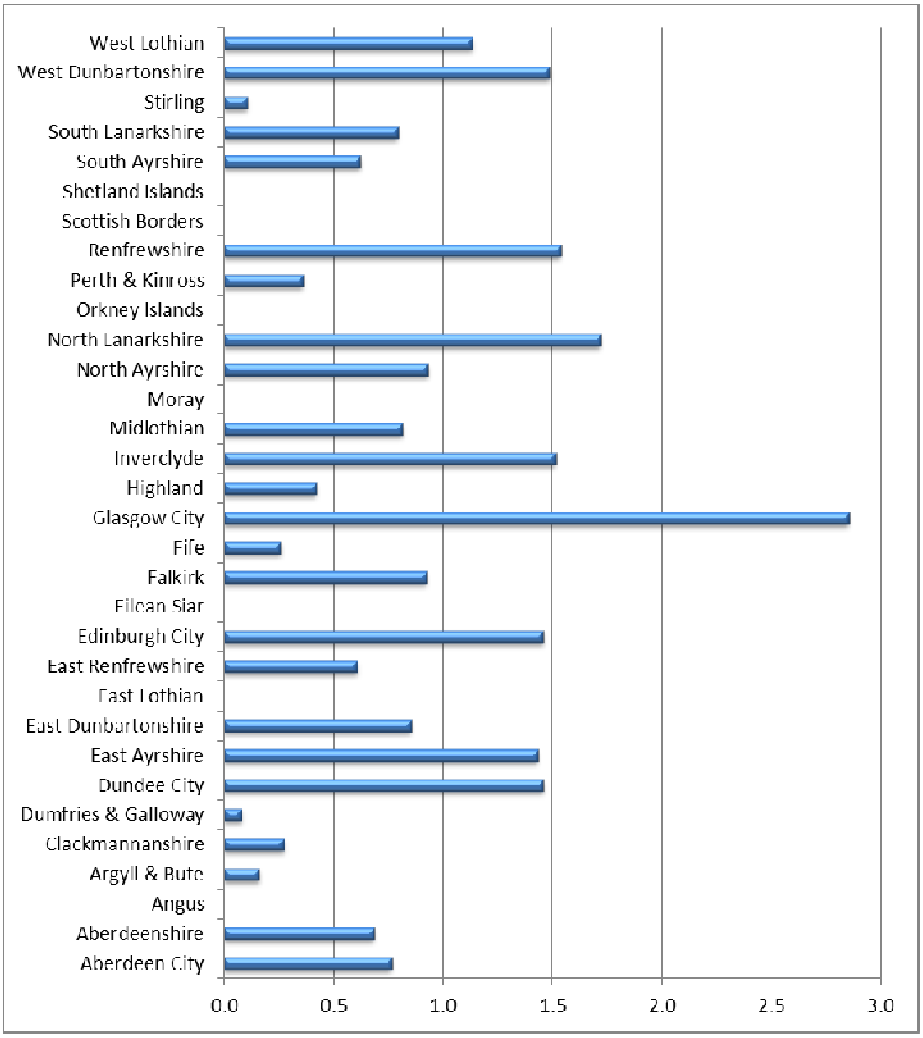


Image 4.3: Percentage of pupils educated in the special school sector by Local Authority Area (Scottish Government, 2012a, Table 5.3)

4.2.1.3 Glasgow School Estate

There has been a great deal of improvement work over the last decade to the Glasgow school estate however it still has the third highest number of schools, from Scotland's 32 local authority areas, which remain in poor and bad condition categories and will require extensive refurbishment or rebuilding (a total of 49, after the Highland Council with 129 and North Lanarkshire with 64), (Scottish Government, 2012b). Glasgow is therefore an ideal local authority to investigate work that has already been undertaken and inform guidelines for the next stage of the building programme. In accordance with the Education (Disability Strategies and Pupils' Educational Records) (Scotland) Act 2002 (Scottish Government, 2002), Glasgow City Council Education Services have undertaken and implemented an Accessibility Strategy in order to improve access to the curriculum and also the physical environment, for pupils with an impairment or additional learning needs. The Accessibility Strategy 2004 – 2007 involved undertaking an audit of all schools within the local authority (Glasgow City Council, 2004), however this did not cover new school buildings built after the Scottish Building Regulations changed in 2004 to comply with the Disability Discrimination Act (DDA) 1995. As such no research has been undertaken assessing the extent to which new and refurbished schools built after 2004 comply with best practice standards. An Accessibility Team is available to conduct site visits and compile a report indicating their recommendations for adaptations and/or solutions which have been identified. The Accessibility Strategy 2009-2012 shows the cost of adaptations which have taken place from 2004 to 2009 (Glasgow City Council, 2012), however it is not clear whether the team actively surveys premises or only attends when a problem presents itself and whether this service is

available for new buildings as well as older building stock. There might be occasions when building users, especially children, do not realise that a building feature could be designed in a way that would enable them to negotiate the building with greater ease and people may not realise that they can raise specific issues that they encounter with the built environment.

4.2.2 Participating Schools

A list of new and refurbished school buildings, built after 2004, was obtained from Glasgow City Council Education Services. The number of schools totalled 46 and included 38 primaries, 5 special schools, 2 special units and one shared primary/secondary school. Permission was given by Education Services to contact the Head Teacher at each of these schools and ask if they were willing to participate in the study. This was done via an online questionnaire which was sent to all head teachers as part of the large-scale investigation described in Section 4.4. At the end of the questionnaire head teachers from schools in the Glasgow local authority area were asked if they were happy to be contacted for future research. The study aimed to cover a range of schools within the primary, secondary and special school sectors. As there was only one secondary school on the list of schools supplied by the council the vast majority of schools which agreed to take part in the study were in the primary sector. Image 4.4 shows the location of each school on a map of Glasgow. As the map shows, the schools were located at 6 different campuses across Glasgow, with 3 campuses being shared by more than one school.

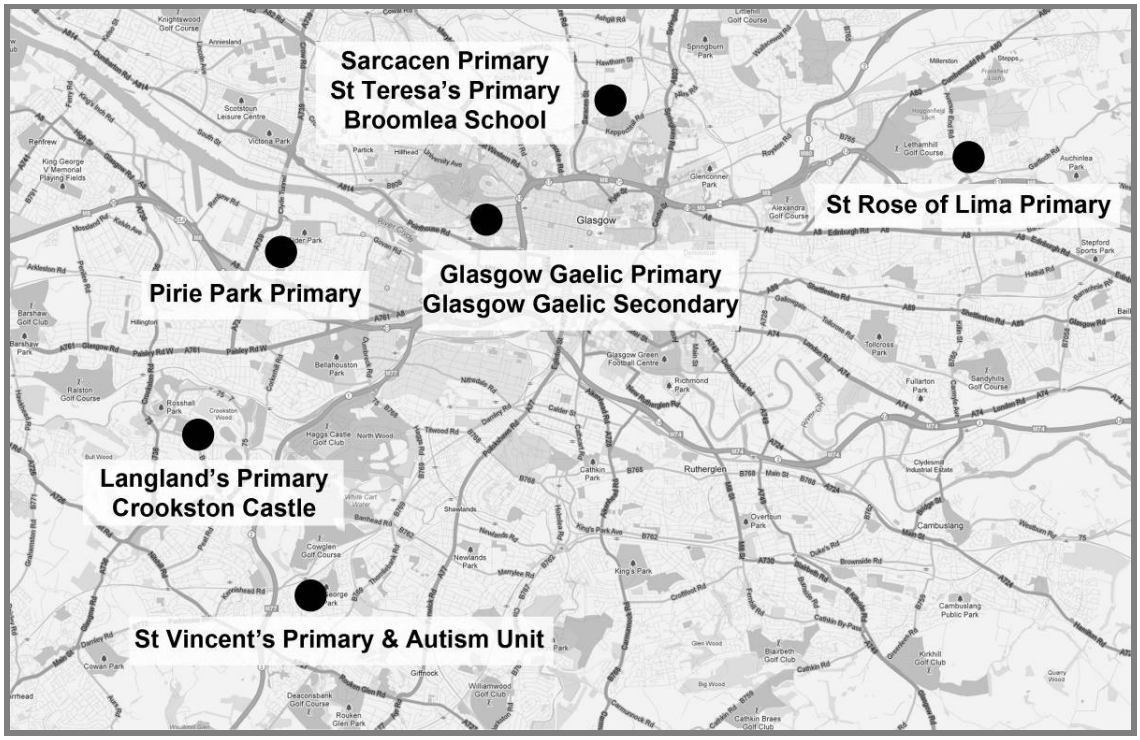


Image 4.4: Location of 10 schools shown on a map of Glasgow.

This section gives a brief description of the participating schools through 6 tables (one for each campus) detailing the school sector, capacity, roll, building type, condition and suitability ratings, nursery provision and community services. Statistics are based on the Scottish Government School Estate Statistics 2012 (Scottish Government, 2012b). Unfortunately these statistics do not detail the capacity of schools in the special school sector within the Glasgow local authority area and this information is therefore marked as unavailable.

Table 1: Pirie Park Primary (Building in black)

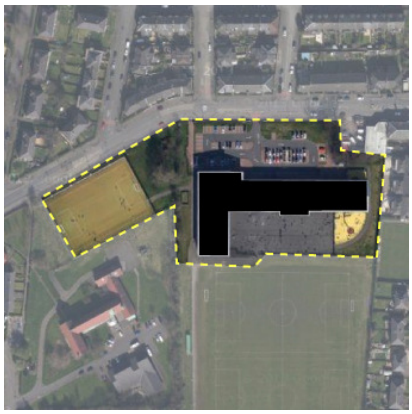
Pirie Park Primary`	
	**Sector:** Primary
	Capacity: 438
	Pupil Roll: 424
	Building type: New build
	Condition: A
	Suitability: A
	Shared Campus: No
	Nursery: Yes
	Community Services: Glasgow Life

Table 2: Crookston Campus (Buildings in black)

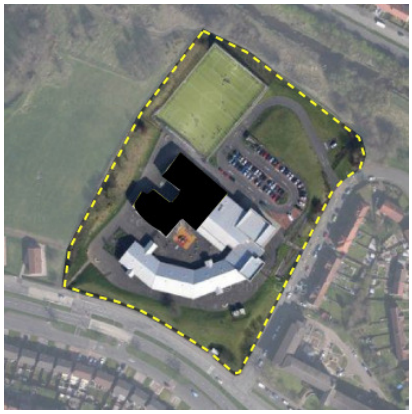
Crookston Campus	
Crookston Castle Primary School	
	**Sector:** Primary
	Capacity: 495
	Pupil Roll: 462
	Building type: New build
	Condition: A
	Suitability: A
	Shared Campus: Yes
	Nursery: Yes
	Community Services: No
Langlands School	
	**Sector:** Primary
	Capacity: Information not available
	Pupil Roll: 48
	Building type: New build
	Condition: A
	Suitability: A
	Shared Campus: Yes
	Nursery: Yes
	Community Services: No

Table 3: Glasgow Gaelic School

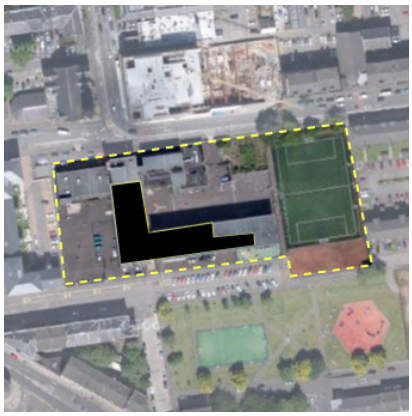
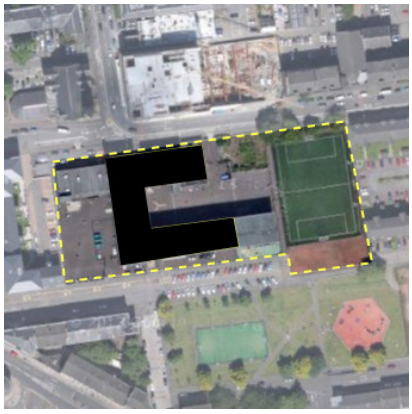
Glasgow Gaelic School	
Bunsgoil Glasgow Gaelic Primary	
	**Sector:** Primary
	Capacity: 322
	Pupil Roll: 371
	Building type: Refurbishment
	Condition: A
	Suitability: C
	Shared Campus: Yes
	Nursery: Yes
	Community Services: No
Ardsgoil Glasgow Gaelic Secondary	
	**Sector:** Primary
	Capacity: 477
	Pupil Roll: 183
	Building type: Refurbishment
	Condition: A
	Suitability: C
	Shared Campus: Yes
	Nursery: Yes
	Community Services: No

Table 4: St. Rose of Lima Primary

St Rose of Lima Primary	
	**Sector:** Primary
	Capacity: 299
	Pupil Roll: 332
	Building type: New build
	Condition: A
	Suitability: A
	Shared Campus: No
	Nursery: Yes
	Community Services: Garthamlock Family Centre

Table 5: Keppoch Campus

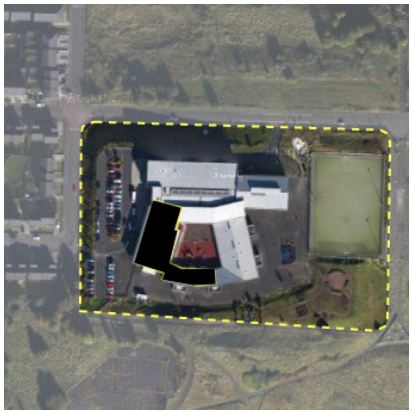
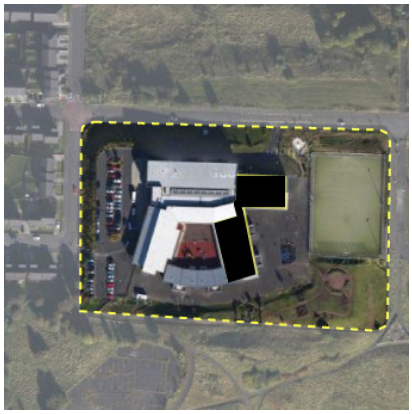
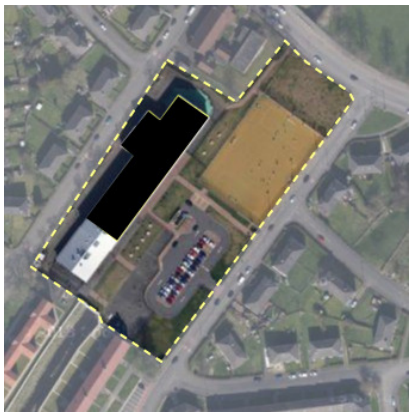
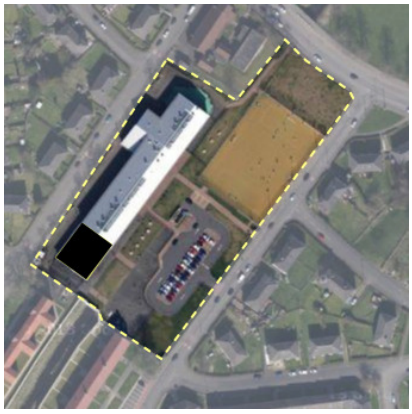
Keppoch Campus	
Broomlea	
	**Sector:** Special
	Capacity: Information not available
	Pupil Roll: 29
	Building type: New build
	Condition: A
	Suitability: B
	Shared Campus: Yes
	Nursery: Yes
	Community Services: Stepping Stones
Saracen Primary	
	**Sector:** Primary
	Capacity: 316
	Pupil Roll: 180
	Building type: New build
	Condition: A
	Suitability: B
	Shared Campus: Yes
	Nursery: Yes
	Community Services: Stepping Stones
St Teresa's Primary	
	**Sector:** Primary
	Capacity: 191
	Pupil Roll: 166
	Building type: New build
	Condition: A
	Suitability: A
	Shared Campus: Yes
	Nursery: Yes
	Community Services: Stepping Stones

Table 6: St. Vincent's Primary & Autism Unit

St Vincent's Primary & Autism Unit	
St Vincent's Primary	
	**Sector:** Primary
	Capacity: 339
	Pupil Roll: 320
	Building type: New build
	Condition: A
	Suitability: A
	Shared Campus: Yes
	Nursery: Yes
	Community Services: No
St Vincent's Autism Unit	
	**Sector:** Primary
	Capacity: Information not available
	Pupil Roll: 21
	Building type: Refurbishment
	Condition: A
	Suitability: B
	Shared Campus: Yes
	Nursery: Yes
	Community Services: No

4.2.3 Research Methods

Two established research methods, the "Design Quality Method" (Cook, 2007) and the "Access Audit Handbook" (CAE, 2005), have been adapted for use in order to investigate the performance of accessible design in the sample schools. The Design Quality Method is used by all auditing bodies in the UK as a method of Post Occupancy Evaluation and includes various sources such as expert opinion, professional judgement, user opinion and scientific measurement (BRE, 2011). The Design Quality

Method is wide in scope and does not go into specific detail concerning parameters for the measurement of accessible design. For this reason, the access audit method was also used. The Access Audit Handbook (CAE, 2005) explains how to audit an internal or external environment and its associated services, in terms of accessibility. It stresses the importance of measuring the accessibility of the environment by giving consideration to all potential users and not just the current building users. As well as identifying potential barriers to access, access audits may also suggest improvements which can be made to an environment. The visual survey undertaken of schools within this study aimed to observe not just the potential barriers to access but also examples of enabling features which can be used as examples for future school buildings. As the main objectives of the study are to assist architects in designing a more accessible school environment, the visual survey focuses purely on the building design and does not take into consideration building management issues other than building maintenance. The results of the detailed study only comment on management issues when there is a direct relation to design, for example when accessible toilets are used as cupboards, or hallways are cluttered this may be due to a lack of storage. Both the Access Audit Handbook and the Design Quality Method also highlight the importance of gathering opinions from a wide range of building users. This was undertaken informally, by talking to building users throughout the visual survey and more formally, through questionnaires and focus groups with pupils and staff. The visual survey and user consultation are described in more detail in the following two sections.

4.2.4 Visual Survey

Visual surveys of all 10 school premises were undertaken between May 2011 and February 2013. The visual survey aimed to investigate the performance of accessible

design not only in the school building and grounds but also in the surrounding area, taking into account how people arrive to the school campus, whether by transportation or walking. This is especially important due to the Scottish Government initiative to include community facilities within school campuses, which means that the campus should be accessible by local people outwith normal school hours when school crossing patrol officers are employed to assist with crossing busy roads. Local Authorities generally provide transportation to and from school for any primary school child who lives further than one mile from the school. An area of approximately one mile radius was audited with consideration given to accessible pavements, crossings and the nearest public transport links. The Access Audit Handbook suggests that studying the building plans to familiarise with the building before undertaking an audit can be useful, however it also comments that it can be beneficial to go with no prior knowledge of a building in order to experience how other members of the public might experience their first visit (CAE, 2005). As the school building tends to be used by people on a frequent basis who are familiar with the spaces and building layout it was considered more beneficial to undertake the visual survey with a prior knowledge of the building. Building plans of each school were requested from the architect or the school head teacher and these were studied before the visit in order to familiarise with the building.

Information gathered during the visual survey was recorded through photography and taking notes on the building plans. Three main documents were used in order to establish criteria against which to benchmark best practice accessible design:

- The mandatory Building Regulations for Scotland (SBSD, 2011)

- Best practice guidance document: “BS8300: 2009. Design of buildings and their approaches to meet the needs of disabled people – code of practice” (BSI, 2009)
- Best practice guidance document: “Building Bulletin 102. Designing for disabled children and children with special educational needs. Guidance for mainstream and special schools” (DCSF, 2008).

A checklist of areas of the school and aspects of design which should be considered was prepared for reference throughout the visit, an example of which is presented in Appendix B. Where relevant, specific measurements were taken and recorded on the plan and sketches were made to record building features in elevation. The researcher spent a minimum of half a day at each school. A member of staff, and in one case two primary 7 pupils, gave the researcher a short guided tour of the school building and grounds. This was important as all the schools involved in the study share their campus with other schools, nurseries or community facilities and the designated usage of certain spaces on the building plans had sometimes been changed. The rest of the day was spent observing how the school worked at different times of the day, taking notes and photographs, and speaking to members of staff working in the building.

4.2.5 Building User Consultation

The consultation process took place between May 2011 and May 2013 and aimed to gather a broad range of views from different groups of staff and pupils at the schools. All consultation was undertaken with the permission of the head teacher. The head teacher or another representative member of staff, participated in a semi-structured interview on the day of the visual survey in order to introduce the researcher and find out general information about the school which could not be found online concerning

the usage of the campus and community facilities. Appendix B contains a sample of a semi-structured interview with a Head Teacher.

4.2.5.1 Staff Consultation

Informal consultation was undertaken by speaking to members of staff during the visual survey of the school premises. A short questionnaire which took 5-10 minutes to complete was also sent to all staff via the Head Teacher asking people to rate certain aspects of school design and leave comments when relevant. This questionnaire was intended to gather quantitative data concerning the 10 schools in the survey and gather the opinions of staff not present on the day of the visual survey. Data collected from a more in-depth questionnaire which had been undertaken as part of a previous research project was also included. These questionnaires contained a mixture of quantitative rating questions and dichotomous questions. In both questionnaires a comment box was provided after each question so that explanations could be sought for the ratings given and staff were invited to contribute any comments they felt relevant at the end of the questionnaire. Questionnaires were was accessed online using Qualtrics software, however a paper format was also designed to be given to people who preferred this method. The questionnaire was kept open as long as possible in order to maximise responses and a reminder was sent before it closed. The electronic questionnaire is shown in Appendix B. Four staff focus groups with staff from Langlands School, Broomlea School, Glasgow Gaelic Primary and Pirie Park Primary, which were held as part of a previous research project, were also included. These were all attended by educational staff and allowed the researcher an opportunity to seek their professional opinion on the teaching environment. Discussions were semi-structured, focusing on issues raised during the visual survey and questionnaire. An example of the structure

for one of the focus groups is shown in Appendix B. The group discussion added more depth of detail to information gathered during the visual survey and questionnaire as staff could discuss issues amongst themselves and many also made useful comparisons with the previous school building or other schools in which they had taught. Contact was also made with Cordia, who operate the canteens in all Glasgow primary and secondary schools and a senior member of staff met with the researcher during one of the visual surveys to contribute opinions regarding the cleaning, catering and janitorial services. The mix of quantitative and qualitative data proved useful in assessing the performance of design factors at a large scale and helped to rule out personal bias but at the same time provided detail to explain certain results. The majority of respondents were from the education group, rather than administrative, catering or janitorial staff. This was expected as teachers form the largest percentage of staff and also have more ready access to a computer in the workplace to complete the survey. The questionnaires were useful in gathering information from teaching staff, however the visual survey proved a more useful method of gathering the opinions of other groups such as janitorial, administration and catering staff.

4.2.5.2 Pupil Consultation

As with the staff consultation, data collected from focus groups undertaken within 4 schools as part of a previous research project was included within this study. Four focus groups were held with children at Glasgow Gaelic School Primary and Secondary, Langlands School and Pirie Park Primary. Through discussions with staff at each school, it was agreed that it would be best to consult primary school children in Primary 7 and secondary school children in 5th year, as they have more experience of the school building and can make comparisons between areas used by different year

groups such as specific classrooms and sections of the playground. The format of each focus group was developed with the help of teaching staff at the school.

The Glasgow Gaelic Secondary School focus group was undertaken with a small group of 5 pupils who were selected by the school. Participants were given a small presentation explaining what is meant by 'accessible design' and an informal discussion then took place structured around specific questions focusing on areas highlighted in the visual survey and questionnaire. The questions were purposely open-ended and intended to encourage discussion rather than constrict the answers or the focus of discussion. Pupils were mainly asked questions about how specific design aspects of the school affected their day. However they were also asked to describe past experiences in the school, how they imagine younger pupils experience the school, and to compare their school with others that they have attended or know of. The presentation and structure for the interview are presented in Appendix B.

As children at Langlands Primary School have complex support needs it was decided that the focus group size should be smaller in order not to disrupt the school day and to get better quality information from individual children. Three children participated and were taken to a quiet room accompanied by their normal teacher who has expertise in how to best communicate with each child. Children were shown cards with photographs of different areas in the school and asked to point to their favourite place. They were then asked what they liked to do in these areas. The focus group lasted roughly 15 minutes and children were thanked and given their favourite cards to take home with them. A photograph of children taking part in the focus group is shown in Image 4.5.

Image 4.5: Picture of children taking part in Langlands focus group.

Focus groups at Glasgow Gaelic Primary School and Pirie Park Primary School followed a similar format to one another, although the questions were focused on design aspects specific to each school. Worksheets were given to each class and the researcher and teacher were both present to answer any questions. The researcher talked through the worksheet in order to ensure the class worked through it at an appropriate pace. Questions were designed to be as simple as possible and photographs of the school were used to clarify the focus of the question. The worksheet included a mixture of dichotomous and open-ended questions as well as multiple choice selections of appropriate descriptive words and drawing tasks. The worksheets designed for each school are presented in Appendix B. School Head Teachers and the children's classroom teacher were asked for their advice and given a draft of the worksheet for comment before the focus group took place. The children's classroom teacher was present at the focus group and children were encouraged to ask either the

researcher or herself when they required assistance. The focus group lasted roughly 30 minutes, at the end of which children were thanked for their time and given a small gift.

4.2.6 Results

As described above, various different methods have been used within the detailed study. The results are presented in the following sections based on the structure of an Access Audit which collates information concerning different aspects of a building into a structured report. Results from the visual surveys and building user consultation have been brought together in order to make informed conclusions regarding the design performance of specific areas. For example, the section examining environmental aspects will use observations made during the visual survey as well as both quantitative and qualitative information from the staff and pupil consultation. The results have been split into two main sections, interior and exterior, which have been divided into sub-criteria covering different design aspects.

4.3 Results: Interior

4.3.1 General Layout

With an increase in the number of shared campuses and mainstream schools with special units the general layout and distribution of facilities within the school can have an impact on opportunities for inclusive learning, timetabling and disruption due to noise from break times or classes moving around the building. Some of these factors are covered in more detail the following sections. The layout of most school buildings was relatively clear and vertical circulation points were fairly easy to identify. A common complaint, especially in one school which had noticeably smaller spaces than others, was a feeling that space had been constricted in certain areas.

The refurbished school is slightly disorientating in terms of circulation. Glasgow Gaelic School is a 4 storey building with the sports hall and canteen providing two main focal points at either side of the main entrance and classroom accommodation situated on the first, second and third floors, around an L-shaped corridor with several vertical circulation towers for different age groups. The floor plans of Glasgow Gaelic School are shown in Image 4.6, which uses different colours of shading to show communal areas, teaching areas, non-school areas (either not used or used by the council) and the main circulation towers.

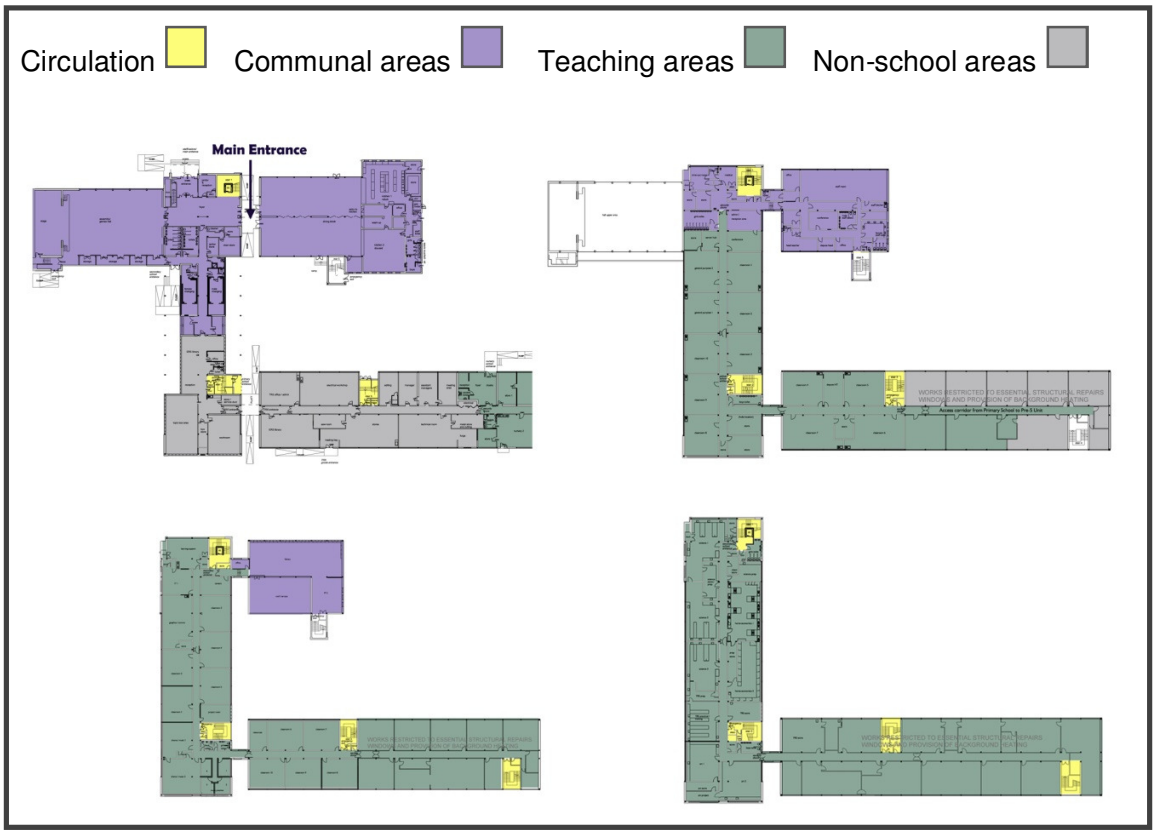


Image 4.6: Floor plans of the four floors of Glasgow Gaelic School. NTS. Floor plans kindly supplied by Glasgow City Council Development and Regeneration Services.

In all campuses care has been taken to ensure that individual schools and units can access communal facilities independently. The layouts of two school campuses with similar facilities are compared in Image 4.7. The first plan (a) shows Keppoch Campus, shared by Broomlea School, Saracen Primary, St. Teresa's Primary and Stepping Stones Nursery. The layout of Keppoch Campus ground floor works well and each school feels that they have equal access to dinner hall, sports hall and general purpose rooms. However there are some issues with vertical distribution. Saracen Primary is located above the nursery with all of the school accommodation on the upper floor. This has caused problems in the past with a pupil who used a wheelchair as the lift could not be used in event of a fire. On the first floor of Keppoch Campus, the IT suite, library and staffroom are all located at the far end of Saracen Primary, making it more difficult for the staff and pupils and Broomlea School and St. Teresa's Primary to access these facilities. Furthermore, the school does not have a fire lift, meaning that pupils from Broomlea cannot access the communal resources on the upper floor. The second plan (b) shows the campus shared by Langland's School, Crookston Castle Primary and Crookston Early Years Centre. In Langland's School several staff commented that they feel the communal facilities appear to belong to Crookston Castle Primary. This is due to the distance that pupils and staff have to travel to access communal resources. The division is also emphasised through the separate entrances, although this was at the request of staff. Plans for this campus involve extending Crookston Castle Primary into the area now occupied by the nursery (shown in grey), which could decrease even further the sense of ownership over communal facilities for staff in Langland's School. Crookston Castle Primary has classrooms on both the ground and upper floors making it easier for the school to accommodate a child with a mobility impairment. There are no

communal resources on the upper floor, however it would be preferable if all areas of the campus were accessible by children from Broomlea School who, in common with those attending Broomlea School, cannot access the first floor at the moment due to fire escape issues.

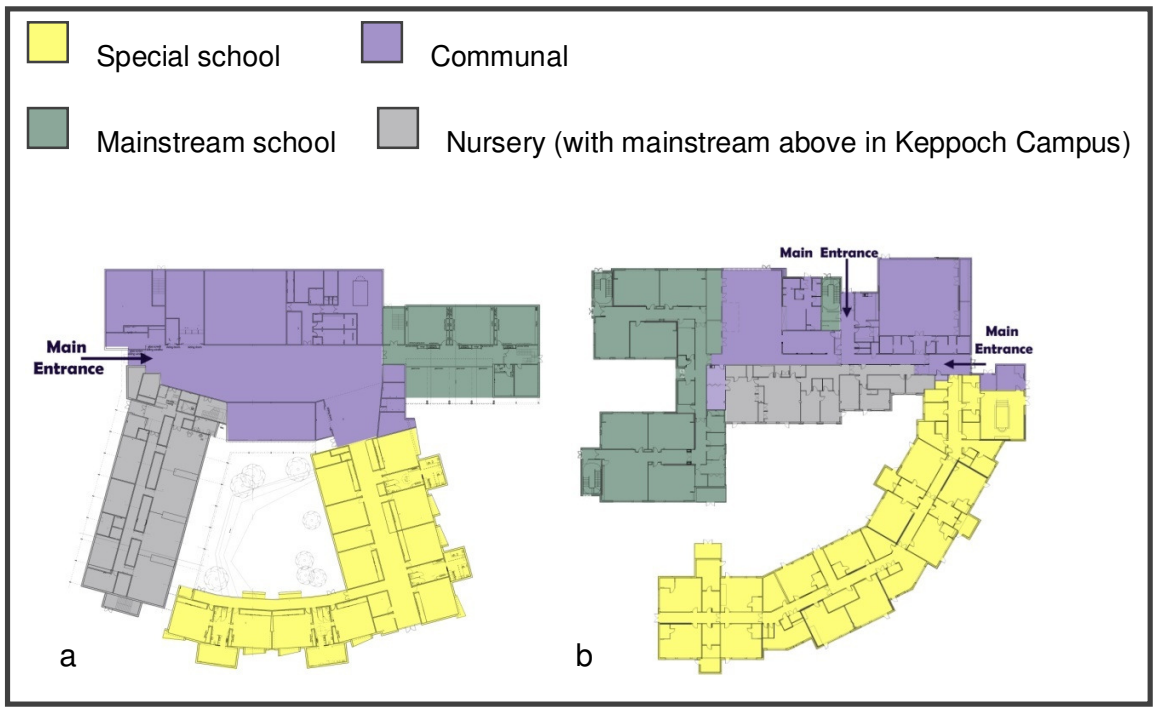


Image 4.7: Diagram showing the layout of (a) Keppoch Campus & (b) Langlands School and Crookston Castle Primary. Floor plans sourced from: http://www.scotland.gov.uk/Topics/Education/Schools/Buildings/CaseStudies/Glasgow/Keppochcampus

4.3.2 Horizontal Circulation

4.3.2.1 Main Entrance

The main entrances in all new school buildings have level access which is line with mandatory legislation and has benefits for a range of users such as people using mobility equipment or visually impaired people. The refurbished school has a flight of 3 stairs and a ramp with a large landing at the top, as shown in Image 4.8. The handrails provided at either side of the stair and ramp are black, providing a good contrast

against the light grey concrete steps, however they do not extend horizontally at the top or bottom of the flight. In addition there are no contrasting nosings or tactile warning.

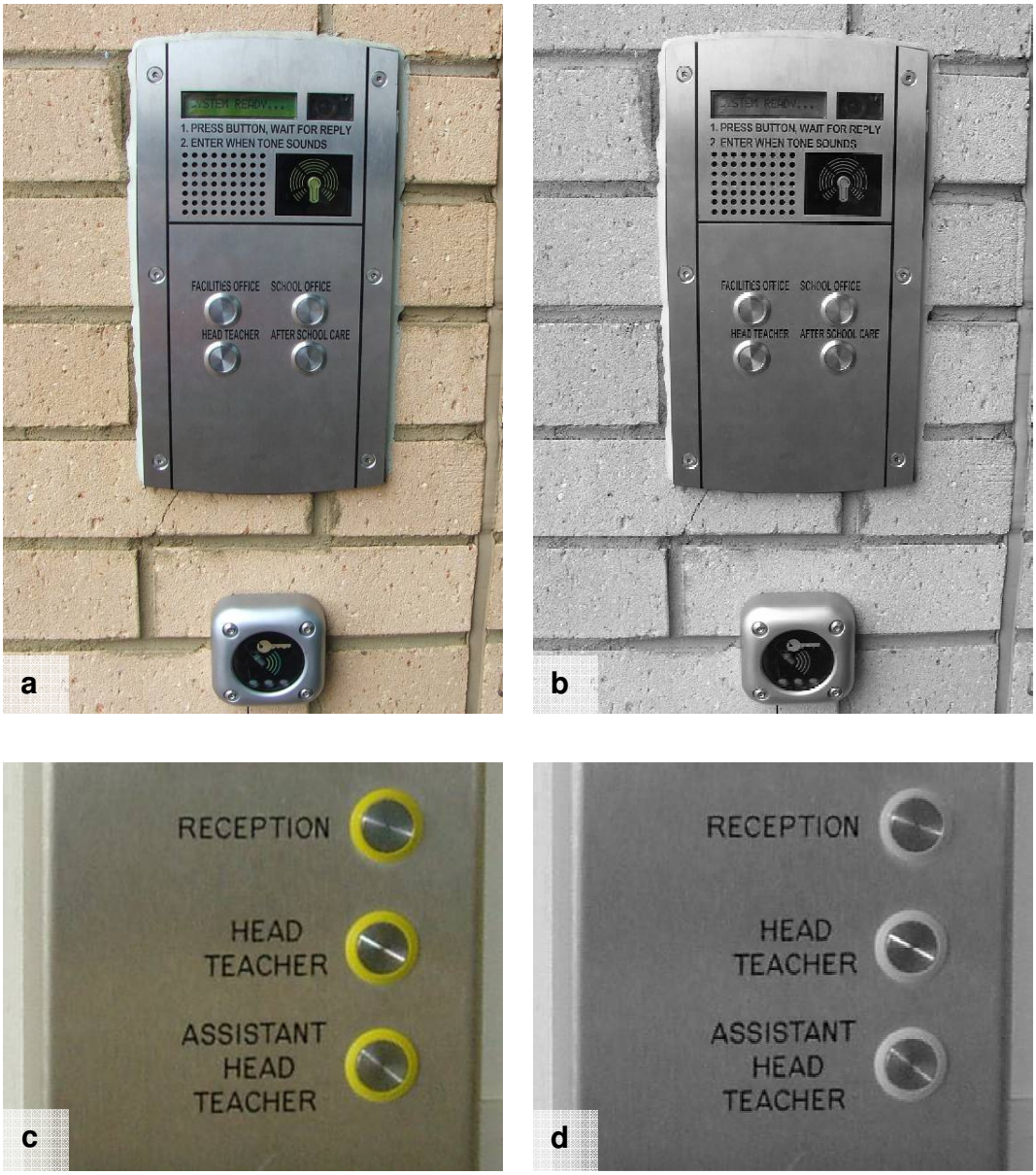
Image 4.8: Entrance to Glasgow Gaelic School showing steps and ramp and level entranceway to Pirie Park Primary

The majority of entranceways have sheltered areas and stand out well from other building features, however all of the doors are the same material and colour as their immediate surroundings providing little contrast. Depending on the way in which the campus was approached it can be difficult to find the main entrance and signage to indicate this could be improved. All new schools have pull handles, however the refurbished school has round handles which are harder to grip and required a twisting action. All of the handles are silver which is the least visible colour for people with a visual impairment (White, 2010) and especially when viewed against the glazed doors with grey surrounds which have been used at many new schools.

In the majority of schools a variety of entranceways/exits are used by children of varying age groups and it is important to consider these as well as the main entrance used by the public and school staff. One teacher commented that two exits for 360 pupils is too little and home times are chaotic. In another school a stairwell originally

designed to operate only as a fire escape had to be turned into a regularly used circulation tower in order to provide an additional entrance. These issues should have been clarified by consulting with staff about the daily use of the school at the design stage.

The design of the secure entry system is similar at all schools. Generally, all of the intercom boxes are positioned between 900 and 1200mm to allow a person in a wheelchair to operate the system and they also incorporated both audio and visual cues. However, the silver colour is problematic as this is the least visible colour and can cause glare and discomfort for people with visual impairments (White, 2010). In many cases the buttons are also silver and do not contrast with the facing of the box. When colour contrasting is provided, the buttons are normally circled by a thin yellow strip but this does not contrast well with silver. Image 4.9a shows a typical door entry system when viewed in colour and Image 4.9b shows the same entry system in greyscale, to demonstrate the lack of contrast between the box and the wall and the glare caused by silver. Images 4.9c and 4.9d demonstrate the lack of colour contrast between silver and yellow. In addition, text is usually small and in uppercase which is advised against by BS8300 (BSI, 2009) as it is more difficult to read for people with a visual impairment. Design of these intercom boxes could be greatly improved by ensuring that the box contrasts against the wall colour, that the buttons are tactile and contrast against the box and that the text meets BS8300 (BSI, 2009).



Images 4.9a and 4.9b showing Intercom system against wall in colour and greyscale and Images 4.9c and 4.9d showing intercom system with yellow button trim in colour and greyscale.

Exits from school buildings are also controlled by standard controls shown in Image 4.10. The distinction between the shape of the controls is helpful, however the green text is in uppercase and does not contrast well against the silver background. Several schools had made their own larger text signs to put next to the switch. In the schools for

children with complex learning needs the security controlled switches were placed higher in order to prevent children from pressing them, which would cause problems for a member of staff in a wheelchair. Staff suggested that a fob-controlled exit button might be more appropriate in this case.

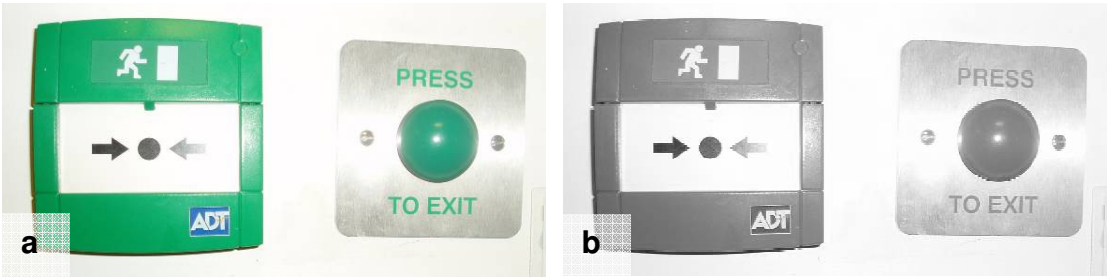


Image 4.10: Exit controls pictured (a) in colour and (b) in greyscale

4.3.2.2 Reception

Reception areas were located at the main entrance in all new schools and on the first floor in the refurbished school. All reception areas have seating and a window opening at an appropriate height for wheelchair users and school children and seating with back support. Only St Vincent's Primary, shown in Image 4.11 has a reception desk designed so that wheelchair users can sit with the chair underneath while writing or speaking to the school administration. At the refurbished school the reception desk opens onto a corridor less than 2.2m wide, the recommended width for a reception area with no built-in knee recess for wheelchair users in BS8300 (BSI, 2009, 7.1.2). The majority of schools do not have hearing aid facilities at the reception area. It would be helpful if the frame of the reception window was painted in a colour which contrasts well with the surrounding wall so that visually impaired users could easily identify the window area. One school for children with complex learning needs does not have a reception area due to changes made during the construction stage of the project, when it was decided that the planned campus administration area, to be shared by all administration staff,

was located to far from the school to allow communication between the administration and the head teacher. The reception area is not therefore located at the entrance which could cause problems for visitors to the school.

Image 4.11: Reception area at St Vincent's Primary with wheelchair accessible desk

4.3.2.3 Level Access

All schools with the exception of the refurbished school have level access to all areas throughout each floor. In the refurbished school the staff accommodation on the first floor and the library and IT suite on the second floor are situated beyond a flight of four stairs, leaving this area of the building inaccessible for anybody using a wheelchair. The stairs on the first floor leading to the staff accommodation have a handrail on either side, however the stairs on the second floor leading to the library, pictured in Image 4.12, have no handrail and the nosings do not contrast with the dark colour of the carpet. Neither set of steps has tactile warning. The stairway is not wide enough for a lift to be installed and could present a serious barrier to a member of staff or child using mobility equipment or with a visual impairment. Possible solutions would involve

installing a lift to provide access from other floors to the accommodation located beyond the steps or widening the access corridor to include a lift. The latter solution is preferable as this would provide access from the same floor.

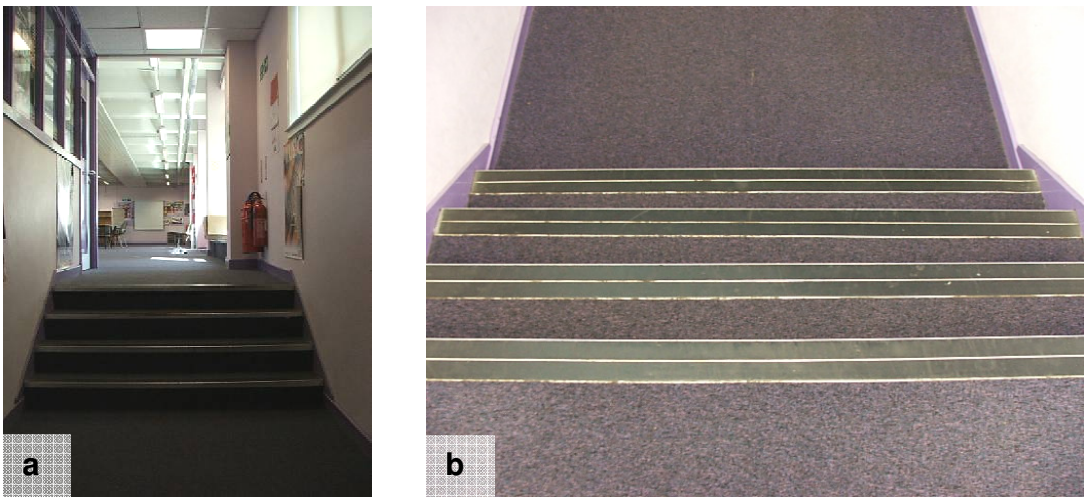


Image 4.12: Inaccessible stairs in refurbished school (a) looking up and (b) looking down.

4.3.2.4 Corridors

Staff were asked to rate aspects of circulation from 1, very poor, to 5, very good. Results are shown in the graph in Image 4.13. Average ratings ranged from 3 to 3.5, with storage and space in hallways scoring the lowest ratings. Corridors in all new schools vary in width along their length, from a minimum of a round 1.4m to around 3.8m in some cases where seating provision is made for small group work. New schools have all managed to make corridor areas feel light and airy, using light wells to introduce daylight to the upper and lower floors, with obvious connections to exterior and interior areas. In the refurbished school corridors are approximately 1650mm wide and do not tend to vary in length, with no light wells, making them feel narrower and longer than in the new schools and making it more difficult navigate around the building.

Staff at all schools commented that corridors have specific areas of congestion, particularly where cloakrooms are located. When children in one Primary 7 focus group were asked if the corridors are ever too crowded 81.8% selected yes. A general lack of storage outwith the classroom means that corridor width can be narrowed by cupboards. At the two schools for children with complex learning needs, storage space for mobility equipment was particularly lacking.

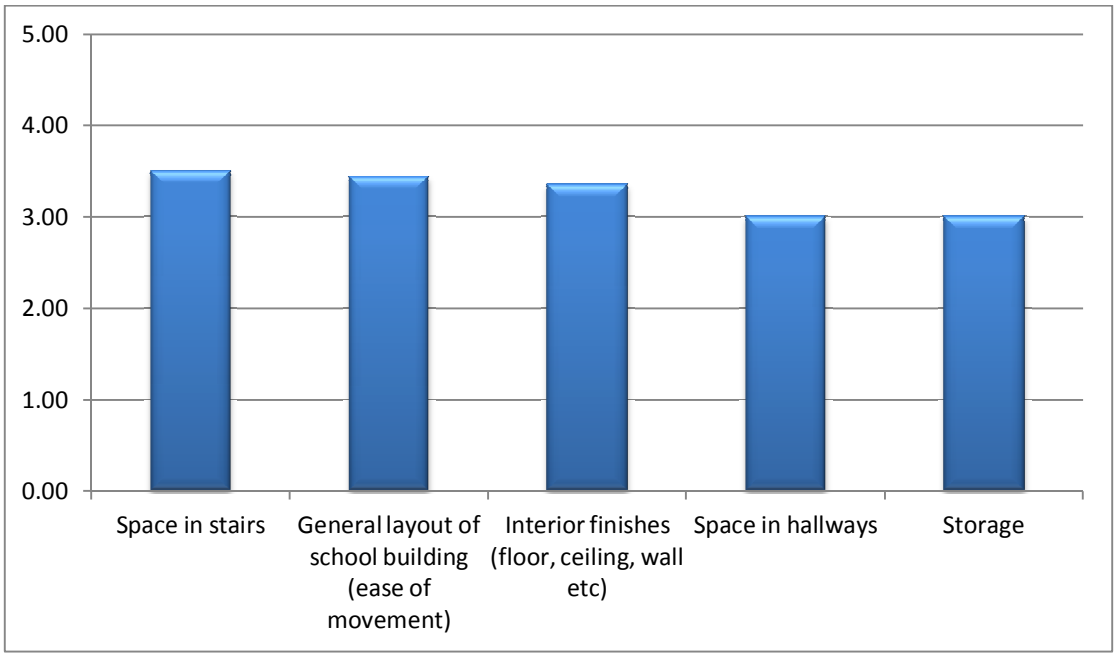


Image 4.13: Graph showing average ratings for circulation

In several schools there is no separate corridor for the dining/assembly hall and this means walking through this area when it is in use, as shown in the plan in Image 4.14. Some staff commented that they tend to go up one staircase and down another to avoid traversing this area and the parent of one child with autism had complained that their

child found it difficult to walk through the assembly hall in order to get to the classroom. Children in a Primary 7 focus group were shown pictures of corridors and routes in the building and asked to circle spaces which are comfortable to use and put a cross through spaces which are uncomfortable, the results of which are shown in the graph in Image 4.15. 30% of the class putting a cross through the assembly hall, showing that it is the least popular route, with reasons given including that it is too wide and can be crowded.

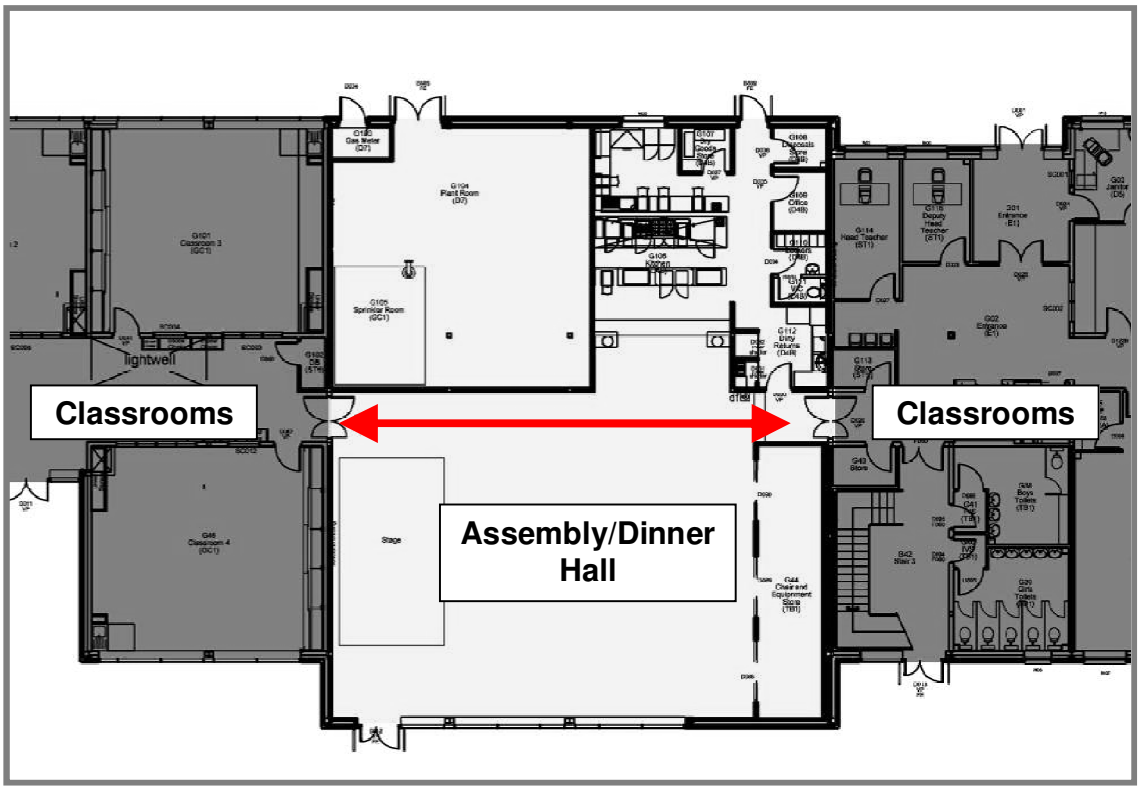


Image 4.14: Plan showing route through assembly hall connecting classrooms on either side. Floor plans kindly supplied by Glasgow City Council Development & Regeneration Services.

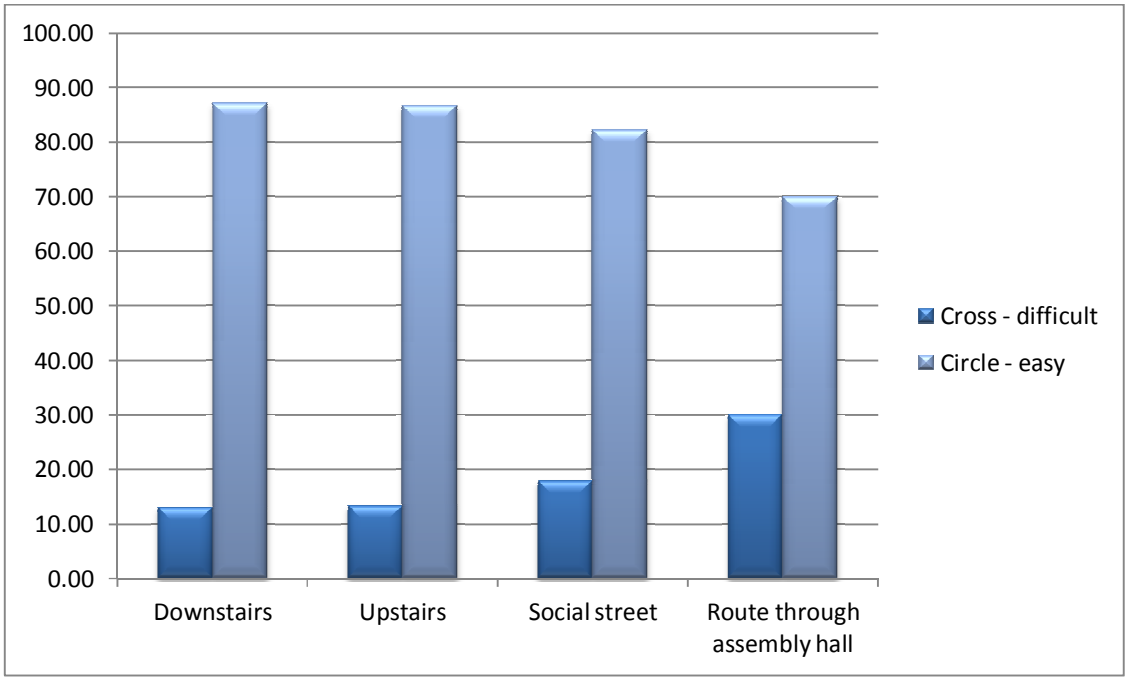


Image 4.15: Graph showing routes that children find easy and difficult to walk through

4.3.2.5 Interior Finish

In general corridors have clear routes and the interior finishes help to minimise glare from daylight. All floors are finished with linoleum which provides a plain, smooth, slip-proof surface which is helpful to people using mobility equipment and preferable for people with a visual impairment than a heavily patterned surface. Because of the widening and narrowing of the corridor and tendency to use the corridor for small group work it would be helpful for the floor finish to indicate a clear, obstacle-free route throughout the building for people using mobility equipment or people with a visual impairment. Image 4.16a shows an example of how this has been done in a shared dinner/assembly hall in Langlands School and Crookston Castle Primary. This would be especially helpful for spaces such as the social street area shown in Image 4.16b. Columns tend to blend into the background rather than contrast, as shown in Image

4.17. In order to prevent collision, it would be helpful if they were painted to contrast with the background against which they are seen and with two colour contrasting bands, as is suggested for exterior free-standing posts and columns in BS8300 (BSI, 2009, 5.7.1.2).

Image 4.16: (a) Example of floor finish denoting route through dinner/assembly and (b) Example of street area hall

Image 4.17: Examples of columns which blend in with the background

A strong contrast between the wall and floor can be an important aid for people with a visual impairment and ideally the skirting board should be of a similar colour to the wall

to enhance the floor boundary. The white finish of the walls and light coloured floor finish in the majority of schools does not provide an adequate contrast between the floor and the wall, as demonstrated in Image 4.18a. Image 4.18b shows an example of flooring which contrasts well with the wall, the dark colour also helping to prevent glare. This could be improved by painting the skirting board the same colour as the wall to stop it blending in with the floor and making the corridor appear wider than it really is. However, it should be noted that in this particular case the skirting board is no higher than 100mm and this is not as problematic as it would be with a higher skirting board which would make the corridor appear far wider than it is. The blue strip on the wall which serves to prevent the wall being damaged by mobility equipment could be confused for the delineation between skirting board and floor finish and would be better if it blended in with the wall colour, allowing the floor finish and handrail to stand out. A darker finish of handrail would also provide a better contrast against the white wall.

Image 4.18: Example of (a) light coloured floor which does not contrast well with the grey skirting board & (b) good contrast between wall and floor, but not between skirting board and floor.

4.3.2.6 Doors & Ironmongery

All door openings are wider than 0.8m, the minimum recommended width for a wheelchair user to pass through. Doors also tend to contrast well with the adjacent wall colour with walls painted white and doors finished in a pine effect with grey or coloured frames. Handles on classroom doors are easy to operate, however the silver colour does not contrast well with the door, making it difficult for people with a visual impairment to locate the handle. It would be helpful if handles were made a darker colour to contrast with the light pine effect of the door. Doors are generally light and relatively easy to open with some exceptions. In one of the schools for children with complex learning needs, doors have been provided leading directly from the classrooms to the external courtyard area. Staff are happy that this has been provided, however the doors are almost impossible to open when they reach 60-70 °, making it extremely difficult to push children who use a wheelchair or help those who use mobility equipment. In certain schools, the accessible WCs have sliding doors which can be heavy to move. The ironmongery on accessible WCs is generally not well specified. Some doors have small handles which require placing a lot of force on the finger tips, an example of which is given in Image 4.19a. Other doors have pull bar handles, however locks are generally small rather than the recommended lever-style handle. If possible it is preferable to provide swing-doors or reduced-swing doors rather than sliding doors as these require more force and tend to become very stiff over time. Where a sliding door is fitted, a pull-bar handle is preferable to the small circular handle. BS8300 recommends that where possible, lever style locks should be used, however the majority of non-accessible WCs have small circular locks. It is recommended that guidance regarding ironmongery and colour contrast for accessible WCs be used throughout all WCs, as people with, for example, limited hand and arm movement may

not necessarily use the accessible WC and people with a visual impairment may find smaller WCs easier to use as larger spaces can be more confusing.

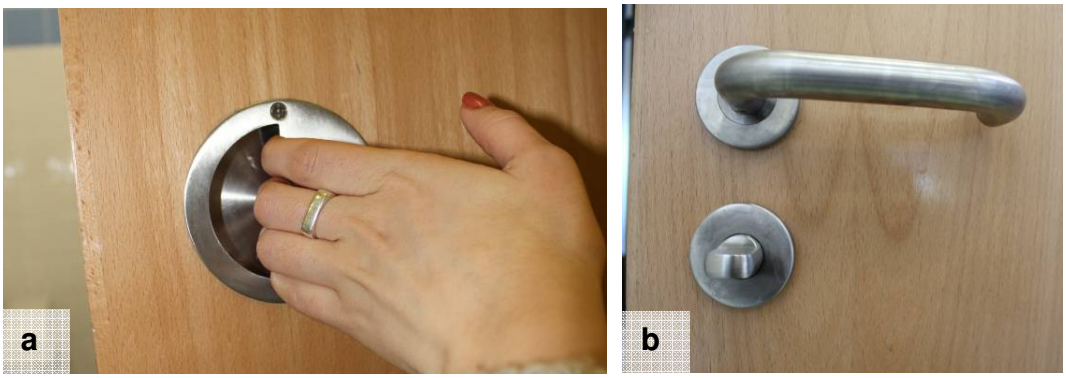


Image 4.19: (a) Small, circular handle fitted to sliding door of accessible WC and (b) small lock fitting

4.3.2.7 Signage

Some examples of exterior signage are shown in Image 4.20. The standard Glasgow City Council signage, shown in Image 4.20a in colour and b in greyscale, has a large white Sans Serif font type which contrasts well against the dark green background, in accordance with BS8300 (BSI, 2009, 9.2.3). The material also helps to minimise glare. This type of signage is preferable to the signage at the refurbished school, shown in Image 4.20c which is reflective and has a more complicated font style. However, Image 4.20d, taken at the oldest school in the study, shows that the signage does not age well, the dark green background almost completely losing its colour and making the white text unreadable. All signage is placed too high at a height of over 1.7m, which could cause difficulties for someone in a wheelchair or someone with a visual impairment who wants to get close to read the sign.

Image 4.20: Standard signage in (a) colour and (b) greyscale, (c) signage at refurbished school and (d) older signage which is badly worn

The standard interior signage at the majority of schools is aluminium finish with black text, examples of which are given in Images 4.21 a and b. Silver contrasts poorly with all surroundings, especially the light colour of the walls and doors in new schools, and can create glare which can cause discomfort to visually impaired people. The standard text font is Sans Serif, however the text is sometimes small and written in uppercase which is recommended against in BS8300 (BSI, 2009, 9.2.3). Signage is generally placed at a height of 1500mm or higher, which is too high for children or wheelchair users to easily read. Signage at the refurbished Glasgow Gaelic School has raised

letters in a large lowercase white Sans Serif font, which contrast well against the blue background, shown in Image 4.22a. The signage is of a matt finish which minimises glare and icons are used for certain spaces. Braille is also used under each of the words, however this would be more useful if placed at a lower height as signage is generally placed above the door viewing panel. Langland's School have had specialist signage made, shown in Image 4.22b. A large Sans Serif lowercase font is used and text is white against a dark blue background. It is positioned at a height of 1010mm which can be easily seen by children and drawing have been used to illustrate the activities taking place in each room.

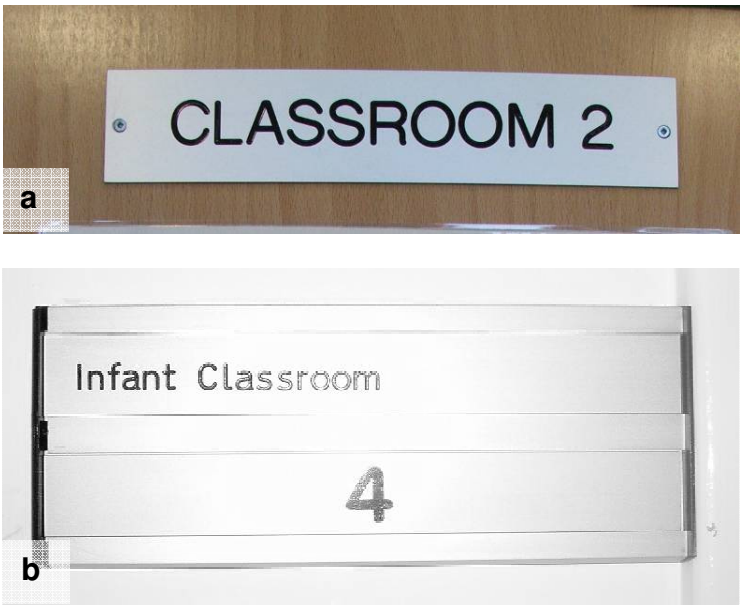


Image 4.21: Examples of silver signage (a) in colour and (b) in greyscale

Image 4.22: Examples of silver signage (a) at Glasgow Gaelic School (b) at Langland's School

4.3.3 Vertical Circulation

4.3.3.1 Lifts

All of the mainstream schools have the majority of the classrooms located on floors above ground level and vertical circulation is therefore a main design consideration. All of the schools in the study have lifts which provide access to all floors in compliance with mandatory building regulations. The lift in the refurbished school provides access to the majority of accommodation on each floor, however it does not provide access to the staff accommodation or library and IT suite. This is discussed in further detail in Section 4.3.2.3 Level Access. The removal of level changes and standard provision of lifts represents a great advancement in building standards which removes a serious barrier to anyone with difficulties using stairs and can be life changing for people with mobility impairments who previously may not have been able to access different floors or even different rooms located on the same floor. However, provision of a lift does not negate the need to provide ground floor classrooms. One primary school does not have

any classrooms located on the ground floor and staff commented that this caused problems for a pupil using a wheelchair. Despite there being a lift, the school were advised that the pupil could not use the upstairs classrooms in case of fire. The lack of a downstairs classroom in which all of the class could have been located was problematic. The school in question shares a campus with 2 other schools and could not therefore occupy the ground floor general purpose rooms which may have provided a solution.

All lifts are fitted with grab rails and mirrors to aid people using a wheelchair to reverse in or out and all have adequate circulation space on entering or exiting (1.5m by 1.5m) (SBSD, 2011, 4.2.7). The majority of lifts were located near the main entrance and exit straight into the upstairs corridor, making it relatively easy to access the majority of accommodation. In the refurbished school the lift is positioned next to the stairwell making it easy to locate but making it necessary to exit through the door in order to reach any accommodation. The majority of lift doors do not contrast well with the adjacent wall surface, typical examples of which are shown in as shown in Image 4.23a and Image 4.23b. The interior finish at the refurbished school, shown in Image 4.23c, helps to minimise glare and is less reflective than the finish typically used in new school buildings, shown in Image 4.23d. Shiny, reflective surfaces can cause discomfort for people with a visual impairment (White, 2010). At the refurbished school the button panel is side lit and the buttons are larger and contrast slightly better against the panel than in the new schools. While all lifts have tactile buttons, none of the lifts have large contrasting print and the numbers are generally difficult to read.

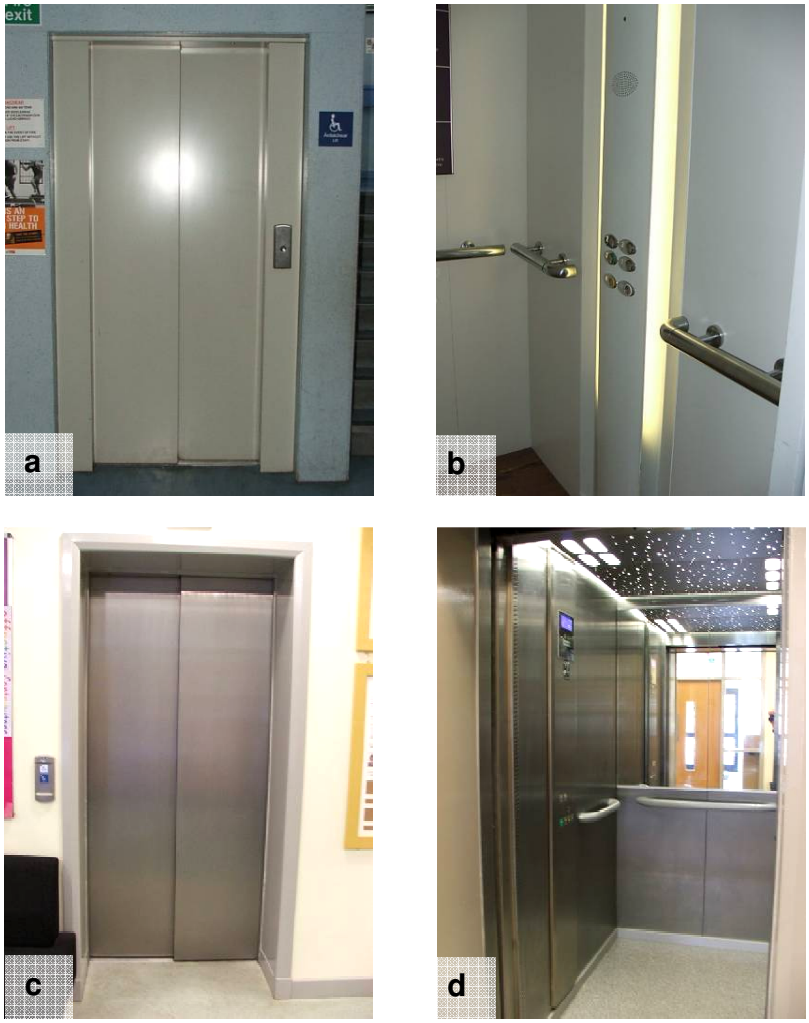


Image 4.23: (a) and (b) typical lift doors demonstrating the lack of contrast between door and wall surface, (c) lift control panel in refurbished school and (d) typical lift interior in new schools with shiny reflective surface and buttons which do not contrast.

4.3.3.2 Stairways

The number of stairways provided in schools was generally felt to be sufficient. In one case, a stairway originally designated solely for means of escape in case of fire was changed due to requests from staff who felt that one stairway was insufficient. Provision of two or more stairways helps to ease crowding in corridors and allows different age

groups to use the stairs at different times making it less likely for younger pupils to be pushed by older pupils.

The design of stairways varied from school to school and there are various different examples of colour and size specifications. Image 4.24 shows examples of the different colours combinations for stair nosing, floor finish and handrails. In the majority of schools a light grey floor finish is used with black stair nosings providing a fairly good colour contrast. The wall and handrail colour varies, the most common being a light pine finish handrail against a white or coloured wall. The light coloured handrail does not contrast well with the yellow or light green wall colour shown in Images 4.24e or 4.24f. It contrasts slight better with the red wall colour shown in Image 4.24d, however the best colour contrast is provided by the white wall and dark coloured handrail shown in Image 4.24a. In Images 4.24a and 4.24c the railings below the handrail have been painted a light grey colour which blends in with the background and works well to prevent creating a patterned surface which can be confusing for people with a visual impairment. This works better than the dark grey colour which has been used in Image 4.24b. In common with corridor finishes, the wall colour of the stairway should contrast with the floor finish. None of the examples below provide an ideal example of this, however the dark skirting in Image 4.24b could help to highlight the edge of the stairs. The light grey skirting board in Image 4.24a is a mid-tone between the stair finish and wall colour making the boundary harder to detect. A darker colour of stair finish with light colour contrasting nosings would help to define the boundary between the stair and wall.

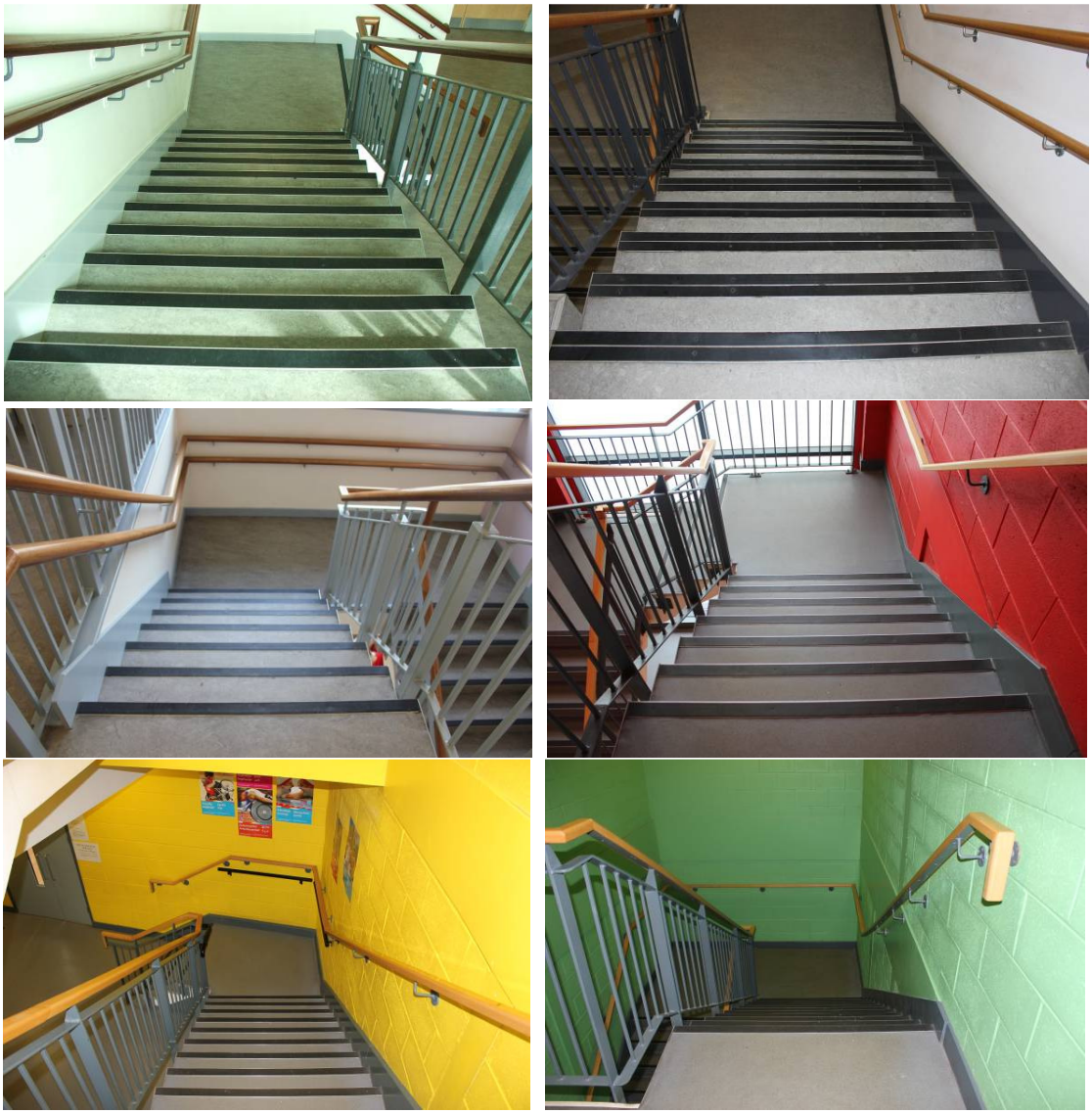


Image 4.24: Various colour combinations for floor finish, stair nosing, wall and handrail

Many schools have installed a lower-height handrail to help smaller children climb stairs, a feature which would be of use in all new primary schools. At all schools there is a distance of between 50 and 75mm between the handrail and adjacent wall surface and the handrail supports meet the handrail centrally on the underside as recommended in BS8300 (BSI, 2009, 5.10.3). The profile of handrails varies between a circular section, shown in Image 4.25a and the rectangular section shown in Image

4.25b. The former conforms better to guidance in BS8300 (BSI, 2009, 5.10.2) which explains that a circular profile is easier to grip, however it could be improved by using an oval profile to provide a flatter surface for people to lean on. In many cases, the handrails have not been terminated according to best practice guidance at the bottom of the stair and although they extend 300mm beyond the edge of the first step, they do no change angle to terminate horizontally which would indicate to a visually impaired person the beginning or end of the steps and allow someone with a mobility impairment to steady themselves before ascent/descent (BSI, 2009, 5.10.2). Images 4.25c and d show examples of handrails terminating incorrectly.

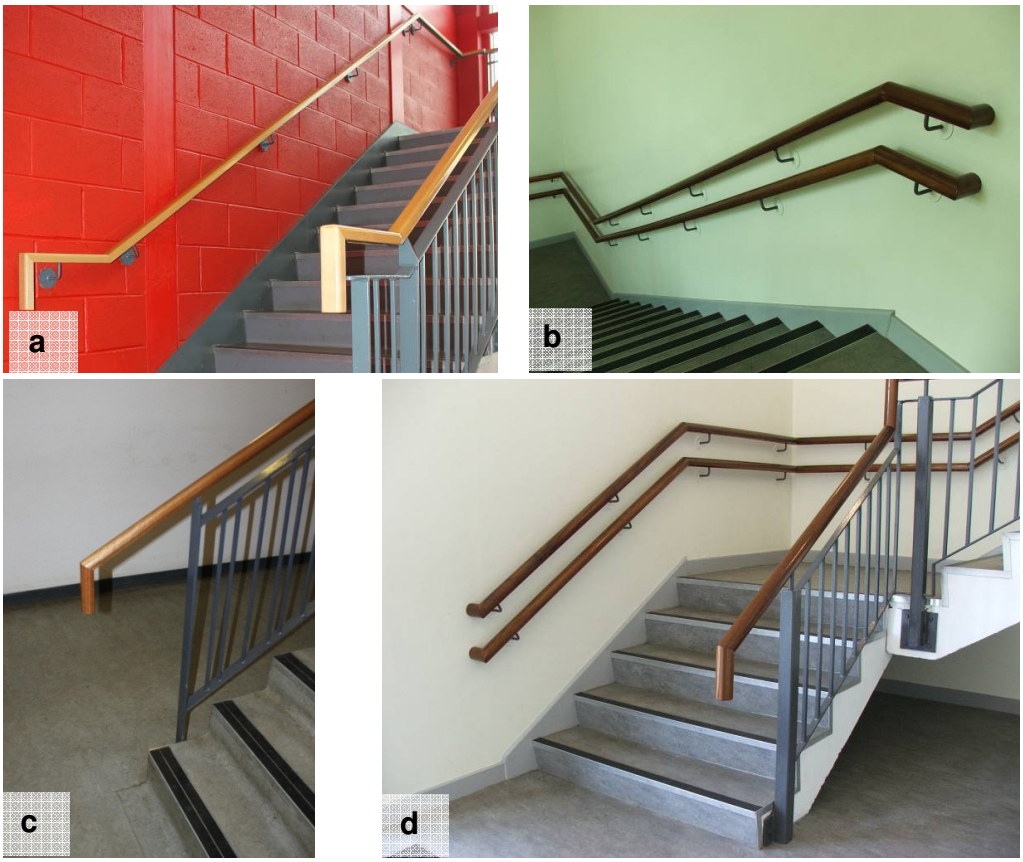


Image 4.25: Handrails terminated correctly showing (a) rectangular profile and (b) circular profile. and (c) and (d) handrails terminated incorrectly.

An additional problem in the majority of schools is the sudden change in height of the handrail as it progresses down/up the staircase, as shown in Image 4.26. BS8300 (BSI, 2009, 5.10.2) states that the handrail should facilitate uninterrupted ascent/descent. Sudden changes in height could cause confusion for a person with a visual impairment and present difficulties for someone using the handrail for support. The reason for the change in height at the top of the staircase may result from the minimum height for protective barriers, which is 1100mm (SBSD, 2011, Section 4.4.2) being higher than the recommended height for handrails, which is from 840mm to 1000mm (SBSD, 2011, Section 4.3.14). Possible design solutions should be investigated which meet these specifications and at the same time meet accessible design requirements.

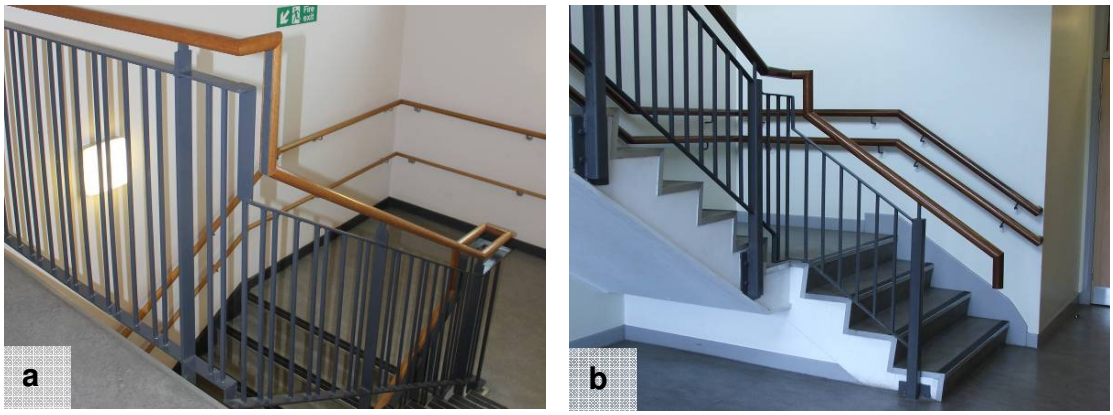


Image 4.26: Changes in height of handrail at (a) the landing and beginning of stair (b) other junctions throughout the stairway.

The stairways in the refurbished school are all below the standards of those in the new schools. The main staircase is shown in Image 4.27a and an example of the other three staircases is shown in Image 4.27b. Staircases generally only have a handrail on one side of the stair and there are no lower height handrails for younger children despite the majority of primary school classes being located on the first floor. Only one stairway has stair nosings, making it difficult for anyone with a visual impairment to detect the edge

of each stair. Furthermore, the black handrails in the majority of the staircases are narrow, providing little support, and the black railings create a patterned effect which makes it hard to detect the top of the handrail and could cause discomfort for someone with a visual impairment.

Image 4.27: (a) the main staircase and (b) an example of the other stairways in the refurbished school.

None of the schools in the detailed investigation used corduroy hazard warning surfaces on stair landings. It is unclear whether tactile warning for level changes in building interiors should be used. BS3000 (BSI, 2009, 5.9.6) recommends that tactile warning paving should be used on approach to exterior steps. Guidance for interior stairways refers readers to guidance points 5.9.2 to 5.9.5. for exterior stairways which cover the design of stairs, the rise of a flight, the stair width and stair nosings. However, this omits section 5.9.6 which covers tactile warning on landings. Point 8.1.2 provides guidance for interior landings however it makes no mention of tactile warning paving, either for or against its use indoors. The author was able to find out that the reason against use of tactile warning is because of differences in slip resistance which may cause a trip hazard. It would be useful if this were explained in order to help designers

and others inform their decision. An appendix or separate document could contain detailed information such as this to avoid the standards becoming too detailed to be practically used.

In all schools a lack of shading means that on bright sunny days there can be glare and dark shadows cast which may appear as level changes or create patterned effects and cause discomfort to someone with a visual impairment. Examples of this are shown in Image 4.28. At two schools there were also signs of poor quality construction with stair nosings falling off just 6 and 9 years after the school opened, as shown in Image 4.29. Some staff commented that they felt the overall quality of construction was poor and that there had been several problems related to this. In two schools additional handrails have also had to be installed for children with mobility impairments, as the original handrail was inadequate.

Image 4.28: Examples of patterns and shadows cast due to a lack of shading.

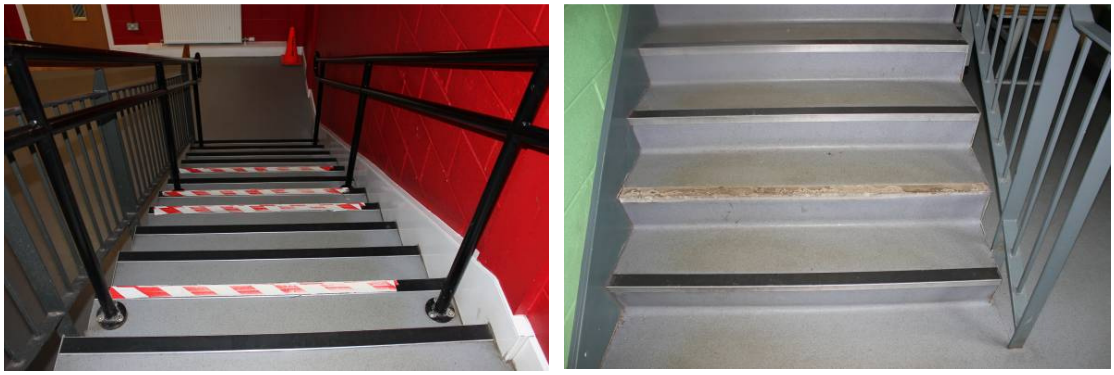


Image 4.29: Examples of poor quality construction with stair nosings coming off stairs at two schools.

4.3.4 Environmental Aspects

Teachers in all 10 schools were asked to rate environmental aspects of building design from 1, very poor to 5, very good. The graph in Image 4.30 shows the average ratings for each environmental aspect. Daylight scores the highest with an average rating of 4.17 and temperature scores the lowest with an average rating of 3.12. In three schools a more detailed study was undertaken with staff being asked to rate both the quality and control of individual environmental aspects, the results of which are shown in the graphs in Images 4.31 and 4.32. The average ratings for quality of environmental aspects in the 3 detailed study schools reflect the average ratings of the wider sample group of 10 schools. Temperature received the lowest average rating for both quality and control. It is also interesting to note that although 'quality of daylight' receives the highest average rating from all environmental aspects, 'daylight control' is positioned in 4th place. This relates to findings in the visual survey which found a general lack of daylight control throughout new school buildings.

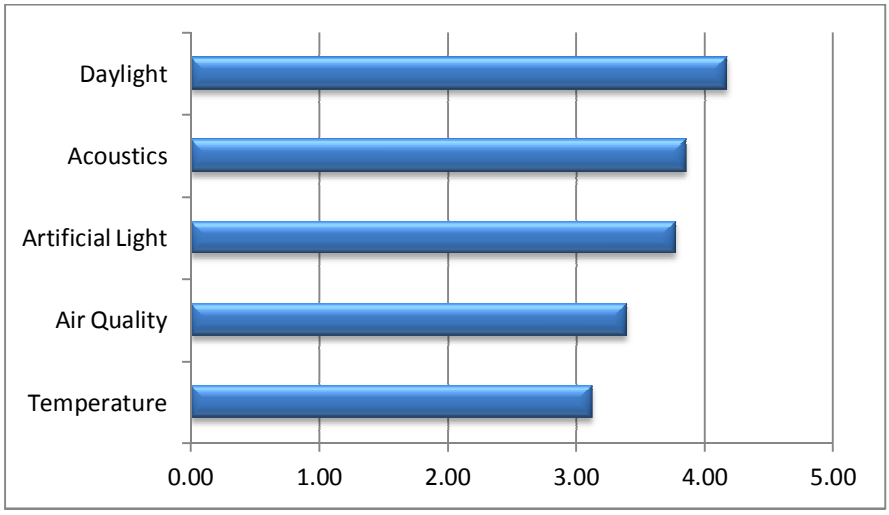


Image 4.30: Average ratings in 10 schools for environmental aspects (1, very poor to 5, very good)

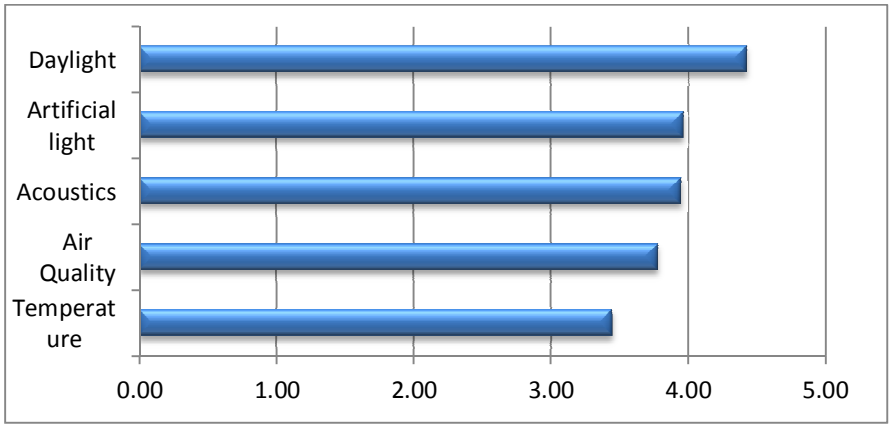


Image 4.31: Average ratings in 3 schools for quality of environment (1, very poor to 5, very good)

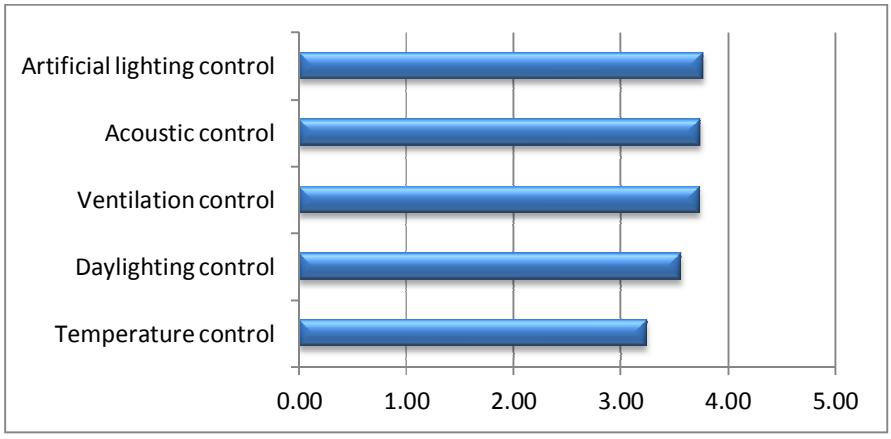


Image 4.32: Average ratings across 3 schools for control of environment (1, very poor to 5, very good)

4.3.4.1 Daylight

Teaching staff commented that they were happy with levels of daylight in the school particularly in corridors and classrooms. Image 4.33 shows a picture of a classroom in Pirie Park Primary School where skylights have been used to introduce daylight to the interior wall of the classroom.

Image 4.33: Photos showing skylight along interior wall of upper floor classrooms.

In some schools an effort has also been made to introduce daylight into corridors, two examples of which are shown in Image 4.34. The first system uses a glazed ceiling with light wells to introduce daylight at certain points along the ground floor corridor. While this is beneficial it means that the corridor changes in width along its length, which could be confusing for someone with visual impairment. This could be overcome by

using a tactile or colour contrasting surface to indicate a clear, obstacle free route around the school. The second system uses high level windows to introduce light along the top level corridor, but not the levels below.

Image 4.34: Photos showing examples of systems used for introducing daylight into corridors in two primary schools.

While attempts have been made to introduce daylight to both corridors and classrooms, a general lack of shading in daylight systems throughout the schools causes several problems. There are severe problems with overheating when the sun is shining and overheating in the corridor can cause the adjacent classrooms to overheat. Furthermore, in some classrooms smart boards cannot be seen properly due to the inability to block out daylight. Smart boards are generally either placed on the teaching wall or interior wall. The interior wall is generally more popular as the movement of the

sliding doors on the teaching wall can cause faults to develop in the smart boards. Any daylight introduced to a classroom should take into account the need to darken the area around the smart board in order for it to be properly viewed. Several schools do not have any blinds fitted to classrooms with north facing windows and staff commented that the blinds fitted to south facing windows were insufficient to block out enough daylight. Schools with skylights along interior walls, such as those shown in Image 4.33, should provide daylight control in order to darken the area above the Smart board. Control of daylight levels in the classroom is necessary in order to use Smart boards as an integral part of the lesson and the ability to completely black out sunlight is also important for certain subjects such as Physics which includes light experiments as part of the curriculum. In focus groups staff at some schools complained that they cannot use the Smart boards in a north facing classroom with no blinds. A focus group was held with a primary 7 class in a north facing classroom (it is presumed that north facing classrooms will not require light control, however this is necessary when using a projector). When asked if it is sometimes too bright to see the Smart board properly 77.3% of pupils selected yes. Children were also asked to write a positive and negative sentence about their classroom. The most common negative points which followed ‘small’, were ‘no blinds’, ‘too bright’ and ‘too many windows’. Staff in south facing classrooms in the majority of schools complained that the blinds were not thick enough to block out light sufficiently for use of the Smart board. A focus group was also held with a primary 7 class in a south face classroom in a different school. When children were asked to put a cross through pictures of objects in their classroom that they find difficult to use, the Smart board received the second highest number of crosses with 38.7%. The most popular reason given was that it is too bright to see the Smart board

followed by technical problems. Staff which work on classrooms on the ground floor, especially the schools for children with complex learning needs, commented that blinds are important to stop children being distracted while other year groups or schools are playing outside. Blinds in north facing rooms could also help to reduce convection, preventing air movement in winter when the temperature of the window surface is lower than the ambient temperature in the room.

Daylight control is particularly important in special schools or units. In some retreat rooms skylights are used to introduce light, as shown in Image 4.35a, and this works well to make the room feel spacious. However staff commented that it would be advantageous to be able to control the daylight and darken the room. Shading for high level interior or exterior windows, shown in Image 4.35b, would also help to control lighting levels in the room. For certain children an enclosed space is more comforting and this would also enable to staff to change the retreat area into a sensory room. Certain children follow a sensory curriculum, e.g. working with bright lights such as flashing a torch to learn numbers.

Image 4.35: Photos of retreat areas showing (a) skylight and (b) high level windows to classroom.

All of the schools had high level windows to allow daylight into the sports hall, however the majority do not have any shading system and in some schools teachers commenting that children cannot see the ball properly due to glare. This was particularly problematic in one school with a large south facing window. In schools with high level windows not orientated towards the south glare did not appear to be problematic. The majority of dining/assembly halls have one wall of full height glazing and a high level and lower level curtain for shading. In dining/assembly halls which face south overheating can be a problem and the curtains often have to be closed in the summertime. While daylight has been introduced to corridors, classrooms, sports halls and dining/assembly halls it is severely lacking in other areas of some schools, where administration offices have been built without exterior windows meaning that staff rely on artificial lighting throughout the entire day and are deprived of daylight and natural ventilation. The majority of kitchen areas also have a lack of daylight, with little or no

exterior windows. Staff commented that soft play areas without windows can feel stuffy and this also contradicts best practice guidance. The soft play area in St. Vincent's Autism Unit, shown in Image 4.36a, has two windows which help the room to feel bright and area. Another soft play area with no windows is shown in Image 4.36b for comparison.

Image 4.36: Soft play areas (a) with windows and (b) without.

4.3.4.2 Artificial Light

Artificial lighting systems varied depending on the school. Staff at Pirie Park Primary School commented favourably on the lighting in classrooms. Lighting at Pirie Park Primary is divided into three sections working from the window to the interior wall. Lighting is daylight linked with a manual override and there is a special light fitting to illuminate the teaching wall if needed. Light fittings are designed to illuminate upwards as well as downwards, as pictured in Image 4.37. In some schools where lighting is movement controlled staff and pupils commented that movement sensors do not work properly meaning that the lighting can switch off erratically. Lighting can take a long time to come back on and that they have to wave objects in front of the motion sensor which can be awkward to access. While the need for automatic lighting is appreciated

the general consensus was that there should always be a manual override. Furthermore, many staff commented that manual controls should preferably be fitted on a wall than by remote controls which can easily break and get lost, especially when shared between classrooms. Staff in schools for children with complex learning needs commented that being able to dim lighting would be beneficial. As mentioned in Section 4.3.3.1, Daylight, separate lighting controls for retreat areas in classrooms would allow teachers to darken the retreat area and undertake sensory work with one or two children, without darkening the rest of the classroom. Being able to dim lighting levels in retreat areas to make the space feel more intimate would also be useful for children who prefer enclosed spaces.

Image 4.37: Pirie Park Primary, examples of light fittings which project light both upwards and downwards.

4.3.4.3 Acoustics

The acoustic conditions at each school vary depending on the position of the classroom, the school capacity and outdoor conditions. Staff are generally satisfied with acoustic conditions in classrooms, however there were some complaints relating to the position of the classroom, the school capacity, and noise travelling from other areas in the building and the surrounding area. In some schools, particularly those with shared

campuses, staff and pupils in classrooms overlooking the playground complained of noise at break times. This is particularly problematic for classrooms located on the ground floor and therefore poses more of a problem to special schools. This impacts on temperature and air quality as they cannot open the window during the summer months. Certain schools have been fitted with dampers which can be opened to improve air quality without impacting on acoustics however staff commented that dampers have little impact on overheating. Class sizes varied in different schools and in larger classes of up to 33 pupils noise from children is understandably more problematic than in smaller classes of 25. In certain schools, the general purpose rooms are not well sound proofed so that the noise of music can travel to nearby classrooms. The surrounding area also had an impact on noise with children and staff in the city centre complaining of noise from various building work and traffic. There are particular problems with acoustics in large sports halls. Staff and pupils commented that they cannot hear or be heard due to the echo and that the sound travels to surrounding classrooms.

4.3.4.4 Air Quality

Staff seemed to be generally happy with air quality in classrooms apart from when the temperature is too high. As mentioned, noise in the playground and surrounding area can impact on air quality by preventing people from opening the window. At Pirie Park Primary a specific system has been put in place to allow staff to control air quality in classrooms. CO_2 detectors, pictured in Image 4.38, alert staff to open dampers and air quality is improved through a system of trickle vents which are fitted into the glazing system and chimneys which lead from the ceiling at the back of the classroom to the roof. The majority of staff had been shown how to use the system and commented that

they found it relatively easy to use. This system can be used to improve air quality when the weather or noise does not permit the opening of windows. Other factors such as class occupancy and ceiling height can impact on air quality.

Image 4.38: Example of classroom CO_2 detector in Pirie Park Primary

4.3.4.5 Temperature

Temperature scored the lowest rating with an average of 3.12. At most schools the heating hours are centrally controlled and each individual radiator is fitted with its own thermostat for local control. Classroom overheating is a problem in the majority of the schools in the study, especially those with skylights glazed in upper floor corridors, which affects the temperature of surrounding classrooms and prevents cooling of the classroom by opening the door. In one school the assembly/dinner hall has a glazed wall which is orientated towards the south and the curtains have to be closed at lunchtime as the space can overheat despite being double height. In this case, a shading system might help to avoid overheating while allowing daylight to enter the space. Overheating was looked at in more depth at one school in particular. Staff at this

school commented that while they are happy with the heating controls, solar gain is impossible to control and the temperature is uncomfortable even when the windows are fully open. In a focus group with children in a south facing classroom in the upper floor at this school, when asked if it is ever too warm, 71% of pupils answered yes with the most popular explanation given as summertime overheating. Occupancy levels also have an impact on overheating and the class which took part in the focus group had 33 primary 7 pupils which will add to the risk of overheating. In the same focus group with the primary 7 class, when asked to underline 3 words from a list of 15 which best describe their classroom, the 3rd most popular option was 'cold'. Teachers also complained of fluctuating temperatures. All of the schools in the study have suspended ceiling tiles in classrooms which can cause temperatures to fluctuate and none of the schools use thermal massing as a way to regulate temperature fluctuations.

Temperature can be perceptive and it is difficult to create an environment which is comfortable for all users, especially in a classroom which may have up to 30 or more people using the space at the same time. However, there are guidelines which state the optimum temperatures for human comfort. The room data sheets for the school in question specify that the classroom temperature should not exceed 28°C for more than 80 hours per year and thermal modelling was undertaken to ensure the design would align with these requirements. The fact that overheating was cited as a main problem at this school concurs with the Scottish Executive report which suggests that there may be some disparity between recommended temperatures in design guidance and optimal temperatures for user comfort (Scottish Executive, 2007). While overheating is recognised as an issue in new school construction and there is an urgent need to

control solar gain to corridors and classrooms via orientation of classrooms and shading systems, there also appears to be issues with cold and fluctuating temperatures which could be resolved by investigating construction methods such as thermal massing which can help to regulate temperature control.

4.3.5 Classroom

Teachers were asked to rate the design of interior areas of the school from 1, very poor, to 5, very good, the results of which are shown in the graph in Image 4.39. The average rating for classroom compares favourably to ratings for other internal areas such as variety of education spaces (e.g. small group work and space for children with additional support needs) with an average rating of 2.45 and assembly/dinner hall design, which received an average rating of 2.81.

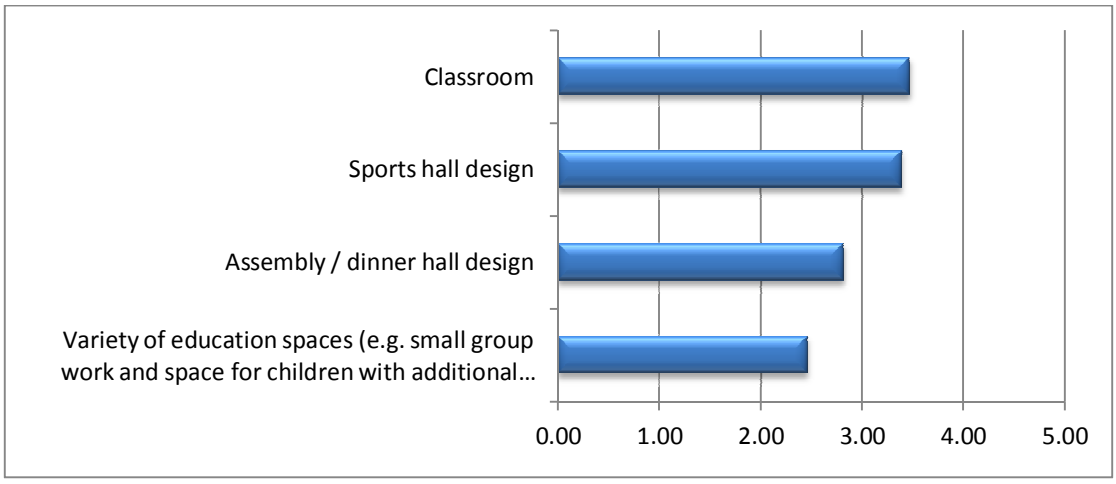


Image 4.39: Graph showing average ratings for design of classroom, sports hall, assembly/dinner hall and variety of educational spaces.

Teachers were asked to rate four features of classroom design from 1, very poor to 5, very good. All features received similar average ratings between 3.32 and 3.57, with

size scoring the highest rating and general design scoring the lowest, as shown in the graph in Image 4.40. Environmental aspects of classroom design are discussed in Section 4.3.3, Environmental Aspects. This section focuses on general classroom design, and furniture and interior finishes.

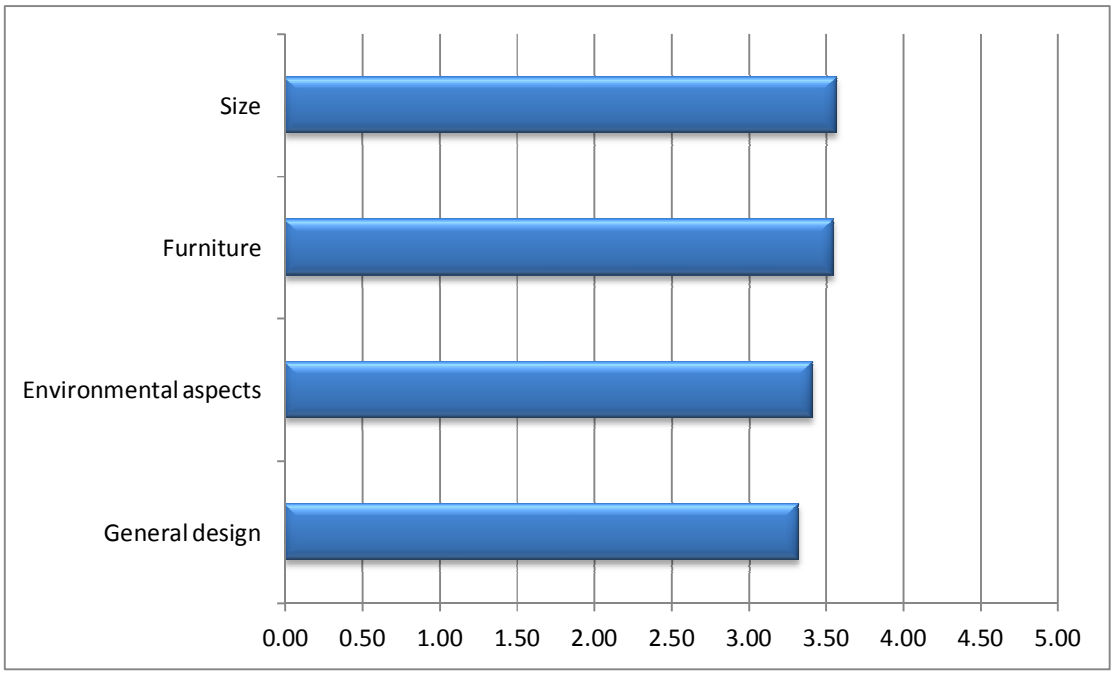


Image 4.40: Average ratings for classroom design, environmental aspects, furniture and size.

4.3.5.1 General Design & Layout

Glasgow City Council specify from 2-3m2 per pupil depending on age and the subject, e.g. sport, technical and science all require more. Teachers in primary schools commented that the classroom size for younger age groups was adequate the classrooms for older primary 6 and primary 7 year groups should be bigger. Perceptions of classroom size also varied depending on the capacity of the school and the number of children in each class. None of schools in the study had facilities such as induction loops in the classrooms. Staff at one school for children with complex learning

needs were particularly frustrated at this as they had requested hearing aid facilities in the consultation process. In the schools for children with complex learning needs there was no wheelchair tracking system in the classrooms and staff commented that provision of a mobile hoist which can be used in classrooms would be useful.

The basic classroom design was similar at all of the new schools with some small variations in each school. A basic sample plan of a standard new classroom is shown in Image 4.41. New classrooms generally have a teaching wall with fitted storage located behind sliding walls and the teacher's desk towards the end of the wall nearest the window, an interior wall with the door entry from the corridor positioned at the end closest to the teaching wall, a back wall with two computer work stations and a sink, and an exterior wall with low level and high level windows and storage located below. Electric points in mainstream schools are provided along the back wall and around the teacher's desk on the teaching wall. Teachers in the two schools for children with complex learning needs commented that flexibility in the classroom was restricted due to the plug sockets being positioned along only one wall and suggested that they should be distributed more evenly around the room. The smart board tends to be located either on a sliding door of the teaching wall or the interior wall. The preference in some schools is the interior wall as the smart boards can be damaged by the movement of the sliding doors.

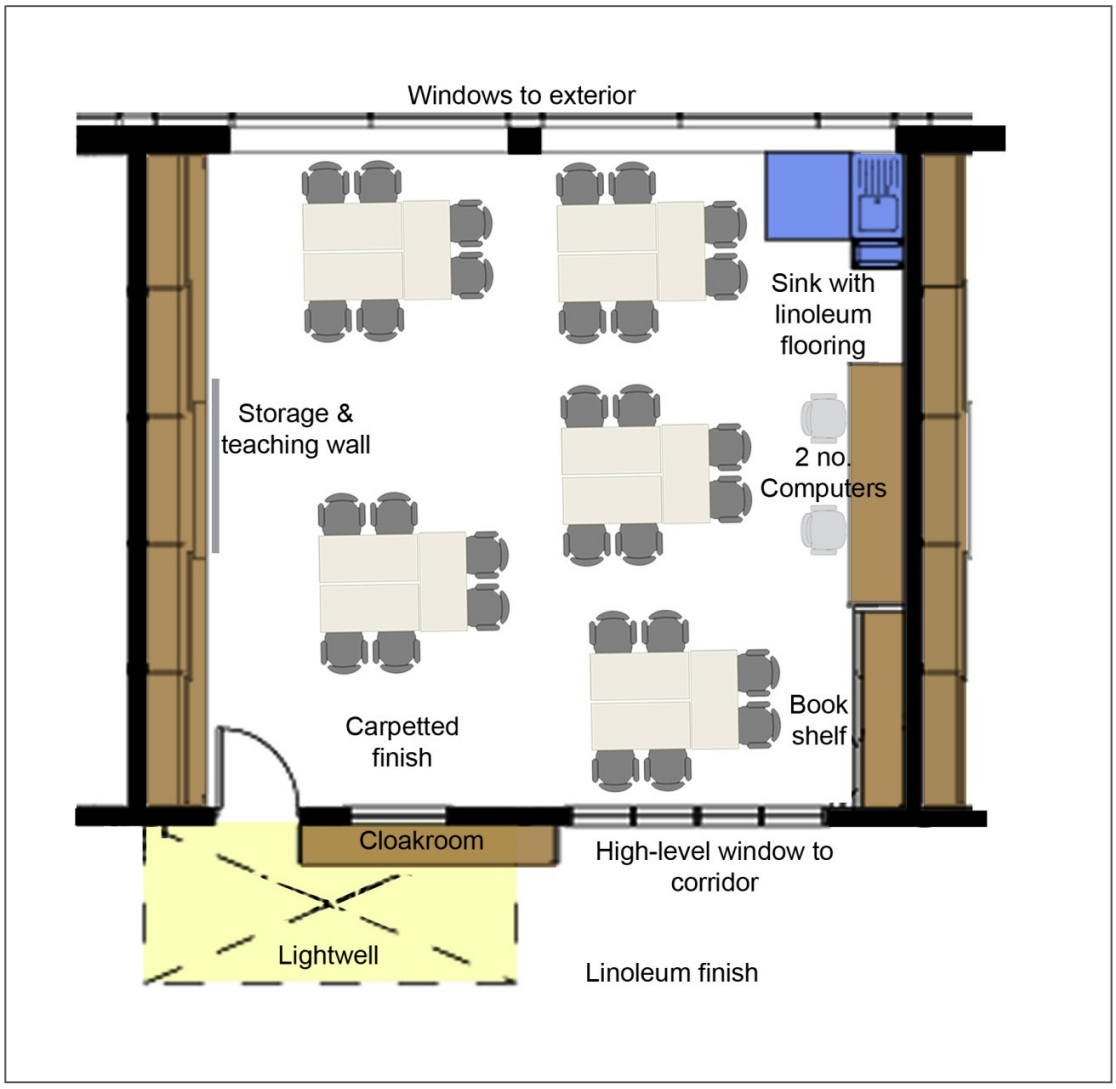


Image 4.41: Sample plan of new classroom layout

Classrooms in the refurbished school have had to adapt according to the layout of the older school. The layout depends on the subject and in some cases the shape and layout of the classroom is uncomfortable. As there is no fitted teaching wall, furniture used for storage intrudes into the classroom space and can be awkwardly placed, as demonstrated in Image 4.42 which compares (a) a new classroom teaching wall with (b) a science classroom in the refurbished school. Staff at the refurbished school

commented that the layout of the science classes is awkward to use and uncomfortable for children. The L-shape of the classrooms means that a large area of floor space is unusable and the positioning of the benches adjacent to the teaching wall mean that children have to twist around to see the board (pictured in Image 4.42b). The room is entered between the teaching wall and seating making it difficult to provide seating close to the board for children who are short sighted or visually impaired.

Image 4.42: Example of teaching wall at (a) new school and (b) refurbished school.

A main problem at all schools is the lack of storage. While classrooms have a fitted storage wall staff commented that communal storage areas are also required for shared resources and in order to prevent classes being interrupted by people accessing storage. Several teachers commented that desks with drawers underneath are more useful as they allow children to store their things close at hand and also mean that storage drawers do not occupy space in the classroom that can be used for other materials such as books or art resources. Staff at schools for children with complex learning needs commented that there is a severe lack of storage for mobility equipment both within and outwith the classroom area. It is preferable to store equipment away in order to avoid distraction, minimise the risk of collision and leave clear space for children using other mobility equipment.

Langlands School has retreat areas incorporated within each classroom, shown in Image 4.43, which were requested throughout the consultation process and are particularly valued by staff in helping to meet the needs of different children. These areas have a full length vision panel so that children can look out and also be supervised by their teacher while still enjoying their personal space and privacy. High level strip windows help to light the space and make it feel peaceful rather than claustrophobic. Each space has been tailored to suit the particular needs of each class; one had been left almost empty for children to vent their frustration by throwing around a ball or drawing and others are filled with activities for children who prefer a quiet space to concentrate on their own. Another potential benefit to the incorporation of retreat areas is the addition of an extra corner in the room. Teachers explained that many children, and particularly those with autism, prefer to sit in a corner than in the middle of the room.

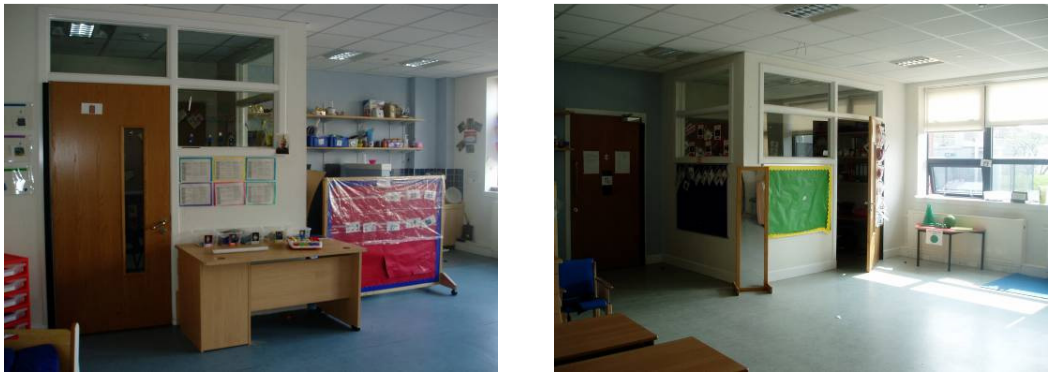


Image 4.43: Photographs showing retreat areas in classrooms in Langlands School.

4.3.5.2 Furniture & Interior Finishes

Children's seating in the majority of all new schools is height adjustable with a pine effect finish. Staff in several schools commented that the bolts in the adjustable seating come loose very easily. Plastic seating is used at the two schools for children with complex learning needs and in the refurbished school. The light colour of the pine effect furniture stands out reasonably well against the blue carpet or linoleum flooring used in the majority of classrooms. However, this varies depending on the shade of the flooring, the flooring material (linoleum or carpet) and the colour of the seating as various different colours of plastic seating are used throughout. Staff at the majority of schools commented that there has been a general lack of consideration for the height of younger primary 1 and primary 2 children, resulting in the computer desks being too large and coat hooks placed at too high a height for them to reach. The standard small silver coat hooks are also difficult for some children to use. At one school for children with complex learning needs new coat stands have been purchased as not all children could lean over the lower height shoe storage to reach the coat hooks.

Staff at one of the schools for children with complex learning needs also commented that none of the classroom sinks allow wheelchair access and this can impact on the curriculum, making it difficult to teach basic skills, such as hygiene, to all children. Staff added that a hydraulic sink would be useful in serving the needs of various children and would also allow staff to raise the sink for their own use when necessary. At the older school for children with complex learning needs hydraulic sinks have been installed but they do not work.

In two focus groups at different schools primary 7 children were shown pictures of 6 items within their classroom and asked to circle objects which are easy to use and put a cross through items which are difficult to use, the results of which are shown in the graphs in Images 4.44 and 4.45. Pupils were also asked to describe why they had put a cross through certain objects. The high percentage of circles indicate that classroom doors, computers and sinks are found easy to use by the majority of children. The largest percentage of crosses were assigned to 'seats and desks' (45%) and 'smart board' (39%) and book shelves (23%) at the new school. Comments related to the seating being uncomfortable, bolts coming loose on the seating, technical faults with the smart board, the classroom being too bright to properly see the smart board and problems accessing shelving. Staff also commented that although height adjustable furniture is useful to meet the needs of different children, the quality of the furniture was very poor. This particular classroom has blinds but as discussed in Section 4.4.4.1 'Daylight', the classroom faces south and the blinds are insufficient to block out the bright light. Problems accessing shelving may be as a result of the high occupancy with 33 children in the classroom. In the refurbished school the particular classroom did not have a smart board so this option was replaced with whiteboard. At the refurbished school far less crosses were assigned with the highest three percentages being used for 'sinks' (14%), 'book shelves' (14%), 'seats and desks' (14%). Comments generally related to difficulty accessing certain furniture. Despite the class size being far smaller with 24 children, the lack of fitted storage and size specific furniture means that the space is less well used than in new schools.

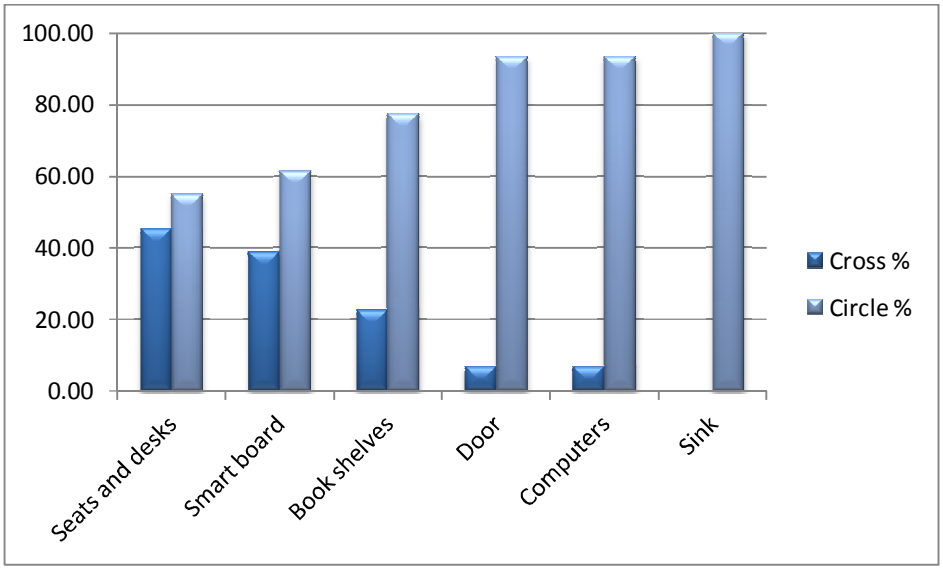


Image 4.44: Results of a focus group with a primary 7 class in a south facing classroom in a new school showing items that are easy and difficult to use.

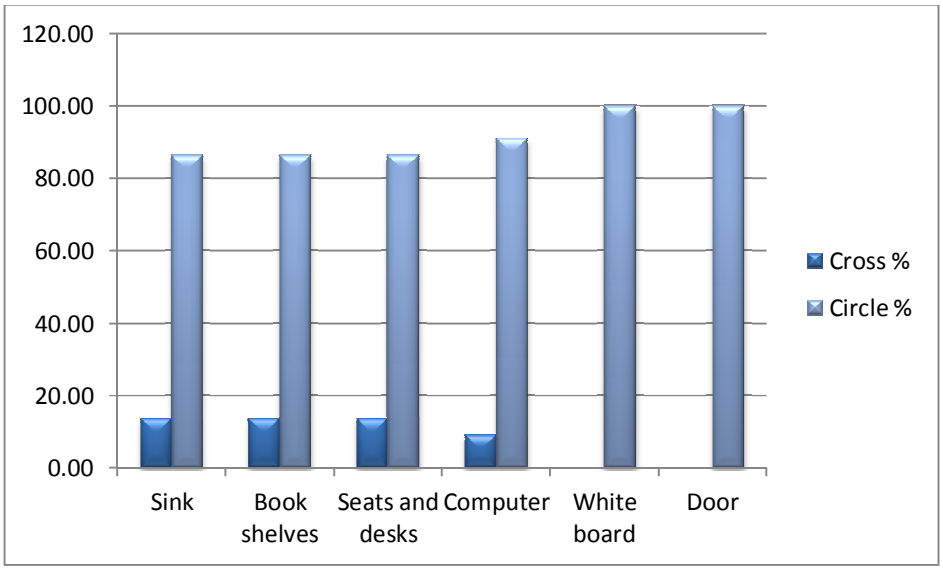


Image 4.45: Results of a focus group with a primary 7 class in a north facing classroom in a refurbished school showing items that are easy and difficult to use.

Children were also asked to write one positive and one negative comment about their classroom. At the new school positive comments generally related to technology such as the computers and smart board and the amount of space, while negative comments

related to the uncomfortable chairs and lack of space. At the refurbished school, positive comments also related to technology and the amount of space, with negative comments relating to a lack of space and the classroom being too bright, having too many windows or a lack of blinds.

All of the classrooms within the study had suspended ceilings finished with white ceiling tiles and plaster finish walls. Classroom walls in new schools were painted white and walls in the refurbished school varied, painted light shades of orange, blue or lilac depending on the usage of the area. Some staff expressed a dislike of the orange colours. At all new schools pin boards have had to be purchased by the school in order to pin up work as either too few or none were supplied on the school opening. Teachers commented both for and against the use of carpet on floors, with some preferring linoleum as it is easy to clean and others preferring carpet as it lends itself to a wider range of activities with younger children. Areas around sinks are generally covered with linoleum and the street area in corridors normally offers a good place for younger children to undertake artwork as the floor can be easily cleaned. Flooring is generally coloured light blue and a darker colour may be preferable in order to provide a good colour contrast with the white walls and light wood effect furniture. The white finish of the ceiling and walls in classrooms helps to reflect light in the classroom and surfaces in classrooms generally do not cause glare or reflection. However doors are generally also light in colour and either the door, or at least the door surround, should be painted a darker colour in order to aid identification of the door from both the interior and exterior.

4.3.6 Variety of Educational Spaces

The variety of educational rooms can have an impact on the ability of a school to provide for the different needs of individual children. For example, if a child with a visual

impairment finds working in a south facing classroom uncomfortable due to glare, the school will find it is easier to accommodate their needs if they have classrooms with a different orientation. Similarly, a child who uses a wheelchair may find it easier if their classroom is located on the floor on which most of the other facilities are located. All of the schools in the study have classrooms which face in a variety of directions. As commented in section 4.3.1, General Layout, one school has classrooms only on the upper floor which caused problems for a pupil using a wheelchair.

4.3.6.1 Spaces for children with additional support needs

As well as a variety of 'standard' classrooms the school building should offer other types of educational spaces. At the majority of new primary schools nurture rooms and visiting professionals rooms have been provided. Children with additional support needs may require individual or group tuition and areas should be provided which are suitably sized for this scale of work. Staff were asked to rate the design of interior spaces from 1, very poor to 5, very good, the results of which are shown in the graph in Image 4.40, Section 4.3.5 Classroom. Variety of education spaces (e.g. small group work and space for children with additional support needs) received the lowest rating with an average of 2.45, followed by assembly hall with 2.81, sports hall with 3.39 and classroom with 3.46. Each primary school has a street area which can be used by the entire class and also by smaller groups of children when required, examples of which are shown in Images 4.46a and b. Other small group work areas have been provided in corridor spaces which have desks and daylight to make it more comfortable to sit, an example of which is shown in Image 4.46c. Street areas are excellent for undertaking large group work and practical activities, especially if a sink is provided. Some staff commented that it would be beneficial to have areas with more privacy to help children concentrate as there are often distractions in the corridor area. In one of the schools language classes

have to be held in the library area of the IT suite while classes are being held which can be very distracting. Staff at one mainstream primary commented that 'street' areas would be far more useful if equipped with sinks which would allow them to be used for painting and art work. This would be especially useful when classrooms which have been finished in carpet as the linoleum finish of the street area is preferable for painting.

Image 4.46: (a) & (b) show examples of street areas and (c) small group work area in corridor

Staff at Broomlea School have created private one-to-one work areas by closing off window box areas which overlook the playground, as shown in Image 4.47. These areas were originally intended to allow children who could not go outside to look at other children in the playground, however staff commented that they work better as one-to-one teaching areas. Langlands School, which was based on the design of Broomlea, has a street space, shown in Image 4.48, which comes off the corridor. This is beneficial as it allows for easy access, has less impact on the circulation space and means there are fewer distractions from people walking through the space. A variation of window sizes and heights in the 'street' area allow both adults and small children views outside and has allowed staff to be creative in the layout of the space, positioning the practice stairway below a small window which is favourite place for some children to sit.

Image 4.47: Window box area in Broomlea School shown from (a) inside and (b) outside.

Image 4.48: Langlands School social street area showing (a) window area and (b) role play area

4.3.6.2 General & special purpose rooms

All new primary schools have been equipped with two general purpose rooms separated by a partition wall. Staff commented that these areas are very useful, particularly at one of the schools for children with complex learning needs where the general purpose rooms are used instead of the sports hall which is too big for pupils and is located at the other end of the school. As with other aspects of design, capacity can impact on school resources and some schools which are over capacity have been forced to use the general purpose rooms as permanent classrooms. As well as general purpose rooms all schools have a shared IT suite and library space and staff commented that this space is particularly valuable. However, at the refurbished school this space is located beyond a flight of inaccessible stairs.

In both schools for children with complex learning needs, there are soft play areas, sensory rooms and hydrotherapy pools. Staff commented that these resources are invaluable in helping them to provide for the children's needs. The unit for children with autism located within the mainstream school did not originally have any of these resources, however the school have converted a space into a soft play room. The sensory room is a small, intimate space with various different audio and visual stimuli.

Staff at one school commented that they sometimes use this space for storytelling but that the projector and other audio-visual equipment can be noisy and distracting for children who find it hard to process auditory input or concentrate. Both the soft play area and hydrotherapy pool are important for Physical Education. In the soft play area in one school the wheelchair tracking system is one-way and staff commented that two-way, H-frame tracking would allow for greater flexibility. Image 4.49 shows photos of (a) a purpose-built soft play room and (b) the soft-play room fitted retrospectively. Neither of the purpose built soft play rooms have a window which would be beneficial to introduce daylight and ventilate the space, with staff commenting that it can become stuffy. The soft play room that has been fitted retrospectively has two high level windows which make the room feel bigger and greatly improve air quality, however as with all areas for children with additional support needs it would be advantageous to be able to control the daylight entering the space in order to undertake sensory work. The hydrotherapy pools shown in Images 4.50(a) and (b) have one-way tracking leading from the changing area at the side of the pool. Staff commented that these pools offer an invaluable resource, however as with the soft play area staff prefer the hydrotherapy pool to have natural daylight. Some staff also commented that they would prefer low-level, frosted windows to give a feeling of open space.

Image 4.49: (a) purpose-built and (b) retrospectively fitted soft playrooms.

Image 4.50: Hydrotherapy pools with one-way tracking leading from the changing area at the side of the pool

4.3.7 Sports Hall

Staff were asked to rate interior areas from 1, very poor to 5, very good, the results of which are shown in the graph in Image 4.40, Section 4.3.5 Classroom. Sports hall design received an average rating of 3.39 which is favourable compared to other areas such as the assembly/dinner hall, with an average of 2.81, and variety of educational spaces, which scored an average of 2.45. The size and design of the sports halls varies depending on the school. Different types of sports hall are shown in Image 4.51. Section 4.4.3, Environmental Aspects discusses environmental elements of sports halls in more detail, highlighting the need for window shading to prevent glare in some cases and for interior surfaces to be sound treated in order to avoid echoes which mean the teacher cannot be heard and disrupt surrounding classes. In one school where the sports hall has been built especially large for community use, shown in Image 4.51b, acoustics are particularly bad and spread to surrounding classrooms. In the refurbished school, the sports hall is normally in use by the secondary school and children in the primary school normally have to undertake PE in the dinner hall, shown in Image 4.51c. Low level windows, tables and columns pose a risk and limit the activities that can take place in the dinner hall. Again, there is a general lack of storage for sports equipment at all schools making it difficult to access resources from the cupboards. All floors are finished with wood and staff commented that they absorb impact well.

Image 4.51: (a) small sports hall with high level lighting, (b) sports hall for community use with south facing window, & (c) dining hall used for sports activities.

4.3.8 Assembly / Dinner Hall

In all new schools the assembly hall and dinner hall use the same area. In the refurbished school the sports hall is used for assembly and school shows. The majority of schools have hearing aid facilities in the assembly hall which can be controlled from the lighting and sound control booth in the first floor. Staff were asked to rate the design of interior spaces from 1, very poor to 5, very good, the results of which are shown in the graph in Image 4.40, Section 4.3.5 Classroom. The assembly/dinner hall received the second lowest rating, with an average of 2.81, followed by variety of educational spaces (e.g. small group work and space for children with additional support needs)

with an average of 2.45. This compares poorly when compared to average ratings for sports hall with 3.39 and classroom with 3.46. Many staff commented that the hall can be very crowded and small when used for a whole-school assembly. This means that it is difficult to invite parents to see school shows and events like this have to be split between the lower and upper school. As with other areas, there is a general lack of storage space for seating, the temporary stage and general resources for school shows. The majority of halls are double height with one wall of full height windows and light or dark curtains to provide shading, an example of which is shown in Image 4.52a. One hall sits in the centre of three schools and has skylights rather than a glazed wall, shown in Image 4.52b. The majority of assembly/dinner halls are orientated towards the north with only one hall orientated towards the south and therefore prone to overheating, discussed in Section 4.3.3.5, Temperature. As discussed, in Section 4.3.2, Horizontal Circulation, the majority of new schools do not have a separate corridor and the assembly/dinner hall has to be used as a through-route to access other areas in the building.

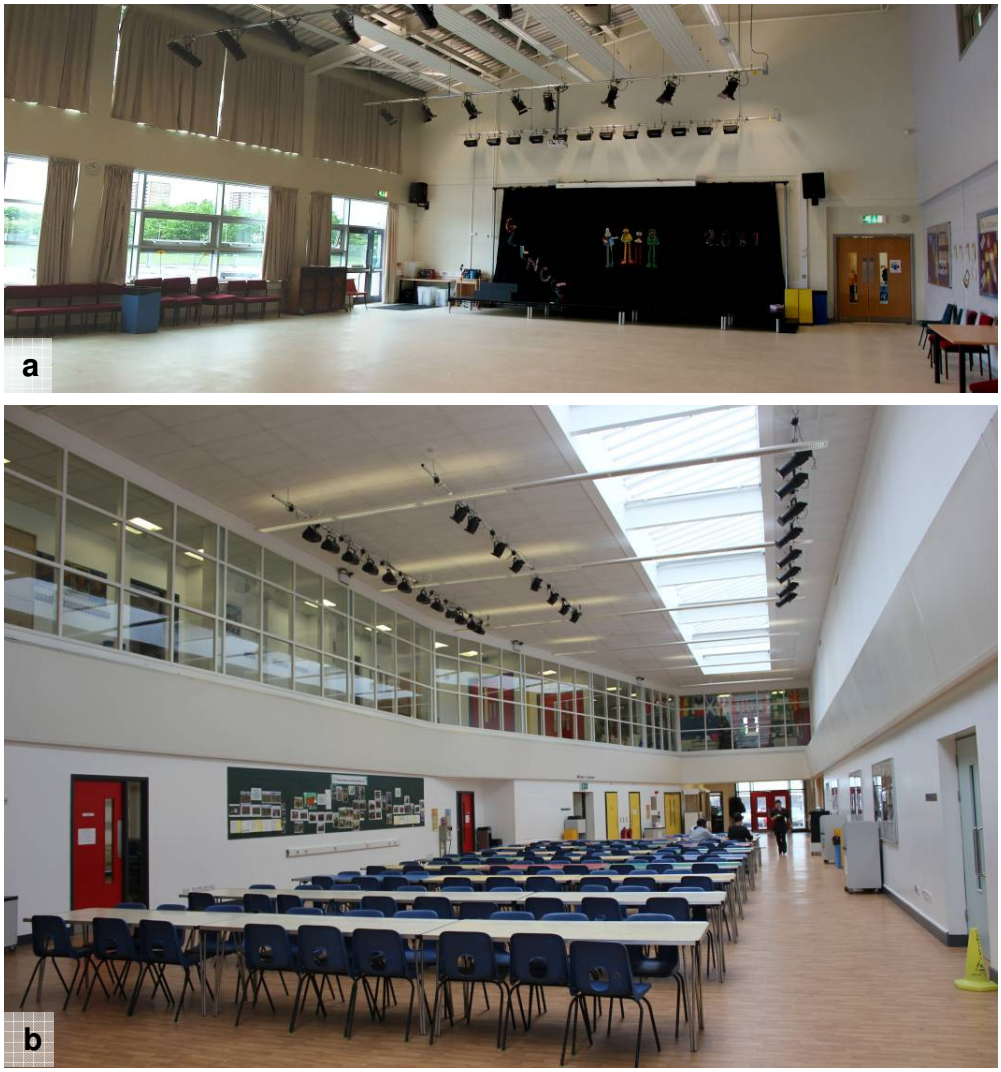


Image 4.52: Dinner/assembly halls showing (a) standard type with glazed wall & (b) with skylights rather than windows.

Pupils at the two schools for children with complex learning needs sit in a separate area of the canteen which has a lower ceiling height, shown in Image 4.53, as larger spaces can feel uncomfortable for many of the pupils, and offers privacy for eating. In one school the space is far too small, as many pupils require staff to sit beside them to assist with meals. While an intimate space feels more comfortable for children care

should be taken to provide enough space for both pupils and staff in these areas. It is also helpful if eating areas are situated away from the queue as children can be easily distracted.

Image 4.53: Lower height eating areas for children with complex learning needs showing (a) smaller space (b) larger space.

The types of furniture used in the canteen vary at different schools with some schools using a mix of furniture. The two standard types are loose tables with benches or tables with fixed seating on casters, shown in Images 4.54 a & b, which make it easier to set up and dismantle the dinner hall quickly before and after lunches in order to allow it to be used for other purposes. The black colour of the fixed chairs on casters tends to contrast better with the floor than the coloured benches. In the secondary school no larger seating has been provided for older pupils and the dinner hall is too small to accommodate them, meaning they tend to their lunch in other areas.

Image 4.54: Seating in dinner halls showing (a) tables with fixed seating on casters & (b) loose tables with benches.

4.3.9 Staff Accommodation

4.3.9.1 Offices

The quality of office design generally varied depending on the school and position of the individual office space. There is a general lack of hearing aid facilities, such as induction loops, within office spaces. At the refurbished school the majority of office space with the exception of the administrative office, is inaccessible, positioned beyond a flight of three inaccessible stairs. Individual managerial office spaces are generally better than shared space offices. Problems in administrative areas generally related to environmental conditions such as daylight, ventilation, acoustics and temperature. Some administration offices have been built without external windows and staff complained of a lack of daylight, ventilation and view outside, commenting that they are unaware of the weather and the level of daylight. Staff also complained about the sound of alarms from the janitor's office, noise generated by office equipment, people talking in the staff break area and the busy corridor. A separate room for photocopying was helpful in minimising sound and heat from the machines. It was also noted that circulation space within most of the administration offices would make it difficult for a wheelchair user or someone using mobility equipment to easily use the space. The

administration office in one school in a shared campus was originally intended to be a social area for children, however this had to be changed as the main administration base would be too far from the school. As a consequence the office has no door which affects the acoustics and ability to control the temperature. The heating panel on the ceiling does not heat the space properly in the winter and the thermostat control is positioned at ceiling height which makes it difficult to reach. This demonstrates design flaws which can result from a lack of communication between the client and building occupant concerning the building layout. In one school the managerial offices have windows which cannot open and a ventilation system has been installed. As with other areas, staff in all schools commented that they would prefer more storage in offices.

4.3.9.2 Kitchen

Catering staff in the refurbished school are generally satisfied with kitchen design, including environmental aspects, furniture, circulation and interior finishes. However catering staff in new schools had similar complaints concerning a general lack of space which causes circulation problems, the low ceiling height, poorly performing environmental aspects such as daylight, temperature and air quality, a lack of storage and no designated place for catering staff to change. Some kitchens have no exterior windows and staff complained there is a lack of daylight and the space can feel stuffy. There was a general consensus that kitchens in new schools are far smaller than older schools. At one school the space between the fixed units where the hotplates and tills are positioned is only 720mm and this narrows to 465mm where the trays are stored, as indicated in Image 4.55a. At another the main entry door from the dinner hall to the kitchen onto a sink, narrowing the distance between the door and the sink to 730mm, as indicated in Image 4.55b. This type of space would cause multiple problems for people with various different types of impairment.

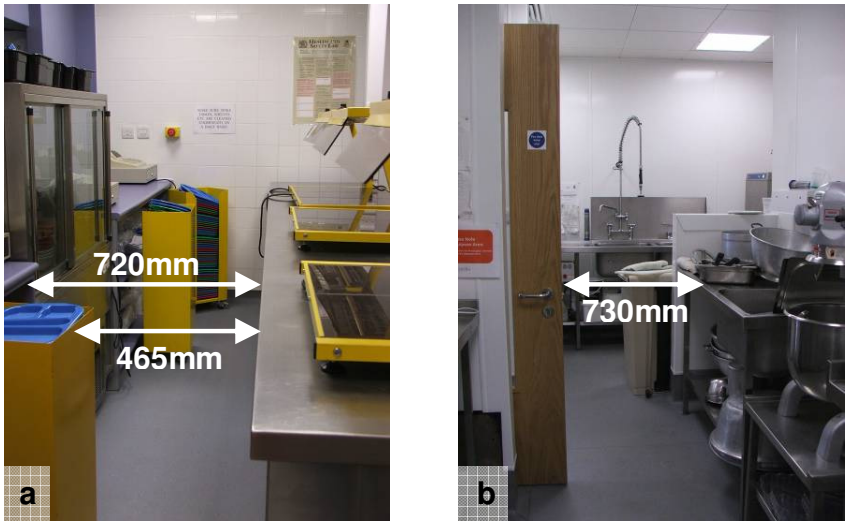


Image 4.55: Kitchens in new schools showing (a) space between door and sink and (b) space between work surfaces.

4.3.9.3 Staffroom

Environmental aspects of staffrooms were generally satisfactory, with some problems relating mainly to the position of the staffroom, space and provision of services. All staffroom areas are adequately day lit with opening windows for ventilation and thermostat controls on radiators. A common complaint in all schools is that the staffroom kitchen facilities are too small and badly distributed for the entire staff to use at the same time. At some schools the location of staff rooms has had to be changed to allow staff a base closer to their working area as break times are short. In some others, staff have given areas intended for use as a small staff base to be used by children with additional support needs. The allocation and position of staffrooms and areas for children with additional support needs is an issue which should be resolved with staff members in order to ensure these issues are resolved at design stage and not after construction.

4.3.10 Toilets

4.3.10.1 Staff WCs

In new schools, WCs tend to be distributed throughout the school rather than clustered together and this has advantages as staff do not have to walk too far on short breaks, however staff in the majority of schools generally complained about a lack of WCs as well as a lack of privacy as some WCs open directly onto the staffroom or corridor. Staffrooms generally only have one WC which is shared between male and female staff. All new schools have at least one WC on each floor and have different sided transfer options from left or right. Some accessible WCs do not have colour contrasting fittings and some fittings have started to come off the wall, as shown in Image 4.56a. An example of an accessible WC with colour contrasting fittings is shown in Image 4.56b for comparison. Colour contrasting fittings would be useful in all toilets and not just accessible toilets, as someone with a visual impairment may prefer to use a smaller space rather than the larger accessible WC. In the refurbished school staff felt that there is a sufficient amount of WCs. The majority are located in a cluster block beside the staffroom, however this means that they are positioned beyond the inaccessible stairway. One accessible toilet is available however this is located far from the majority of the teaching accommodation on a narrow, busy corridor in the ground floor changing facilities.

Image 4.56: Accessible WCs showing (a) grab rail broken from wall and no colour contrasting fittings & (b) colour contrasting fittings.

4.3.10.2 Children's WCs & Changing Areas

It was also felt that there is a general insufficient number of children's WCs, despite meeting the minimum requirements (Statutory Instruments, 1967, 15.1). This may be related to the location and design of toilets, although some teachers commented that older buildings have more than modern buildings. One teacher specified that on one floor which accommodates over 150 children there are only two cubicles in the girls' WC and one cubicle plus urinal in the boys' WC. In one school individual WCs have been provided for children, however staff commented that this is impractical. Some teacher's also commented that smaller size WCs have not been provided for younger primary 1 and 2 children meaning they have to use a step to sit on the toilet seat and reach the sink.

At one school for children with complex learning needs there are WCs located in between classrooms which allows easy access without having to walk through the corridor. However in both schools for children with complex learning needs the WCs and changing areas suffer from a general lack of storage meaning the area can become cluttered and circulation space is occupied by furniture. Staff at both schools

commented that the WC areas could be better designed for children using wheelchairs. In one school the door opens onto the urinal in the boys WC meaning there is a lack of privacy. In Langlands School the doors offer an excellent contrast with the adjacent partition wall, as shown in Image 4.57.

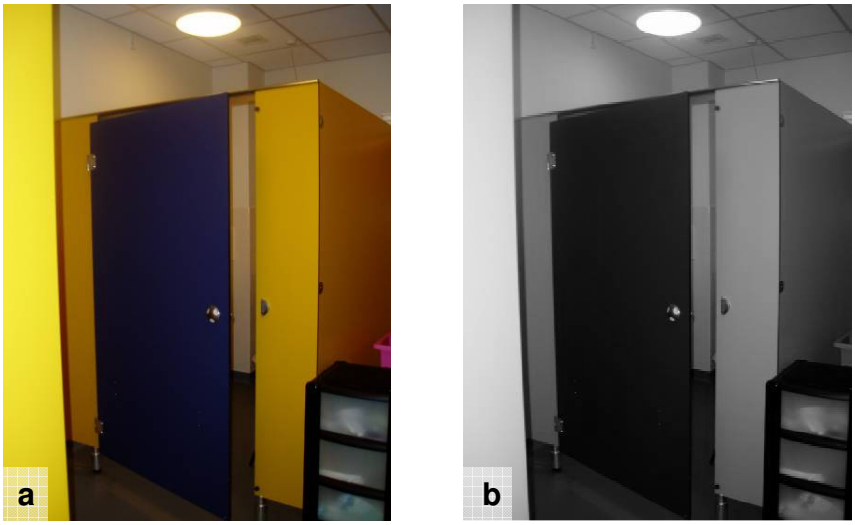


Image 4.57: Langlands Primary toilets with contrasting door shown (a) in colour and (b) in greyscale

4.4 Results: Exterior

4.4.1 Playground

Teachers were asked to rate aspects of the design of exterior educational areas from 1, very poor, to 5, very good, the results of which are showed in the graph in Image 4.58. Playground design received the lowest rating with an average of 2.91, compared to 3.18 for external learning space and 3.82 for outdoor sports facilities.

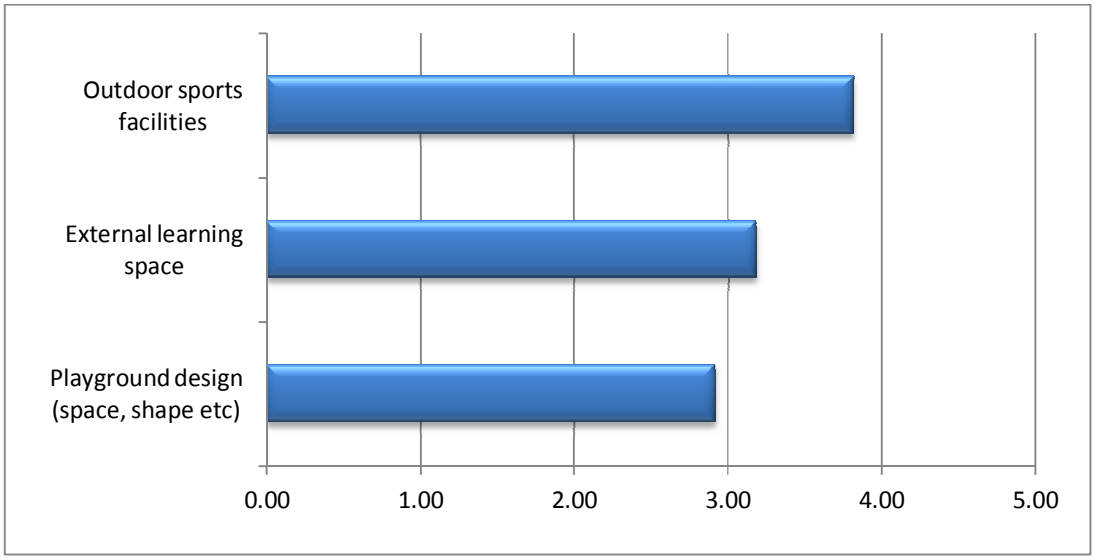


Image 4.58: Average ratings for outdoor educational areas from 1, very poor, to 5, very good.

Two examples of typical playgrounds are shown in Images 4.59a and b. Staff at several schools commented that the playground space is small and can be very crowded at break times which impacts on children's play. At one school there is a lot of ground which cannot be used as it lies on the other side of the carpark from the school. Staff commented that while the playground is small this land lies unused and that more consideration should have been given to the site layout. Most playgrounds are covered with a tarmacadam surface and any grass areas are towards the outside boundary of the playground on sloped surfaces. To a large extent, the amount of play and garden equipment, such as tables for eating outdoors and bird feeders, depends on resources available at each individual school and is generally not provided when the building first opens.

Image 4.59: Two playgrounds showing (a) wildlife area to the left and (b) tarmacadam area with seating to the right.

Coloured designs have been painted on some of the tarmacadam areas and each playground has seating areas as shown in Image 4.60a. The majority of playgrounds have a sheltered area for younger children which joins onto the street area in the corridor, shown in Image 4.60b. However, there is generally no shelter provided for older children waiting to enter the school at the beginning of the day. The amount of grassy, wildlife areas varies depending on the school with some schools having very little soft surface or wildlife areas at all. Research (for example Boldemann et al, 2012) suggests that wildlife is one of the most important factors in encouraging children to play and that playground surfaces covered with trees, shrubbery and large objects such as tractor tyres and logs on the ground can inspire children's imagination and be more effective than expensive play equipment. A main issue in the majority of playgrounds is that where wildlife areas do exist, they are generally located on steep slopes towards the exterior of the playground. While slopes and changes in topography are important in encouraging active play accessible wildlife areas should also be provided. This would have the added benefit of bringing life to the large expansive areas of tarmacadam and providing more relaxing views from the classroom windows. Ensuring there are clearly

marked routes in wildlife areas and highlighting changes in level and obstacles in bright colours which stand out against their background could help children with visual impairments use these spaces.

Image 4.60: Two playgrounds showing (a) painted surface and seating and (b) sheltered area for younger children.

Mainstream and special playgrounds tend to be separated. The unit for children with autism, shown in Image 4.61a, has a plain tarmacadam surface with no play equipment surrounded by a tall black fence, which staff likened to a jail or cage. The two schools for children with complex learning needs, shown in Images 4.61b and c, have soft surface playgrounds positioned in the centre of the school with a variety of play equipment. The positioning of the playgrounds in the centre courtyard allows for easier supervision and increased security as some of the children sometimes try to run away. Staff at one school commented that there is a lack of play equipment for children who use wheelchairs however the school are currently in the process of installing this. Most equipment has been acquired by the school themselves and brought from the previous building. In all special playgrounds there is a lack of wildlife or sensory equipment.

Image 4.61: Playgrounds belonging to (a) the unit for children with autism and (b) & (c) the schools for children with complex learning needs.

4.4.2 External Learning Spaces

Teachers were asked to rate exterior facilities from, 1, very poor, to 5, very good. External learning spaces received an average rating of 3.18, performing better than playground with 2.91 but not as well as sports facilities with 3.82. Opportunities to learn in the external environment can be determined by a large extent to the built environment. Many of the issues raised above with regard to provision of wildlife in the playground are relevant to learning outdoors. Many of the schools in the study have eco-gardens which provide a specific space to encourage wildlife, grow plants and vegetables and learn while outdoors, two examples of which are shown in Images 4.62a and b. While eco-gardens are not included in the construction of a new school, consideration of allocating a space for this purpose with access to water etc. can make

it easier for the school to create and manage the space. Many staff commented that a lack of exterior storage impedes on their ability to store resources and equipment for exterior learning. Often this means that equipment has to be stored in circulation areas in the school interior. Access throughout the eco-garden areas could be improved by the provision of smooth, flat surfaces, such as the tarmacadam surface at Langlands School, which could benefit both people with a visual impairment and people with mobility impairments. Planting boxes can also be provided at different heights for a range of children.

Image 4.62: Garden areas at (a) Langlands Primary and (b) Glasgow Gaelic School.

4.4.3 Sports Facilities

Sports facilities were rated well with an average of 3.82, the highest rating for both interior and exterior facilities. Staff and pupils value this resource and see it as important. As with all other areas there is a general lack of storage for outdoor sports equipment. All schools in the study have large sports fields covered in artificial turf which is easier for people using mobility equipment or wheelchairs and allows use in all weather conditions. All sports fields are surrounded by silver coloured fencing and the

entrances could therefore be difficult to negotiate for people with a visual impairment as they contrasts poorly from the background against which they are seen. The refurbished school did not originally have a sports field. At the time of the study the old sports field to the east of the school was being improved for use, however both staff and pupils commented that they felt this should have been done before the school opened. The majority of sports fields are on the same level as the school making access fairly easy, however two schools have access issues. At one school the topography of the site means that children have to travel up two sets of exterior steps to access the sports field at break times. The sports field can be accessed from a higher level in the school building which has a lift, however the stairs are inaccessible. The stairs, pictured in Image 4.63, do not have corduroy tactile warning paving at the top or bottom or colour contrasting stair nosings, the handrail is stainless steel which does not contrast well with any background and is prone to changing temperature with the weather and it does not extend in a horizontal direction for 300mm at the top and bottom of the flight.

Image 4.63: Steps leading from playground to sports field (a) looking upwards and (b) looking downwards.

At another school the route from the changing areas to the sports field has a pavement without a dropped or lowered kerb. The exit from the changing area and access to the sports field are photographed in Image 4.64. The access route to the pitch provides level access, however the doors of the sports hall and changing area open onto a pavement with has a kerb height of 85mm which is not dropped or lowered. The pavement leading to the nearest dropped kerb narrows to 730mm due to the positioning of large extractor fans, making it almost impossible for a person using a wheelchair or mobility equipment to pass easily.

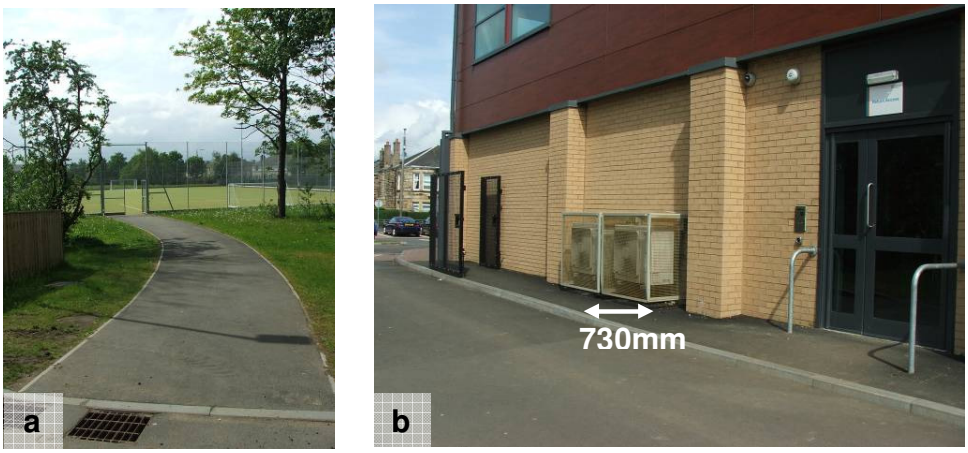


Image 4.64: Access to sports field (a) path towards sports field and (b) access from changing area.

4.4.3 School Grounds

In general school grounds tend to meet best practice guidelines for accessibility far less than the building interior. In some schools the site topography means that there is no level access and it is impossible to provide a ramp with a gradient meeting the mandatory building regulations either from the surrounding area to the school or within

the school grounds themselves. This affects members of the community who wish to access the community facilities in the school campus. Two examples of stairways from the pavement to the school are shown in Image 4.65. In particular, two schools for children with complex learning needs have been positioned on high level sites which are difficult to access from the surrounding area. This is more of a problem when there is a significant height difference between the pavement and school grounds as the lift within the school building generally offers a way to access changes in level within the school grounds. In common with the example in the previous section, stairs are generally inaccessible with no tactile warning paving to indicate the level change, no colour contrasting stair nosings. Handrails also tend to be stainless steel which is the least visible colour in the external environment for people with a visual impairment (White, 2010) and they generally do not extend horizontally for 300mm at the top and bottom of the flight.

Image 4.65: Examples of two stairways leading from the pavement to the school building.

Similarly to school interiors, columns and posts, such as those pictured in Image 4.66, are not painted with colour contrasting bands and children running while playing could easily collide into them.

Image 4.66: Examples of (a) columns and (b) posts which are not marked with colour contrasting bands.

A mix of paving surfaces have been used throughout the schools. The tarcmacadam paving surface shown in Image 4.67a is preferable to the red monoblock paving used in Image 4.67b. Smooth paving surfaces are preferred by people using mobility equipment, pose less risk of trip hazards from uneven paving and the smooth surface is preferred by people with a visual impairment as patterned surfaces can be uncomfortable to look at. The example shown in Image 4.67a also has a light grey slab strip which leads people to the building entrance from the drop off area. This helps to distinguish the building entrance from the exterior.

Image 4.67: Examples of (a) tarmacadam paving with white contrasting path (b) red monoblock paving.

4.4.4 Surrounding Area

The visual survey included some of the area surrounding each school, extending to roughly one mile which is the point at which primary school children are issued with a bus pass. The pedestrian areas surrounding schools are generally inaccessible and would be difficult if not impossible to negotiate for some people to access the school without using a car. Transport links vary depending on the position of the school, however the majority of schools can be accessed from the city centre either by bus or train. However, not all transport stops are accessible. At one school, pictured in Image 4.68, the bus stops are positioned on a grass verge with no pavement leading to them.

Image 4.68: Inaccessible bus stop across the road from a school on a grass verge with no pavement.

Pedestrian areas around all school are well served by lollypop people who assist children to cross the road at peak times in the morning and afternoon. While most schools had a controlled crossing to get to the other side of the road directly in front of the school, the rest of the surrounding areas all had uncontrolled crossings which would cause problems for someone with a visual impairment. Many crossings do not have dropped kerbs making them inaccessible to someone using a wheelchair and the majority do not have audio signals or tactile spinning cones. In addition, there were many instances when the pavement breaks for vehicle access and the kerb is not lowered or dropped.

4.5 Conclusion

This chapter has reported on the findings of a detailed study of 10 schools within the Glasgow local authority area which involved visual surveys and stakeholder consultation with various groups of building users. It has been found that different types

of schools are emerging as a response to the inclusive education agenda. Two examples of this are special schools which retain a separate identify and run under an individual management structure but share a campus with a mainstream school and small special units within mainstream schools being run under the same management structure. The two special schools within the study have better accommodation and resources than the unit within the mainstream school. This emphasises one of the points in Chapter 3, which focuses on the inclusive education debate. It was highlighted that some parents are worried that children attending mainstream schools or units do not receive the same support and resources as at a special school (Riddell, 2009).

Goldsmith (1997) states that architectural disability in public buildings is most commonly caused by steps or stairs where there could have been level access and confined space where the space provided could have been more generous. There have been major advances in accessible design with all new schools designed to have level entry and level access throughout each level, with lifts installed in schools which have accommodation on more than one floor. However, several complaints concerning circulation pinch points or crowded classrooms and corridors related to spaces being constricted in size. This was particularly evident when staff compared modern school buildings to older ones where they had worked which were more generous with space. This concurs with findings in the Audit Scotland (2008) report, covered in Chapter 3, which found that staff rated ease of movement through the school building poorly (George Street Research, 2007a) and pupils complained about a general lack of space in classrooms, corridors and social spaces (George Street Research, 2007b).

Areas of accessible design which could be improved include signage, colour contrast, the layout of accessible toilets and changing areas, daylight control and the provision of spaces for children with additional support needs. In common with the Audit Scotland (2008) findings, described in Chapter 3, the refurbished schools perform worse than new school buildings in the majority of areas, however in some areas such as kitchen design and the provision of staff WCs these schools were rated far better. Areas for administration and catering staff generally perform poorer than areas designated for, managerial staff, teaching staff or children. The extent to which measures are taken in order to make the entire building accessible could be far greater, for example all toilets could have colour contrast rather than just accessible toilets and the upper floor of mainstream schools which share a campus with special schools should be made accessible to all children through the provision of a fire escape lift. In common with the Audit Scotland report, overheating and fluctuating temperatures between hot and cold were found to be a major concern. This may be as a result of solar gain or a lack of thermal mass to regulate temperatures with a tendency to use suspended ceiling tiles which are known to cause temperatures to fluctuate. A general lack of daylight control also means that there are difficulties viewing the interactive whiteboard in some classrooms and shadows and glare are created on surfaces throughout the school. Finally, exterior areas were rated far worse than interior areas showing that there are still great advances to be made in this area. The following chapter uses the results from the detailed study to create detailed matrices which show the extent to which mandatory and best practice accessible guidelines are met within the 10 schools and make recommendations to improve underperforming areas.

Chapter 5: Matrix Analysis

5.1 Introduction

This chapter builds on the results from the detailed study in Chapter 4 and uses the visual surveys to create matrices which quantify the performance of general accessible design aspects across the 10 schools. The criteria in the matrices are referenced throughout and have been sourced from the three main reference documents which were used for the visual survey (detailed in Chapter 4, Section 4.2.4). These are the mandatory Building Regulations for Scotland (SBSD, 2011) and best practice guidance documents "BS8300: 2009. Design of buildings and their approaches to meet the needs of disabled people – code of practice" (BSI, 2009) and "Building Bulletin 102. Designing for disabled children and children with special educational needs. Guidance for mainstream and special schools" (DCSF, 2008). These matrices are not intended to analyse the performance of one school against another, but to identify where specific design aspects are underperforming or performing well across the board. For this reason, a simple tick and cross system has been used rather than a more complex points system (for example 1-3 or 1-5 from very poor to very good). Some of the specified criteria do not apply to all schools and in this case 'na' has been entered to indicate 'not applicable' and an asterisk (*) has been placed next to the total to indicate that this is not out of 10. Where the answer is unknown a question mark (?) has been used to indicate this. The findings of the detailed investigation and other relevant research publications are then used to create of recommendations for improving accessible design in the relevant area. The table has been split into three main sections: the 'design process' section details ways in which school layout can be improved through the design process and at what stage this should happen, the 'design

guidelines' section suggests criteria to be incorporated within future design guidelines, and the 'future research' section highlights areas which require further investigation or clarification in order to be incorporated within national guidelines or to inform more local design practices. The production of the matrix and table allow for conclusions to be made regarding common underperforming and well performing design guidelines as well as identifying areas for future research.

5.2 Results: Interior

5.2.1 General Layout

The matrix in Table 5.1 gives an overview of the main guidelines relating to the general layout of the school and the extent to which these have been met by each of the 10 schools. Specific guidelines relevant to school layout have been sourced from Building Bulletin 102, "Designing for disabled children and children with special educational needs" (DCSF, 2008) as the other two reference documents used in this chapter are generic and do not cover issues specific to school design. The matrix has been split into two sections, the first showing criteria applicable to all schools and the second detailing criteria which is only applicable to co-located schools which share a campus. It is encouraging to see that new school buildings tend to perform better than the older refurbished school buildings. The best performing areas are the location of spaces used by staff and parents, the location of medical and therapy rooms, the progression through each school from youngest to oldest pupils and the provision of toilets in small clusters. Importantly, all co-located schools have shared resources, however the layout of these spaces sometimes appears to favour the mainstream school and they are not as easy to access for the special school or unit. Other criteria which are not well met are the provision of small group rooms and local stores close to teaching spaces, the ease of

access to outdoor spaces and the placement of large spaces adjacent to one another to give the option of creating a larger space when necessary. Although new schools provide local storage in each classroom, teachers commented that communal storage is also necessary to avoid classes being disturbed by people entering the room to access shared resources. Some of the schools have nurture rooms however none of the schools have small rooms for one-to-one or group work and where space has been made available it tends to be in the corridor which is not ideal for children with additional support needs, especially those who find it difficult to concentrate or are hard of hearing. This is especially relevant in the Scottish schools context with the vast majority of children being educated in a mainstream setting.

Table 5.1: Matrix showing extent to which 10 schools meet accessible design standards related to general layout.

Surrounding Area	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	Total
Footway (pavement)											
A simple, clear layout, easily understood by all users (DCSF, 2008, B3)	x	x	✓	✓	✓	✓	✓	x	✓	✓	**7**
Reception/admin office close to main entrance (DCSF, 2008, B4)	x	x	x	✓	✓	✓	✓	✓	✓	✓	**7**
Spaces most used by visiting staff and parents easy to access from the main entrance (DCSF, 2008, B4)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	**10**
Large spaces likely to be used by the community are easy to reach but allow separation from teaching and learning spaces (DCSF, 2008, B4)	✓	✓	x	✓	✓	✓	✓	x	x	x	**6**
Shared medical and therapy rooms are easy to access for all age groups (DCSF, 2008, B4)	✓	✓	✓	✓	x	x	x	✓	✓	✓	**7**
Small group rooms and local stores are close to teaching spaces (DCSF, 2008, B4)	x	x	x	x	x	x	x	x	x	x	**0**
There is a progression of spaces from youngest to oldest pupil (DCSF, 2008, B4)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	**10**
Toilet areas in small clusters are evenly distributed to limit travel distances (DCSF, 2008, B4)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	**10**

Outdoor spaces are easily reached (DCSF, 2008, B4)	x	x	✓	✓	✓	✓	x	x	✓	x	**5**
Large spaces are adjacent, allowing them to be combined when required (DCSF, 2008, B4)	x	x	✓	✓	✓	✓	✓	x	x	x	**5**
Co-located schools.											***Total out of 3. **Total out of 6.**
Shared social spaces (which can act as links or buffer spaces between the schools) (DCSF, 2008, B4)	na	na	✓	✓	✓	✓	✓	na	✓	na	**6****
Shared spaces should be within reasonable travel distance for both groups (DCSF, 2008, B4)	na	na	x	x	✓	✓	✓	na	x	na	**3****
Quieter locations (not remote or isolated) may be needed, with safe, contained outdoor space for special schools or units (DCSF, 2008, B4)	na	na	✓	na	✓	na	na	na	✓	na	**3***

Table 5.2 sets out the recommendations which have been made to improve areas relating to school layout, based on the findings of the detailed study. The table has been split into three sections, as detailed in the introduction, with recommendations relevant to general school design, the design process and future research. Many of the underperforming areas relating to the layout and usage of the building may have been avoided if this had been discussed with staff during the initial design stages. All of the new school buildings in the study have two levels. As mentioned in the previous chapter, there are issues relating to the layout of the school building across various levels, with two co-located special schools being unable to access first floor accommodation used by the mainstream school due to fire escape issues and another school which has all of the classrooms located on the first floor, meaning that ground floor accommodation cannot be provided when required. The need to provide classroom accommodation on the ground floor and for all floors in a mainstream school to be able to be used by children in a co-located special school or unit should be emphasised in the building layout section of best practice guidelines.

Table 5.2: Recommendations to improve areas relating to school layout.

School Layout Recommendations
Design Process
Concept design – consult with staff and discuss the way the building will be used focusing on communal areas and access to outdoors
Brief – specify the requirement for small group-work rooms to be provided for different age groups
Brief & developed design – check with teaching staff that there is enough communal storage for resources
Design Guidelines
Schools on more than one level – provide classroom accommodation on all floors to allow for flexibility
Co-located schools – the entire school building should be accessible for children in the special school / unit. This may mean providing a fire evacuation lift (as numbers are too large for other methods such as evacuation chair)
Future Research
Research the nature of space for children for additional support needs (small room provision) for different types of school in Scotland based on new figures detailing the types of additional support needs of the school population

5.2.2 Horizontal Circulation

The matrix in Table 5.3 gives an overview of the extent to which general accessible design standards relating to horizontal circulation are met by the 10 schools in the study. This reflects the immense progress that has been made in certain areas such as the provision of level access to the building and throughout each floor. However it also reflects the amount of progress still to be made in areas such as colour contrast and the provision of hearing aid facilities.

Table 5.3: Matrix showing extent to which 10 schools meet accessible design standards for horizontal circulation

Horizontal Circulation – existing guidelines	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	Total
Main Entrance											
Distinct from other building features (SBSD, 2011, 4.1.7)	✓	✓	✓	✓	x	x	x	x	✓	✓	**6**
Level entry (SBSD, 2011, 4.1.7)	x	X	✓	✓	✓	✓	✓	✓	✓	✓	**8**
Door - colour contrast with surrounding surface (BSI, 2009, 6.1.2)	x	X	x	✓	x	x	x	x	x	x	**1**
Sheltered waiting area (BSI, 2009, 6.1.3)	✓	✓	✓	x	x	x	x	✓	x	x	**4**

Entry system – location (SBSD, 2011, 4.1.7)	✓	✓	x	✓	✓	✓	✓	✓	✓	✓	**9**
Entry system – inductive coupler (SBSD, 2011, 4.1.7)	?	?	?	?	?	?	?	?	?	?	**?**
Entry system – controls contrast with surrounding surface (SBSD, 2011, 4.1.7)	x	x	x	x	x	x	x	x	x	x	**0**
Entry system – contrast visually with background (BSI, 2009, 6.6.2)	x	x	x	x	x	x	x	x	x	x	**0**
Entry system – LED display (BSI, 2009, 6.6.2)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	**10**
Reception											
Located close to main entry (BSI, 2009, 7.1.2)	x	x	x	✓	✓	✓	✓	✓	✓	✓	**7**
Easily identifiable by people with a visual impairment (BSI, 2009, 7.1.2)	x	x	x	x	x	x	x	x	x	x	**0**
Seating (BSI, 2009, 7.1.2)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	**10**
Hearing aid facilities (BSI, 2009, 9.2)	✓	✓	x	x	x	x	x	x	x	x	**2**
Circulation space (BSI, 2009, 7.1.2)	x	x	✓	✓	✓	✓	✓	✓	✓	✓	**8**
Knee recess for wheelchair users (BSI, 2009, 11.1.2)	x	x	x	x	x	x	x	x	✓	x	**1**
Height of reception desk suitable for wheelchair users & children (BSI, 2009, 11.1.3)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	**10**
Level Access.											***Total out of 2.**
Level access throughout each level (SBSD, 2011, 4.2.1)	x	x	✓	✓	✓	✓	✓	✓	✓	✓	**8**
Corridor											
Corridor & door width (SBSD, 2011, 4.2.2 & 4.2.5)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	**10**
Clear routes throughout (BSI, 2009, 7.2.1)	✓	✓	✓	✓	✓	✓	✓	x	x	x	**7**
Minimisation of glare & shadows (through lighting etc.) (BSI, 2009, 7.2 & 7.2.4)	✓	✓	✓	✓	✓	✓	✓	x	x	x	**7**
Colour contrasting furniture (cloakroom etc) (BSI, 2009, 5.7.2)	x	x	x	x	x	x	x	x	x	x	**0**
Interior Finishes											
Plain surfaces, rather than patterned (BSI, 2009, 7.2.3)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	**10**
Avoid high gloss or shiny surface finishes on large areas (BSI, 2009, 9.1.1)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	**10**
Colour contrast – floor with wall including skirting board (BSI, 2009, 7.2)	x	x	✓	x	x	x	x	x	x	x	**1**

Colour contrast – door & frame with surrounding surface (BSI, 2009, 9.1.1)	x	x	x	x	✓	✓	✓	x	x	x	**3**
Colour contrast – obstacles & columns (BSI, 2009, 5.7.2)	x	x	x	x	x	x	x	x	x	x	**0**
Doors & Ironmongery											
Pressure (SBSD, 2011, 4.2.6)	✓	✓	x	✓	✓	✓	✓	✓	✓	✓	**9**
General ironmongery – ease of use (BSI, 2009, 6.5.1)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	**10**
Door ironmongery – contrast (DCSF, 2008, D11a)	x	x	x	x	x	x	x	x	x	x	**0**
Add anti-finger-trap on doors (DCSF, 2008, D11a)	x	x	x	✓	x	✓	✓	✓	x	x	**4**
Signage											
Position (BSI, 2009, 9.2.3)	x	x	✓	x	x	x	x	x	x	x	**1**
Size (BSI, 2009, 9.2.3)	✓	✓	✓	x	x	x	x	x	✓	✓	**5**
Contrast (BSI, 2009, 9.2.3)	✓	✓	✓	x	x	x	x	x	x	x	**3**
Font - Sans Serif style (BSI, 2009, 9.2.3)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	**10**
Lowercase text (BSI, 2009, 9.2.3)	✓	✓	✓	✓	✓	✓	✓	✓	✓	x	**9**
Use of pictograms (BSI, 2009, 9.2.2)	✓	✓	✓	x	x	x	x	x	x	x	**3**

Table 5.4 shows the suggestions relating to the improvement of horizontal circulation based on the results of the detailed investigation. Mandatory guidelines for door entry systems (BSI, 2009, 6.6.2) specify that controls should contrast with the surrounding surface and that the entry system contrasts visually with the background. However, the majority of door entry systems are made from stainless steel or aluminium and are therefore silver in colour. Research undertaken by White (2010) found that silver is the least visible colour for people with a visual impairment and that its reflective surface can cause glare and discomfort. Investigations should therefore be undertaken to investigate whether an appropriate contrast can be achieved when the entry system is silver and how this can be improved. Design guidelines for standardised controls also require further investigation. Standard tactile control buttons and braille text on every entry system would also help people with no vision or reduced vision to use the system. The same colour contrast issues arise with the door handle. One solution for this is to use

nylon coated stainless steel which would allow designers to select the appropriate colour to contrast with the surrounding door and may also provide better grip for people with dexterity problems. Best practice guidelines specify that the reception area should be easily identifiable by people with a visual impairment (BSI, 2009, 7.1.2). However, it may be helpful to detail specific ways of achieving this, perhaps through distinguishing the floor or by providing a highly contrasting window frame around the reception window. Best practice guidance (BSI, 2009, 9.1.1) details the Light Reflectance Value (LRV) which must be achieved between the floor and wall (including the skirting board) and the wall and door (including the frame), however it is apparent that in practice many of the schools could be achieving a far greater contrast between the floor and wall. It is necessary to investigate if LRVs are being considered in the specification of colour and if this is being checked by the client. Designers should also be asked if supplementary guidance methods such as computer simulation or suggested colour combinations would be helpful for designers. If LRVs are being used it should be investigated if the recommended differences achieve a suitable colour contrast when viewed by people with different types of visual impairment.

Table 5.4: Recommendations to improve areas relating to horizontal circulation

Horizontal Circulation Recommendations
Design Process
Consultation - Discuss the way that horizontal circulation will work with building users, focusing on the use of different entrances for different children relevant to the location of classrooms within the school building and the provision of sheltered waiting areas / canopies outside
Detailed design - Client should ensure that colour contrast is being met for various specifications such as floor and wall finishes and furniture/obstacles placed in the hallway (which may be specified by different parties)
Post-occupancy – ensure that doors can be easily used by users and adjust pressure as necessary
Design Guidelines
General routes – people should not have to walk through open spaces being used for assembly etc. to get from one area of the building to another
Entry system – standard tactile buttons on all systems
Entry system – Braille text

Main entrance door – to contrast in colour from the side panels
Main entrance door handle – avoid silver (White, 2010) – nylon coated stainless steel to minimise glare, enhance colour contrast & improve grip
Reception - Colour contrasting window frame
Reception - Floor finish to indicate window
Future Research
Research how best to make reception areas easily identifiable by people with a visual impairment
Investigate whether an appropriate contrast can be achieved using a silver finish for the entry system and door handle and the best ways to improve this
Explore the design of standardised controls for entry systems & how to best incorporate Braille lettering
Investigate if the design team are using Light Reflectance Value (LRV) to specify colours for wall and floor finish as well as furnish/obstacles, and if current recommendations provide satisfactory contrast for people with a visual impairment

5.2.3 Vertical Circulation

The matrix in Table 5.5 gives an overview of the extent to which general accessible design standards relating to vertical circulation are met by the 10 schools in the study. This matrix shows that areas underperforming are to do less with dimensions and more related to colour contrast specification and avoidance of glare and shadows. Daylight control systems are necessary for stairways with any orientation other than north and guidance is required to ensure that appropriate colour contrast is used.

Table 5.5: Matrix showing extent to which 10 schools meet accessible design standards for vertical circulation

Vertical Circulation – existing guidelines	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	Total
Lifts											
Clear landing 1.5m x 1.5m (SBSD, 2011, 4.2.7)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	**10**
Position of controls (outside & inside) (SBSD, 2011, 4.2.7)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	**10**
Landing – tactile call button (SBSD, 2011, 4.2.7)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	**10**
Landing - visual & tactile indication of storey level (SBSD, 2011, 4.2.7)	x	X	x	x	x	x	x	x	x	x	**0**

Doors, handrails and controls that contrast visually with surrounding surfaces (SBSD, 2011, 4.2.7)	x	X	x	x	x	x	x	x	x	x	**0**
Signalling system that lift is answering call (SBSD, 2011, 4.2.7)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	**10**
Two-way communication system (SBSD, 2011, 4.2.7)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	**10**
Dimensions for clear door opening width & minimum size (SBSD, 2011, 4.2.7)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	**10**
Mirror & horizontal handrail (SBSD, 2011, 4.2.7)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	**10**
Stairways											
Dimensions for rise, going, tread & pitch (SBSD, 2011, 4.3.2)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	**10**
Dimensions for width of stair & landings (SBSD, 2011, 4.3.3)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	**10**
Contrasting nosings (SBSD, 2011, 4.3.5)	x	X	✓	✓	x	x	x	✓	✓	✓	**5**
Handrail - both sides of flight (SBSD, 2011, 4.3.13)	x	X	✓	✓	✓	✓	✓	✓	✓	✓	**8**
Handrail - extend horizontally for 300mm (SBSD, 2011, 4.3.13)	x	X	✓	✓	✓	✓	✓	x	✓	x	**6**
Handrail – profile to allow a firm grip (SBSD, 2011, 4.3.13) – circular or oval	x	X	✓	✓	✓	✓	✓	✓	✓	✓	**8**
Handrail - End scrolled or wreathed (SBSD, 2011, 4.3.13)	x	X	✓	✓	✓	✓	✓	✓	✓	✓	**8**
Handrail - Visual contrast with adjacent surface (SBSD, 2011, 4.3.13)	x	X	x	x	x	x	x	x	x	✓	**1**
Handrail - Dimensions for height (SBSD, 2011, 4.3.14)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	**10**
Handrail - lower height for children under 12 (DCSF, 2008, D11a, Steps & Stairs)	x	x	x	x	x	x	x	✓	✓	✓	**3**
Avoid glare & shadows (BSI, 2009, 9.4.2)	x	x	x	x	✓	✓	✓	✓	x	x	**4**

Table 5.6 details the suggested improvements for vertical circulation which have been based on the results of the detailed investigation. BS ISO 4190-5:2006 “Lift (elevator) installation Control devices, signals and additional fittings” (BSI, 2006) details the British Standards for lift design. Progress has been made with providing audio and visual signals as well as considering colour contrast and tactile symbols. This document specifies that, on a landing and in the car operating panel and keypad, the active part of

the push button shall be identifiable both visually and by touch from the faceplate, and the faceplate of a landing push button shall be in contrast to its surrounding background. However, in many instances the silver colour of both the faceplate and button mean that individual buttons do not contrast well and while recommendations are made for the shape of tactile buttons there is no standard design to ensure consistency in all lifts. The issue of colour contrast should be clarified and examples given. As mentioned, White (2010) found silver to be the least visible colour for people with visual impairments and best practice standards (BSI, 2009, 9.1.1) also recommend the avoidance of high gloss or shiny surface finishes on large areas as this can result in glare, which causes discomfort for people with a visual impairment and can make it difficult for someone who is hard of hearing to lip-read. The majority of lifts in the detailed study have a silver finish. Although the finish is usually matt rather than polished steel it has a tendency to create glare and reflection and could create an uncomfortable environment for people with different types of impairment. A mirror is required in order to allow wheelchair users to manoeuvre however the other walls and ceiling surfaces could be finished in a colour that minimises glare. The floor surface should also contrast to make it easier for someone with a visual impairment to gain an idea of the size of the lift.

Best practice guidance for handrail design (BSI, 2009, 5.10.2) states that the spacing of the handrail from the adjacent wall and the positioning of the handrail support are important in achieving the uninterrupted use of the handrail. All of the examples in the detailed study have met this standard, however it is common for the handrail to change suddenly in height when it changes direction, for example on a half landing. This could cause multiple problems such as shock through the hand hitting the handrail as it changes height, problems for someone using the handrail for support and confusion for

someone with a visual impairment as the change in slope of a handrail should indicate the start or beginning of a flight. The importance of designing a handrail which does not change in height should be highlighted. It is also common for the handrail to drop suddenly in height at the top of a staircase when the handrail is the top rail of balustrading and forms part of the guarding at the landing, which is higher in height to prevent children climbing and falling into the stair well. Design solutions to resolve this issue should be investigated. Best practice guidance for handrail materials (BSI, 2009, 5.10.5) mentions the choice of handrail material with relevance to exterior handrails which are comfortable to touch in extremes of temperature and provide resistance to vandalism. All of the schools in the study have interior handrails with a wooden finish which is more comfortable to touch than steel and the light or dark wood finish can be used to provide a good colour contrast with the adjacent wall surface. The use of steel should be avoided as it is colder to touch and more difficult to provide a good colour contrast with the adjacent surface as it reflects its surroundings (White, 2010). Wooden or nylon coated steel finishes should be recommended.

Table 5.6: Recommendations to improve areas relating to vertical circulation

Vertical Circulation Recommendations
Design Process
Detailed design – Ensure lift design is specified to ensure silver reflective surfaces are not used and that floor contrasts with walls
Detailed design & construction – Detail the handrail carefully to avoid sudden changes in height & ensure handrail is constructed according to detailed drawings
Design Guidelines
Lift interior – highlight the need to minimise glare, reduce use of silver (White, 2010) & provide a contrast between the floor & wall surface
Lift controls – Both the faceplate and the push buttons should contrast with the adjacent surface - silver buttons should not be used against a silver faceplate
Lift controls – Braille control buttons should be provided inside & out
Handrail – highlight the need for handrails not to change in height during descent / ascent & give example of handrail detail

Handrail – incorporate findings of White (2010) and highlight the benefits of providing a contrasting colour other than silver such as wood or nylon coated steel
Handrail – the top of the handrail should colour contrast with the wall/background, however the railings should be painted a colour which does not stand out in order to minimise the pattern effect which could cause discomfort for people with a visual impairment
Future Research
Create standardised tactile buttons for lifts which align with or take account of other standards throughout the world
Resolve the issue of handrail suddenly changing height to provide protection at the top of the stairwell

5.2.4 Environmental Aspects

The important impact that environmental aspects of building design can have on people with impairments and children with additional support needs was discussed in detail in Chapter 3, Section 3.4. It was not within the scope of this research project to take scientific measurements for the quality of environmental aspects such as air quality and lighting levels and standards of environmental aspects of building design were measured by user satisfaction. The mandatory building regulations (SBSD, 2011) sets out minimum standards for ventilation within buildings, however the information given in best practice guidance documents (BSI, 2009, DCSF, 2008) covers a wider scope of environmental aspects such as heating and lighting, and is also more relevant to the impact of environmental aspects on accessible design. The matrix in Table 5.7 therefore uses these documents to set out general best practice aims rather than detailed scientific measurements. The performance of environmental aspects can vary throughout the building and the matrix bases the score (tick or cross) on the average standard of performance throughout the majority of the school building. For example a lack of daylight in the administration area or soft play room would not result in a cross, however larger scale problems such as the acoustics in the sports hall preventing the teacher from being heard or disturbing teaching in neighbouring classrooms would result in a cross. The matrix shows that underperforming areas are: the ability to control

daylight entering a space (which can cause unwanted solar gain in summer and heat loss in winter as well as glare and shadows), fluctuating temperatures, the provision of hearing enhancement systems and localised acoustic problems. Well performing areas are the maximisation of daylight, artificial lighting, air quality and ventilation.

Table 5.7: Matrix showing extent to which 10 schools meet accessible design standards for environmental aspects

Horizontal Circulation	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	Total
Daylight											
Maximise daylight (BSI, 2009, 9.4.1)	x	x	✓	✓	✓	✓	✓	✓	✓	✓	**8**
Avoid solar heat gain (BSI, 2009, 9.4.1)	✓	✓	✓	✓	✓	✓	✓	✓	x	x	**8**
Avoid glare & shadows (BSI, 2009, 9.4.2)	x	x	✓	x	✓	x	x	✓	x	x	**3**
Window blinds for adjusting lighting conditions & reducing distraction from outside (DCSF, 2008, D11b)	x	x	x	x	✓	✓	✓	✓	✓	✓	**6**
Avoid slatted blinds (DCSF, 2008, D11e)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	**10**
Light coloured window wall to avoid glare between light & dark surface (DCSF, 2008, D11b)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	**10**
Avoid metal blinds which can absorb and radiate heat (DCSF, 2008, D11e)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	**10**
Artificial Lighting											
Even illuminance across a room or space (BSI, 2009, 9.4.2)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	**10**
Avoid glare, pools of bright light and strong shadows (BSI, 2009, 9.4.2)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	**10**
Good colour rendering of all surfaces (BSI, 2009, 9.4.3)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	**10**
Illuminate the face of person speaking for lip reading (BSI, 2009, 9.4.4)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	**10**
Avoid down-lighting (DCSF, 2008, D11b)	x	x	✓	✓	✓	✓	✓	✓	✓	✓	**8**
Electric dimming or local controls (DCSF, 2008, D11b)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	**10**
Fittings that avoid flicker & noise (DCSF, 2008, D11b)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	**10**

Acoustics											
Acoustic environment to help orientation & enable audible information to be clearly heard (BSI, 2009, 9.1.2)	✓	✓	✓	✓	✓	✓	✓	✓	x	x	**8**
Avoid use of hard materials or materials with very high absorbencies for ceilings, walls and particularly floors (BSI, 2009, 9.1.2)	✓	✓	✓	✓	✓	✓	✓	✓	x	x	**8**
Hearing enhancement system (induction loop, infrared or radio transmission) where it may be difficult to see or hear the speaker (BSI, 2009, 9.3.2)	x	x	x	x	x	x	x	x	x	x	**0**
Good room acoustics and sound insulation between rooms and from outside (DCSF, 2008, D11b)	x	x	✓	✓	✓	✓	✓	✓	x	x	**6**
Ventilation design should not compromise acoustic performance (DCSF, 2008, D11b)	x	x	x	x	✓	✓	✓	✓	✓	✓	**6**
Minimise disturbance from sudden or background noise (DCSF, 2008, D11b)	x	x	x	✓	✓	✓	✓	✓	✓	x	**6**
Temperature											
Temperature controls to be positioned in a zone 750mm to 1000mm from the floor (BSI, 2009, 10.5.2)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	**10**
Avoid extremes of temperature (DCSF, 2008, D11b)	✓	✓	x	✓	x	x	x	x	x	x	**3**
Provide localised temperature controls in any space that is used for more than a transitory period (DCSF, 2008, D11b)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	**10**
Shading & devices for solar control to control heat gain (DCSF, 2008, D11b)	✓	✓	✓	✓	✓	✓	✓	x	x	x	**7**
Exposed thermal mass combined with night cooling and/or ground-coupled ventilation to stabilise internal temperatures is recommended (DCSF, 2008, D11b)	x	x	x	x	x	x	x	x	x	x	**0**
Avoid fan convectors due to background noise, dust & contaminant circulation (DCSF, 2008, D11b)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	**10**
Avoid radiant ceiling panels – unsuitable for people of various heights (DCSF, 2008, D11b)	✓	✓	x	✓	✓	✓	✓	✓	✓	✓	**9**

Air Quality											
Ventilation controls to be positioned in a zone 750mm to 1000mm from the floor (BSI, 2009, 10.5.2)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	**10**
Localised ventilation control (DCSF, 2008, D11b)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	**10**
Minimise draughts (DCSF, 2008, D11b)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	**10**
Ventilation design should not compromise acoustic performance (DCSF, 2008, D11b)	x	x	x	x	✓	✓	✓	✓	✓	✓	**6**
Operating mechanisms should be virtually silent (DCSF, 2008, D11b)	✓	✓	✓	✓	✓	✓	✓	✓	✓	x	**9**

Table 5.8 details the suggestions to improve environmental aspects of school design, based on the results of the detailed investigation. The Scottish Executive (2007) suggest there may be disparity between guidelines for maximum temperatures (maximum internal air temperature recommended in schools when the space is occupied is 32°C and the temperature should not exceed 28°C for any longer than 120 hours) and user comfort. The results of this research reinforce the need to review these guidelines as schools which are said to keep within the maximum temperature limits are reported by users as being unbearable. The majority of recommendations to improve environmental aspects and ensure that best practice guidelines are met relate to the design process and future research.

Table 5.8: Recommendations to improve areas relating to environmental aspects

Environmental Aspects: Recommendations
Design Process
Liaise with building users to ensure the design of environmental control features work for the particular uses in each space – e.g. which areas require daylight and which would benefit from having any, the quality of daylight
Detailed design – ensure all classroom windows have blinds and that any stairway not facing direct north has daylight control to prevent glare & shadow
Post-occupancy – undertake post occupancy evaluations to find out which average temperatures are the most comfortable for the majority of people
Design Guidelines
Review temperature guidelines as building users are not satisfied even when temperatures are kept within the current limits

Artificial lighting can be timer controlled but switches should always be provided to override this – this is crucial for children learning how to put switches on & off as part of the curriculum
Emphasise that blinds are not just for light or temperature but are also necessary for privacy and minimising distraction from outside
Radiators should not have grates with small gaps which children can get their fingers stuck in
Future Research
Carry out building simulations to investigate whether other construction methods such as provision of thermal mass and avoidance of suspended ceiling tiles can help to regulate ambient room temperatures and resolve current problems with temperature fluctuation

5.2.5 Classroom

The matrix in Table 5.9 shows the extent to which the 10 schools in the detailed study meet best practice guidelines in relation to classroom design. The matrix has been divided into three main areas focusing on classroom design and layout; furniture, fittings and equipment, and interior finishes. This section does not cover environmental aspects of classroom design as these are covered in the previous Section 5.2.4, Environmental Design. Specific guidelines relevant to classroom design have been sources from Building Bulletin 102, "Designing for disabled children and children with special educational needs" (DCSF, 2008). The other two main reference documents for this chapter have not been used as they are generic and do not relate specifically to school design. Classrooms are all equipped with sinks and have moveable furniture which allows for flexibility and various different activities to be undertaken. Furniture is also generally available in various different sizes and fittings such as taps follow best practice guidelines. Surface finishes minimise acoustic reflection and are generally plain and not patterned, however pin up space and the type of displays are restricted by the amount and size or shape of pin boards that are available as teaching staff are not allowed to pin directly to the wall. Underperforming areas are: direct access to outdoors from the classroom, the provision of small group-work rooms, the provision of blinds to control views, and the ability to reduce class numbers as many new schools are over capacity and already use rooms which were originally designated general purpose rooms as

permanent mainstream classrooms. In common with other design aspects, there are also issues with colour contrast of furniture, floor, walls and doors.

Table 5.9: Matrix showing extent to which 10 schools meet accessible design standards for the classroom

Classroom	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	Total
Design & Layout (DCSF, 2008, C7)											
Space at the entrance & to access key facilities including the whiteboard, sink & resources	x	x	✓	✓	✓	✓	✓	✓	x	x	**6**
Direct access to outdoors	x	x	✓	x	x	x	x	x	x	x	**1**
Ability to reduce class numbers to accommodate a child using a wheelchair or mobility aids	✓	✓	✓	x	✓	x	✓	✓	x	x	**6**
Easy access to quiet small group-work rooms not accessed from other classrooms	x	x	✓	x	✓	x	x	x	x	x	**2**
Access from circulation spaces, not other classrooms	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	**10**
The potential for arranging different groupings and activities	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	**10**
Furniture, fittings & equipment (DCSF, 2008, D11e)											***Total out of 6.**
Avoid fixed furniture	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	**10**
Surfaces should be smooth with no sharp edges or projections	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	**10**
Easy to clean and maintain	✓	✓	✓	✓	✓	✓	✓	x	x	x	**7**
Work surfaces at a suitable height	✓	✓	✓	✓	✓	x	x	✓	x	x	**6**
Avoid patterned & reflective surfaces	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	**10**
Furniture which provides visual contrast to the surroundings	x	x	x	x	x	x	x	x	x	x	**0**
Avoid acoustically reflective materials	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	**10**
Sufficient storage space	x	x	x	✓	x	✓	✓	✓	✓	✓	**6**
Accessible fittings, such as lever taps	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	**10**
A range of chairs of appropriate size with full back support	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	**10**
Minimal but versatile furniture & fittings to enable teachers to use stimuli from teaching materials more effectively	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	**10**
Stability and safety of height adjustable furniture should be maintained	na	na	na	✓	na	x	x	✓	x	x	**2***
Blinds for privacy or to hide an external view to reduce distraction	x	x	x	x	✓	✓	✓	✓	✓	✓	**6**

Interior Finishes											
Plain surfaces, rather than patterned (BSI, 2009, 7.2.3)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	**10**
Avoid high gloss or shiny surface finishes on large areas (BSI, 2009, 9.1.1)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	**10**
Colour contrast – floor with wall including skirting board (BSI, 2009, 7.2)	x	x	x	x	x	x	x	x	x	x	**0**
Colour contrast – door & frame with surrounding surface (BSI, 2009, 9.1.1)	x	x	x	x	x	x	x	x	x	x	**0**
Avoid use of hard materials or materials with very high absorbencies for ceilings, walls and particularly floors (BSI, 2009, 9.1.2)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	**10**

Table 5.10 shows the recommendations for classroom design which have been based on investigations undertaken during the detailed study. The requirement of the DDA 1995, 2005 and subsequent Equality Act 2010 for education bodies to make adaptations to the curriculum and information provided has led to much research examining educational strategies and adaptations that can be made for students with various types of impairments or additional support needs, one example of which is “Effective Classroom Adaptations for Students with Visual Impairments”. Educational studies such as this can be used as a basis for exploring the type of environment which can support these adaptations and incorporated within best practice guidance. McAllister and Maguire (2012) undertook a study of this kind investigating classroom design considerations to support pupils with autism. This research project involved a 2 year study of classroom design, undertaken between architects and teachers of children with autism in Northern Ireland, and led to the production of 16 specific design considerations for the Key Stage 1 classroom (Primary 3 and 4 in Scotland). Similar studies should be undertaken within a Scottish context examining the design of both the mainstream and special classroom environment as well as other important areas in the school such as the playground.

Table 5.10: Recommendations to improve areas relating to environmental aspects

Classroom Recommendations
Design Process
Consultation - Discuss classroom layouts in detail with teaching staff focusing on the classroom layout and zoning of activities
Consultation – Liaise with teaching staff regarding the provision of direct access to outdoor areas from ground floor classrooms
Brief – Ensure small rooms are provided for each group of classrooms
Brief – Ensure space calculations are based on accurate estimates of the school roll taking into account the school may be more popular because it is new
Brief – Include communal storage for each group of classrooms as well as teaching wall storage
Initial design – Ensure there are sufficient connections to outdoors (ideally from all street areas)
Detailed design – Client should ensure that tonal contrast combinations are satisfactory as different parties may be specifying the colour of different aspects such as the floor and furniture
Detailed design – Ensure blinds are provided in every classroom regardless of orientation or floor level
Detailed design – Ensure that skylights etc. do not interfere with the use of the interactive whiteboard
Design Guidelines
Classroom storage – fixed storage with closing doors should be provided to minimise clutter which could be beneficial to people with visual impairments and children with autism who can find untidy areas stressful and be easily distracted while trying to focus on a task
Storage trays under children's desks allow children to access materials easily, minimise clutter and save storage space
Full height pin board should be provided on one wall of the classroom to allow for creative displays and for teachers to pin work at a suitable height for children – better for children with visual impairment to come close to see work and for children who may want to touch work
Protected display boards should be provided for special schools or units – this can protect work as some children can get angry and tear it down
Wheelchair accessible sinks are crucial in special schools or units and should be height adjustable
Special schools or units should have keys fitted to allow staff to turn water off – some children can become fixated with water
Future Research
Investigate with teaching staff the ideal layout for classrooms in a special school or unit, focusing on the provision of a retreat room, storage, the best way to access toilets and changing areas and outdoors
Investigate use of thermal massing to regulate temperatures (see Table 8 for more details)
Investigate interactive whiteboards with teaching staff – focusing on the whether it is best to have portable or fixed and where they should be positioned
Undertake studies with pupils and teachers to examine positive learning environments for pupils with additional support needs in both mainstream and special schools settings

5.2.6 Variety of Educational Spaces

The matrix in Table 5.11 sets out the criteria for best practice accessible design related to the variety of educational spaces and identifies the extent to which these criteria are met within the 10 schools in the detailed study. Guidelines relating to the variety of educational spaces have been sourced from Building Bulletin 102, "Designing for disabled children and children with special educational needs" (DCSF, 2008) as the other reference documents in this chapter are generic and do not contain information specific to school design. The worst performing area is the provision of small rooms for one-to-one and group work with children with additional support needs. These activities often take place in the corridor or in the library and specialist support staff commented that children can find it difficult to concentrate. All new schools are provided with a shared library and IT suite and staff commented that this is a valuable resource. In one shared campus these communal resources have been placed within the area of the building occupied by one school, making it difficult for staff and children from the two other schools to access the spaces. In addition, there is no fire escape lift and children from the special school located on the ground floor who rely on wheelchairs and mobility equipment may not be able to access these spaces due to escape issues.

Table 5.11: Matrix showing extent to which 10 schools meet accessible design standards for the variety of educational spaces

Variety of educational spaces	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	Total
Spaces for children with additional support needs (DCSF, 2008, C7)											
Provide extra small group rooms (separate from support spaces such as therapy & medical rooms) where teachers or visiting professionals can work with children individually	x	x	x	x	x	x	x	x	X	x	**0**
Positioning one small group room so that it can be shared rather than accessed from only one classroom	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	**10**
Type of provision based on individual school requirements	x	x	x	x	x	x	x	x	X	x	**0**
Support spaces such as therapy & medical rooms	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	**10**

General rooms (DCSF, 2008, C7)											
Library	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	**10**
Computer suite	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	**10**
Special purpose rooms* (DCSF, 2008, C10)											***Total out of 2. **Total out of 3.**
Dark sensory room	na	na	✓	na	✓	na	na	na	X	na	**2****
White sensory room	na	na	x	na	x	na	na	na	X	na	**0****
Sensory room - Wheelchair tracking	na	na	✓	na	✓	na	na	na	Na	na	**2***
Sensory room - plastic covered cushioned linings to walls, to half or full height	na	na	✓	na	✓	na	na	na	Na	na	**2***
Sensory room - dimmer switches to adjust light levels	na	na	✓	na	✓	na	na	na	Na	na	**2***
Sensory room - A firm slip-resistant floor, with soft carpet or cushioned sheet flooring	na	na	✓	na	✓	na	na	na	Na	na	**2***
Sensory room - dimmer switches to adjust light levels	na	na	✓	na	✓	na	na	na	Na	na	**2***
Hydrotherapy pool - a surround of 2 –2.5m wide	na	na	✓	na	✓	na	na	na	Na	na	**2***
Soft play – at least 24m2	na	na	x	na	x	na	na	na	X	na	**0****
Soft play - walls and floor lined with soft-padded mats	na	na	✓	na	✓	na	na	na	Na	na	**2***
Soft play – avoid internal spaces natural light & ventilation from high-level windows opening outwards	na	na	x	na	x	na	na	na	✓	na	**1****
Soft play – Wheelchair tracking travelling in both directions for access to all parts of the space	na	na	x	na	✓	na	na	na	x	na	**1****

Table 5.12 details the recommendations for improving the variety of educational spaces in new schools. Requirements at each school will depend on the expected requirements or needs of the school population. As the majority of children with additional support needs are educated in a mainstream setting in Scotland it is important that the appropriate spaces are provided. It is also important that special units located within a mainstream school are provided with the same specialist resources that they would receive if they were in a separate special school.

Table 5.12: Recommendations to improve areas relating to the variety of educational spaces

Classroom Recommendations
Design Process
Brief – Consult with staff to ensure appropriate provision has been made concerning types of spaces required for children with additional support needs
Brief – Ensure special units within a mainstream school have the same specialist resources (sensory room, soft play room etc.) as a separate school
Detailed design – ensure that projection equipment in sensory room is specified to avoid background noise which can be disturbing for children who are hard of hearing or who have difficulty concentrating or processing auditory input
Design Guidelines
Small group work should not take place in circulation space which is accessed by other classes
Hydrotherapy pool – tracking from changing area to pool is crucial
Hydrotherapy pool – daylight is preferable with low-level frosted windows for ambience
Avoid L-shaped rooms for general purpose spaces as they limit flexibility
Future Research
Research the nature of space for children for additional support needs (small room provision) for different types of school in Scotland based on new figures detailing the types of additional support needs of the school population
Investigate the ideal size & layout of sensory spaces by studying those already in use

5.2.7 Sports Hall

The matrix in Table 5.13 sets out the best criteria for sports hall and indicated whether these are met by each of the 10 schools within the detailed study. The specific guidelines relevant to the sports hall have been taken from Building Bulletin 102, “Designing for disabled children and children with special educational needs” (DCSF, 2008), as the other reference documents used in this chapter are generic and not specific to school design. Best practice standards for sports halls are generally well met, however there were some localised problems with acoustics and daylight causing glare on the floor. The general size of some of the sports halls is also problematic and as with other areas storage is lacking.

Table 5.13: Matrix showing extent to which 10 schools meet accessible design standards for the sports hall

Sports hall	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	Total
Sports hall (DCSF, 2008, C7)											
Centrally located	✓	✓	x	x	✓	✓	✓	✓	x	x	**6**
Open directly onto an external recreation area	x	x	x	x	x	x	x	x	x	x	**0**
Proportions that are suitable for curricular use and age-appropriate (large sports halls may be uncomfortable for some children)	x	✓	x	✓	✓	x	x	✓	✓	x	**5**
Glare-free lighting	x	✓	✓	✓	✓	✓	✓	✓	✓	x	**8**
Impact resistant floor	x	✓	✓	✓	✓	✓	✓	✓	✓	✓	**9**
Low glare floor	x	✓	✓	✓	✓	✓	✓	✓	✓	x	**8**
Walls smooth with no projections	x	✓	✓	✓	✓	✓	✓	✓	✓	✓	**9**
Wall, floor & ceiling to enhance acoustics	x	✓	✓	✓	✓	✓	✓	✓	x	x	**7**
Long shallow storage directly off the hall (min 15m2)	x	x	✓	✓	✓	✓	✓	✓	✓	x	**7**

Table 5.14 details the recommendations for improving the design of sports halls. It is recommended that a hearing enhancement system be installed in sports halls which would bring benefits to all users and especially older people and people who are hard of hearing. At the detailed design stage, acoustic simulations should be undertaken to ensure that the appropriate materials are being specified to achieve the best acoustic conditions possible.

Table 5.14: Recommendations to improve areas relating to the sports hall

Sports Hall Recommendations
Brief / initial design – discuss the provision of storage with staff & check that the size of the space is suitable for all types of users – consider providing alternative smaller spaces
Detailed design – undertake acoustic calculations to ensure acoustic conditions are adequate for all

Design Guidelines
When campus is shared consider provision of smaller space for children with additional support needs as larger spaces can be uncomfortable and make supervision difficult. Sharing may also be problematic
Ensure floor markings contrast with flooring – avoid use of yellow against a light wooden surface
Daylight control should be provided for all windows
The size of mainstream sports hall can sometimes be too big for certain children with additional support needs - provide a smaller space or a space that can be made smaller – a net curtain in a big sports hall is not adequate for dividing the space for children with additional support needs
Future Research
Research best colour systems for a dark floor with bright coloured markings provides a visual contrast with a light coloured wall and helps to minimise glare
Research existing sports hall which have good acoustic conditions and identify design criteria, e.g. material specification, sizes etc.
Research best colour systems for sports halls – e.g. a dark floor with bright coloured markings provides a visual contrast with a light coloured wall and helps to minimise glare

5.2.8 Assembly / Dinner Hall

The matrix in Table 5.15 summarises best practice design guidelines for the assembly / dinner hall and indicates whether these are being met by the 10 schools in the detailed study. As with other areas, guidelines relevant to sports halls are taken from Building Bulletin 102, “Designing for disabled children and children with special educational needs” (DCSF, 2008) as the other reference documents used in this chapter are generic and not specific to school design. The assembly/dinner hall space in new school buildings is generally shared. Most of the 10 schools in the study meet best practice criteria with underperforming areas being the even distribution of daylight, with the majority of halls having a glazed side wall. The glazed side wall may also affect acoustic conditions when children are eating as glass can be reflective, although there were no reports of acoustics being problematic. There is a trend to design assembly/dinner halls as open spaces with no separate corridor. This was not considered problematic when the hall links communal spaces, in the case of Keppoch Campus, but it is problematic when the hall links corridor areas with classrooms.

Table 5.15: Matrix showing extent to which 10 schools meet accessible design standards for the assembly / dinner hall.

Assembly / Dinner Hall	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	Total
Dinner Hall (DCSF, 2008, C7)											***Total out of 3.**
Dinner hall - provide a quiet, sheltered space away from distraction	na	na	✓	na	✓	na	na	na	x	na	**2***
Provide space for staff to sit with children during meal times	na	na	x	na	✓	na	na	na	x	na	**1***
Avoid a space that is too constricted or busy	x	x	x	✓	✓	✓	✓	✓	✓	✓	**7**
Enough space between tables for children to circulate	✓	✓	x	✓	✓	✓	✓	✓	✓	✓	**9**
Servery counters low enough for children to see the food	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	**10**
Assembly Hall (DCSF, 2008, C7)											
Located centrally	✓	✓	x	✓	✓	✓	✓	✓	✓	✓	**9**
Provide access to the stage area	x	x	✓	✓	✓	✓	✓	✓	✓	✓	**8**
Low-glare floors	✓	✓	x	x	✓	✓	✓	✓	x	x	**6**
Even distribution of light (side lighting at high level preferred, as end glazing produces glare)	✓	✓	x	x	✓	✓	✓	x	x	x	**5**
Curtains or blinds for full blackout facilities	✓	✓	✓	x	x	x	✓	✓	✓	✓	**7**
Good quality room acoustics	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	**10**
Fire escape	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	**10**

Table 5.16 shows the recommendations for improving assembly / dinner hall design. Various recommendations are made for consideration during the design process. The design of private eating spaces for children with additional support needs should not be so small to be cramped and overheat and should be positioned in a quiet zone away from circulation areas. It is also recommended that research is undertaken to examine the nature of open assembly/dinner halls with no separate corridor to ensure that they do not impact negatively on users with impairments or additional support needs.

Table 5.16: Recommendations to improve areas relating to the assembly/dinner hall

Assembly / Dinner Hall Recommendations
Design Process
Brief – discuss whether is it would be advantageous to position the assembly hall and sports hall side by side to allow them to be joined together for whole-school events
Brief – discuss the space that will be needed for children with additional support needs & the staff that will be expected to sit with them to assist with eating
Initial design – Consult with users concerning use of assembly/dinner hall on a daily basis & for large events focusing on through traffic, the position of the servery area, the location of the sound both & stage, provision of any small private eating areas
Initial design – If full-height glazing is provided ensure there is adequate daylight control, flooring which minimising glare, and that the space is not orientated toward the south
Design Guidelines
Ensure small, private eating spaces do not overheat due to low ceiling height & are not positioned where other children will be queuing
Ensure sound/lighting control booth can be seen from the stage area
There should be a visual contrast between the floor and the wall
Future Research
If the assembly / dinner hall is an open space what design criteria can ensure that this is not problematic when using the hall to access classrooms spaces etc. on either side, e.g. if flooring can be used to mark a clear, obstacle-free route through the space; if the types of spaces that it links are important

5.2.9 Staff Accommodation

The matrix in Table 5.17 summarises the best practice design guidelines relating to staff accommodation and indicates the extent to which each criterion is met by the 10 schools in the detailed study. Specific guidelines relating to staff accommodation have been sourced from Building Bulletin 102, “Designing for disabled children and children with special educational needs” (DCSF, 2008) as the other reference documents used in this chapter are generic and do not relate to school design. Senior staff offices generally meet best practice criteria, with administration offices and the kitchen area performing worse. A main complaint from staff is the lack of daylight in some administration areas and the majority of kitchens, an aspect which should be highlighted in best practice design guidelines.

Table 5.17: Matrix showing extent to which 10 schools meet accessible design standards for the staff accommodation.

Assembly / Dinner Hall	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	Total
Offices (DCSF, 2008, C10b)											
Administration – space for between 3 & 5 members of staff to work comfortably, including clearances for circulation	X	x	x	x	x	x	x	x	x	x	**0**
Administration - Sufficient storage space	✓	✓	✓	x	✓	✓	✓	x	x	x	**6**
Separate reprographics space	X	x	x	x	✓	✓	✓	✓	x	x	**4**
Senior staff offices – located near reception	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	**10**
Senior staff offices – adjustable blinds on any glazed screens and windows & acoustic insulation for privacy	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	**10**
Meeting room	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	**10**
Teaching staff preparation and resource space	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	**10**
Kitchen											
Sufficient ventilation to provide a comfortable environment for staff and prevent overheating	✓	✓	x	x	x	x	x	x	x	x	**2**
Adequate storage facilities	✓	✓	x	x	x	x	x	x	x	x	**2**
A separate wheelchair accessible toilet	X	x	x	x	x	x	x	x	x	x	**0**
Changing rooms	✓	✓	x	x	x	x	x	x	x	x	**2**
Small office	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	**10**
Staffroom											
Space for workstations, notice boards, book/magazine shelves	✓	✓	x	✓	x	x	✓	x	x	x	**4**
Audio-visual facilities with blinds and blackout	X	x	x	x	x	x	x	x	x	x	**0**
Small area for refreshments	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	**10**

Table 18 sets out the recommendations for improving the design of staff areas. The design of the kitchen and space for catering staff needs to be improved as this was one of the worst performing areas in all of the schools. It is recommended that both catering and administration staff are consulted regarding the design of their workspace. Furthermore, daylight should be considered a basic requirement in all work areas as this is just as important for staff as it is pupils. The issue of overheating should be

investigated with consideration given to a variety of design aspects and not only ventilation.

Table 5.18: Recommendations to improve areas relating to staff accommodation

Staff Accommodation Recommendations
Design Process
Brief – Ensure that the schedule of accommodation includes a changing area for catering staff, a separate accessible toilet & adequate storage facilities
Initial design – Ensure administration and catering staff are represented in the consultation process & involved in the design of their work area
Initial design – ensure that minimum circulation widths are provided in the kitchen space and that tray storage units are considered when designing the room layout
Initial design – discuss the provision & location of staff rooms with teaching staff, especially if the school is on a shared campus
Design Guidelines
Highlight the importance of daylight in all staff in all areas, specifically administration offices and kitchens which sometimes have no windows
Administration – a separate reprographics area should have a door so that noise can be blocked out if necessary
Kitchen - Overheating is not just a ventilation issue - volume of kitchen, windows and use of thermal mass can be used to regulate the temperature. Windows can provide cooling properties and make space feel less claustrophobic when warm and humid.
Kitchen- the kitchen layout should ensure a minimum circulation width of 1000mm between all working units
Staffroom – should have a large area for refreshments, this is the main use of the staffroom and everyone has to access the same area in a short time
In a shared campus care should be taken to situate the staffroom where is can be easily accessed by all schools
Future Research
Investigate overheating in the kitchen using building simulation models to study the use of windows, the volume of the space, thermal mass and materials to regulate the temperature – staff commented that older kitchens with brick or tiles walls feel far cooler

5.2.10 Sanitary Accommodation

The matrix in Table 5.19 sets out the standards and best practice guidelines relating to sanitary accommodation and indicates the extent to which the 10 schools in the detailed study meet these criteria. Provision of sanitary accommodation for pupils is stipulated in the “School Premises (General Requirements and Standards) (Scotland) Regulations 1967” (Statutory Instruments, 1967). Provision of sanitary accommodation for staff is

covered in Part 3 of the mandatory Building Regulations for Scotland (SBSD, 2011). All new school buildings have accessible toilets on each floor level with a variation left and right-hand transfer. The grabrails in one of the accessible toilets in one school are falling off the wall and staff commented that this shows poor standards as the school is only 10 years old. The worst performing areas are colour contrast, signage (covered in detail in Section 5.2.2, Horizontal Circulation), flexibility in provision to allow for variation in occupancy and the design of children's sanitary accommodation and changing areas to allow staff to help children on either side.

Table 5.19: Matrix showing extent to which 10 schools meet accessible design standards for the sanitary accommodation.

Sanitary Accommodation	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	Total
Staff WCs											
Staff WCs - Number of sanitary facilities (SBSD, 2011, 3.12.2)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	**10**
All WCs - Sanitary facility & associated aid or fitting, such as a grabrail, should contrast visually with surrounding surfaces (SBSD, 2011, 3.12.6)	X	x	x	x	x	x	x	x	x	x	**0**
Accessible WCs – clearly identified by signage (SBSD, 2011, 3.12.7)	✓	✓	x	x	x	x	x	x	x	x	**2**
Accessible WCs – Fitted with fixed and folding grab rails (SBSD, 2011, 3.12.7)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	**10**
Accessible WCs – Fitted with an assistance alarm (SBSD, 2011, 3.12.7)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	**10**
Accessible WCs – Both left and right-hand transfer layouts (SBSD, 2011, 3.12.7)	X	x	✓	✓	✓	✓	✓	✓	✓	✓	**8**
Travel distance not more than 45m	X	x	✓	✓	✓	✓	✓	✓	✓	✓	**8**
Children's WCs & changing areas											***Total out of 3.**
Number of sanitary facilities (Statutory Instruments, 1967, 15.1)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	**10**
Sanitary facility & associated aid or fitting, such as a grabrail, should contrast visually with surrounding surfaces (SBSD, 2011, 3.12.6)	X	x	x	x	x	x	x	x	x	x	**0**
Flexibility in provision to allow for variation in occupancy (DCSF, 2008, 10D)	✓	✓	x	x	x	x	x	x	x	x	**2**
Separate facilities for younger & older children (DCSF, 2008, 10D)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	**10**

Separate toilet provision for boys and girls aged eight and above (DCSF, 2008, 10D)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	**10**
Changing areas conveniently located around the school (DCSF, 2008, 10D)	na	na	✓	na	✓	na	na	na	x	na	**2***
Accessible WC & changing – space for non-ambulant children & staff to help them if necessary, (DCSF, 2008, 10D)	na	na	x	na	x	na	na	na	na	na	**2***

Table 5.20 details the recommendations for improvements to the design of sanitary accommodation. Despite minimum requirements for the number of sanitary fittings for both staff and pupils being met, anecdotal evidence gathered during the visual surveys suggests that there may be issues with WC provision. It should be established if this is due to distribution, design or quantity. The layout of sanitary accommodation and amount of storage provision should be discussed with relevant staff members, especially when members of staff are required to assist children. Appropriate colour contrast should be provided in all toilets and research should be undertaken to investigate the adequacy of the recommended 1500mm turning circle for wheelchair users.

Table 5.20: Recommendations to improve areas relating to sanitary accommodation

Toilet Recommendations
Design Process
Brief – Ensure adequate sanitary accommodation is provided in the schedule of accommodation – Best practice guidance states that this may have to be more than mandatory guidelines to meet local needs (DCSF, 2008, 10D)
Initial design – Discuss the provision and layout of sanitary accommodation in relation to building use and the location of other spaces – identify areas where more sanitary accommodation will be required such as the teaching staffroom
Detailed design – Ensure that the specification of WCs and wall & floor finishes ensures the best colour contrast combinations will be met in all sanitary accommodation & not just accessible WCs
Design Guidelines
Accessible WC & changing area – space for staff is currently stipulated as two adults for a secondary age child using a wheelchair – this should be amended to include primary children as they can require one member of staff on either side (DCSF, 2008, 10D)
Highlight the need for adequate storage provision within WCs and changing areas – for clothing, towels, incontinence pads etc.

Future Research
Investigate if the standard turning circle of 1500mm is adequate for the majority of wheelchair users
Research best practice examples of WC & changing area design based on user satisfaction
Establish if current sanitary provision sufficient & optimum distribution & design

5.3 Results: Exterior

5.3.1 Playground

The matrix in Table 5.21 details the best practice guidelines for playground design and indicates the extent to which these are met by the 10 schools in the detailed study. The matrix has been split into two areas, the first covering guidelines which related to the special schools and the second covering guidelines related to mainstream schools. It is apparent playground criteria generally score less than criteria for interior areas such as the classroom & many aspects are still to be met. Playground design is largely down to the individual school with most resources being provided through funding grants secured after the school has opened.

Table 5.21: Matrix showing extent to which 10 schools meet accessible design standards for the playground

Playground	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	Total
Special schools	*Total out of 1. **Total out of 2. ***Total out of 3.										
A designated unit for children with additional support needs in a mainstream school should have a separate play area (DCSF, 2008, C7)	na	na	na	na	na	na	na	na	✓	na	**1***
Co-located (mainstream & special school) – provide safe, contained outdoor space (DCSF, 2008, B4)	na	na	✓	na	✓	na	na	na	✓	na	**3*****
Special school - outdoor spaces are easily reached, especially by younger children (DCSF, 2008, B4)	na	na	✓	na	x	na	na	na	na	na	**1****
Special school - plan around one or more courtyards (DCSF, 2008, B4)	na	na	✓	na	✓	na	na	na	na	na	**2****
Special school – Courtyard large enough (150 –300m2) for a range of activities (DCSF, 2008, B4)	na	na	✓	na	✓	na	na	na	na	na	**2****
Special school – Courtyard with adequate sunlight, avoiding overshadowing (DCSF, 2008, B4)	na	na	x	na	x	na	na	na	na	na	**0****

Special school – provide a sensory garden (DCSF, 2008, B4)	na	na	x	na	x	na	na	na	na	na	**0****
All schools											
Separate noisy and quiet, wet and dry activities (DCSF, 2008, C7)	X	x	x	✓	x	x	x	✓	x	x	**2**
A variety of areas for different types of play (DCSF, 2008, C7)	X	x	x	x	x	✓	✓	✓	x	x	**3**
Some areas partially covered (DCSF, 2008, C7)	✓	x	x	x	x	✓	x	x	✓	✓	**4**
Safe simulations of hazards that children might meet outside school (DCSF, 2008, C7)	X	x	x	x	x	x	x	x	x	x	**0**

Table 5.22 details the recommendations for improving playground design. As mentioned in Chapter 4, research (for example Boldemann et al, 2012) suggests that wildlife is one of the most important factors in encouraging children to play. Wildlife areas are often the least accessible areas for children with impairments and research should be undertaken investigating the best types of outdoor play spaces that children with various additional support needs require. Playgrounds in special schools often have a severe lack of wildlife and when wildlife areas are provided these are completely separate to the playground. Ways in which wildlife features can be safely incorporated within playgrounds in special schools should be investigated. Ward Thompson (2011) explores the importance of landscape on people's physical and mental wellbeing by encouraging activity and reducing stress levels, and discussed how this theme has recurred from ancient time to present day. She refers to studies by Pretty et al. (2005) who have found that nature can help us recover from existing stresses or problems and also have an 'immunising effect' by protecting from future stresses and help us to concentrate and think more clearly. Pretty et al. (2005) also identify three levels of engagement with nature: (i) 'viewing nature' (through a window or in a painting); 'being in the presence of nature' (while undertaking other activity such as cycling to work) and (iii) 'active participation and involvement with nature' (gardening, trekking, cross-country etc.). These levels of engagement could be used in order to establish design guidelines for the

natural environment within a school. Studying the effect of nature on children with different types of additional support needs could also help to establish important design criteria. Christopher Henry has written extensively on architecture for autism and his article on exterior views (2012) argues that *what* is viewed can be as or more important than the extent of the view, arguing that there is a different between a distraction and a needed restorative break, giving the example of one school with expansive views to a bleak hardscaped courtyard where the teachers have covered the windows. Ward Thompson (2008) has also found that a child's engagement with nature impacts on the attraction of natural spaces as places for physical activity and mental renewal in adult life. This reinforces the importance of providing this engagement in schools which may then later impact on the mental and physical well-being of the adult population.

Table 5.22: Recommendations to improve areas relating to playground

Playground Recommendations
Design Process
Initial design - Discuss the exterior layout with staff identifying the main connection points to the building interior, different zones for various activities and areas for future development e.g. creation of an eco-garden
Initial design – Discuss how the school playground will be used at different times of day identifying where shelter will be required for children waiting to enter in the morning
Detailed design – Discuss the type & amount of sensory stimulus and play equipment with staff & the level of access to certain areas, for example some children may become fixated with water but for others it can be a learning tool (DCSF, 2008, C7)
Design Guidelines
Highlight the need for access to wildlife in special school playgrounds
Highlight the need to ensure that part of wildlife areas in mainstream playgrounds are accessible to children with impairments
Obstacle free routes should be created for people with visual impairments & all furniture & columns should be painted with appropriate colour contrasting bands
Storage space is required for outdoor playground equipment
Future Research
Research the types of outdoor spaces for children with different types of additional support needs, e.g. spaces which are sheltered for children that are sensitive to sensory input
Research the types of play spaces that children with various types of additional support needs require focusing on the need to provide how wildlife and imagination can be best incorporated into playgrounds for children with additional support needs
Research the impact of nature on children with different types of additional support needs in order to establish design criteria.

5.3.2 External Learning Spaces

The matrix in Table 5.23 summarises the best practice design criteria for external learning spaces and identifies the extent to which these are met by the 10 schools in the detailed study. Mainstream schools do not tend to have dedicated outdoor space for children with additional support needs and wildlife areas are often inaccessible. There is also a lack of outdoor classroom and covered areas, and classrooms do not tend to open out onto outdoor spaces.

Table 5.23: Matrix showing extent to which 10 schools meet accessible design standards for external learning spaces

External Learning Spaces	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	Total
Dedicated outdoor space for children with additional support needs (DCSF, 2008, B7)	x	x	✓	x	✓	x	x	x	✓	x	**3**
Accessible wildlife / habitat areas (DCSF, 2008, C7)	✓	✓	✓	✓	x	x	x	x	x	x	**4**
Outdoor classroom areas (DCSF, 2008, C7)	✓	✓	✓	✓	x	x	x	x	x	x	**4**
Classrooms opening directly onto an external area for children with additional support needs (DCSF, 2008, C7)	x	x	✓	x	x	x	x	x	x	x	**1**
A covered outdoor space to act as transition from inside to outside (DCSF, 2008, C7)	✓	x	x	x	x	✓	x	x	✓	✓	**4**

Table 5.24 details the recommendations for improving external learning spaces. Many of the areas between playground and external learning spaces cross over and consultation or research in these areas would no doubt overlap.

Table 5.24: Recommendations to improve areas relating to external learning spaces

External Learning Spaces Recommendations
Design Process
Initial design – consult with staff concerning types of outdoor learning spaces & connections between indoors / outdoors. Direct external access & views might distract some children and access control may be needed, yet access to a safe contained outdoor place might help other children to calm down. Access via a lobby may resolve this. (DCSF, 2008, C7)
Design Guidelines
Colour contrast & clear pathways / routes are equally important, if not more so, for exterior environments (White, 2010).
Highlight the need for a school to have at least some classrooms on the ground floor in order to create connections with the exterior environment.
Storage space is required for outdoor learning resources – these can often be big items such as wood for building, tractor tyres etc.
Future Research
Investigate external learning areas for shared campuses and how the boundaries between different areas can be created without creating a cage or jail-like feeling.
Investigate external learning areas for children with different types of additional support needs

5.3.3 Sports Facilities

The matrix in Table 5.25 details the best practice criteria for outdoor sports facilities and the extent to which these are met by the 10 schools in the detailed study. All of the schools in the study have sports pitches with artificial surfaces which can be used by people using mobility equipment or wheelchair users. Hard-surfaced games courts are not generally provided over and above the standard sports pitch. As with other areas, it is apparent that storage is significantly lacking.

Table 5.25: Matrix showing extent to which 10 schools meet accessible design standards for sports facilities

Sports Facilities (DCSF, 2008, C7)	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	Total
Sports pitches of grass or artificial surfaces	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	**10**
Hard-surfaced games courts	x	x	x	x	x	x	x	x	x	x	**0**
Pitches and access to them designed and constructed so that wheelchair users can make full use of them	✓	✓	✓	✓	✓	✓	✓	x	✓	x	**8**
External stores for sports and play equipment (about 10m2) & smaller maintenance items (about 10–20m2)	x	x	x	x	x	x	x	x	x	x	**0**

Table 5.26 details the recommendations for improving sports facilities. It is recommended that research is undertaken to produce more detailed guidelines for the types of sports facilities that can provide a positive learning environment for children with impairments or additional support needs.

Table 5.26: Recommendations to improve sports facilities

Sports Facilities Recommendations
Design Process
Brief – Ensure storage for external sports areas is included & that the area provided excluded storage for the playground & external learning areas
Brief – Discuss the size of the sports field required – this space may be too big for children with certain types of additional support needs to use & it may be necessary to provide another similar but smaller space
Initial layout – Ensure that the sports field can be accessed from the same level as the changing facilities
Construction – Ensure that all routes from the school to external sports facilities have been constructed to be accessible with the appropriate dropped kerbs etc. For community facilities consideration should be given to adults using the facility on their own.
Design Guidelines
The entrance & boundary around a sports field should be clearly indicated using colour contrast
The route towards the entrance to the sports field from the changing rooms should be marked
Future Research
Investigate design of sports facilities for children with impairments or additional support needs & how these types of spaces can be best incorporated into school design

5.3.4 School Grounds

The matrix in Table 5.27 summarises the best practice guidelines relating to school grounds and details the extent to which these are met by the 10 schools in the detailed study. The matrix is divided into four main sections based on mandatory standards and best practice guidance documents, which are parking, access routes, ramps and stairs.

Table 5.27: Matrix showing extent to which 10 schools meet accessible design standards for school grounds

School Grounds	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	Total
Parking											
Designated off-street parking (BSI, 2009, 4.2)	x	x	✓	✓	✓	✓	✓	✓	✓	✓	**8**
Designated setting-down point suitable for disabled passengers close to building entrance (BSI, 2009, 4.2)	x	x	✓	✓	✓	✓	✓	✓	✓	✓	**8**
Access Route											***Total out of 6.**
Continuous accessible route from public transport stops to the accessible entrance (BSI, 2009, 5.1)	✓	✓	x	x	x	x	x	✓	✓	x	**4**
Continuous accessible route from designated car parking spaces to the accessible entrance (BSI, 2009, 5.1)	x	x	✓	✓	✓	✓	✓	✓	✓	✓	**8**
Continuous accessible route to and from facilities associated with buildings (BSI, 2009, 5.1)	✓	✓	✓	✓	✓	✓	✓	x	✓	x	**8**
Should not contain steps (BSI, 2009, 5.1)	x	x	x	x	x	x	x	✓	✓	✓	**3**
At least 1.8m wide (BSI, 2009, 5.2)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	**10**
Level (<1:60) or gently sloping (>1:60 & <1:20) (BSI, 2009, 5.4)	✓	✓	x	x	x	x	x	✓	✓	✓	**5**
Firm, slip-resistant and reasonably smooth surface (BSI, 2009, 5.5.1)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	**10**
Tactile paving where necessary (BSI, 2009, 5.5.2)	x	x	x	x	x	x	x	x	✓	x	**1**
Street furniture should be located at or beyond the boundaries of an access route (BSI, 2009, 5.7.1.1)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	**10**
Free-standing columns supporting an entrance canopy should not be positioned within the width of an access route (BSI, 2009, 5.7.1.2)	na	na	✓	na	✓	✓	✓	✓	na	✓	**6***
Ramps											***Total out of 3. **Total out of 4.**
Ramped access where the gradient is 1:20 or steeper (BSI, 2009, 5.8.1)	✓	✓	✓	x	na	na	na	na	na	na	**3****
Ramp should have the lowest practical gradient within the range 1:20 to 1:12 (BSI, 2009, 5.8.2)	✓	✓	x	na	na	na	na	na	na	na	**2***
Ramp width min 1.5m & landings provided at foot & head (BSI, 2009, 5.8.3 & 5.8.4)	✓	✓	✓	na	na	na	na	na	na	na	**3***
Ramp – continuous upstand of 150mm (BSI, 2009, 5.8.6)	✓	✓	✓	na	na	na	na	na	na	na	**3***
Ramp –upstand to colour contrast with surface of ramp (BSI, 2009, 5.8.6)	x	x	x	na	na	na	na	na	na	na	**0***
Ramp surface material should be durable and slip resistant when wet (BSI, 2009, 5.8.6)	✓	✓	✓	na	na	na	na	na	na	na	**3***

Ramp – evenly distributed lighting	✓	✓	✓	na	na	na	na	na	na	na	**3***
Stairs											***Total out of 4.**
Less than 20 risers in a flight & number of risers in separate flights to be uniform (BSI, 2009, 5.9.3)	✓	✓	✓	✓	na	na	na	na	na	na	**4***
Width note less than 1.2m (BSI, 2009, 5.9.4)	✓	✓	✓	✓	na	na	na	na	na	na	**4***
Step nosings to incorporate a contrasting continuous material for the full width of the stair (BSI, 2009, 5.9.5)	x	x	x	x	na	na	na	na	na	na	**0***
Level landing provided at top & bottom of each flight (BSI, 2009, 5.9.6)	✓	✓	✓	✓	na	na	na	na	na	na	**4***
Corduroy hazard warning surface at the top and bottom of each flight flight (BSI, 2009, 5.9.6)	x	x	x	x	na	na	na	na	na	na	**0***
Well illuminated, glare-free lighting (BSI, 2009, 5.9.8)	✓	✓	✓	✓	na	na	na	na	na	na	**4***
Handrail provided at each side with top surface between 900 & 1000mm (BSI, 2009, 5.10.1)	✓	✓	✓	✓	na	na	na	na	na	na	**4***
Second handrail for buildings designed for use by children (BSI, 2009, 5.10.1)	x	x	x	x	na	na	na	na	na	na	**0***
Handrail - Circular/oval profile, perimeter of 100 & 160mm; graspable along entire length; strong enough to support user & terminated to reduce risk of clothing being caught (BSI, 2009, 5.10.2)	✓	✓	✓	✓	na	na	na	na	na	na	**4***
Handrail - Contrast with surroundings & terminated horizontally 300mm at start & finish (BSI, 2009, 5.10.2)	x	x	x	x	na	na	na	na	na	na	**0***

Table 5.28 sets out recommendations for improvement of areas of design relating to the school grounds. Best practice guidelines make recommendations for zoning of street furniture, level access and colour contrast within an accessible access route, however a person may not always be walking with this route, especially in a school setting where the grounds are used for learning and play. It is recommended that as far as possible, these guidelines should apply for the entire school grounds and not just within the boundaries of an 'accessible route'.

Table 5.28: Recommendations to improve areas relating to school grounds

School Grounds Recommendations
Design Process
Initial design – identify main pedestrian access points to the site which provide the most level entry from the surrounding pavements
Initial design - consult with staff concerning the initial layout of the school grounds to ensure all areas will be used & minimise the risk of creating 'dead space' that cannot be used
Design Guidelines
Guidance for zoning and contrast of street furniture etc. should not be restricted to an accessible route – people may not know where this route is, they may not be coming from a designated parking space or transport stop. Children & staff should be able to safely use the whole school grounds.
Incorporate the findings of White (2010) - concerning the design of exterior environments for people with a visual impairment
A clear material distinction should be made between the pedestrian area & car zone.
Future Research
Current guidelines recommend the use of stainless steel for handrails in locations where resistance to vandalism or low maintenance are key factors however silver does not contrast well with its surroundings (White, 2010) – a solution should be found which provides the appropriate colour contrast
The guidelines currently make recommendations which should happen within an accessible route – research should be undertaken to examine which of these recommendations should be applied to the entire grounds of a building

5.3.5 Surrounding Area

The matrix in Table 5.29 details best practice guidelines for the surrounding area of a school and indicates the extent to which these are met by the 10 schools in the detailed study. Again, it is clear that guidelines for colour contrast are not being met. Controlled crossings generally have tactile indicators at the bottom of the push button unit, however there is a severe lack of audio signals. The push button itself is generally small and could be hard to locate and push for many people with a visual impairment or limited dexterity.

Table 5.29: Matrix showing extent to which 10 schools meet accessible design standards for the surrounding area.

Surrounding Area	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	Total
Footway (pavement)											***Total out of 2. **Total out of 3.**
Clear width of 2000mm or 1500mm due to physical constraints & absolute minimum of 1000mm (DfT, 2005, 3.1)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	**10**
Physical segregation of footway & cycle-path (DfT, 2005, 3.1)	✓	✓	na	na	na	na	na	na	na	na	**2***
Maximum gradient of 1:12 (DfT, 2005, 3.2)	✓	✓	✓	✓	x	x	x	✓	✓	✓	**7**
Staggered barriers across footways and footpaths should colour contrast with surroundings (DfT, 2005, 3.5)	x	x	x	x	x	x	x	x	x	x	**0**
Street furniture positioned to leave minimum footway widths (DfT, 2005, 3.7)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	**10**
Bollards at least 1000mm in height (DfT, 2005, 3.7)	na	na	na	na	✓	✓	✓	na	na	na	**3***
Colour contrasting poles & bollards (avoid grey) & colour contrasting bands (150mm deep) (DfT, 2005, 3.7)	x	x	x	x	x	x	x	x	x	x	**0**
Colour contrast on all structures such as poles, guardrails, glass & bus stands (DfT, 2005, 3.9)	x	x	x	x	x	x	x	x	x	x	**0**
Smooth surface (DfT, 2005, 3.10)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	**10**
Pedestrian Crossings											***Total out of 8.**
Controlled crossings – red tactile blister paving (DfT, 2005, 3.12 & 4.1)	✓	✓	✓	✓	✓	✓	✓	x	na	na	**7***
Controlled crossings – control unit located close to tactile surface with button between 1000mm and 1100mm above the footway (DfT, 2005, 3.12)	✓	✓	✓	✓	✓	✓	✓	✓	na	na	**8***
Post on which the unit is mounted should be clearly marked with a contrasting band of colour (DfT, 2005, 3.12)	x	x	x	x	x	x	x	x	na	na	**0***
Tactile indicator placed on the right hand side of the bottom of the push button unit (DfT, 2005, 3.12)	✓	✓	✓	✓	✓	✓	✓	✓	na	na	**8***
Tactile indicators should not be considered a substitute for audible signals (DfT, 2005, 3.12)	x	x	x	x	x	x	x	x	na	na	**0***
Large diameter raised push button that can be activated with a closed fist (around 50mm diameter) (DfT, 2005, 3.12)	x	x	x	x	x	x	x	x	na	na	**0***
Colour contrast push button (DfT, 2005, 3.12)	✓	✓	✓	✓	✓	✓	✓	✓	na	na	**8***

Tactile paving at all uncontrolled pedestrian crossings (colour other than red) (DfT, 2005, 3.12 & 4.1)	x	x	x	x	x	x	x	x	x	x	**0**
Dropped kerb & raised crossing to provide level or flush access at all road crossing points & other places side roads, access points to parking areas (DfT, 2005, 3.13)	✓	✓	x	x	✓	✓	✓	✓	✓	x	**7**

Table 5.30 details the recommendations for improving the surrounding area. As with school grounds, it is recommended that best practice standards incorporate the findings of White (2010) and also that certain guidelines for zoning and colour contrast be applicable to all areas and not confined to the limits of an accessible route.

Table 5.30: Recommendations to improve the surrounding area

Surrounding Area Recommendations
Design Process
Outset – Local authority should instigate a plan for improving the accessibility of a mile radius of the school building, involving the local community and transport companies to ensure accessible public transport links can be made
Design Guidelines
Extend certain guidelines (zoning & colour contrast) which apply to accessible route to all areas
Incorporate the findings of White (2010) - concerning the design of exterior environments for people with a visual impairment
Future Research
Research current standard controlled crossing provision & design focusing on provision of audio signal, size of button, colour contrast of wait light & pole
The guidelines currently make recommendations which should happen within an accessible route – research should be undertaken to examine which of these recommendations should be applied to the entire grounds of a building

5.4 Conclusion

This chapter has used the results from the detailed study reported in Chapter 4 to produce matrices detailing the extent to which mandatory and best practice guidelines are met by the 10 schools in the detailed study. In common with the results of

consultation with staff, the matrices show that best practice design for exterior areas generally performs far poorer than for interior areas. It is also clear that there are far less guidelines concerning the design of exterior spaces and this may be part of the reason why these areas are less accessible. Mandatory regulations and best practice guidance for exterior spaces apply only to a designated accessible route and not to the entire area, meaning that the majority of the exterior built environment is not accessible. Common underperforming areas of accessible design are the use of colour contrast, the provision of hearing enhancement systems and spaces for children with additional support needs. Furthermore, it is clear that there is a lack of consistency in the extent to which best practice guidelines are met in each school.

Information gathered during the visual survey and consultation with staff and pupils has also been used to create tables identifying ways in which underperforming areas can be improved in the design process, suggestions to amendments to design guidelines and areas of future research. The design process section repeatedly suggests areas of consultation with building users. Significantly, the consultation process was rated very poorly in the detailed study and this would be the first step in improving some of the underperforming areas. Another important outcome in the design process is the important role of the client in setting out the aspirations through the developing of the brief and in overseeing specifications by various members of the design team. This can have an impact on various aspects of design including the type of space provided (for example small rooms for one-to-one and group work), enhancing connections between indoors and outdoors, ensuring colour contrast between the floor, wall and furniture, and that building service equipment does not emit sound. The suggestions for design guidelines vary with some suggesting amendments such as incorporating the findings of White (2010), the need to extend certain accessible design guidelines beyond

designated accessible areas. Other suggestions merely highlight the need for certain existing guidelines to be stated more clearly or explained in more detail such as the need for adequate storage provision in changing spaces and toilets.

Future research recommendations focus on exploring existing guidelines, for example examining whether Light Reflectance Values are being used to specify tonal contrast between areas such as the floor and wall and if the minimum difference works well for people with a visual impairment. The spaces required by people using wheelchairs or other mobility equipment should also be examined as there are many reports that the current spaces specified by mandatory building regulations are restrictive. The problem of temperature regulation in Scottish schools needs immediate attention. Building simulation tools could be used to explore whether incorporating thermal mass or avoiding the use of suspended ceiling tiles might help to prevent fluctuating temperatures. Other future research suggestions include the creation of new guidelines relevant to a local setting, exploring the nature of the provision of spaces for children with additional support needs, both indoors and outdoors. Research projects such as that undertaken by McAllister and Maguire (2012) exploring design considerations for classrooms used by children with autism which involved collaboration between architects and specialist teaching demonstrate what this type of research can achieve. This type of research should focus not only on the internal environment but also the playground and external learning spaces as there are far less guidelines in these areas and guidelines which do exist are not well met. The school building programme currently underway in Scotland offers the opportunity to explore some of these ideas in detail to create new positive learning environments in both mainstream and special settings.

Chapter 6: Large-Scale Study

6.1 Introduction

This chapter describes the large-scale investigation which aims to identify whether the outcomes of the detailed study regarding user satisfaction with school design are similar in other local authority areas and explore how different elements involved in the design process can impact on accessible design. The chapter firstly describes the analytical methods used with each of the three main stakeholder groups involved in this investigation, which were architects, head teachers and local authorities. The results from each of these separate investigations have then been brought together under identified themes describing different elements of the design process from site selection and development of the project brief to design, construction and post occupancy. This allows each area to be explored by from the different angles of the three main stakeholder groups, highlighting when results concur or differ between the three. Where relevant, reference is made to the findings of the detailed study, particularly when exploring head teachers' satisfaction with school design. This analysis of the school design process from preparation (site selection, development of brief) to usage (building performance evaluation) is used as a basis for recommendations to improve standards of accessible design.

6.2 Analytical Methods

The large-scale investigation aims to examine the school design process and gain a broad insight into user satisfaction with new and refurbished schools across the local authorities of the 7 cities in Scotland. As mentioned, special education is traditionally more likely to have been provided in urban areas (Riddell, 2006) and the study therefore

focuses on schools in urban areas. Image 6.1 shows a map detailing the location of the 7 cities in Scotland, which are Aberdeen, Dundee, Edinburgh, Glasgow, Inverness, Perth and Stirling. The large-scale investigation has involved undertaking questionnaires and interviews with the local authorities of each city, head teachers at new and refurbished schools built after 2003 and architects who have experience working on school projects. The following sections briefly describe the research that was undertaken with the local authorities, head teachers and architects.

Image 6.1: Map showing 7 cities in Scotland with Glasgow highlighted by a larger circle

6.2.1 Interviews with Local Authorities

The local authorities invited to participate in the study were Aberdeen City Council, Dundee City Council, City of Edinburgh Council, Glasgow City Council, the Highland

Council, Perth and Kinross Council, and Stirling Council. Each local authority was contacted by telephone or email in order to find the appropriate person to contact concerning school design. The department and position of the questionnaire respondent varied depending on the local authority and the researcher was sometimes referred to two people rather than one. Initially, the local authority was asked to supply the researcher with a list of new and refurbished schools from 2003 onwards and for their permission to contact the head teacher at each school to invite them to participate in the study. All seven local authorities supplied this information, making a total of 161 new or refurbished schools. The majority (66%) of schools were new buildings, followed by refurbishments (31%) and a mix of refurbishment and new build (3%), as shown in the graph in Image 6.2.

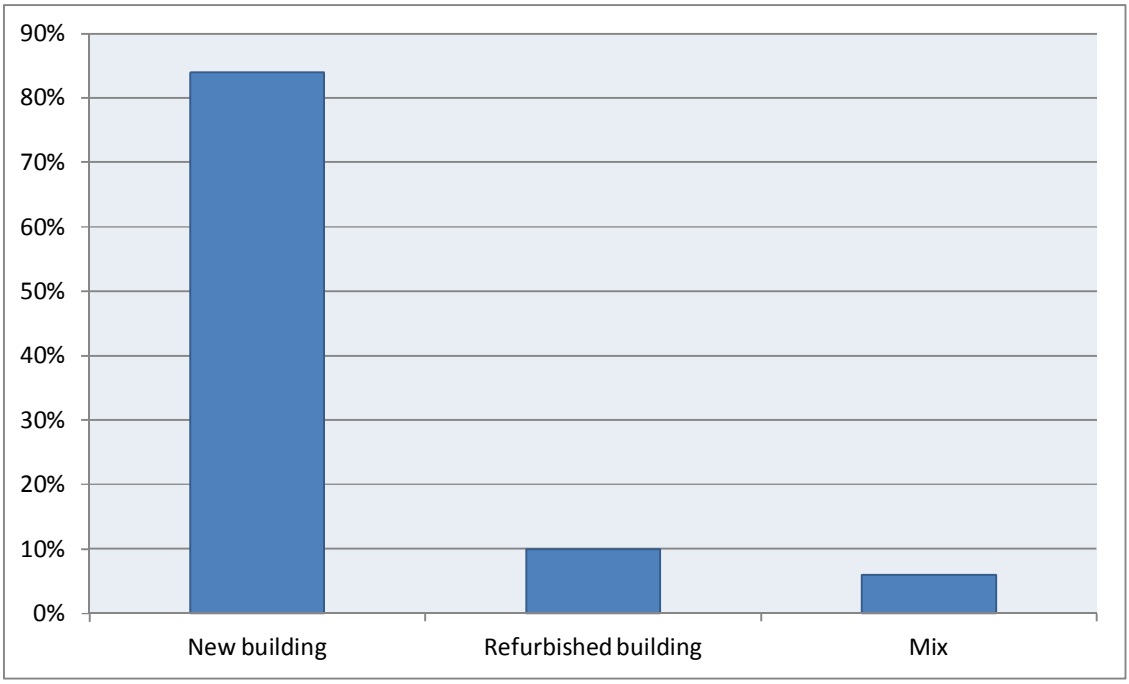


Image 6.2: Graph showing percentage of schools since 2003 which are new build, refurbishment or a mixture of both (as supplied by local authorities).

The stacked graph in Image 6.3 shows the number of newly built, refurbished and mixed schools built since 2003 by each local authority area. The Highland Council has undertaken the largest number of building projects, with a total of 53, the majority of which (39) have been refurbishments. However Glasgow City Council has undertaken the largest number of new builds with a total of 45. This could be because these two councils had a larger number of schools in poor or bad condition categories (C and D) and therefore requiring extensive refurbishment or replacement. There are no statistics available from 2003 concerning the condition of the school estate in each local authority area, however statistics from 2007 (Scottish Government, 2007b) suggest that the Highland Council and Glasgow City Council had a larger number of schools in poor or bad condition categories than the other 5 local authorities in the study, as illustrated in the graph in Image 6.4. More detailed information regarding condition category ratings of schools is detailed in Chapter 3, Section 3.2, The Scottish School Building Programme.

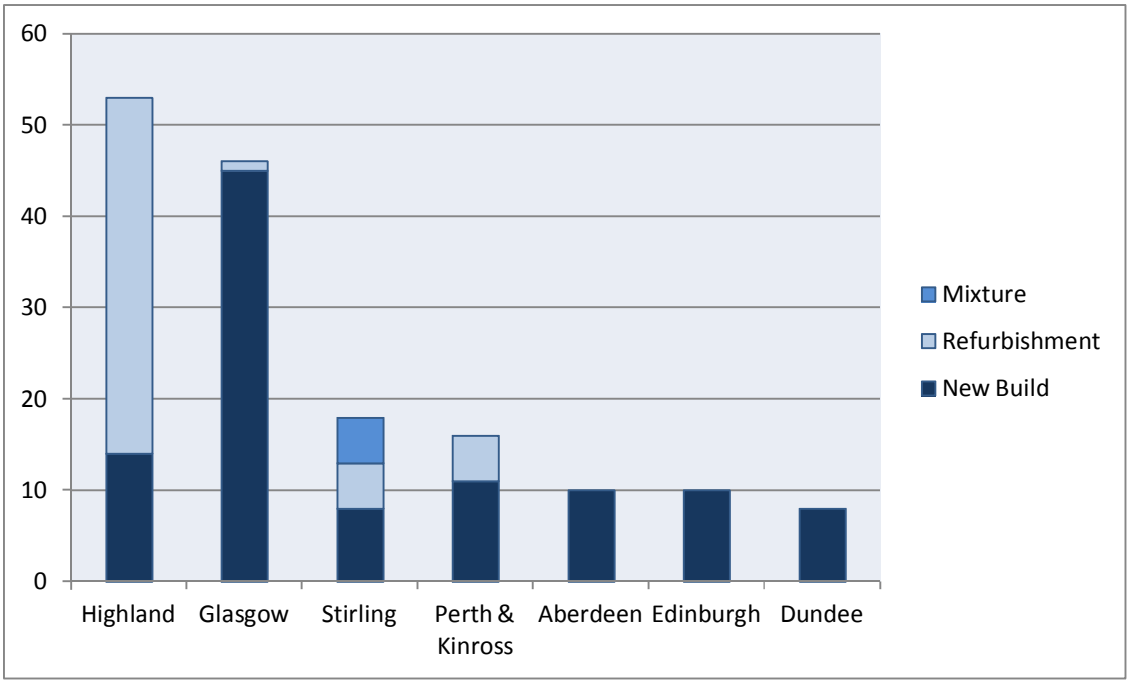


Image 6.3: Stacked graph showing the number of new build, refurbishment and mixed school building projects in each local authority area.

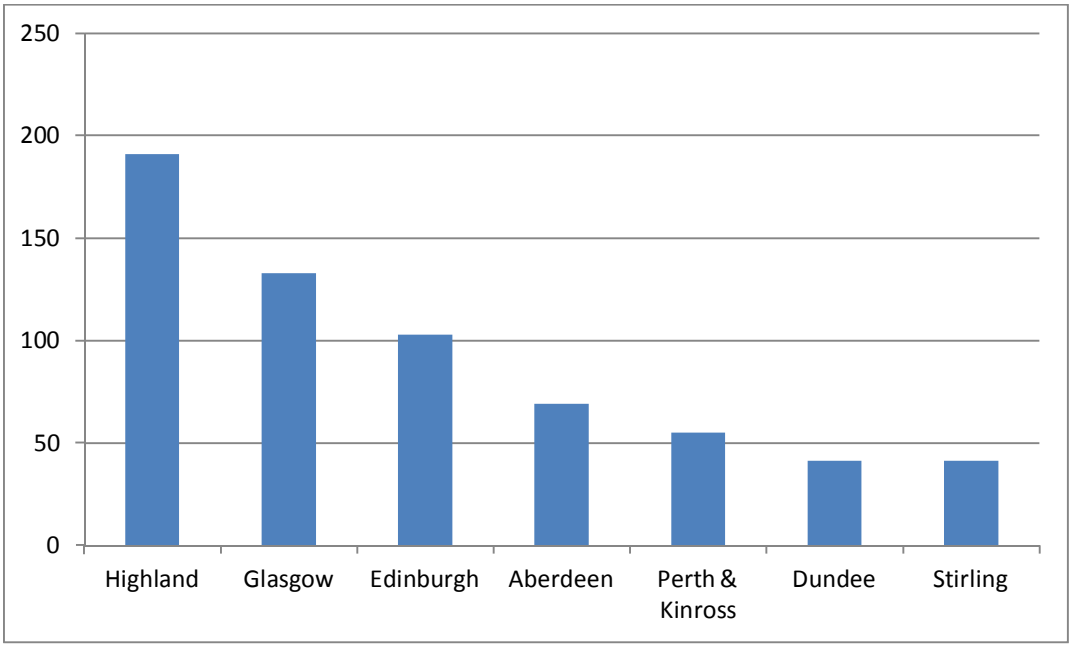


Image 6.4: Graph showing the number of schools in each local authority area in poor and bad conditions categories (C & D).

Participants were then supplied with an electronic copy of the interview and invited to complete it in their own time and return by email, or arrange a date for a telephone interview or face-to-face interview. Five local authorities took part in this interview: including Dundee City Council, City of Edinburgh Council, Glasgow City Council, the Highland Council, and Perth and Kinross Council. A copy of the interview format is presented in Appendix C. The interview questions were split into six sub-sections covering:

- The local authority's accessibility strategy
- Accessible design standards (knowledge and general perceptions)
- The pre-design process (site selection, development of brief)
- The design process (responsibility for specific design elements)
- Evaluation of the finished project
- Resources, skills & knowledge

All participants preferred to complete the electronic copy. Additional questions and information was requested, when required, through follow up telephone calls and emails.

6.2.2 Questionnaire to Head Teachers

Local authorities were asked to supply a list of new and refurbished schools built after 2003, when local authorities were required to prepare and implement accessibility strategies. Permission was sought to contact the head teacher at each of the schools and invite them to complete an online questionnaire. As detailed in Section 4.2.1, Interviews with Local Authorities, councils supplied the researcher with a list of 161 new and refurbished schools from the year 2003 onwards. Electronic questionnaires were sent to by email to the head teachers at all schools. In order to maximise the response rate the researcher phoned each of the schools to explain that the questionnaire was going to be sent and also sent two reminder emails. The questionnaire was also kept as short as possible, taking no longer than 10 minutes to complete, and it was not obligatory to complete every question. The full questionnaire can be viewed in Appendix C. Participants were given a brief description of the project and asked to agree to terms and conditions before filling out information about the school, such as local authority area, the approximate year it opened and whether it is a new build or refurbishment. A total of 8 questions were asked covering:

- The consultation process
- Satisfaction with the school building design
- Preferred ways to improve accessible school design

Questions varied and included rating design features on a scale of 1, very poor to 5, very good, and open-ended questions regarding feedback that had been received from the school community. A comment box was supplied after each question to gather additional qualitative information and help explain quantitative outcomes. At the end of the

questionnaire participants from the Glasgow local authority area were invited to leave their details to take part in further research.

A total of 47 responses were collected from the 161 which were sent, equalling a response rate of 29%. Responses were collected from a broad range of schools and reflect that the majority of new schools are mainstream primary schools. New build schools made up the majority (84%), followed by 3% refurbishment and 2% mix between new build and refurbishment. There was also a larger percentage of mainstream schools with 89% selecting mainstream and 11% selecting special. The graph shown in Image 6.5 illustrates the year in which the school buildings opened, with the majority opening in 2009. Participants were also asked to select the local authority area in which the school is situated. The graph in Image 6.6 shows the percentage of schools in each local authority area, with the majority (31%) coming from Glasgow City Council. No responses were received from schools in the Aberdeen City Council area.

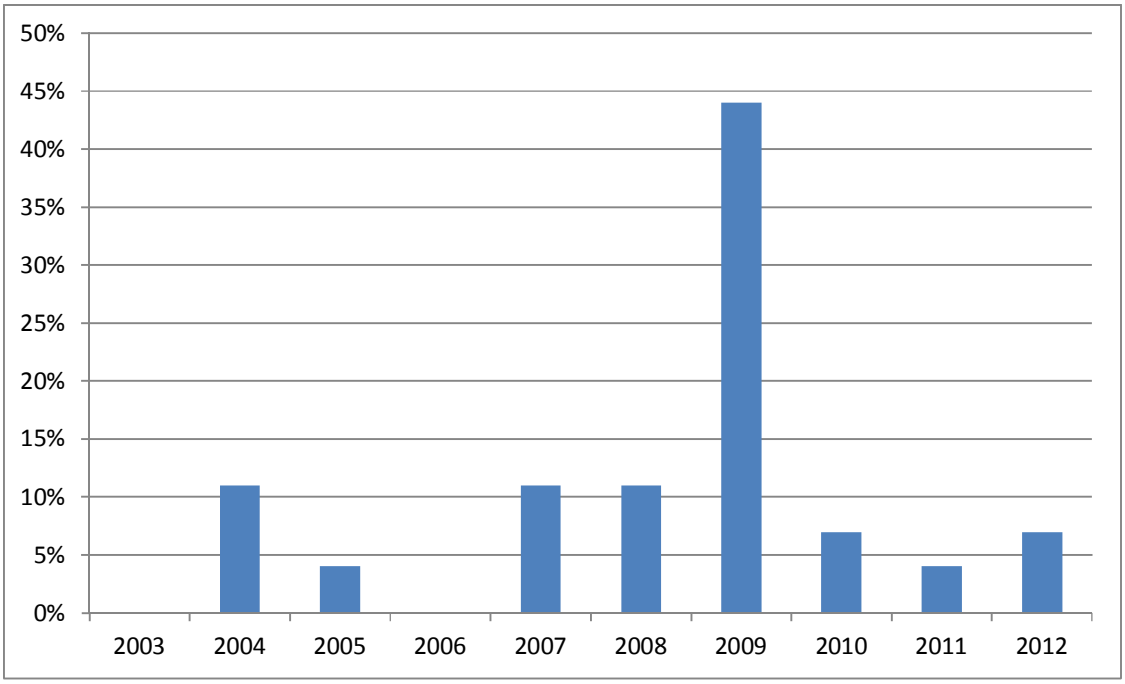


Image 6.5: Graph showing the year in which the school building opened.

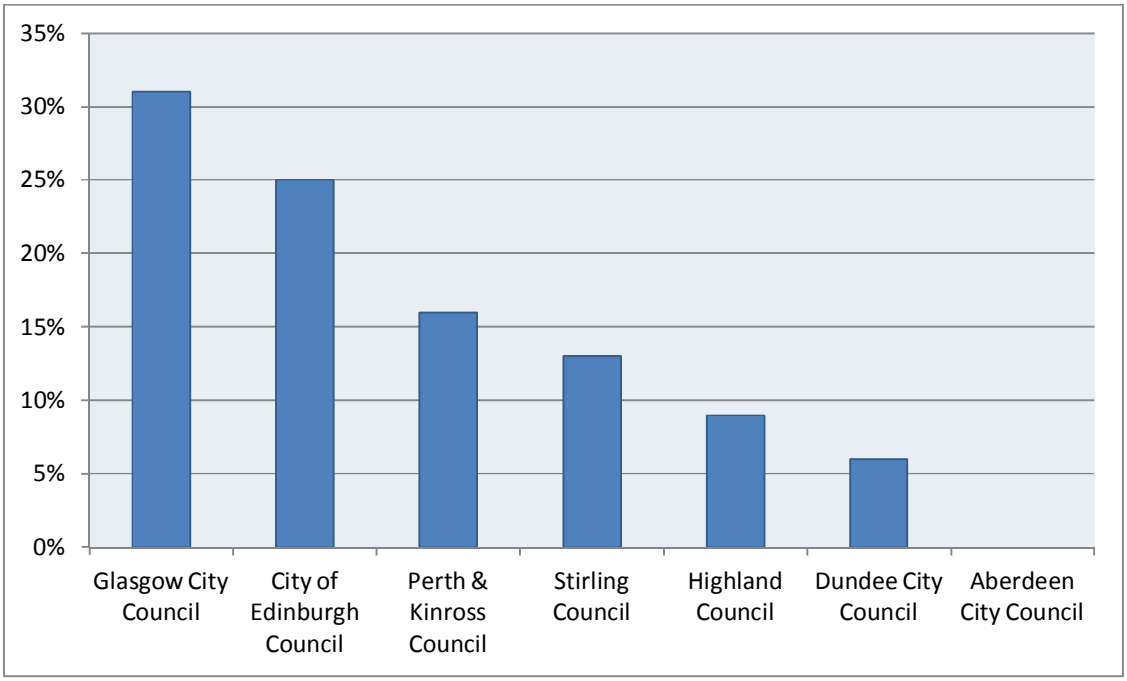


Image 6.6: Percentage of respondents from each local authority area.

Results from rating questions have been cross-tabulated to find correlations with the year of construction and the local authority area within which the school was positioned. No trend was noticed for year of construction, however some correlations were found between levels of user satisfaction and local authority area. As it was not mandatory to specify the local authority area, the sample size when comparing this data is not large enough to draw conclusive results and further research would be needed in order to establish if these results are true for the majority of schools in each area. Furthermore, there is insufficient data to enable other variables to be eliminated, such as the procurement method, project budget, whether the school building is new or refurbished or the school capacity.

6.2.3 Consultation with architects

An online questionnaire was sent to 12 architecture practices with experience in school design. As one of the main objectives of the study is to establish ways in which to improve accessible design standards in future school projects, it was considered crucial to gather the opinions of architects with experience in this area. The questionnaire focused on several different topics including:

- The consultation process
- Factors which impact on accessible design
- Ability to meet best practice design guidance
- Knowledge & skills in designing accessible environments

A complete copy of the questionnaire is presented in Appendix C. As with other questionnaires, questions were of both a quantitative and qualitative nature, and a comment box was provided after each to encourage participants to explain their answers. Architects were asked to give the names of any local authorities who place a particular emphasis on accessible design and these local authorities were contacted to find out more about how they ensure accessible design throughout the design process. In order to encourage participation, architects offices were contacted and the appropriate individual was identified and notified about the questionnaire before it was sent. Participants were asked to leave their contact details if they were happy to be contacted by the researcher to answer further questions. When necessary, some architects were contacted and invited to answer specific questions about projects which featured in the detailed investigation. A total of 14 responses were received from 9 different architecture practices, out of which 4 architects indicated their willingness to discuss their projects with the researcher.

6.2.4 Results

As with the detailed investigation described in the previous chapter, the quantitative and qualitative results from this study have been collated and are reported using common themes which describe the design process from the outset to the user occupation of the building. For example the section examining the consultation process contains relevant answers from questionnaires and interviews with head teachers, local authorities and architects. This allows results from each strand of investigation to be cross referenced which can help to give layers of information and explain certain results. The results have been structured into eight main areas: user satisfaction, consultation, site selection, briefing, design, construction, post occupancy, exemplar project and improving accessible design.

6.3 Consultation

Head teachers were asked to rate the consultation process that took place with different stakeholder groups from 1, very poor, to 5, very good. Options were also given to indicate if no consultation took place by selecting ‘none’ or if the respondent did not know by selecting ‘don’t know’. The graph in Image 6.7 details the percentage of respondents who selected ‘yes’ (a consultation process did take place), ‘none’ or ‘don’t know’. 85% of respondents indicated that some sort of consultation process did take place. Head teachers appear to have been consulted better than other groups with 5% indicating that no consultation was undertaken, compared to 10% for teaching staff, other staff and pupils. This reflects anecdotal evidence that consultation tends to take place with head teachers more than other stakeholder groups. The majority of respondents who selected ‘don’t know’ explained that they had not been employed by the school at the time. The consultation process for head teachers received more

positive average ratings than for other groups. The graph shown in Image 6.8 details the average ratings for each stakeholder group, including head teacher, teaching staff, other staff and pupils.

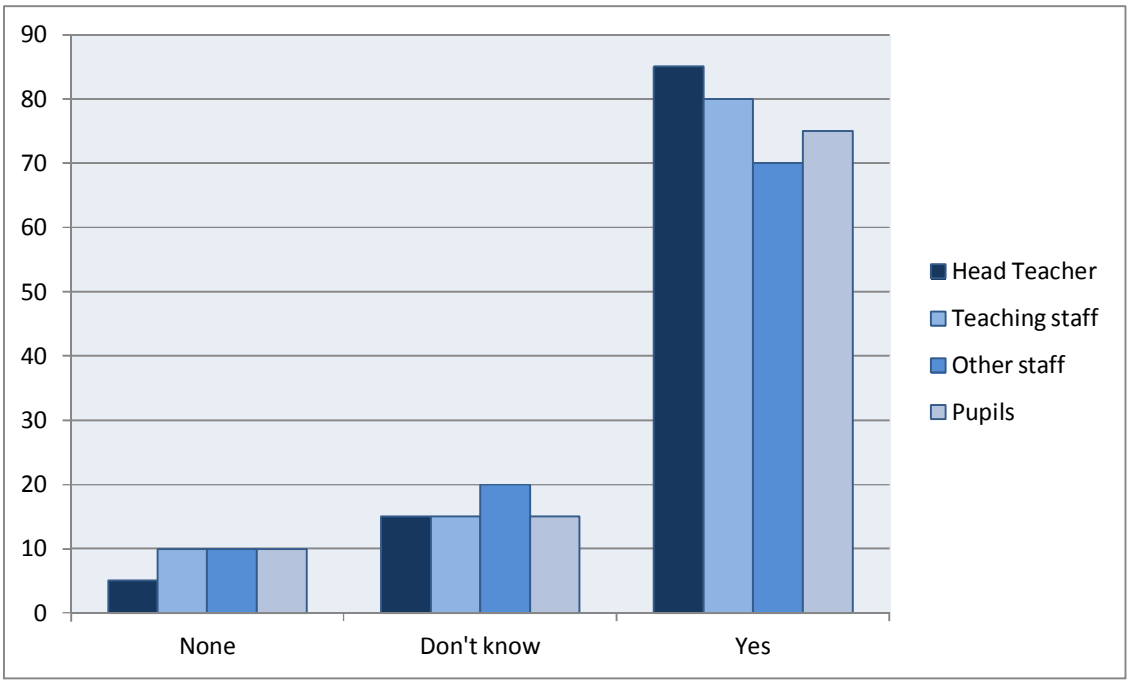


Image 6.7: Graph showing percentage of respondents that selected 'none' and 'don't know' for consultation process

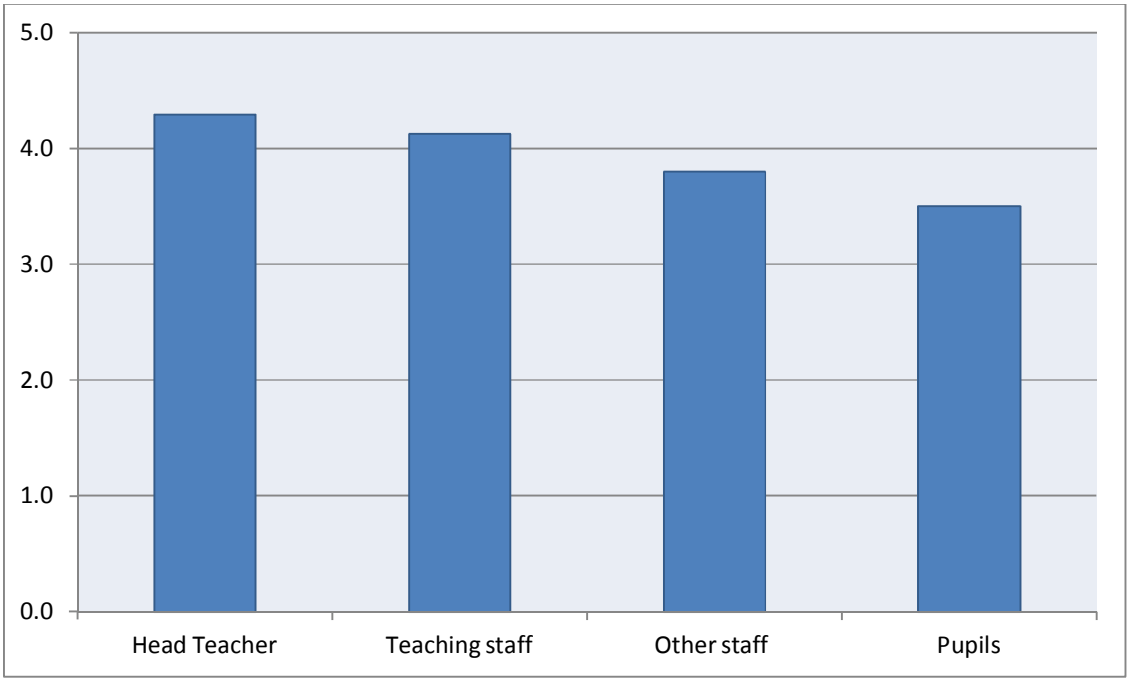


Image 6.8: Graph showing average rating from 1, very poor to 5, very good, for consultation process with the head teacher, teaching staff, other staff and pupils

No correlation was found between the date of construction and the average rating for the consultation process, however there did appear to be a relationship between the local authority area and the average rating for consultation process. Insufficient responses were collected from Aberdeen Council and the Highland Council to cross-tabulate their data. The graph shown in Image 6.9, shows the average ratings for each stakeholder consultation group cross-tabulated with the remaining five local authority areas. This shows that Perth and Kinross Council and Stirling Council consistently achieve a higher rating for each stakeholder group, with Glasgow City Council scoring the lowest.

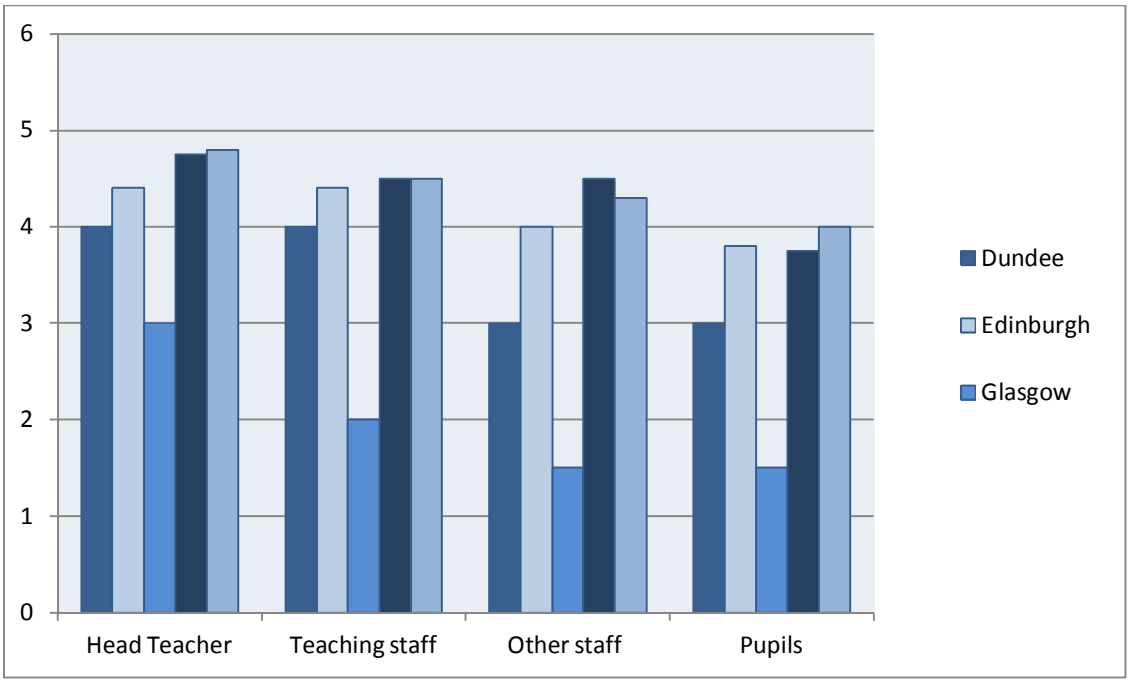


Image 6.9: Graph showing average rating from 1, very poor to 5, very good, for consultation process with various stakeholder groups cross-tabulated with local authority

Positive comments regarding successful consultation processes highlighted the benefits of starting at an early stage in the design process and holding a series of events

throughout, as well as being able to see the outcomes acted upon. Perth and Kinross Council has developed a system of consultation using User Reference Groups. This was driven by Scottish Government recommendations for consultation to be undertaken and also because the council saw the benefits in consulting with users to ensure basic requirements are provided and communicating any changes made at the time of construction to the user group. In order to avoid too many people being involved the User Reference Group is made up a representative member from each stakeholder group and includes the school head teacher, a member of the teaching staff, a member of non-teaching staff, a parent representative, a member of the local Community Council and others who may be relevant to the project, e.g. if there is a neighbouring church. Clear lines of communication are established at the beginning of the process and each member of the group is given the responsibility of feeding information to or asking the opinions of a certain stakeholder group. The User Reference Groups are involved in all stages of the project, from compilation of the brief and room data sheets to the post occupancy evaluation. The groups are presented with plans at a very early stage which allows the group to discuss how the building will be used. The budget and brief are discussed so that expectations about the project outcomes can be managed and items which may be additional to the basic project brief can be prioritised. The plans are then revised according to comments and re-presented to the group. The group is responsible for signing off the completed design and a drop in session for all users and local neighbours is also held prior to planning application being submitted. The construction timeline and logistics of decanting the original school building etc. are also discussed. These pre-established communications also help the council undertake post project evaluations after the school has been occupied for a year and users are aware of building performance in all seasons. The Education and Children's Services department of the council commented that the results of these evaluations are useful in informing

internal project reviews and can help to inform detailed technical information as well as the general layout of the school building. One of the architects working with Perth and Kinross Council commented that this system is a useful way of informing the design process and allows the architect direct contact with the user group in order to discuss design requirements and expectations. Two head teachers also commented that this system works well, specifically remarking that a senior member of staff was appointed as a full time advisor, a series of events were held throughout and that the consultation outcomes were acted upon as much as budgets would allow.

The City of Edinburgh Council also hold a series of events with regard to the consultation process and ensure that the school users are involved in the development of the schedule of accommodation and that the basic design principles have been agreed with the users before the architect submits for planning. Access groups are also sometimes consulted. Staff at Bonaly Primary School in Edinburgh also commented that they were happy with the consultation process that was undertaken for their school. Another example of an excellent working relationship between the school user and architect is Hazelwood School in Glasgow for children and young people with sensory impairment. The architect on this project built a close working relationship with the head teacher, staff and specialists who work with the children and was able to gain a full understanding of their requirements. An architect working with Aberdeen City Council commented that spending time with staff and children with complex needs prior to starting the school design allows architects to see for their self the challenges users face during an average school day and was far more informative than someone just saying what they would need. One head teacher who was satisfied with the user consultation

commented that it would be advantageous for teachers to give more input to furniture selection for individual schools.

Negative comments related to consultation processes which happened too late in the process and seemed to waste staff time. One system of consultation involved asking staff to choose between three to four designs, however in many cases the design selected by staff was not the one which was eventually built leading to frustration that time had been wasted and the staffs' opinion was not considered. Numerous staff commented that they were unhappy with this system. Many non-teaching staff, such as administration, cleaning, janitorial and catering staff commented that they had not been consulted at all. This has an obvious impact on the design of the spaces in which they work. In the previous chapter specific problems were found with the design of administration offices and kitchens such as no exterior windows for daylight or ventilation, a lack of space to move around and no changing areas or staff base for catering staff. In general there appears to be no consistent framework or mechanisms for involving people with impairments in the consultation process, with this being done sporadically dependant on the resources and priorities of individual local authorities. The consultation process should ideally run alongside the design process and not be seen as a separate stage which can be undertaken at one particular point.

6.4 User Satisfaction

This section explores user satisfaction with school design using the results of the questionnaire sent to head teachers to give an idea of general performance across the board and compare the results to the findings of the detailed study. Head teachers were asked to rate certain aspects of school design from 1, very poor to 5, very good, providing comments to explain their answers. Respondents were also asked qualitative

questions concerning feedback they have received from the school community regarding factors which impede or facilitate access and suggested improvements. Answers have been structured to focus on educational, communal and exterior areas.

6.4.1 General Design

Comments throughout the questionnaire indicated that head teachers are generally appreciative of the new school building and are eager to give their input to the future school building programme. Respondents were asked how confident they were that no adjustments would have to be made in order to employ a member of staff or enrol a pupil with an impairment or additional support need. The majority of respondents selected either 'confident' or 'very confident', as shown in the graph in Image 6.10, reflecting the advances that have been made in recent years to provide basic levels of access to buildings.

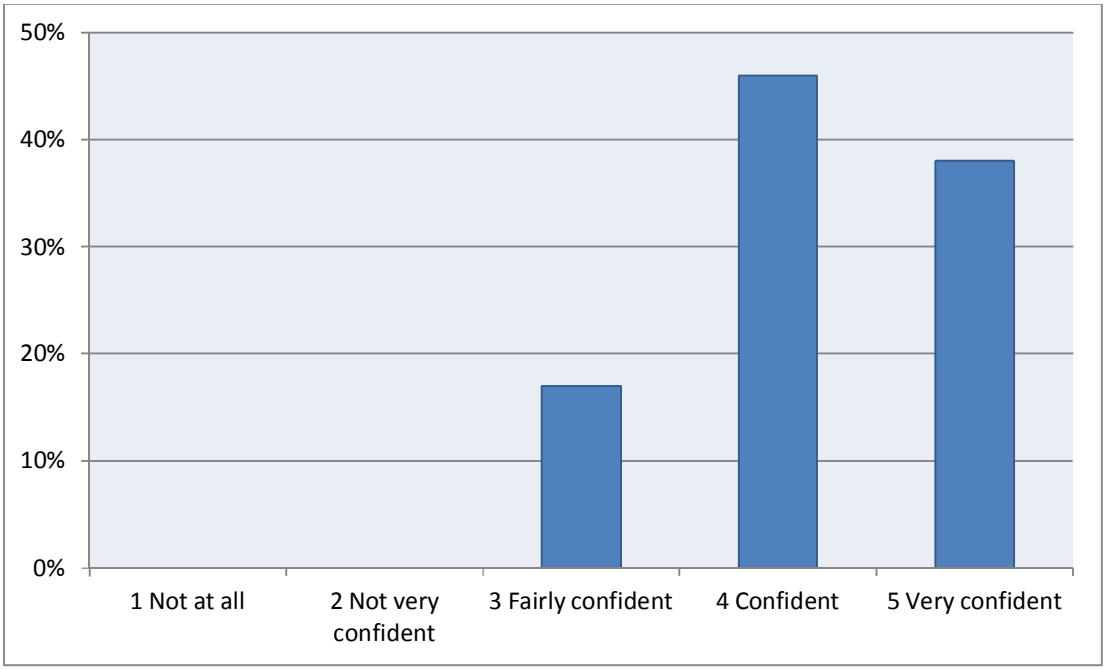


Image 6.10: Graph showing how confident head teachers are (by percentage) that they would not have to make an adjustment to accommodate a user with an impairment or additional support need.

Head teachers were asked to rate the overall accessibility of three different areas of the school, the results of which are shown in the graph in Image 6.11. Communal areas (corridors, dinner hall, staff accommodation etc) the highest average rating with 4.46, followed by educational areas (classroom, sports hall etc.) with 4.08, and finally outside areas (playground, sports field, surrounding area etc) with 3.04. This concurs with the findings of the detailed study that outside areas are generally far less accessible than the building interior.

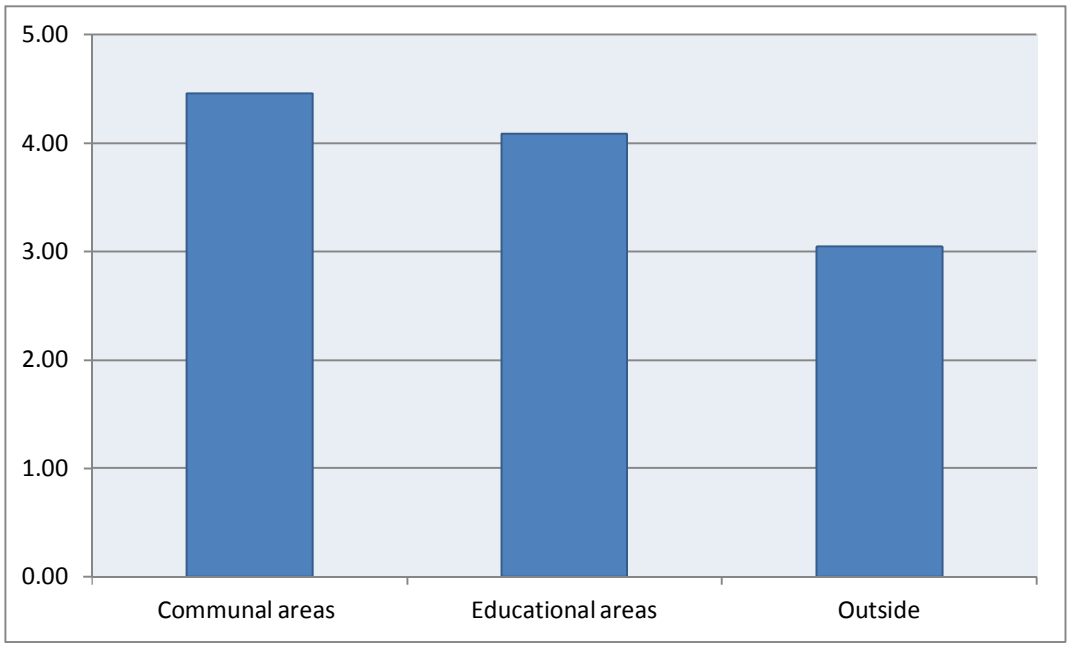


Image 6.11: Average ratings given by head teachers for accessibility of communal, educational and outside areas.

The results were cross-tabulated with the local authority area within which the school was positioned, the results of which are shown in the graph in Image 6.12. Average ratings varied for each local authority area with the City of Edinburgh Council performing the best, receiving ratings of 5 for educational areas, 4.5 for communal areas and 5 for outside areas. Glasgow City Council performed the worst with ratings of 3.7 for

education, 3.6 for communal and 3.3 for outside. Outside areas were rated worse than educational or communal areas in 3 out of 5 council areas.

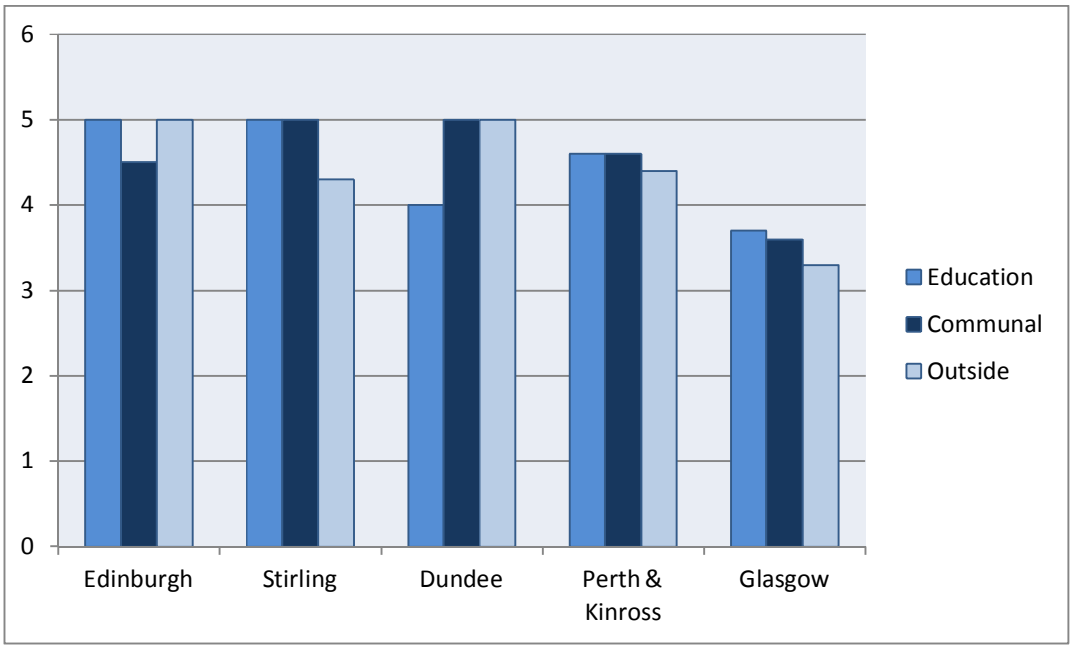


Image 6.12: Average ratings given by head teachers for accessibility of communal, educational and outside areas in each local authority area.

6.4.2 Educational Areas

Head teachers were asked to give individual ratings to detailed aspects of these three areas, considering the use of spaces by people with physical, cognitive or sensory impairments or additional support needs, in order to give a broad idea of the performance of individual design aspects. The average ratings for aspects of educational areas are shown in the graph in Image 6.13. This concurs with the detailed review, which found that sports hall and classroom design performed well compared to other areas. Interior finishes of classrooms may be rated lower because of the lack of pin boards provided when some schools open and teachers being prohibited to pin children's work on the walls. The worst performing aspects also concur with findings in the detailed study which highlighted a general lack of storage space, a lack of hearing

aid facilities and inadequate space for children with additional support needs. Results were cross-tabulated with the local authority area, the results of which are shown in Image 6.14. Stirling City Council and the City of Edinburgh Council tend to score higher average ratings for each individual aspect and Glasgow City Council scores lower ratings for each category.

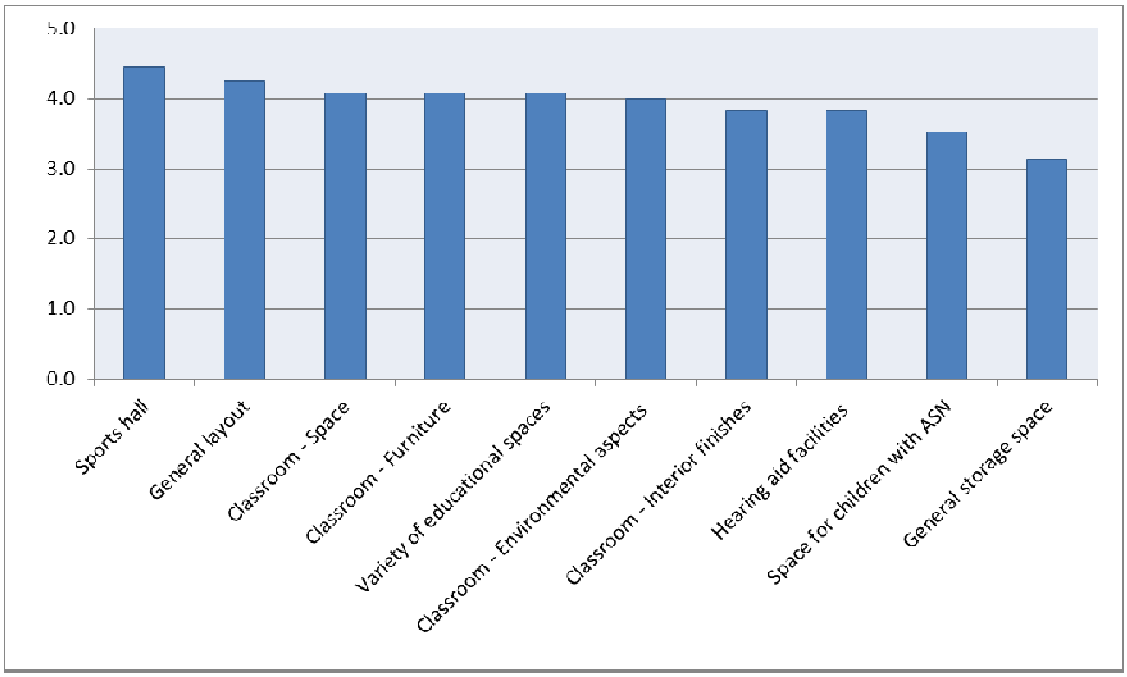


Image 6.13: Average ratings given by head teachers for individual aspects of education areas.

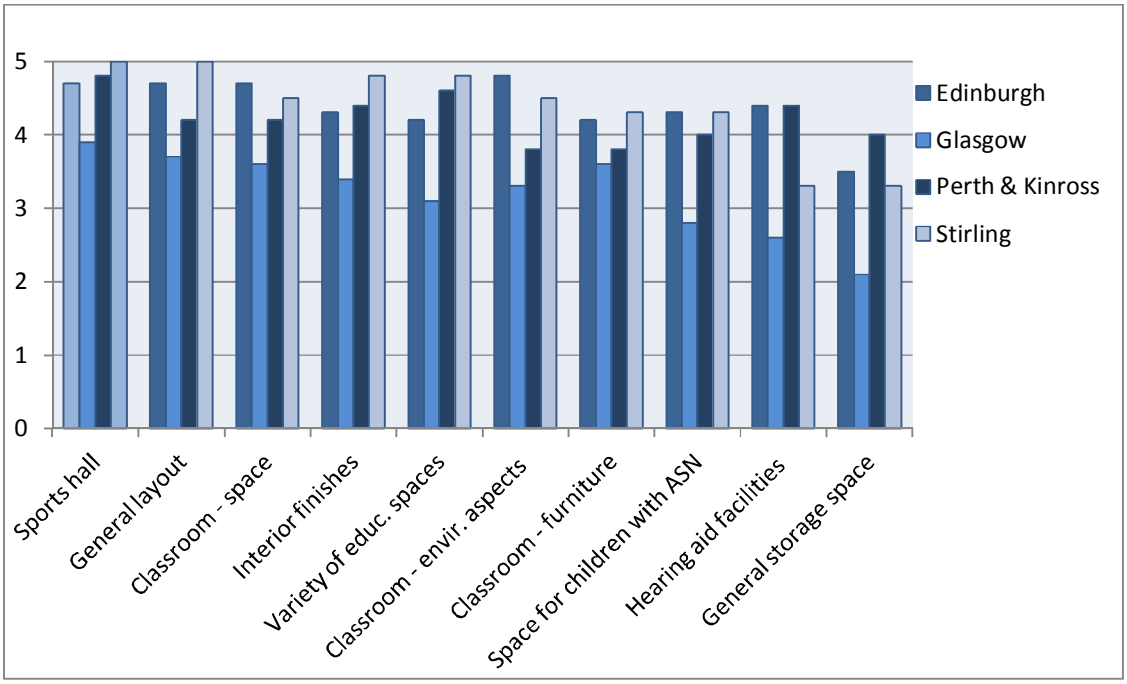


Image 6.14: Average ratings given by head teachers for individual aspects of education areas in each local authority area.

Comments concerning educational areas which were made throughout the questionnaire generally reflect the findings of the detailed study and the results of the rating questions. With regards environmental aspects, respondents commented positively about the amount of daylight but complained about overheating. One respondent remarked that the CO2 controls seem pointless if the temperature cannot be lowered. Positive comments were made about the provision of a retreat room in the classroom and flexible learning areas (for more detail see Chapter 4: Detailed Study, Section 4.3.5). Negative comments included the lack of storage and display areas throughout all new schools, showing that this is a common concern. One respondent also commented that classroom space is tight for adult wheelchair users. More space for children with additional support needs is also important: “The biggest issue is that we don’t have enough space and teaching rooms for children who need intensive support outwith the classroom”. Respondents also detailed specific facilities and design features which

would be useful such as classroom wall space for schedules and one-to-one teaching areas for quiet work or intensive interaction, particularly for autism specific teaching. Being able to darken spaces for children who are light sensitive is important but this can be difficult in working spaces which have skylights and no daylight control system. The provision of a soft space for children with challenging behaviour would be beneficial. School bells can also cause problems for children who have auditory sensitivity and autism specific units or schools should investigate the use of other systems.

6.4.3 Communal Areas

Head teachers were asked to rate individual aspects of communal areas the results of which are shown in Image 6.15. Communal areas were generally rated highly with hearing aid provision and interior finishes receiving lower average ratings than other aspects. The detailed study also found a general lack of hearing aid facilities. Interior finishes were generally rated well by teachers in the detailed study, however there were problems with the quality of some finishes, with flooring and stair treads not wearing well. Interior finishes may also have been rated poorly due to a lack of display space in all new schools. The graph in Image 6.16 shows the average rating results for communal areas by each local authority area. Again a relationship was found between the average rating and the local authority area. Stirling Council and Perth and Kinross Council scored the highest rating in the majority of categories with Glasgow City Council again scoring the lowest rating for each factor.

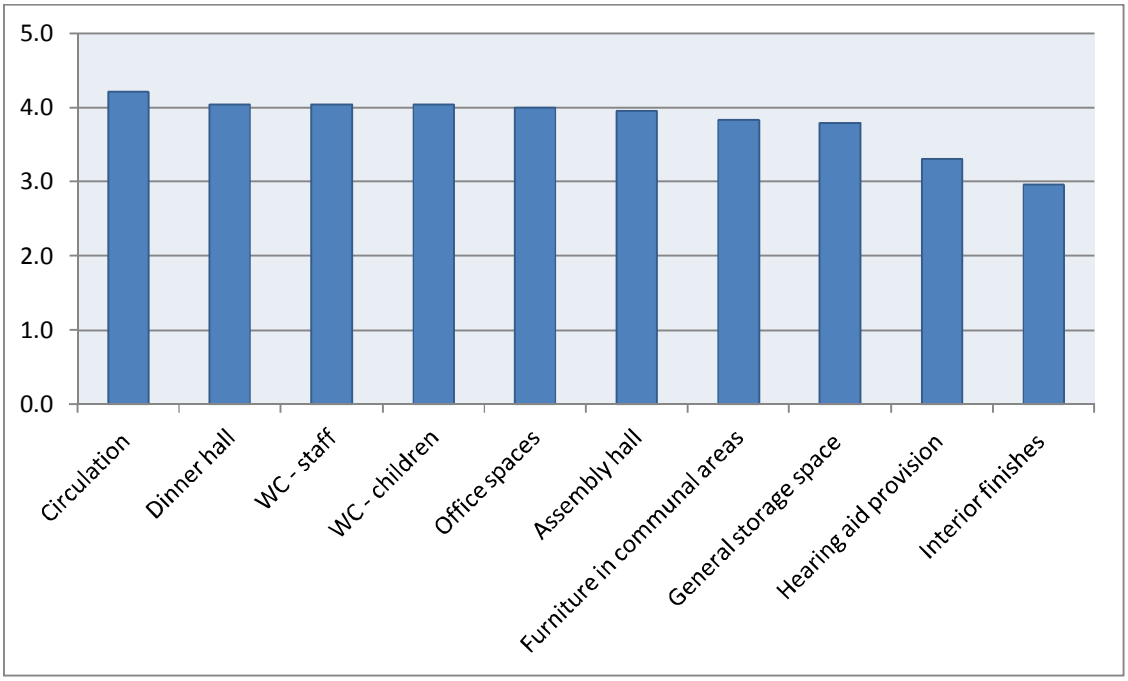


Image 6.15: Average ratings given by head teachers for individual aspects of communal areas.

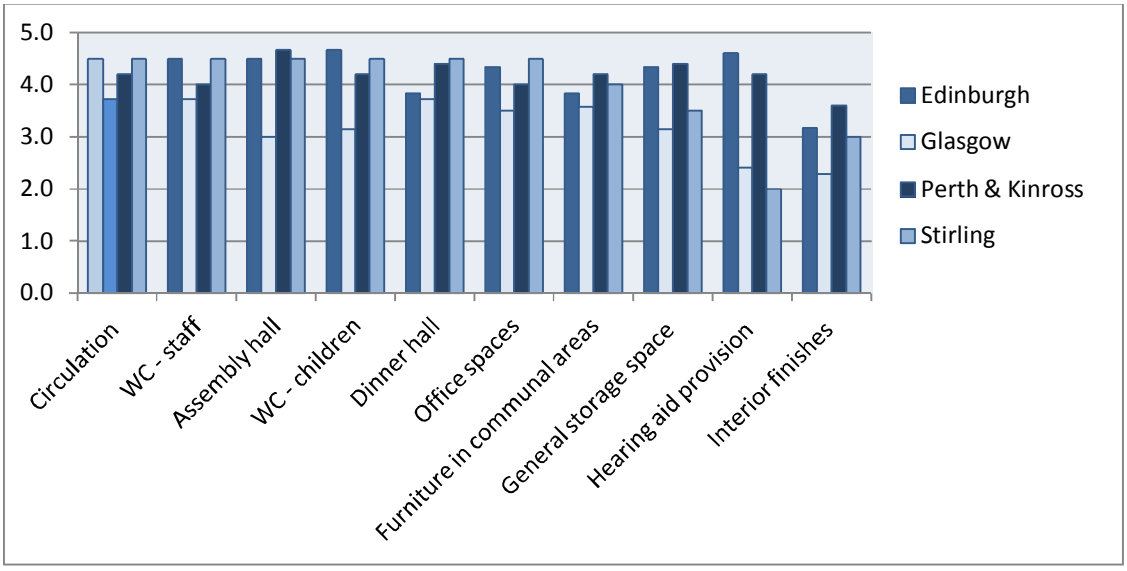


Image 6.16: Average ratings given by head teachers for individual aspects of communal areas in each local authority area.

Comments relating to communal areas focused mainly on circulation with some comments relating issues specific to individual spaces. One respondent commented that acoustics in large areas do not suit people, an issue which was found to be problematic

in the detailed study. With regards to staff space, one respondent commented that the provision of subject hubs can help to promote collegiality. The provision of a lift and wide corridors was viewed positively for ease of circulation. However there were also some negative comments regarding circulation 'pinch points', a lack of automatic doors in specific circumstances when they are viewed as being required, and travel distances which are too long for some children with complex learning needs. In one school which has been partially refurbished the visitor access from the assembly hall to the accessible toilet requires the use of a key controlled stair lift which can be problematic.

6.4.4 Exterior Areas

Head teachers were also asked to rate individual aspects of exterior areas, the results of which are shown in the graph in Image 6.17. Outside areas generally received lower ratings than educational or communal areas, with the playground receiving the highest average rating and the surrounding area receiving the lowest. This concurs with the detailed study which found that the surrounding area and school grounds were generally less accessible than the building interior. As with educational and communal areas there appears to be a relationship between the average rating and the local authority area, illustrated in the graph in Image 6.18. The City of Edinburgh Council and Perth and Kinross council score the highest average ratings for each factor, with Glasgow City Council again receiving the lowest average rating for each category.

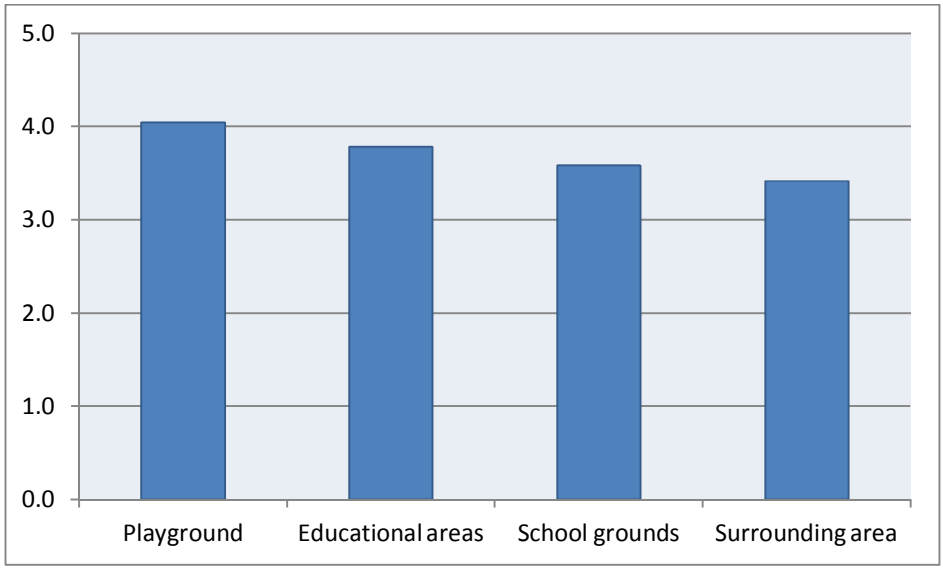


Image 6.17: Average ratings given by head teachers for individual aspects of exterior areas.

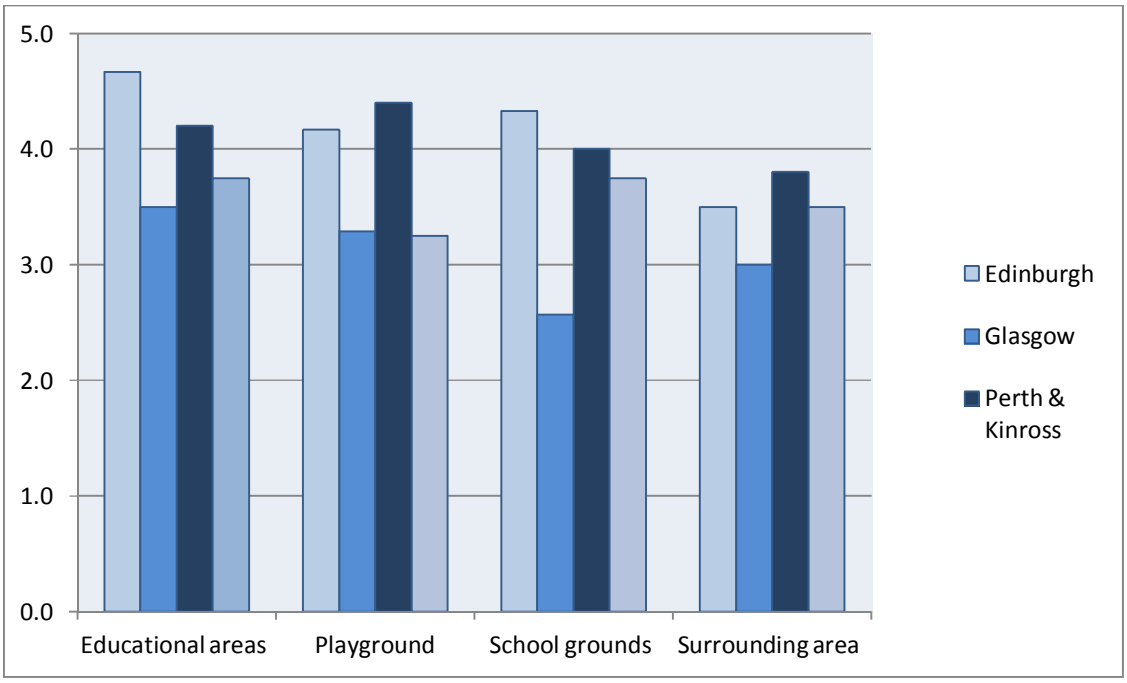


Image 6.18: Average ratings given by head teachers for individual aspects of exterior areas in each local authority area.

Comments concerning the exterior area related mainly to transport and the playground.

There were several positive comments concerning the amount of accessible car parking

bays, however the provision of car parking space in general is viewed as inadequate. Other concerns were poorly designed drop-off areas with no shelter, a lack of parent and baby bays and the distance from the carpark to the school entrance. There were both positive and negative comments regarding public transport which varies depending on the individual school. Some respondents commented that there can be space restrictions in the playground, however this is not viewed as problematic if the space has been well designed to cope with this. Suggestions for playground design included the incorporation of natural features such as trees which would give shade to pupils who are light sensitive and provide retreat points for children with autism.

6.5 Site Selection

It was noted in the detailed investigation that the site selection can greatly impact on access from the surrounding area to the school building. This is of increasing importance due to the Scottish Government initiative to provide community facilities such as meeting rooms and sports facilities within the school building. The site location can impact on people with impairments who find negotiating level changes challenging but also on people pushing prams and buggies, especially in poor weather conditions. Local authorities were asked which parties are involved during the site selection process. Answers varied depending on the council and included the client department, estates officers from planning design and construction, the project sponsor, the project manager and the lead consultant. Perth and Kinross Council were the only local authority to comment that they hold discussion with relevant agencies, users and communities about the need for new service provision before presenting the client with a preferred geographical position. The majority of local authorities which took part in the study take the accessibility of the site into account with other considerations such as catchment

areas, local transport links, town planning guidelines, local plans, use of green space, regeneration and future housing plans. However, the availability of sites is restricted to local authority ground and often there are very limited choices or only one available site. Glasgow City Council commented that this can be particularly limiting for a city which is built on drumlins, making the topography challenging.

Certain people registered to receive Disability Living Allowance may also receive a mobility allowance which can help to pay travel expenses and may help access sites which would be otherwise inaccessible from the surrounding area. However, this by no means covers all of the people affected by inaccessible sites. It would be helpful for local authorities to make more accessible sites available for future schools through their large-scale strategic plans for each region. There are also many measures which would improve accessibility such as ensuring that level changes are well designed with the appropriate tactile warning and handrails, that any access roads (which may provide a preferable gradient) has a pavement, that ramps are placed at all main entrances to the site to avoid people having to take major detours to other entrances and finally that information regarding accessible routes to the building entrance is conveyed through clear signage and the school website in order to allow people to plan their journey. Level changes between the surrounding area and school building present a significant challenge to many people accessing the school building, however topography is not the only challenge and a programme should be put in place to carry out access audits of the surrounding roads and ensure that there are dropped kerbs and controlled accessible crossing points within the walking distance determined by the local authority outwith which free transportation is provided for pupils, and the nearest public transport links.

This would also be of benefit to ensuring safer routes to school for children and increasing more sustainable travel options such as walking and public transport.

6.6 Briefing

Preparation of the brief and room data sheets are crucial to achieving accessible design. It is at this stage in the project when clear aspirations for accessible design can be conveyed to the design team and the accommodation to be provided in the school building is decided. This can impact on crucial factors such as the amount of space provided for one-to-one and group learning as well as the nature of the space (e.g. whether it can be open-space in the corridor or more private space, whether it should be located in one area or in various different spaces in the building, importance of daylight control etc.). If building occupants are consulted at this stage issues which could cause problems in the future can be resolved. For example, in the detailed study, a school for children with complex learning needs had the office for the school administrator located at the entrance to the mainstream primary school on the same campus. The school asked for this to be changed as the base was located too far away which meant making changes to the original design and resulted in one of the street areas for pupils that does not have a door being turned into an administration office. If this had been noticed at an earlier date, either in the preparation of the brief or the early design stages, the area could have been properly adapted. Luck et al. (2001) discuss project briefing for accessible design and point out that within recent years briefing is considered to be an on-going process throughout the early stages of a project rather than the production of a fixed document. They also highlight the need to improve user involvement in the briefing process.

Important specifications for items such as door handles and signage can also be detailed at this stage. One example of this is a brief prepared by a local authority in which door handles had been specified as 'bright polished aluminium finish' and signage as 'satin anodised aluminium' with no specifications given for text height or font style, whether it is uppercase or lowercase, positioning of signage, colour contrast, or direct reference made to meeting the requirements of BS8300. Although reference was made to this document at the end of the brief the specification for the use of silver makes it hard to achieve guidelines in the document regarding colour contrast. Silver is the least visible colour for people with a visual impairment offering little contrast as it reflects its surrounding surfaces (White, 2010). Specifying details of minimum requirements for aspects such as colour contrast, text, size and positioning of signage would better ensure these guidelines are met.

All local authorities consider accessible design at the time of preparing the project brief and the majority also use design consultants or similar in-house specialists at this stage. The Highland Council seek advice from the Additional Support Needs Team who have specialist knowledge in the requirements of children with additional support needs and the City of Edinburgh Council have developed a Briefing for Accessibility document which gives in depth information for design teams to follow during the design process. When asked which parties are responsible for preparation of the project brief answers varied depending on the local authority and included, the client department, the design team, the Children and Families Asset Planning team and project officers. The majority of local authorities also mentioned that input is given from other parties within the council such as education, culture and sport. Two councils mentioned consulting with the future building occupants. The City of Edinburgh Council commented that they involve the particular school in the development of the brief and review standard room data sheets

on a project by project basis. Project officers at Perth and Kinross Council compile the brief and room data sheets in consultation with the User Reference Groups, mentioned in Section 4.3, Consultation.

6.7 Design & Construction

Each part of the design stage is crucial in ensuring best practice accessible design standards in the school building are met. Both feedback from previous projects and input from future building occupants should be used to inform the concept and detailed design. The initial design stages are important in determining factors such as the building orientation which can impact on environmental aspects, as well as the general layout of the building and relationships between different spaces, impacting on circulation and the way the occupants will use the building. This is also when the nature of certain spaces will be determined, for example whether one-to-one and small group work provision is in a private enclosed space or in a communal area such as the corridor or IT suite. It is crucial that these aspects of design are agreed with the building occupants before moving onto more detailed design aspects. Detailed specifications for dimensions, colour and material can also impact on accessible design ensuring that vertical and horizontal circulation areas are easy to negotiate, the signage system is clear and that environmental aspects of the building are easily controlled. This section uses the results from consultation with local authorities and architects to examine how accessible design is incorporated within the design process, focusing on accessible design guidance, parties responsible for ensuring accessible design and barriers to accessible design.

6.7.1 Accessible Design Guidance

The overarching guidance document produced by the Scottish Government is the Building Better Schools Strategy and councils prepare their own school estate management plans annually to show how progress is being made. One local authority commented that while the Scottish Government has produced a sizeable amount of guidance regarding general school design and the preparation of Accessibility Strategies, there is no specific guidance for accessible design and accessible design processes. The majority (four out of five) local authorities believe that in order to achieve accessible design it is necessary to look beyond the mandatory building regulations, with one commenting that building regulations tend to cater more for wheelchair users than people with other types of impairment. The City of Edinburgh Council has created its own guidance documents for accessible design which have been specifically created to assist the design team throughout the design process and ensure that the local authority's expectations of accessible design standards are consistently met on each project.

6.7.2 Responsibility

Local authorities were asked to detail which party is responsible for each aspect of design, the results of which are shown in Table 6.1. The answers demonstrate the variety of people responsible for each aspect of design and the need for accessible design to be considered by each. It is also clear to see the important role that the client, or local authority, has to play in ensuring that each aspect of design meets accessible design standards. However the importance placed on creating accessible environments over and above meeting the minimum building standards varies. For example, one local authority commented that creating acoustic conditions which are appropriate for people who are hard of hearing through acoustic floor backing etc. is beneficial to all users,

while another commented that normal acoustic conditions in a sports hall do not work for people who are hard of hearing and that bespoke adaptations such as the room treatment required can create a compromise. Two local authorities, the City of Edinburgh Council and Perth and Kinross Council, specifically mention users for certain aspects of design, demonstrating that user consultation is considered an integral part of the design process.

Table 6.1: Parties responsible for various aspects of design, as indicated by Local Authority

Design aspect	Responsibility				
Classroom size	Arch / Client	Education Department (ED)	Local Authority Architect (LAA)	LA	LA – council agreed standard
Classroom layout	Arch/ Client / Services Engineer	ED & school	LAA	Arch	LA, with teaching staff & Arch
Provision of hearing aid facilities such as induction loops	Arch/ client / accessibility officer	Design team - guidance from LA	LAA	MEE	LA (part of brief)
Daylight control system (blinds)	Arch	Design team - guidance from LA	LAA	Arch	LA (part of brief)
Environmental control systems (artificial lighting, air ducts)	Services Engineer	Design team - guidance from LA	Mech. & Elec. Engineer (MEE)	MEE	LA (part of brief)
Type of facilities provided, e.g. no of general purpose rooms	Client	ED	Client	LA	LA (part of brief)
Signage specification	Client	Design team - guidance from LA	LAA	LA	Client (part of brief)
Furniture specification	Client	Specialist school furniture company (on large projects) - guidance from LA	Client	Arch	LA (part of brief) & user group
Interior finish specification	LA / Arch	Design team & end users - guidance from LA.	LAA	Arch	LA (part of brief) & user group
Secure entrance system	LA / Arch	Design team - guidance from LA	MEE	Arch	LA (part of brief)
Number of vertical circulation towers	Services Engineer	Design team	LAA	Arch	Engineers and Arch
Number of WCs	LA / Arch	Education legislation for pupils & Building Regs for staff	LAA	Arch	LA (part of brief)

WC specification (e.g. colour of sanitary fittings)	LA / Arch	Design - guidance from LA for all WCs, not just accessible	LAA	Arch	LA (part of brief), & user group
Playground design (zoning etc)	LA / Arch	Design team /landscape designer - guidance from LA	LAA	Arch	LA (part of brief) & senior management
Exterior ground surface material	LA / Arch	Design team - guidance from LA	Land. Arch.	Arch	LA (part of brief) & arch.
Street furniture specification, e.g. bollards	LA / Arch	Design team - guidance from LA	LAA	Arch	LA (part of brief), safe routes to school & Roads Dept.

Three out of five local authorities have a disability access officer. One stated that the disability access officer is not involved in schools and deals with the rest of the council estate, however specialist staff in the Children and Families Department who work with pupils with impairments participate in council's Accessibility Strategy. At the two local authorities which do not have disability access officers, another individual or group of people are consulted with regard to accessible design in schools. One local authority have gone down the route of making everyone responsible rather than one person and have champions in each service area, with action plans being drawn up and monitored regularly for progress achieved. Another council have a Moving and Handling Coordinator and coordinators for the specialist services within the Additional Support Needs Team who all offer advice and support in relation to access at different levels. Two local authorities expressed doubt that all other parties involved in the design process will give adequate consideration to accessible design and have the knowledge to create accessible spaces, explaining that some are more knowledgeable than others in this area. One local authority explained that it is the responsibility of the client to ensure that accessible design is fully included and that it needs to be continuously driven as part of managing any project or programme. Another local authority explained that all

school projects are either designed or supervised by their own in-house design teams who ensure that best practice standards are met.

6.7.3 Factors impacting design

Architects were asked what they consider to be the most important factors impacting on their ability to meet best practice standards of accessible design by rating a series of options from 1, not at all important, to 5, extremely important. The results shown in the graph in Image 6.19 shows that 'feedback from building users' is considered to be the most important factor with an average rating of 4.3. This is followed by 'involvement of the architect throughout the whole project' with an average rating of 3.9, 'confidence in my general knowledge of accessible design' and 'priorities of individual educational authorities' which both received the same average rating of 3.7. The least important factor is the procurement method which received the lowest average rating of 3. One architect commented that that involvement of people with impairments would be an invaluable tool. It was also pointed out that an architect can push the agenda further when they have full involvement with the project but that building regulations also impact on design. Another architect stated that the best design solution comes from a good working relationship between the client and the architect, which again highlights the important role that the local authority have in ensuring accessible design.

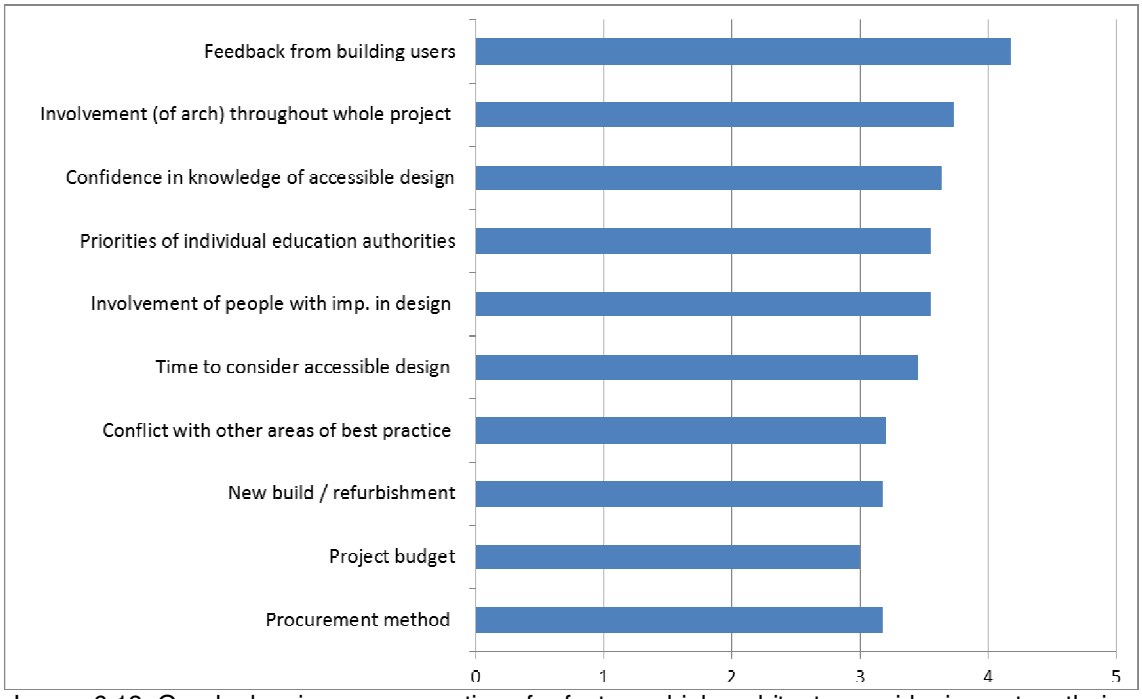


Image 6.19: Graph showing average ratings for factors which architects consider impact on their ability to ensure best practice design

Architects with experience working in more than one local authority were asked if they feel the emphasis placed on accessible design varies depending on the local authority. Reponses were divided with half of respondents responding 'yes' (38%) or 'sometimes' (12%) and 50% responding 'no'. One architect commented: "I felt the authorities I have worked with tend to be similar however I would say none of them go as far as they could to ensure accessible designs are provided. I have found they generally provide the minimum and not over and above". Another respondent commented that local authorities tend to monitor accessible design through the building control process and how design complies with the technical standards. Provision of accessible WCs is also sometimes under-briefed by the local authority and has to be corrected by the architect. Respondents were then asked if there is a local authority that they feel is more proactive in ensuring best practice standards of accessible design are met and how they do this.

Aberdeen City Council have commissioned external consultants to carry out access audits on its properties and is carrying the recommendations contained in them and they have a specific group which will make comments on accessible design as part of the building warrant application. South Lanarkshire Council were also cited as being proactive in ensuring accessible design by placing appropriate importance on this in the initial brief. An exemplar design of an inclusive school in South Lanarkshire is detailed in Section 4.8.

Architects were also asked to select the type of procurement method that has been used on the school projects with which they have experience, the results of which are shown in the graph in Image 6.20. The most common procurement route is traditional or a contractor-led contract, with the least common being two stage design and build. One architect commented that “Ultimately the method of procurement is irrelevant if the Local Authorities vision, briefing and internal design leadership are weak”, reinforcing the finding in the previous section that procurement is the least influential factor affecting the architects’ ability to ensure accessible design and the important role that the local authority, as the client, have in the design process. However, another architect did comment that design and build contracts can limit the architects’ ability to oversee changes made at the construction stage of the project which may impact on accessible design.

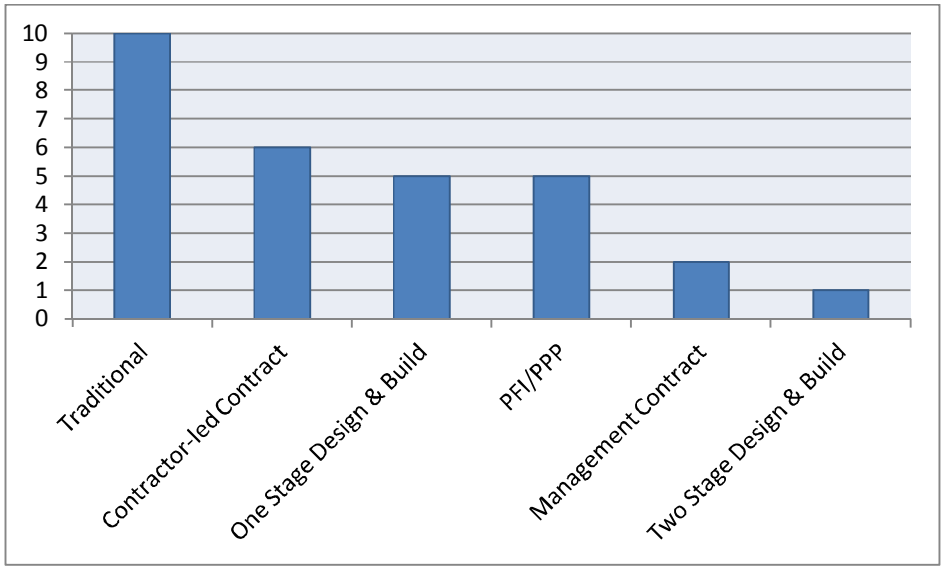


Image 6.20: Graph showing the type of procurement route used in projects

The majority (three out of five) local authorities said there are times when they are concerned that by providing for one group of people with a specific impairment they may inadvertently disadvantage another. Two examples included provision of a wheelchair lift narrowing the stairway and removing the handrail from one side and extending a handrail by 300mm or providing a lower height handrail making it easier for children to climb on handrails. However, it was generally felt that through a lot of care, attention to detail, a knowledge of different types of additional support needs and through creative design, a compromise can be reached that does not disadvantage anyone. The majority (three out of five) of local authorities felt that there can be a tendency to consider the needs of wheelchair users over people with other types of impairment such as sensory impairment or autism. It was suggested that this could be because the design and cost implications for people with a mobility impairment are greater than others. One local authority also pointed out that many accessible guidelines offer solutions which are developed for adults and may not meet the needs of children. However, it was also acknowledged that there is much greater awareness of all types and levels of

impairment nowadays compared to a few years ago and that working with specialists in additional support needs can support the design process.

There appeared to be disagreement over whether a building which meets best practice standards of accessible design costs more to design and build than one which meet minimum requirements, with 3 local authorities responding 'no' (it does not cost more) and 2 responding 'yes' (it does cost more). One local authority explained that many of the features that make for good accessible design are a matter of specification, e.g. colour contrasts. Another pointed out that if the building is well designed to begin with accessible design should not cost more, e.g. floors with acoustic backing should be provided from the outset as a basic of good design. The majority (three out of five) local authorities find that meeting best practice standards of accessible design does not tend to conflict with meeting best practice standards in other areas such as sustainable/environmental design, with one commenting that the market has expanded to develop and provide a wide range of products that help to meet all of the targets required. One local authority commented that there can be a conflict with reference to mechanical and electrical services, for example warmer rooms and higher air change rates for ventilation may be required for children who need to be undressed and cleaned, as well as hold open devices for heavy doors and visual alarms for people with hearing impairments. Another local authority explained that while there is no reason that general accessible design should impact on other areas, certain bespoke adaptations can create a compromise, such as acoustic room treatment for sports halls which are unsuitable for people who are hard of hearing.

Architects were asked if they find it easy to source and specify items from product suppliers which will meet best practice accessible design guidelines (e.g. sanitary fittings, ironmongery, interior finishings, colours, ground surface materials, street

furniture), the results of which are shown in the graph in Image 6.21. The majority (58%) feel that information given by product suppliers could be better, however a significant amount (42%) felt that it is relatively easy to specify accessible products. None of the architects think it is difficult to specify accessible products, suggesting that accessible design is seriously considered by product manufacturers and designers. Architects commented that information and guidance on specification of items relevant to accessible design is generally well covered through product literature. However, one architect commented negatively on the aesthetics of accessible items: “It’s a great shame that equipment manufacturers treat equipment for disabled people as if the only colours available are shades of beige”.

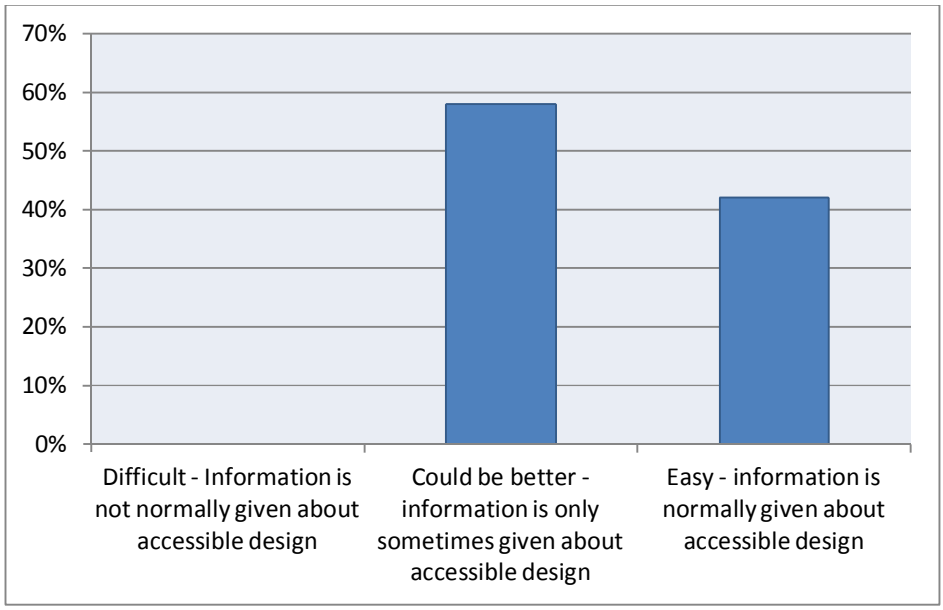


Image 6.21: Graph showing percentage of architects who find it easy or dificult to specify accessible items from product suppliers.

6.8 Post Occupancy

Post Occupancy Evaluation (POE) which includes an access audit is crucial to informing future building projects and also best practice guidelines. In accordance with the Education (Disability Strategies and Pupils' Educational Records) (Scotland) Act 2002

(Scottish Government, 2002), all local authorities are required to prepare, implement and review accessibility strategies to improve access to the school curriculum, information and physical environment. All five local authorities who replied to the interview have undertaken access audits of new, refurbished and older buildings as part of this strategy, resulting in some schools being closed and rebuilt and others undergoing minimal or extensive refurbishment. One respondent explained that the intention of the accessibility strategy is to improve access to existing buildings over time as part of planned maintenance and other works, and to ensure that new buildings and extensions are fully accessible. The City of Edinburgh Council have prepared a set of Head Teachers Guidelines on Reasonable Adjustments for schools that have devolved management budgets. The majority of local authorities also make bespoke adaptations for individual pupils when required. An example of this is a wheelchair lift for a set of steps which may fall into disrepair if it is unused and will work better for the individual who requires to use it if it is newly installed when required. Often adaptations are made with the input of the pupil. The City of Edinburgh Council commented that when required, a pupil with an impairment can visit a school campus and can discuss the types of adaptations that will be appropriate for their individual needs. The parties commissioned by the local authority to carry out access audits vary and include external building surveyors, the local access group, external access consultants, and in-house departments such as the additional support needs team and the housing and property team. Good and best practice is benchmarked using design guidance documents such as BS8300 and BB102: Designing for disabled children and children with special educational needs: Guidance for mainstream and special schools. The City of Edinburgh Council have also developed a Briefing for Accessibility document which is not optional and must be followed by design teams.

Not all councils carry out access audits or Post Occupancy Evaluation (POE) of new and refurbished buildings, however all five local authorities feel that this is something that should happen as standard and are putting plans in place for this. Perth and Kinross Council undertake quality management checks at four stages throughout the planning, design, construction and occupation stages. The City of Edinburgh Council have prepared an Access Audit Pro Forma which design teams use in design and buildings have been audited as part of the Council's Asset Management Plan. Architects were asked if they normally receive feedback from building users concerning matters related to accessible design, the results of which are shown in the graph in Image 6.22. None of the respondents selected that they normally receive feedback, 50% indicated that they sometimes receive feedback, 25% have never received feedback and 25% do receive feedback but it is not relevant to accessible design. Architects commented that feedback is often only received when something has not worked, rather than when something does work well. POE is viewed as a valuable tool and architects encourage their clients to engage in this process.

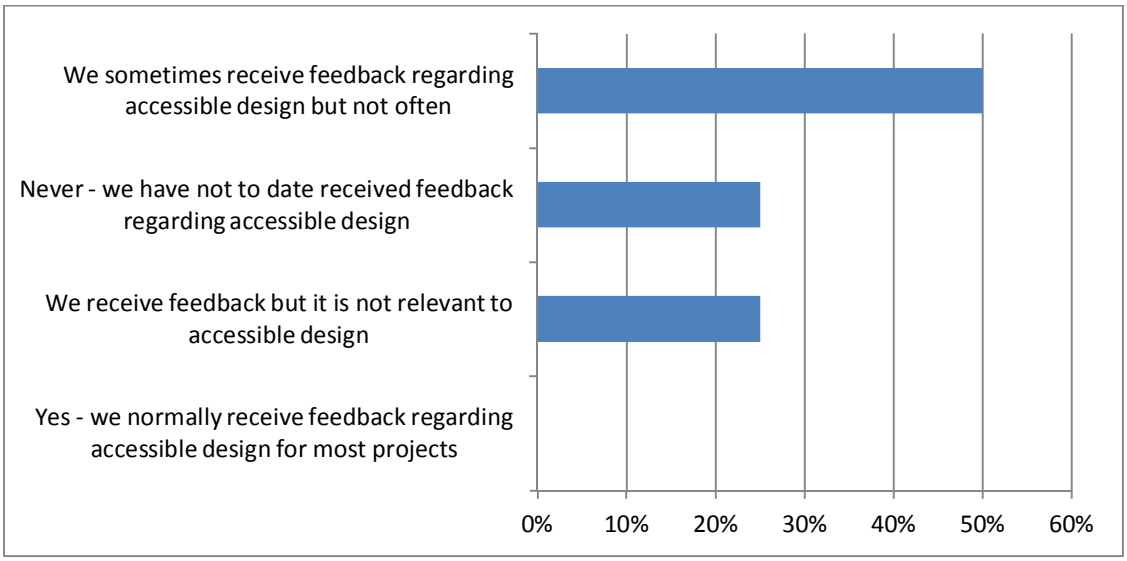


Image 6.22: Graph showing percentage of architects who receive feedback from users regarding accessible design.

The detailed investigation also highlighted maintenance to be an issue which can impact on accessible design, such as stair nosings coming loose from steps and grabrails in accessible WCs falling off the wall. These problems could sometimes be viewed as more of an issue to do with quality of construction, however it is important that a maintenance plan is put in place for such instances. Head teachers commented that repairs need to happen as part of a rolling programme as it can often take too long for items to be fixed.

The Soft Landings Framework (UBT & BSRIA, 2009), provides a structure for design teams to stay in contact with the client and building user after practical completion, in order to fine-tune and improve systems during the first months and ensure occupiers understand how to control the new building. The Framework is designed to extend up to three years after completion. Architects were asked if the Soft Landings Framework had to their knowledge ever been used in any of the educational project in which they have been involved. All of the respondents selected 'no', with some commenting that they are unaware of this strategy and others that they were only involved up to a scheme design stage C report so they may have been unaware of the Soft Landings Framework being used. One architect commented that while it is not as formal as the BSRIA guidance, a local authority designer will maintain contact with the client beyond practical completion, sometimes years after the project is complete and after staff have changed. The respondent had worked on the same buildings for over 18 years and sometimes has a more in depth knowledge of their history than the client.

6.9 Exemplar Project

South Lanarkshire Council has recently completed a project which integrates Greenburn PS, a school for children with additional support needs, with Maxwellton PS, a mainstream primary school and nursery, into one school building while preserving the

identity of both schools. As noted earlier, two 'models' of new schools for additional support needs children have been identified. The first model creates a separate identifiable 'unit' for additional support needs children within a mainstream school, with both parts being administered under one single school management structure. The second model has two individual schools occupying different parts of the same building- each retaining their own separate management structures, and only sharing some communal facilities, such as the dinner hall.

The Maxwellton & Greenburn facility differs from both of these models in that the two schools have retained their individual management structure and identity, and are not segregated by the building layout e.g. classes for additional support needs children are placed directly alongside mainstream classrooms. Unlike some units for children with additional support needs in mainstream schools, the Maxwellton & Greenburn facility includes the same resources as an individual special school, such as a hydrotherapy pool, soft play room and sensory room etc. The school has not yet been used meaning that the views of the occupants cannot therefore be gained. This section is intended to briefly demonstrate some of the positive design features of this example. It does not offer a critique of the extent to which the building meets certain design criteria of the kind undertaken in the detailed study. The playground has not been finished and could not be included in the study.

The school is designed around a block atrium plan, shown in Image 6.23a, with many of the communal areas, such as the social street areas, shown in Image 6.23b, IT suite and library designed as open plan areas within the centre of the atrium. This type of atrium design was made possible due to a smoke ventilation strategy developed by a specialist fire safety engineer. High level glazing is used to both introduce daylight and facilitate the natural ventilation strategy, allowing teachers to open the windows between the

classroom and corridor and also the high level windows. Classrooms and communal spaces for both schools are distributed on both levels. The provision of a large refuge area (for a whole class) and a fire lift allow children with mobility impairments to use the first floor, making the whole campus accessible to all users.

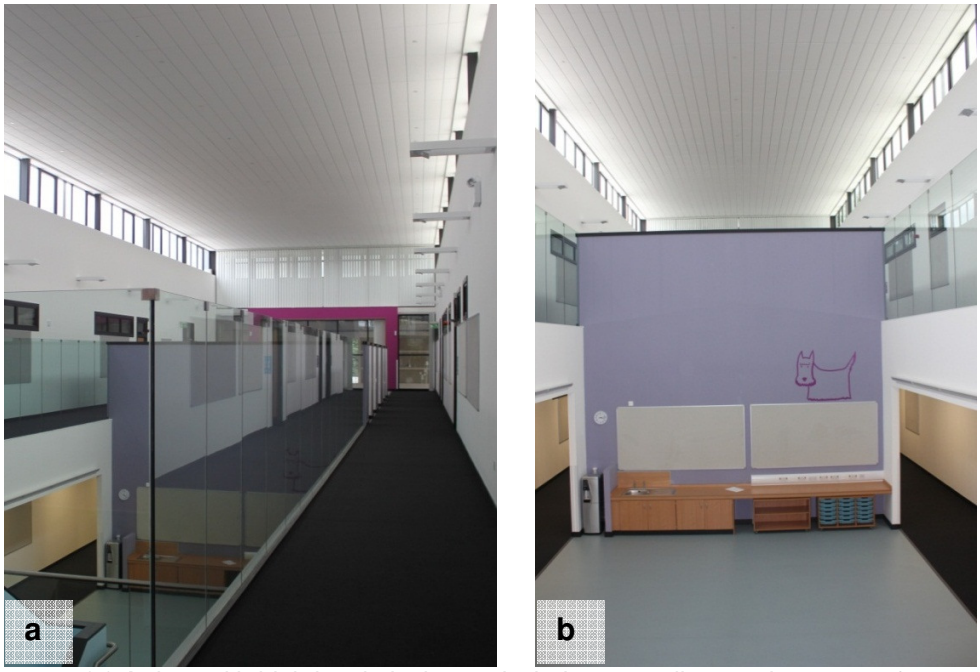


Image 6.23: (a) Atrium with high level glazing and windows to adjacent classrooms from corridor & (b) social street area placed in the centre space of the atrium.

The floor is finished with a dark grey carpet, shown in Image 6.24a, which contrasts well with the white wall. The door frames have also been painted dark to make them stand out against the white wall. The carpet is a loop pile type and helps to facilitate use by people using mobility equipment. The colour choice also helps to minimise glare which can be uncomfortable for people with a visual impairment. Cloakroom areas, an example of which is shown in Image 6.24b, have been positioned in small rooms located to the inside of the atrium which will help to minimise congestion in the corridor and keep the space free of obstacles. Larger cloakroom areas have been provided for storing mobility equipment.

Image 6.24: (a) Dark grey carpet with contrasting doors & (b) cloakroom area set back from corridor towards centre of atrium.

White colour nosings have been used on the stairs which contrast well with the dark carpet colour, as shown in Image 6.25a. This provides a better contrast than a light colour with dark stair nosings. Signage is placed at a height of around 1.5m which means it is easier for children and people in wheelchairs to read. The dark background, shown in Image 6.25b, contrasts well with the white text which is written in a large sans serif typeface making it easier for people with dyslexia and a visual impairment. Signs have been developed using symbols from Boardmaker Software, which is used for children with additional support needs so that pictures are recognisable to them for certain activities that take place in each space.

Image 6.25: (a) Stairs with colour contrasting stair nosings & (b) signage with dark background, large colour contrasting sans-serif typeface & symbol adapted from Boardmaker.

The mainstream toilets have been increased in size in order to facilitate ease of use and colour contrast has also been considered. Accessible toilets and changing areas have a bright green wall finish which contrast well with dark grey sanitary fittings, as shown in Image 6.26a in colour and 6.26b in greyscale. The position of the WC in accessible toilets designated for use by children has also been considered and has been placed in the centre to allow staff to give assistance on both sides. Colour contrast has also been considered in all non-accessible children's toilets. Although the WC lid does not contrast, the dark coloured pink wall finish contrasts well with the white sanitary fittings, as shown in Image 6.26c in colour and 6.26d in greyscale.

Image 6.26: Accessible toilet & changing area (a) in colour & (b) in greyscale; smaller toilet cubicle (c) in colour & (d) in greyscale.

Classrooms for children with additional support needs, an example of which is shown in Image 6.27a, have a linoleum floor finish which can be easily cleaned. They all have H-frame tracking, a wheelchair accessible, an adjacent retreat room with a window which can also function as a mirror to provide privacy and a height-adjustable sink, shown in Image 6.27b. Touch screens have been used throughout all classrooms rather than interactive whiteboards with projectors, and daylight levels are therefore not required to be attenuated for their use.

Image 6.27: Classroom showing (a) H-frame wheelchair tracking, door & window to retreat room & touchscreen, & (b) wheelchair accessible, height-adjustable sink.

The school for children with additional support needs has the same resources as it would if it was not integrated with a mainstream school. These spaces are large enough to be used by various children at the same time. The soft play room, pictured in Image 6.28a, has H-frame wheelchair tracking and tracking has also been provided leading from the hydrotherapy pool changing rooms to the pool area. The hydrotherapy pool, pictured in Image 6.28b, has a switch to raise or lower blinds and has frosted glass with the same graphics used elsewhere in the school. The sensory room, shown in Image 6.28c, has a mixture of seating, floor mats and clear space for people using mobility equipment as well as a range of visual, audio and tactile equipment floor and controls for dimming lighting.

Image 6.28: (a) Soft play room with H-frame tracking (b) hydrotherapy room with blinds open showing frosted glass & (c) sensory room with seating and floor activities.

The project was discussed with the architect, the construction company, and the local authority, South Lanarkshire Council. The architect and construction company both highlighted the importance of the local authority's vision in proposing the creation of a fully integrated school. They also described the detailed consultation process which involved a series of detailed meetings throughout the design process which allowed them to discuss the concept of the project, room relationships, and classroom layouts, as well as finer design details such as signage, colour schemes and door security mechanisms with the staff. The local authority also consulted with children's parents and a public meeting was held before the planning application was made.

6.10 Improving Accessible Design

Architects, head teachers and local authorities were all asked questions concerning measures that they feel could be put in place to improve accessible design, the results of which are summarised in this section. Architects were asked to rate the extent to which accessible design was covered in their education or training, from 1, not covered at all, to 5, covered in the great detail. The majority of respondents (50%) selected option 2, only partially covered, as shown in the graph in Image 6.29. Several architects commented that this subject was not covered at the time of their studies and that they believe it is now covered in greater detail. One respondent commented that although it was discussed at university there were few good examples at that time. This is important as the architectural curriculum is often taught by means of case studies or exemplar projects. Many respondents commented that their knowledge has been gained through personal experience or study.

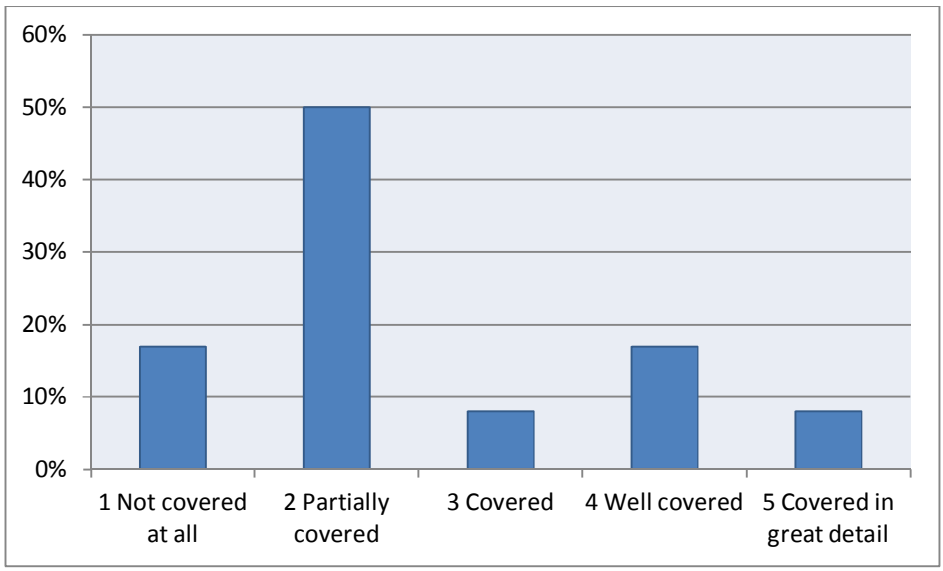


Image 6.29: Graph showing the percentage extent to which accessible design was covered in the architects' education.

The Scottish Building Regulations highlight the importance of considering inclusive design from as early as possible, and as an integral part of, the design process, as well as the benefits of including potential building users. Architects were asked if a framework exists which allows them to easily do this. The majority (50%) selected 'yes – but it could be better', with 20% selecting 'yes and it works well', 20% selecting 'no – I think it would be helpful' and finally 10% choosing 'no – I don't think it's necessary'. There were various different comments regarding this question the majority of which focused on considering inclusive design rather than the involvement of potential building users. Two respondents focused their comments on the importance of the design team with one commenting that local government procurement seldom favours the selection of talented, enthusiastic architects and prefers low-cost as the decision driver. Another commented that while guidelines and checklists are very important, a good design team and a good working relationship with the client and consultants is vital. Another respondent echoed this, commenting that while most architects know how to provide the basics of the regulations and use BS8300 for guidance more could be provided and another commented that there is a particular person in the office with expertise in accessible design.

Architects were asked what would help them and the rest of the design team to meet best practice standards of accessible design in schools, selecting a maximum of five options from a list, the results of which are shown in the graph in Image 6.30. The two most popular options were 'Educational events (CPD & workshops) in accessible design' and 'Involve people with impairments in the design process', and sharing third position were 'A BREEAM-type standard for accessible design' and 'More involvement (of architect) during entire project'. The least popular options were 'One party being responsible for accessible design', 'More time to consider accessibility at certain stages'

and 'Join a community of practice, sharing knowledge and experience with others interested in accessible design'. One respondent commented that feedback from care professionals who use the building type in question is essential. Another commented that they have spent time with staff and children with complex learning needs to understand the challenges they face on an average school day prior to starting the school design and this was more educational than someone saying what they would need. Concern was voiced by one respondent about a disability-surveyor being appointed to police design teams because accessible design is not a bolt-on optional extra, with current legislation already enforcing the requirement.

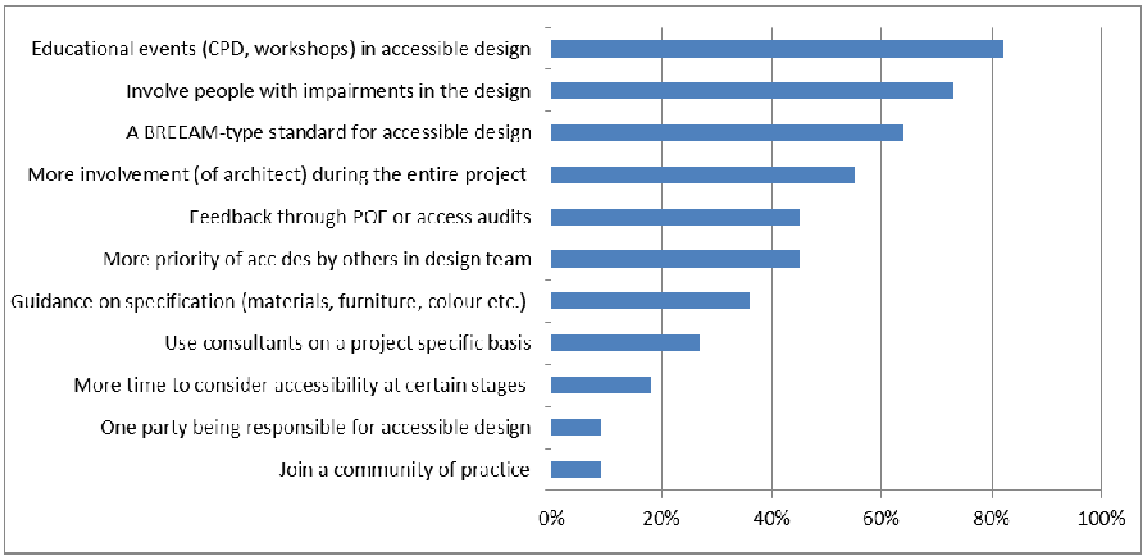


Image 6.30: Graph showing results from question asking architects to select up to 5 options which would help them and the rest of the design team to meet best practice standards of accessible design in schools.

Local authorities were also asked to select from a list a maximum of five options which would help them and the rest of the design team to meet best practice standards of accessible design in schools. The results are shown in the graph in Image 6.31. The most popular three options were 'Feedback through Post Occupancy Evaluation (POE) or access audits', 'Workshop events focusing on accessible design' and 'Involve people with impairments in the design process'. The least popular options were 'Use

consultants on a project specific basis', 'A BREEAM-type standard for accessible design' and 'More time to consider accessibility at certain stages in the design process'. One respondent commented that support from councillors and management is also crucial.

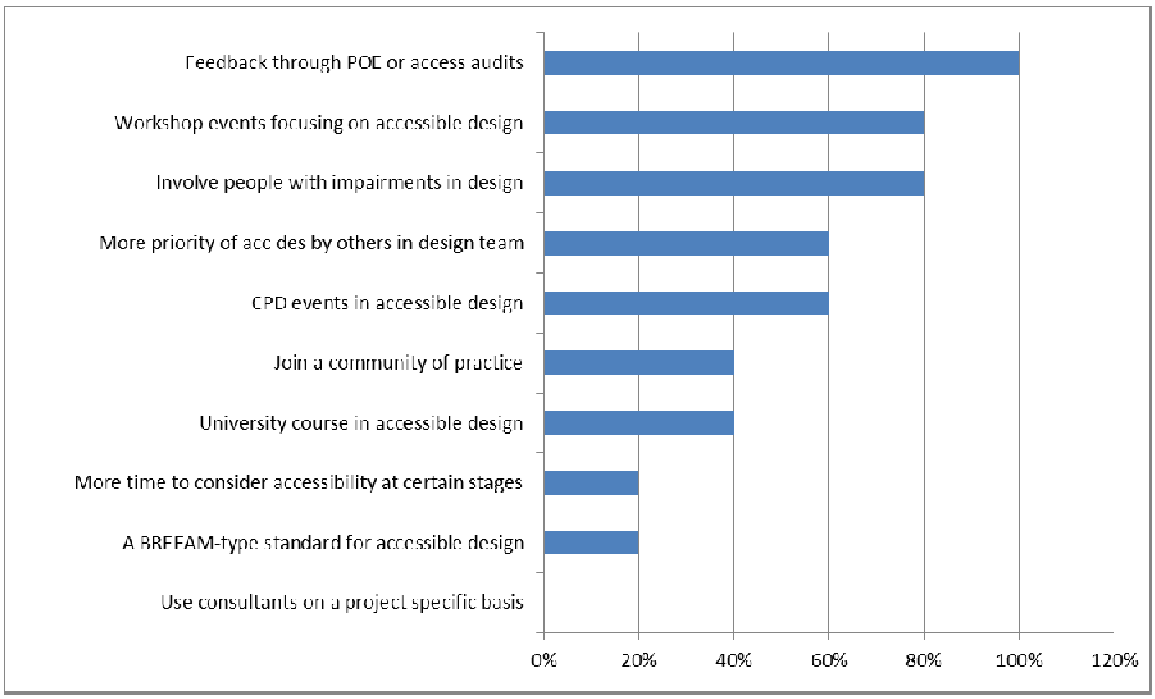


Image 6.31: Graph showing results from question asking local authorities to select up to 5 options which would help them and the rest of the design team to meet best practice standards of accessible design in schools.

Head teachers were asked to select from a list a maximum of five options which they think would help to improve their ability to ensure accessible design in schools. The results are shown in a graph in Image 6.32. By far the most popular options were 'Involvement of people with impairments in the design process' and 'Users giving feedback on performance of existing buildings'. The least popular option was 'Take a university course on building related topics, such as building management'. One head teacher from the City of Edinburgh Council area commented that local authority staff had taken responsibility for accessible design and were excellent.

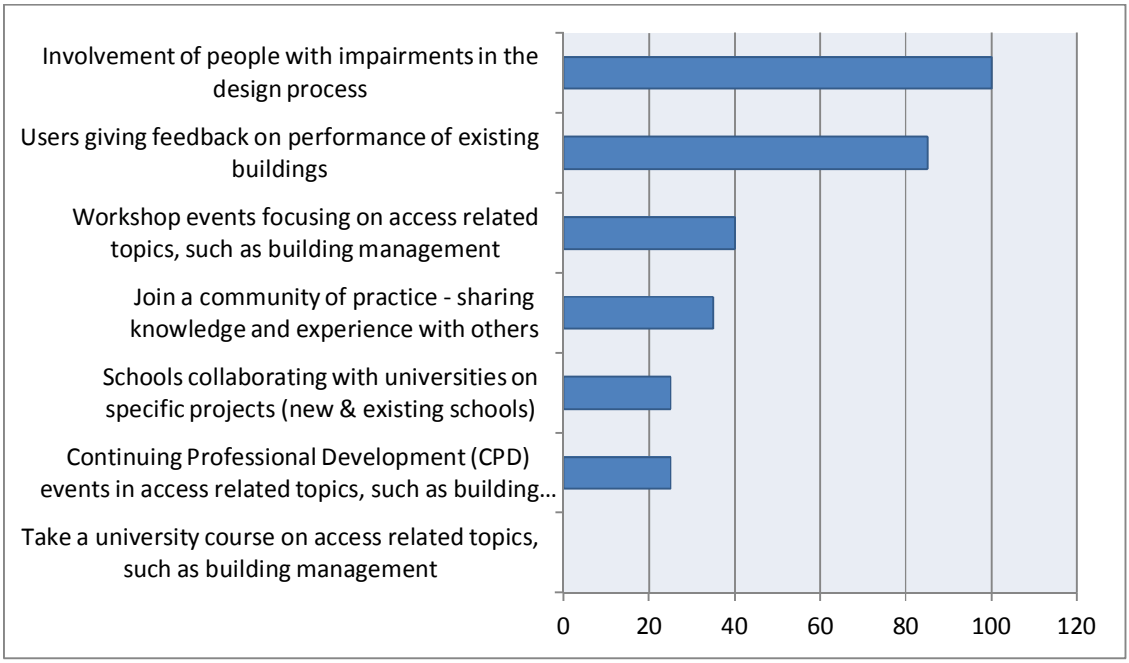


Image 6.32: Graph showing results from question asking head teachers to select up to 5 options which would help them and the rest of the design team to meet best practice standards of accessible design in schools.

Architects were asked to indicate the areas in which they would like to advance their knowledge and skills in accessible school design by selecting a maximum of 5 options from a list, the results of which are shown in the graph in Image 6.33. The most popular areas were 'Incorporating accessibility in the brief ' followed by 'Lighting, acoustics & environmental aspects' and 'Colour & materials'. The least popular options were 'Introduction to accessible design' and 'Auxiliary aids (e.g. hearing aid induction loops, wheelchair tracking)'. In general, topics which are themed around general aspects of building design were more popular than topics which focused on specific areas within a building, user groups, or types of impairment. One architect commented that good Scotland specific textbooks or websites with guidance notes and links backed up with educational events such as Continuing Professional Development (CPD), lectures or seminars in the workplace would be useful. Another architect commented that there is a

tendency by many people to view accessible design and aesthetics as mutually exclusive which is not the case in other countries.

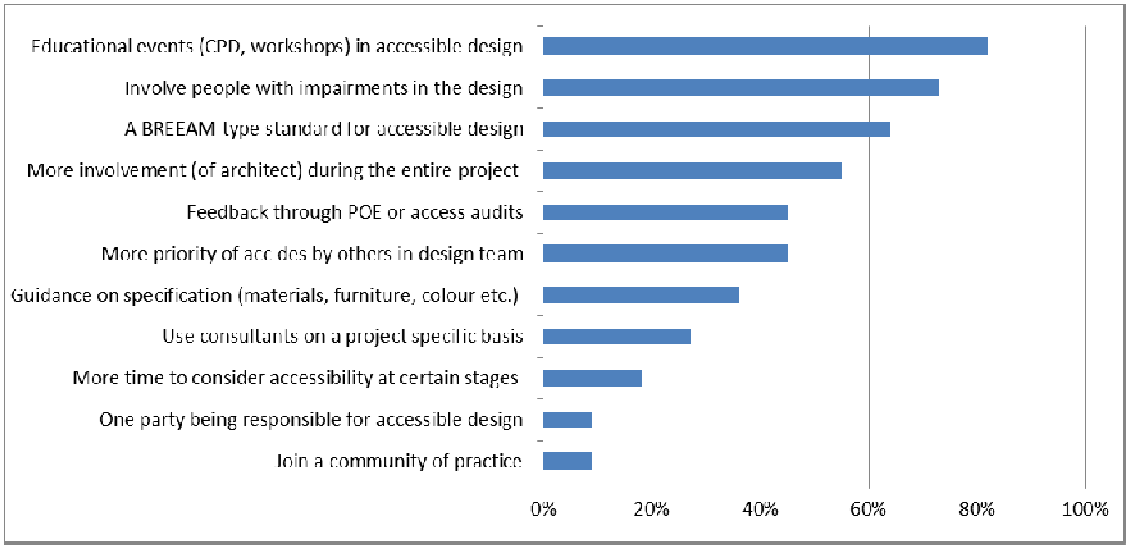


Image 6.33: Graph showing results from question asking architects to select areas in which they would like to advance their knowledge and skills in accessible school design by selecting a maximum of 5 options from a list

Local Authorities were also asked in which particular areas they would like to advance their knowledge and skills in accessible school design by selecting a maximum of 5 answers from a list, the results of which are shown in the graph in Image 6.34. By far the most popular answer was 'Exterior areas (e.g. playground, school grounds). This was followed by 5 options which all received the same amount of hits: 'Classroom design', 'Colour & materials', 'Lighting, acoustics & environmental aspects', 'Circulation through buildings' and 'Auxiliary aids (e.g. wheelchair tracking)'. The least popular suggestions were 'Introduction to accessible design' and 'Incorporating accessibility in the brief'. An additional suggested topic was accessible furniture and equipment would be of interest.

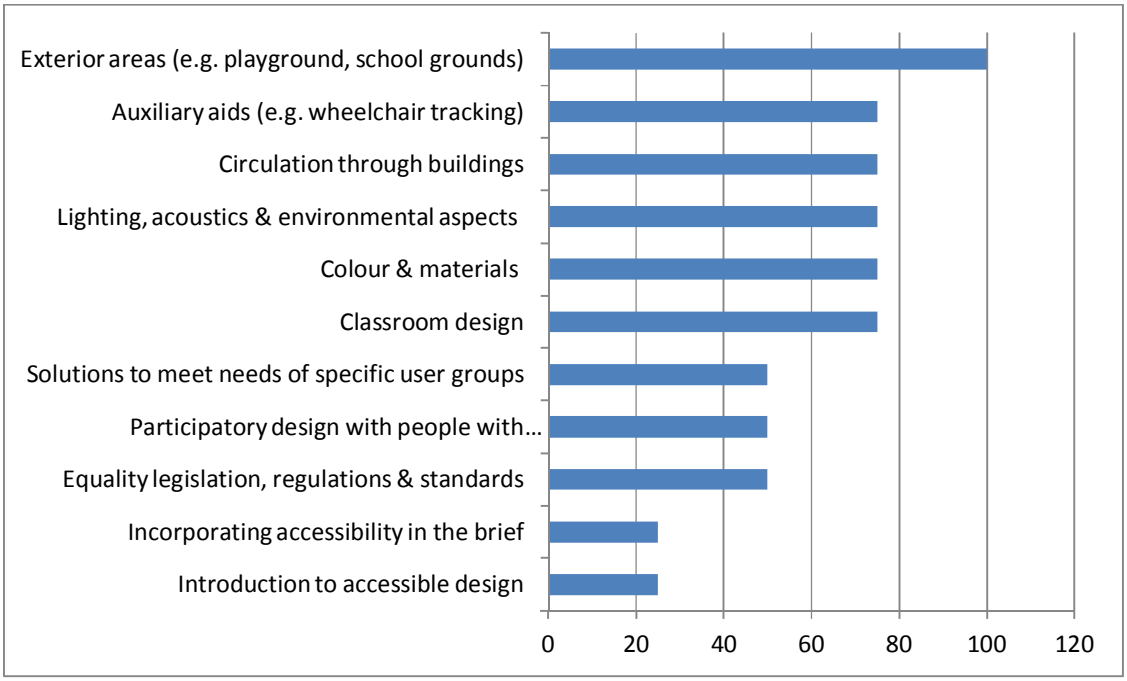


Image 6.34: Graph showing results from question asking local authorities to select areas in which they would like to advance their knowledge and skills in accessible school design by selecting a maximum of 5 options from a list.

Head teachers were also asked in which particular areas they would like to advance their knowledge and skills in accessible school design / building management by selecting a maximum of 5 options from a list, the results of which are shown in the graph in Image 6.35. The most popular topics were 'Meeting the needs of specific user groups (e.g. children, people with specific impairments)' and 'Requirements in specific areas of the building (e.g. classrooms, corridors, playground). The least popular options were 'Building management for accessibility' and 'Equality and disability legislation, regulations and standards'. Other suggestions included 'toilet and personal care facilities particularly for older children and adults with intimate care needs' and 'positive learning environment for young people with autism, complex learning needs and physical impairment e.g. wheel chair users who may require hoisting & space.'

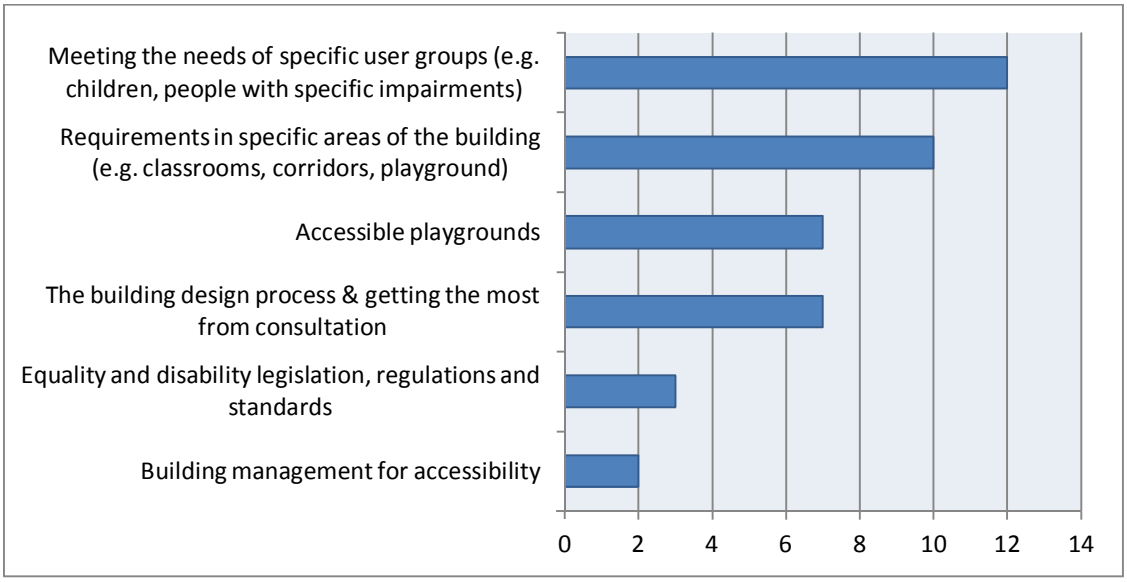


Image 6.35: Graph showing results from question asking local authorities to select areas in which they would like to advance their knowledge and skills in accessible school design by selecting a maximum of 5 options from a list.

6.11 Conclusion

This chapter has detailed the results of a large-scale investigation exploring the school design process in the 7 cities of Scotland, involving three main stakeholder groups: architects, head teachers and local authorities. The consultation processes vary between each local authority and consultation with head teachers and teaching staff is generally better than with other staff groups or pupils. It is important to maintain a continuous dialogue throughout the design process and identify channels of communication for various stakeholder groups. There is at the moment no specific framework used by any of the local authorities for involvement of people with impairments in the design process. This is important because involvement of people with impairments in the design process was rated by all three stakeholder groups as one of the most important factors which would improve standards of accessible design in schools. The large scale questionnaire found similar results concerning the performance

of school design to those identified in the detailed study. Classroom and sports hall design were rated positively. Aspects which received poorer ratings were space for children with additional support needs, general storage space, hearing aid provision and interior finishes. Exterior space received a poorer rating than internal space, showing that more needs to be done to improve accessible design in external areas in all local authority areas. It has been found that local authorities that receive high ratings for user consultation also achieve higher ratings for satisfaction with the finished building design, highlighting the importance of consultation.

The majority of local authorities consider the accessibility of a location when selecting a site, however in many cases this is not possible due to restricted availability of sites. This could be resolved through the identification of accessible sites for schools in long-term local urban design plans. Despite challenging topography, local authorities should be more proactive in improving accessible design in the areas surrounding school buildings. This is especially important because of the Scottish Government initiative to promote the provision of community facilities in schools. Guidelines for accessible design in the external environment should be disseminated to architects and local authorities in order that external design standards are understood to the same extent as those for building interiors. Accessible design is also considered by all local authorities when compiling the brief and the majority consultant with other parties within the council such as education specialists with knowledge in the requirement of children with additional support needs. It was found that local authorities which involve the future building occupants in the development of the brief achieve better user satisfaction than other local authorities.

The responsibility for ensuring individual design aspects varies depending on the local authority, however there is a general consensus that the local authority as the client has an important role to play in ensuring that best standard practice in accessible design is met throughout. The Scottish Government has produced a sizeable amount of design guidance however local authorities commented that there is no specific guidance with regards to accessible design and accessible design processes. This reaffirms the findings in Chapter 3 that accessible design is not consistently mentioned in all design guidance. One of the most influential factors on accessible design in the school estate has been the requirement on local authorities to prepare, implement and review accessibility strategies to improve access to the school curriculum, information and physical environment in accordance with the Education (Disability Strategies and Pupils' Educational Records) (Scotland) Act 2002 (Scottish Government, 2002).

Various different procurement methods have been used with the most common being traditional. Architects rated the procurement method as the least important factor impacting on their ability to ensure best practice standards of accessible design. It was generally felt by local authorities and architects that through attention to detail, knowledge of different types of additional support needs and creative design, design solutions can be reached which do not inadvertently disadvantage one group while meeting the needs of another. Most local authorities felt that awareness regarding different types of impairment has broadened. Architects find that building products suppliers generally provide enough information to specify accessible products, however it was also felt that this information could be improved and more consideration given the aesthetics of items for accessibility.

Local authorities and architects believe that Post Occupancy Evaluation (POE) of new and refurbished buildings should take place as standard and some councils are putting plans in place for this. Architects indicated that they do not normally receive feedback from building users and when they do it is not often relevant to accessible design and is sometimes only negative focusing on aspects which do not work rather than those that do. Architects rated feedback from building users as the most important factor impacting on their ability to ensure best practice standards of accessible design. The Soft Landings Framework (UBT & BSRIA, 2009), which provides transition from the design completion to building occupancy has not been used on any of the school projects, however the local authorities maintain contact with the building users and the same architect may work on a building for many years. Many local authorities intend to implement Post Occupancy Evaluation (POE) as standard.

Results from architects, local authorities and head teachers all seem to indicate that the most popular ways to improve accessible design are the involvement of people with impairments in the design process, feedback from building users regarding the performance of accessible design and workshops or other educational events focusing on accessible design. Introducing a 'BREEAM-type rating system for accessible design' was rated higher by architects than local authorities. It was noted with both architects, local authorities and head teachers, that topics relating to design themes and the requirements of specific user groups were more popular than those related to legislation, regulation, or general accessible design. Local authorities and architects appear to be more interested in design themes while head teachers appear to topics which relate to specific user groups such as children and people with specific impairments. Local authorities appear to be more interested in exterior areas and auxiliary aids than

architects. This could be because local authorities have more involvement in the design and specification of these areas than architects. Interestingly, the most popular topic with architects was incorporating accessible design the brief while this was the least popular with local authorities.

Chapter 7: A Plan of Work for Inclusion

7.1 Introduction

This chapter brings together the findings of the detailed and large-scale studies to inform discussion concering the extent to which the social model of architecture is embedded within the school design process and make recommendations for future progress. The first section discusses the social model of architecture, defined in Chapter 2, and places the results of the study within the context of some important sections of the literature review such as the inclusive education debate and the difference between integration and inclusion; the role of legislation in increasing awareness; accessible design guidelines and future research; and the importance of consultation and feedback. Where relevant, recommendations are made for changes to existing guidelines and future research. The following section proposes the creation of an Inclusive Overlay to the RIBA Plan of Work and details what this might look like based on the context of this research study.

7.2 Towards a social model of architecture

In Chapter 2 a social model of architecture was proposed, detailing how architectural research, practice and education can respond to the social model of disability and the call to reimagine societal structures and processes based on the divergent capacities of the individual (Stiker, 1999). This section discusses the extent to which this model has been integrated within the school design process and identifies specific areas which require further improvement. An important aspect of the social model of architecture is the need for continuous review and improvement. Great advancements have been

made in the area of accessible design however there remains a lot of work to be done in this area.

7.2.1 The Inclusive Education Debate

The debate surrounding inclusive education was discussed in detail in Chapter 3. It was highlighted that although the principles of inclusion are agreed on rhetorically, practical achievements remain irregular (Priestley, 2003). Compared to other European countries Scotland educates a high proportion of pupils with impairments in mainstream schools, however issues still remain in terms of achieving sufficient resources to enable children to be included in mainstream schools and classes. While some parents are fighting with local authorities for their child to have access to mainstream education, others see special education as preferable, viewing the support their child will receive as far superior (Riddell, 2006). The voices of pupils with impairments and their parents and a discourse of disability rights tend to be marginalised over professionals when deciding what type of education to provide and in what location (Riddell, 2009). This debate over inclusion and segregation is reflected in the type of school accommodation that is provided. In a response to the call for inclusive education and a move away from segregation local authorities have started to provide other options to stand-alone special schools. Three basic types of new schools have been identified (although variations of each may exist): special schools which run under separate management but share a campus with mainstream schools, special units located within a mainstream school and running under the same management as a mainstream school, and schools which fully integrate mainstream and additional support needs classes next door to one another. In terms of the built environment, the special unit involved in the study had

fewer facilities than the other two models. In both models of special schools sharing a campus with mainstream schools the first floor areas are inaccessible to the majority of children in the special schools. In one of these models the layout of the campus led to staff perceiving the shared resources as belonging more to one school than another. The model which appears to go furthest in terms of inclusion is that which positions mainstream and special school classrooms beside one another and ensures that both floors are accessible to all pupils. However, the proponents of inclusive education who argue for all children to receive their education in a mainstream classroom would still view the segregated classroom arrangement as inadequate. The building of new schools offers a unique opportunity to open up the inclusive education debate and allow pupils, adults and those involved in the disability discourse to voice their opinions concerning the type of provision in new schools. While some local authorities involve building users to a certain extent, as yet the opportunity to focus on inclusion for children with impairments and the nature of provision given has not been fully exploited. In order to understand how well these new educational settings are responding to the inclusive education agenda it is necessary to hear the opinions of the staff, parents and children and also the proponents of the wider disability rights movement.

7.2.2 Legislation

One of the most influential factors on accessible design in the school estate has been the requirement on local authorities to prepare, implement and review accessibility strategies to improve access to the school curriculum, information and physical environment in accordance with the Education (Disability Strategies and Pupils' Educational Records) (Scotland) Act 2002 (Scottish Government, 2002). Significant progress has been made in new school buildings to remove barriers to access, with the

main achievement being the provision of a lift and the removal of level changes throughout each floor of a building, The removal of level changes does not just help people using a wheelchair but anybody with a visual or mobility impairment. However, as discussed in Chapter 3, accessible design is not just about the removal of barriers but the promotion of a positive learning environment and more needs to be done to promote innovative design and research in this area within a Scottish context.

All of the architects and local authorities were aware of disability rights and equality legislation as well as best practice accessible design guidance such as "BS8300: 2009. Design of buildings and their approaches to meet the needs of disabled people – code of practice" (BSI, 2009). However, the emphasis placed on accessible design, beyond meeting minimum mandatory regulations, varies depending on the local authority. Some local authorities consider providing environments which are suitable for people with impairments to benefit all users while others still speak of 'normal conditions' and 'bespoke adaptations' when referring to aspects such as acoustic design. Accessible design is also sometimes considered a separate area for example colour contrasting sanitary fittings in WCs, which can help people with a visual impairment, are used in accessible WCs but not in all WCs.

7.2.3 Accessible Design Guidelines and Future Research

A main point made in the inclusive education debate, covered in Chapter 3, is the important distinction between 'integration' which expects that children with impairments will adjust to mainstream education and 'inclusion' which involves making adjustments to mainstream education to provide for all children (French and Swain, 2004). Similar consideration should be given to the built environment, as mainstream schools in

Scotland are expected to provide a positive learning environment for all learners and should therefore be exemplary of accessible design. It was found through the detailed and large-scale studies that certain guidelines are not being met such as those relating to colour contrast, the provision of small rooms for children with additional support needs and many of those relating to the exterior environment. More should be done to raise awareness of these guidelines throughout the design professions. Specific areas for further research which can feed into best practice guidelines were also identified such as the guidelines for comfortable temperatures, an issue already highlighted by the Scottish Executive (2007). Some recommendations for future research relate to improving existing guidelines and others are more specific to creating a positive learning environment for children with impairments and would involve consulting around new school design. Results from the large scale study indicate that the most popular ways to improve accessible design are the involvement of people with impairments in the design process, feedback from building users regarding the performance of accessible design and workshops or other educational events focusing on accessible design. The school building programme offers an opportunity to organise educational events and research projects focused on accessible design that are multidisciplinary and bring together the various members of the design team, building users, and most importantly, people with impairments.

7.2.4 Consultation & Feedback

The level of consultation undertaken with building users also varies depending on the local authority. The large scale study indicated that a better consultation process results in higher levels of user satisfaction with the school and that it is crucial to undertake

consultation at various stages throughout the project from the development of the schedule of accommodation and brief through to post-occupancy. This is supported by Luck et al. (2001) who highlight that user participation is considered a good mechanism for increasing levels of satisfaction with the completed building, especially in the case of users who have an impairment. The framework for consultation established by Perth and Kinross Council, who create User Reference Groups for each project, could offer a way forward for other local authorities. However, at the moment there is no apparent framework for involving people with impairments or children with additional support needs in the design process. Architects, head teachers and local authorities all rated involvement of people with impairments in the design process as one of the most important factors to improve standards of accessible design in schools. Post Occupancy Evaluation (POE) of new and refurbished buildings should take place as standard and some councils are putting plans in place for this. Architects, local authorities and head teachers rated this as one of the most influential factor impacting on accessible design. Architects indicated that they do not normally receive feedback from building users and when they do it is not often relevant to accessible design and is sometimes only negative. As discussed in Chapter 3, at the moment POE does not necessarily ensure that feedback will be given concerning accessible design. The Soft Landings Framework (UBT & BSRIA, 2009), which provides transition from the design completion to building occupancy, has not been used on any of the school projects. It is clear from the results of the small and large-scale study that accessible design is a multidisciplinary issue which should be fully integrated within the whole design process. The following section discusses the proposal of a framework which can support progress towards a social model of architecture, based on the new RIBA Plan of Work.

7.3 A RIBA Plan of Work for inclusive design

7.3.1 RIBA Plan of Work 2013

The RIBA Plan of Work has been the definitive guidance framework in the UK for the building design and construction process since it was developed in 1963. For the first time a fundamental review of the original Plan of Work has taken place and a new Plan of Work 2013 has been launched. This offers a unique opportunity to investigate how accessible design can be embedded throughout the entire design process. The new Plan of Work was created to address key issues such as integrating sustainable design, mapping BIM processes, providing flexibility around planning procedures, addressing changes in the way building services design is delivered, responding to the recommendations of the UK Government Construction Strategy, and providing straight forward mapping and flexibility for all forms of procurement, rather than traditional procurement (RIBA, 2012b). The former RIBA Outline Plan of Work 2007 consisted of 11 key stages (A-L) and a description of key tasks. This has been replaced by 8 stages, defined by the numbers 0-7, and 8 task bars that replace the description of key tasks. The task bars for procurement, programme and planning can be customised online to create a project or practice-specific plan of work.

7.3.2 An Inclusive Overlay for the RIBA Plan of Work 2013

A Green overlay (RIBA, 2011) and a Building Information Modelling (BIM) overlay (RIBA, 2012a) to the RIBA Outline Plan of Work 2007 were produced to examine the implications of developments in sustainable design and BIM for the RIBA Outline Plan of Work 2007. Accessible design is similar to sustainable design in that both concepts have to been integrated throughout the entire design process, from the outset to post

occupancy, and require for a multi-disciplinary approach from all members of the design team. A similar overlay for inclusive design would help towards integrating the social model of architecture, discussed in Chapter 2, within the design process. The RIBA Plan of Work is not a contractual document and serves as guidance, however the process of developing an Inclusive Overlay would ensure that it is given due consideration by all members of the design team and that accessible design is embedded within the existing framework, meaning that accessible design considerations would also be fed back into mandatory building regulations and best practice guidelines. The Green Overlay was produced through the collaboration of multi-disciplinary teams of architects and engineers, and a similar approach should be taken to the production of an Inclusive Overlay, involving representatives of the entire design team with expertise in accessible design and most importantly, ensuring the involvement of people with impairments. It is acknowledged that this would be part of a larger exercise that is out with the remits of this research project, however this thesis recognises the gap in this area and makes an initial contribution based on the findings of the detailed and large scale studies. The following sections make recommendations for embedding accessible design throughout existing design methodologies and actions for accessible design, which are aligned with the key stages of the new RIBA Plan of Work 2013.

7.3.2.1 Embedding Inclusive Design

One of the main changes made by the new RIBA Plan of Work 2013 is to incorporate the Soft Landings Framework and Post Occupancy Evaluation (POE) throughout the design and build process. The Soft Landings Framework was developed to improve

briefing, design, handover and building performance in-use. The industry is recognising the need for systematic Post Occupancy Evaluation but it needs to be linked to a rational methodology for assessing the briefing, design and commissioning stages. The Soft Landings Framework intends to close the loop between design, construction, operation, feedback and into design again (UBT & BSRIA, 2009). The Soft Landings framework promotes a culture shift in the way buildings are delivered which answers some of the problems that have been highlighted concerning accessible design. This includes a better understanding of how buildings are actually used and managed and closer links between design, construction, operation, research and development. In this way Soft Landings and POE offer the perfect vehicle by which to embed accessible design issues throughout the design process.

As mentioned in Chapter 3, undertaking POE does not necessarily guarantee that information will be gathered concerning the performance of accessible design. This was confirmed by the results of the large scale study which found that the architects who took part in the questionnaire rarely receive feedback concerning accessible design. One of the main problems may be because POE is designed to evaluate the current users of a building and does not consider potential users in the same way that an Access Audit would. Accessible design is not covered in the Soft Landings Framework document (UBT & BSRIA, 2009) or the Soft Landing for Schools report (UBT, 2010). In the large scale study it was found that the Soft Landings strategy had not been used on any of the school projects, however several local authorities indicated that they are preparing to undertake POEs of school buildings as standard and the use of Soft Landings may also increase given that it is now embedded within the RIBA Plan of

Work. Newlands et al. (2010) recognise the importance of qualitative post occupancy research exploring the use of the internal environment by groups such as people with mobility disabilities. Accessible design should be embedded throughout both POE and Soft Landings, with Access Audits undertaken as a standard part of any building evaluation.

7.3.2.1 Actions for Inclusive Design

The Green Overlay to the RIBA Plan of Work sets out the key tasks for each stage of the framework and aligns these with sustainability checkpoints (RIBA, 2011). A similar process has been undertaken in this section using the new stages of the RIBA Plan of Work 2013 as a framework within which to sit the outcomes of the detailed and large scale investigations. Table 7.1 shows the 8 stages of the RIBA Plan of Work 2013, with the core objectives in the middle row and suggested actions for inclusive design in the b, including points and topics for consultation. Although it is possible to make a project specific plan of work, the generic plan of work is considered to be more suitable in this case because of the various procurement methods used in school design, demonstrated in the results of the large scale study discussed in Chapter 6. It should be noted that the production of an Inclusive Overlay would involve the collaboration of many organisations with expertise in this area and this table has been based on research related only to school design in Scotland. However, this can serve as a basis for discussion which can help to promote progress towards a social model of architectural practice.

Table 7.1 – part a: Inclusive Overlay to the RIBA Plan of Work 2013

		0 Strategic Definition	1 Preparation & Brief	2 Concept Design	3 Developed Design
Existing	Stages				
	Core objectives	Identify client's **Business Case** and **Strategic Brief** and other core project requirements.	Develop **Project Objectives**, including **Quality Objectives** and **Project Outcomes**, **Sustainability Aspirations**, Project Budget, other parameters or constraints and develop **Initial Project Brief**. Undertake **Feasibility Studies** and review of **Site Information**.	Prepare **Concept Design**, including outline proposals for structural design, building services systems, outline specifications and preliminary **Cost Information** along with relevant **Project Strategies** in accordance with **Design Programme**. Agree alterations to brief and issue **Final Project Brief**.	Prepare **Developed Design**, including coordinated and updated proposals for structural design, building services systems, outline specifications, **Cost Information** and **Project Strategies** in accordance with **Design Programme**.
Proposed overlay	Actions	Decide which type of facility to provide (special unit/shared campus etc.) guided by feedback from POE of existing school buildings. Undertake access audit if building is to be refurbished. Inclusive design strategy to be developed/amended according to feedback.	Brief should state client's aspirations for accessible design. Requirements for exterior environment to be included. Establish the nature of the facilities required depending on the type of school. Feasibility studies & site review to consider accessible design. Client/project manager to determine what will be required of each party in the design team at each stage to demonstrate accessible design.	The concept design should clearly demonstrate how accessible design has been taken into consideration. The concept design should include both the interior & exterior & the relationship between both. Feedback from the initial stakeholder consultation and POE should be fed into the Final Project Brief. Check that none of the specifications in the brief contradict accessible design guidelines.	Outline specifications should demonstrate compliance with best practice accessible design guidelines and take into account feedback from POE. Recommendations for guidelines for accessible spaces within the building and the external access route can be applied to all areas.
	Consultation	Form representative consultation group with relevant stakeholders, establish objectives and timeline.	Present the initial project brief to the stakeholder group. Review project brief – continuous process.	Present concept design to the stakeholder group.	Developed design should be presented to stakeholder group before being submitted to planning. Discussion should focus on more detailed aspects of design.

Table 7.1 – part b: inclusive Overlay to the RIBA Plan of Work 2013

		4 Technical Design	5 Construction	6 Handover & Close Out	7 In Use
Existing	Stages				
	Core objectives	Prepare **Technical Design** in accordance with **Design Responsibility Matrix** and **Project Strategies** to include all architectural, structural and building services information, specialist subcontractor design and specifications, in accordance with **Design Programme**.	Offsite manufacturing and onsite **Construction** in accordance with **Construction Programme** and resolution of **Design Queries** from site as they arise.	Handover of building and conclusion of **Building Contract**.	Undertake **In Use** services in accordance with **Schedule of Services**.
Proposed overlay	Actions	Client or project manager to review the accessible design information, as requested from each party in the design team, to ensure coherence throughout project & improvement based on feedback from POE. Ensure specialist subcontractor design & specifications are in keeping with the access strategy.	Ensure changes made during construction do not negatively impact on accessible design criteria, as supplied by each party of the design team. Access strategy for operation of the building should be incorporated into the Handover Strategy.	Prepare a design strategy for future work undertaken – to cover interior, exterior & surrounding area & include responsibilities & timescale.	Ensure that accessible design, especially in the external environment, is a core part of all activities in the Handover Strategy, such as POE, review of Project Performance, Project Outcomes & Research and Development aspects.
	Consultation	Update to be sent to members of stakeholder group with revised objectives and timeline as well as project progress.	Arrange for stakeholder group to visit site & explain which changes have taken place.	Invite stakeholder group to view building – record & respond to comments. Gather comments on strategy for future work.	Finalise design strategy for future work. Review the entire consultation process.

RIBA Stage of Work 0: Strategic Definition

At this stage the client or local authority may be considering which type of school facility to provide and if an older building is to be refurbished and it is crucial that accessible design is taken into consideration from the outset as one of the core project requirements. If an older building is to be refurbished an access audit should be undertaken to determine the priorities for ensuring accessible design are considered as a core part of the project and not as an optional extra if the budget allows for this. This may impact on the way the building is used. If the council is considering providing a special school or a special unit within a mainstream school this should be debated with representatives of parents whose children will attend the facility and school staff. The success or problems encountered in previous projects can be used in order to inform this debate. For all school projects a representative consultation group should be formed at this stage and realistic consultation objectives and a timeline should be established.

RIBA Stage of Work 1: Preparation and Brief

The brief should clearly state the client's aspirations for accessible design. The practical, technical and architectural objectives for accessible design should be reviewed based on feedback from previous projects. Requirements for both interior and exterior environments should be included, for example providing outdoor learning areas, accessible wildlife areas and appropriate shelter. Once the type of school to be provided has been decided (e.g. refurbishment/new build, special/mainstream/mix) the local authority should establish the nature of facilities that will be required, such as soft play room, outdoor play, wildlife, hydrotherapy pool. The initial project brief should be

presented to the stakeholder group for consultation. It should be made clear which areas are flexible and if certain facilities can be substituted by others. Feasibility studies and the review of site information should examine access to the site from surrounding areas as this may determine the main entry points. If only one site is available options to improve accessibility should be investigated – this may involve ensuring accessible transport is made available on appropriate occasions, such as parents' nights or sports days. Discussions with architects and local authorities indicated that accessible design should be a shared responsibility rather delegated to one member of the design team. However, the important role that the local authority, or client, play in ensuring that standards of accessible design is met was also highlighted. It should be made clear that each party in the design team is responsible for ensuring that accessible design is considered.

RIBA Stage of Work 2: Concept Design

The concept design should clearly demonstrate how accessible design has been taken into consideration, showing how the building and outdoor spaces respond to the requirements of people with cognitive, sensory and physical impairments, as well as children with additional support needs. Areas on which to focus inside the school building include the orientation of the building, the strategy for regulating the temperature and controlling solar gain, the types of spaces provided for small group work, the relationships between spaces (especially in a shared campus), and the circulation strategy inside the building. The school grounds should also be included in the concept design demonstrating how the site will be accessed from the surrounding area, the use of land, how opportunities for outdoor education will be maximised and how wildlife will be incorporated. Varying topography, which encourages play, should be

balanced with access to the sports field etc. Feedback from the initial project brief and studies looking at previous schools should be fed into the final brief. In particular, storage and space for small group work should not be underestimated. It should be checked that none of the specifications in the brief, for example silver signage, contradict best practice accessible design guidelines. The concept design should be presented to the stakeholder group to ensure that their ideas have been well interpreted. Discussions should centre around how the school building and grounds will be used on a daily basis. A member of the design group should explain how the concept responds to initial stakeholder consultation and feedback from POE.

RIBA Stage of Work 3: Developed Design

The local authority (or client) should establish how each party will be expected to demonstrate that accessible design has been considered at each stage of work (e.g. producing story boards, Light Reflectance Values etc.). Outline specifications should demonstrate compliance with best practice accessible design guidelines and take into account feedback from POE. This includes specifications for building services such as lighting and minimising sound from mechanical services. Recommendations for colour contrast between floors, walls, door handles, sanitary fittings should apply throughout the whole building and not just areas deemed accessible. Guidelines for zoning and colour contrast of street furniture and recommended ground surfaces within an access route in the exterior environment should also apply to the entire school grounds. The developed design should be presented to the stakeholder group and signed off before being submitted to planning. Discussion should focus on more detailed aspects such as the layout and architectural quality of individual exterior and interior spaces such as the

quality of daylight, provision for flexibility etc. Routes throughout the building should be considered focusing on daily routines and the relationship between the interior and exterior.

RIBA Stage of Work 4: Technical Design

Each party of the design team, including specialist subcontractors, should demonstrate how their specifications take into account accessible design guidelines as set out by the client or project manager. The client or project manager should review this information in order to ensure coherence throughout the whole project. Each party should also demonstrate how the technical design and specifications respond to feedback from POE, for example concerning acoustic design of sports hall, fluctuating temperatures and a lack of colour contrast.

RIBA Stage of Work 5: Construction

Ensure that changes made during construction do not impact on design measures put in place to ensure accessible design. Ensure specialist subcontractors' design & specifications are in keeping with the access strategy. The party or parties responsible for compiling 'As-Constructed' Information should ensure that changes do not negatively impact on accessible design criteria, as previously communicated by members of the design team. Stage information supplied by each member of the design team regarding accessible design and specifications has been achieved in construction. The access strategy for operation of the building should be prepared and incorporated into the Handover Strategy. This should explain the main accessible design intentions so that operation of the building does not negatively impact on these.

RIBA Stage of Work 6: Handover and Close Out

Invite stakeholder group to view the building and explain how it responds to the requirements of people with cognitive, sensory and physical impairments and children with additional support needs. Be prepared to record, investigate and respond accordingly to comments. Ensure a maintenance programme is put into place and that priority will be given to features which affect accessibility. Prepare a design strategy for future work to be undertaken (e.g. playground development, eco-garden, indoor facilities) with the input of the stakeholder group and the local authority. Design features and specification that are crucial to accessible design should be highlighted to ensure accessible design criteria are maintained during future maintenance or refurbishment work. The strategy should include the interior and exterior environment as well as the surrounding area, with the improvements to be made set out within a timescale and the responsible party identified.

RIBA Stage of Work 7: In Use

Ensure that accessible design, particularly in outdoor areas, is included as a core part of activities in the Handover Strategy, such as POE, review of Project Performance, Project Outcomes and Research and Development aspects. Finalise design strategy for future work.

7.2 Conclusion

This Chapter has discussed the outcomes of the detailed and large-scale investigations undertaken as part of this doctoral thesis project in the context of the literature review. It is argued that within Scotland, much progress has been made in recent years towards achieving a social model of architecture and creating a built environment that can support and foster inclusive education. Recommendations for future research which can feed into the creation of local guidelines have been made which build upon this progress. Importance is placed on embedding accessible design throughout the entire design process and it is proposed that an Inclusive Overlay to the new RIBA Plan of Work 2013 would help to achieve this. It is acknowledged that this would require the collaboration of various stakeholders with expertise in this area such as access panels, architects and local authorities, ensuring that people with impairments are well represented. A proposed overlay based on the results from this investigation of school design in Scotland has been created to contribute towards this process. Recurring themes throughout the Inclusive Overlay are the need to embed accessible design within existing processes such as POE, the importance of placing responsibility on each party of the design team to demonstrate how accessible design has been considered, the need to involve people with impairments in the design process and increase awareness through educational activities.

Chapter 8: Conclusion

8.1. Research Aims

It is 30 years since the emergence of the social model of disability (Oliver, 1983), when the disability movement called for people to question, research, analyse and focus on disability from a new standpoint (Finkelstein, 1980). The biggest school building programme in the history of Scotland has taken place, with around one fifth (Scottish Government, 2009) of the school estate having been refurbished or replaced. Statistics (Scottish Government, 2011) show that the coming years will see the replacement or extensive refurbishment of a similar number of school buildings. The most comprehensive study of design standards in Scotland's new and refurbished school buildings (Audit Scotland, 2008) did not include any special schools. Furthermore, this study was unable to make firm conclusions regarding standards of accessible design; however it does show that several design aspects relating to accessible design are underperforming. In response to these key issues, this thesis set out to investigate the extent to which the social model of disability is embedded within the school design process in Scotland.

The thesis hypothesis is that although progress has been made towards embedding the social model of design in the design process, there is a requirement to improve knowledge and application of best practice standards and ensure that accessible design is considered throughout the entire design process. It is argued that a paradigm shift in our design ethos is required in order to move from policy to practice and create truly inclusive places. The thesis has begun by exploring the theoretical aspects which help to set out the context and parameters for practical investigations. This has included

exploring the emergence of the disability movement in Britain, the historical and contemporary relationship between disability, impairment and the built environment, and the progress made by the architectural profession in responding to the social model of disability. The inclusive education discourse has been summarised, followed by a detailed analysis of the school design programme in Scotland and the findings of current research exploring new and refurbished school design. The thesis has then detailed the analytical methods and results of two practical investigations. The detailed study has measured standards of accessible design in 10 schools through visual surveys and user consultation. The large-scale study has determined whether results from the detailed study regarding performance of specific design aspects are similar across the board and explored the extent to which accessible design is embedded throughout the design process. The main research findings of this work are presented in the following section.

8.2 Main Conclusions

8.2.1 Historical Analysis

A historical analysis has been undertaken exploring how Western society's views of impairment have been manifest in prominent art and architecture of the time. This analysis has informed the creation of a timeline diagram which gives an overview of social perceptions of impairment aligned with relevant architectural trends. This study demonstrates that segregation has not only arisen as a result of the neglect of the architectural profession to consider the needs of people with impairments but has in some cases been actively reinforced through the design of the built environment. Two themes are identified as recurring interchangeably throughout Western history: the first

views impairment as a result of wrongdoing and results in punishment, the second views impairment as tragedy and results in healing. There were periods during which one theme dominated more than another and also times when the two themes overlapped. It is important to note that both themes of healing and punishment place people with an impairment at the lower end of the social scale and contrast with the social model of disability which calls for the environment to adjust to meet the needs of the individual rather than the onus being placed on the individual to adjust or adapt to the environment. A new theme of the 'enabling' environment has emerged.

8.2.2 A Need for Change

The disability movement has succeeded in instigating a seminal shift in the history of the architectural profession which is represented in changes which have been made to mandatory legislation, architectural reference books, the production of best practice guidelines and the emergence of new types of practice such as Universal Design. However, it is argued that there still remains an urgent need for change. Various areas of concern have been identified, such as the tendency to presume that accessible design is concerned mainly with people who use wheelchairs. There is a lack of knowledge concerning the requirements of people with sensory or cognitive impairments compared to people with physical impairments. Furthermore, existing guidelines have been premised on standards developed for a young, more able-bodied group of people and there are criticisms that certain minimum and best practice standards do not work for the majority of people, a prime example being the minimum turning circle for wheelchair users. An additional problem is the tendency to view accessible design issues as an add-on or separate areas of design and not as an integral issue from the outset of the project, an issue which is reinforced by the building

regulations. Accessible design is only partially covered by mandatory building regulations in Scotland, which refer users to best practice design standards, however many builders and designers may only build to meet minimum requirements. Furthermore, architectural practice is non-democratic in nature and far removed from public participation (Imrie, 2006), making it difficult to involve people with impairments within the design process.

8.2.3 Accessible Design Standards: Interior

The practical investigations have allowed various conclusions to be made regarding the extent to which accessible design standards are met in Scotland's new and refurbished schools. The detailed study (Chapters 4 and 5) discusses accessible design standards in detail and makes recommendations for improvement relating to the design process, design guidelines and future research. The large-scale study (Chapter 6) establishes whether issues identified in the detailed study were common across the larger study area. These investigations have found that there is inconsistency in the extent to which best practice guidelines are met in each school, however some areas of improvement have been identified. In terms of environmental design, it was found that although there has been a considerable effort to introduce daylight into all new schools, daylight control systems are lacking. This is particularly important for people who have a visual impairment and may need more or less light, and also for children with autistic spectrum disorders who may be sensitive to daylight or require darker spaces to learn through sensory stimulation. In common with the Audit Scotland (2008) report, fluctuating temperatures were found to be problematic. This may partly be a consequence of solar gain from glazed areas with no shading, however it is likely that this is also related to the light weight steel frame construction and use of suspended ceiling tiles which can

cause temperatures to fluctuate. A lack of daylight and natural ventilation was a particular issue in areas for administration and catering staff.

One of the best performing aspects of accessible design in new schools is the provision of level entranceways and level access throughout each floor; however in some shared campuses first floor areas are not accessible to children using wheelchairs due to fire escape issues. In common with the Audit Scotland (2008) report there were found to be circulation pinch points and issues with certain routes throughout the school. Classrooms generally perform well when compared to other areas of the school and there are exemplary design features such as storage walls, retreat areas for children with additional support needs and communal activity areas in corridors. However, all mainstream schools were found to lack small group areas for children with additional support needs and a lack of wheelchair accessible sinks makes it difficult to teach core parts of the curriculum. There is a general lack of storage in most schools, particularly for mobility equipment. There are also issues with detail design concerning stair handrails, signage, colour contrast, ironmongery specification, hearing aid facilities and door pressure.

8.2.4 Accessible Design Standards: Exterior

Results from both the detailed and large-scale studies strongly indicate that exterior areas perform poorer than interior areas. It was also noted that there are far less guidelines for exterior spaces compared to building interiors. Furthermore, mandatory regulations and best practice guidance for exterior spaces apply only to a designated accessible route. This means that guidelines relating to colour contrast and zoning of street furniture, treatment of level changes and ground surfaces do not apply to areas outwith this route. None of the level changes within any of the school grounds have

tactile paving or colour contrasting nosing and there are issues with handrail design. It was also found that there are a general lack of sheltered areas and few areas which are adequate for outdoor learning and this tends to be dependent on the initiative of the school or individual staff members. Wildlife areas are generally not accessible to children with certain types of impairment and playgrounds for children with additional support needs have a lack of wildlife. The accessibility of the streets in the local area varies depending on the individual school but there are common problems with uneven paving surfaces, a lack of dropped kerbs, and inaccessible transport stops.

8.2.5 The Design Process

A successful consultation process is fundamental to achieving spaces which work well and are embraced by the people who use them on a daily basis. The large scale investigation found that local authorities which received higher ratings for the consultation process also received higher ratings for satisfaction of individual design aspects. Consultation processes vary in different local authority areas and are generally better undertaken with head teachers than other stakeholder groups. Successful consultation processes maintain a continuous dialogue with stakeholders, holding various events throughout the design process and identifying appropriate points of communication for various stakeholder groups. This can help establish links to gain feedback regarding school design. Feedback from building users was rated by architects as the most important factor impacting on their ability to ensure best practice standards of accessible design. Architects do not tend to receive feedback from building users and when they do it is not relevant to accessible design. There is currently no established framework for involving people with impairments in the design process.

The selection of an appropriate site can have a substantial impact on the accessibility of a school building, however many local authorities reported that there is often very limited or no choice of site. It has been found that in terms of responsibility, the client has a crucial role to play in ensuring accessible design is a main consideration. Architects rated the procurement method as the least important factor impacting on their ability to ensure best practice standards of accessible design. Design guidance produced by the Scottish Government does not consistently mention accessible design and there is no specific guidance for accessible design standards and processes. Local authorities and architects believe that design solutions which meet a variety of user groups can be reached through creative design, attention to detail and having knowledge of the requirements of people with various types of impairment or additional support needs.

8.3 Contributions

This thesis makes a contribution to both theoretical knowledge and architectural practice. The historical analysis contributes to the historical disability discourse by analysing exactly how society's views were manifest in the art and architecture of the time. The analysis demonstrates that the architectural profession has not neglected to consider the needs of people with impairments but it has had an active role in reinforcing societal perceptions related to both healing and punishment. This emphasises the importance of the architect's role in what Finkelstein (1980) termed the third phase, in which the focus moves from the individual to the nature of society which disables impaired people. The proposal of a 'social model of architecture' (Image 8.1) leads on from the historical analysis and contributes to current debate concerning how

the architectural profession can enable rather than disable. This vision includes objectives for architectural education, research and practice and sets the scene for research investigations which aim to provide practical steps towards linking theory, policy and practice.

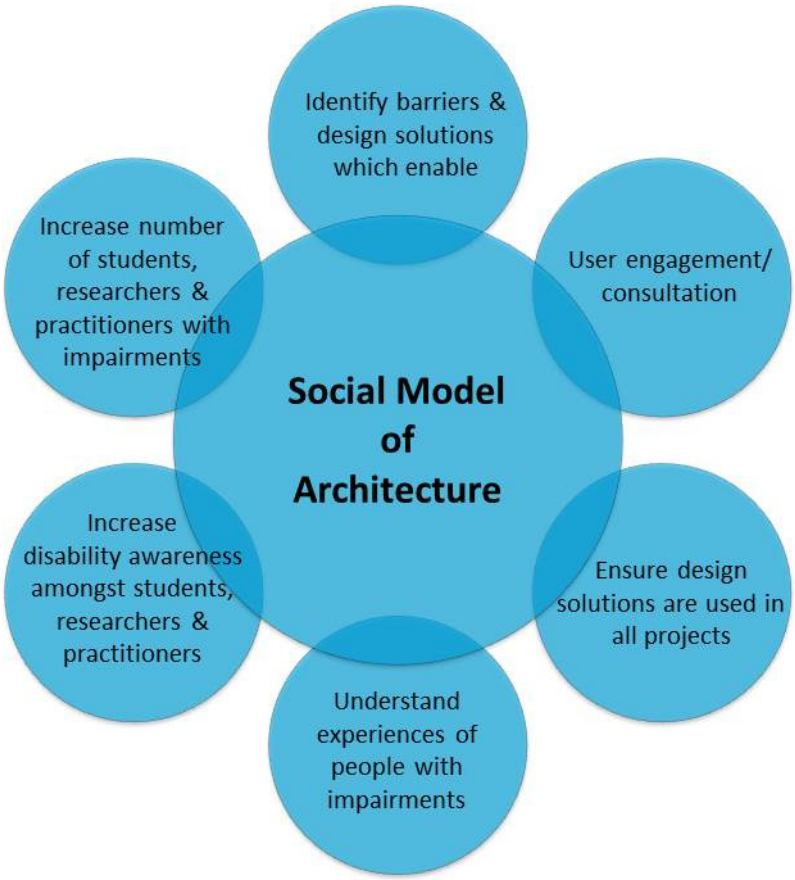


Image 8.1: Diagram illustrating the social model of architecture.

The practical investigations contribute to a significant gap in research evaluating standards of accessible design in Scotland's new and refurbished schools, and particularly those in the special sector. The set of matrices which were produced to measure standards of accessible design in the detailed study provide a concise

summary of mandatory and best practice guidance which can be used as checklists for evaluating both existing and future school building projects. These could also be used as a basis for developing an accessible rating system, such as BREEAM (the Building Research Establishment's Environmental Assessment Method) or the Energy Performance Certificates which have to be displayed in every building in Scotland.

The production of a proposed overlay for the new RIBA Plan of Work 2013 contributes to current architectural practice by suggesting practical steps and actions which should be taken to ensure accessible design throughout each stage of the design process. At the time of writing the author was notified that plans are in place to develop such an overlay and was able to contribute this work towards its development. The proposed overlay not only suggests creating new actions for accessible design but highlights the importance of embedding accessible design throughout current framework methodologies such as Post Occupancy Evaluation (POE) and the Soft Landings Strategy, neither of which highlight the importance of accessible design.

8.4. Recommendations For Future Directions

One of the main aims of this research was to provide practical steps towards linking school design policy, which promotes inclusive environments, and practice, which does not always achieve this. To this end, various recommendations have been made with regard to accessible design standards and the design process. The study has produced important findings in regard to the importance of consultation and the best methods to embed accessible design guidelines within the design process. The limitations of the study are recognised in terms of the sample size (which was on the basis of voluntary participation) and the ability to accurately measure the response rate (due to the

method of distribution of questionnaires). However, these early indicative results may be used by which to establish research questions and parameters for further more conclusive investigation.

8.4.1 Recommendations for Accessible Design Guidelines

The most comprehensive research project examining standards of school design in Scotland (Audit Scotland, 2008) found one of the worst performing areas to be the quality and control of the indoor environment. An investigation into the impact of poorly performing environmental conditions has concluded that while the effects of a poor internal environment are proven to have a detrimental impact on all occupants the effect can be far worse for people with an impairment and/or additional support needs. Accessible design standards should therefore emphasise the importance of environmental aspects. It has been found that buildings which are said to comply with maximum temperature guidelines receive numerous complaints of overheating by people who use the space. The Scottish Executive (2007) suggests that there is some disparity between maximum temperature guidelines and user comfort. This research reinforces this and suggests that guidelines are reduced so that design issues can be resolved when thermal modelling is undertaken.

Both the detailed and large-scale investigations reinforce the findings of White (2010) who argued that the exterior environment is far less accessible than the interior environment. This is due to two main reasons: a lack of knowledge concerning existing accessible design standards for exterior environments, the fact that less guidelines exist for the exterior environment (in terms of school design), and the fact that mandatory and accessible design guidelines for the exterior environment only apply within a designated access route. It is suggested that educational events such as workshops

and Continuing Professional Development (CPD) events be used to promote existing guidelines to architects and local authorities, that research is undertaken to produce guidelines for positive exterior learning environments for children with additional support needs, and finally that guidelines for colour contrast and paving apply to the entire area within a building curtilage and not only a designated access route. Another main finding of White (2010) was that silver does not provide a good visual contrast with its surroundings and is the least visible colour in the exterior environment for people with varying degree and type of vision loss. Silver is commonly used throughout all schools and it is suggested that design guidelines be amended to include the results of this research and highlight the need to avoid silver.

8.4.2 Improving Accessible Design

The majority of local authorities consider the accessibility of a location when selecting a site, however in many cases this is not possible due to restricted availability of sites. This could be resolved through the identification of accessible sites for schools in long-term local urban design plans. Local authorities and architects believe that Post Occupancy Evaluation (POE) of new and refurbished buildings should take place as standard and some councils are putting plans in place for this. At the moment, it is possible to undertake POE without making any conclusions with regards to accessible design. While some areas of accessible design cross over with general comfort for all users, other areas may go unnoticed if potential users are not considered. It is recommended that the methodology for POE be revised to include potential users and not just existing users or recommend that Access Audits be undertaken as part of POE. In terms of specification, architects indicated that information given by building product suppliers could be improved and more consideration could be given to the aesthetics of

items for accessibility. Research involving people with visual impairments, architects and building product designers should be undertaken to advance this area and create design solutions for items such as door entry systems and lift interiors.

Architects, local authorities and head teachers agree that the three most popular ways to improve accessible design are: involvement of people with impairments in the design process, feedback from building users regarding the performance of accessible design and workshops or other educational events focusing on accessible design. Introducing a BREEAM-type rating system for accessible design was rated more favourably (in joint third place) by architects than local authorities. It was also found that topics relating to design themes (e.g. 'materials and colour' or 'environmental aspects'), areas of the building (e.g. 'classrooms' and 'playground') and meeting the needs of specific user groups ('people with visually impairments', 'children with additional support needs') are more popular with architects, local authorities and head teachers, than those relating to legislation, regulation, or general accessible design. Architects and other members of the design team report that spending time with building users and having access to building users throughout the process is crucial in achieving positive learning environments. It is suggested that educational and consultation events to address the identified gaps in knowledge and research should bring together people with impairments and designers in order that the event itself presents opportunities for experiential learning rather than purely information giving.

Finally, a crucial point made in the discussion concerning 'the social model of architecture' was that of continuous improvement and development. This work acknowledges the immense achievement of the disability movement in arguing for accessible environments and the progress that has already been made towards this

should not be denied, however it has also been shown that much work remains to be done. The proposed ‘social model of architecture’ and ‘Inclusive Overlay to the RIBA Plan of Work 2013’ do not propose to be completed pieces of work but are intended to generate discussion within the architectural community and emphasise the need for a paradigm shift in our design ethos in order to create environments which positively enable people with impairments and children with additional support needs.

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Appendix A

A1: Sample Information Sheet

Participant Information Sheet (Head Teacher)

Department of Architecture

"Learning Lessons from the School Building Programme"

University of Strathclyde Glasgow

Researcher
This research project is being undertaken by Miss Claire Hyland, as part of a PhD in Architecture at the Department of Architecture, University of Strathclyde. Claire is a member of the PVG scheme through her work with the Disability Service at the University and can supply her up-to-date certificate to the school on request.

Investigation Aims
This investigation aims to determine the strengths and weaknesses of accessible design in new or refurbished school buildings built after 2003 when local authorities began to implement accessibility strategies. The research involves speaking to local authorities of the 7 cities in Scotland, interviewing architects, sending questionnaires to the Head Teachers at school in the 7 cities of Scotland, and undertaking visual surveys of school premises in Edinburgh and Glasgow. This study is intended to highlight the need for best practice accessibility guidelines to be met in all school buildings and make recommendations as to how this aim can be best accomplished in future projects.

Participation
You are under no obligation to participate in this study, supply requested information or answer specific questions. You can request that certain information remain anonymous if necessary and withdraw from the study at any time.

What will you do in the project?
Participation in this study will involve consenting to a visual survey being undertaken of the school premises while occupied. This will include classrooms, communal areas such as the dinner hall and toilets, service areas and the playground / car park. Information will be documented by measurements, annotations and photography. No children will be photographed. Members of staff are invited to contribute their views during the visual survey. As the survey focuses on accessible design it would be helpful to speak to members of staff who work with children with additional support needs.

Why have you been invited to take part?
Your school was contacted from a list of new or refurbished school buildings supplied by City of Edinburgh Council.

What are the potential risks to you in taking part?
No potential risk is envisaged. It should be noted that this study does not aim to critique any element of the curriculum or its delivery and will focus solely on the built environment of the school.

What happens to the information in the project?
No individual person will be named in any piece of work, and all personal details will be made anonymous. The school will be named and the school's contribution will be recognised. All data is confidential and will be kept in a password secured computer in a locked room for no longer than three years.

The University of Strathclyde is registered with the Information Commissioner's Office who implements the Data Protection Act 1998. All personal data on participants will be processed in accordance with the provisions of the Data Protection Act 1998.

Thank you for reading this information – please ask any questions if you are unsure about what is written here.

What happens next?
Thank you for taking the time to read this information. If you are happy to be involved in the project, you will be asked to sign a consent form to confirm this. Information from this study will be published as a PhD thesis and may be disseminated by other means, such as academic papers, conference contributions, or student lectures, after the completion of the project. The school's involvement will be acknowledged in any published work.

This investigation was granted ethical approval by the University of Strathclyde ethics committee. If you have any questions/concerns, during or after the investigation, or wish to contact an independent person to whom any questions may be directed or further information may be sought from, please contact:

Secretary to the University Ethics Committee Research & Knowledge Exchange Services University of Strathclyde Graham Hills Building 50 George Street Glasgow G1 1QE Telephone: 0141 548 3707 Email: ethics@strath.ac.uk	**Researcher** Miss Claire Hyland Dept. of Architecture 131 Rottenrow G4 0NG Tel: 0141 548 3989 Email: c.hyland@strath.ac.uk

A2: Sample Consent Form

Consent Form

University of Strathclyde Glasgow

Department of Architecture

"Learning Lessons from the School Building Programme"

- I confirm that I have read and understood the information sheet for the above project and the researcher has answered any queries to my satisfaction.
- I understand that my participation is voluntary and that I am free to withdraw from the project at any time, without having to give a reason and without any consequences.
- I understand that I can withdraw my data from the study at any time.
- I understand that any information recorded in the investigation will remain confidential and no information that identifies me will be made publicly available.
- I consent to being a participant in the project

I (print name),	
hereby agree to take part in the above project.	

Signature:	
Date:	

Appendix B: Detailed Study

B1: Access Audit Checklist prepared for visual survey.

School Name:
Date:

Exterior Areas		General Comments
Surrounding area		
Approach to building		
Drop-off area		
Playground		
Sports field/s		
Learning areas		
Pedestrian routes		
Carpark		
Other		

Educational		General Comments
Classroom		
Gymnasium		
Library		
Smaller rooms (one-to-one support)		
Other		

Communal		General Comments

Assembly hall		
Dinner hall		
Medical facilities		
Other		

Staff accommodation		**General Comments**
Offices		
Kitchen		
Staff rooms		
Other		

Service		**General Comments**
Toilets		
Storage		
Other		

Circulation		**General Comments**
Main entrance		
Reception		
Vertical circulation		
Horizontal circulation		
Emergency escape		
Other		

Interior Checklist – design aspects

Classroom, office, gymnasium, kitchen, dining hall, assembly hall, library, staff common room, medical facilities.

Environmental Conditions			
Daylight		Air quality	
Daylight control		Ventilation control	
Artificial light		Temperature	
Artificial light control		Temperature control	
Acoustics		Other	
Acoustic control		Other	

Circulation, furniture, equipment, interior finishes	
Signage – contrast, size, clarity, pictograms etc.	
Entrance / exit doors (easy to open, position, contrast)	
Circulation space	
Clear routes throughout	
Space per person	
Storage provision	
Furniture / equipment design – size, contrast, positioning	
Technological aids – magnifiers, hearing-aid facilities etc.	
Interior finish – wall (glare, light reflection, pin work up)	
Interior finish – floor (non-slip, glare, clear floor markings in gym)	
Interior finish – ceiling (light reflecting, height)	
Other	
Other	
Other	

Interior Checklist – design aspects

Horizontal (lifts & stairways) & vertical (corridors, doorways)

General Circulation	
Signage – contrast, size, clarity, pictograms etc.	
Entrance / exit doors (easy to open, ironmongery, position, contrast)	
Circulation space	
Clear routes throughout	
Space per person	
Storage provision	
Lighting (shadows, too dark, too bright, glare, reflection)	
Position of lifts and stairways	
Design of lifts (position of controls, contrast & big print, well signed)	
Design of stairs (treads, nosings, handrail, tactile warning)	
Interior finish – wall (glare, light reflection)	
Interior finish – floor (non-slip, glare)	
Interior finish – ceiling (light reflecting, height)	
Other	
Other	
Other	

Toilets – staff & pupil	
Disabled toilet – size, layout & contrast	
Door ironmongery (easy to use, lever-style, contrasting)	
Lighting	
Quantity	
Positioning	
Ventilation	
Signage	
Other	
Other	

Exterior Checklist – design aspects

Drop-off area, sports fields, playground, learning areas, pavements, carpark.

School Grounds	
Ease of orientation	
Space to move around	
Clear pedestrian routes	
Disabled parking	
Lighting	
Storage provision (for sports equipment etc)	
Signage	
Seating (provision, design, contrast)	
Ease of access to sports field	
Variety of activities	
Variety of hard & soft surfaces	
Street furniture (zoning & contrast)	
Other	
Other	

Surrounding area	
Accessible crossings	
Accessible transport stops	
Pavements	
Lighting	
General safety	
Other	
Other	
Other	

B2: Semi-structured interview format for head teacher.

Sample Interview - Head Teacher

School Name
Address

Head Teacher:
Telephone:
E-mail:

Sector: Primary / secondary / mainstream
Capacity:
Roll:

Building shape: Dual aspect / L-shape / courtyard

Number of storeys: All accommodation located on one floor?

Technical facilities
Are there computers / projectors in each classroom?

Play facilities
Equipment? Shared facilities with other schools? Swimming?

Room variation
Are there small rooms for visiting specialists etc?

Transport
How do most pupils get to and from the school?

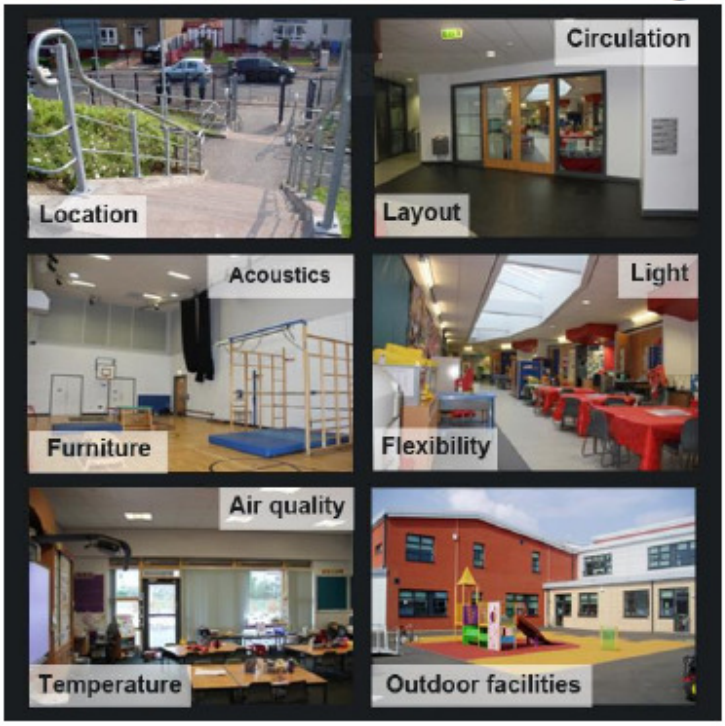
Community links
Can school facilities (sports hall etc) be used by the community?

Consultation process
What kind of consultation process was undertaken?

B3: Electronic Staff Questionnaire.

Default Question Block

10 out of 10 for Scottish School Design?



This questionnaire contains 4 questions and should take no longer than 5-10 minutes to complete. The questions ask you to rate certain aspects of school design on a scale of 1-5, however it would be helpful to the researcher if you could give additional information to explain your answers in the comment boxes provided after each answer. You do not have to rate all design aspects and there is a comment box at the end for any issues you feel have not been covered in the questionnaire.

Claire Hyland: I am a third year PhD student in the Department of Architecture at the University of Strathclyde.

Aim of study: To determine the strengths and weaknesses of accessible school design, considering the needs of people with sensory, cognitive & physical impairments & children with additional support needs.

Accessible Design: Includes many factors, from the building location & general layout to light, air quality, material finish & space to move around.

Areas included in study: All areas of the school, including offices, kitchen, educational areas & WCs.

Your contribution: Take 5-10 mins to tell me what you think the strengths & weaknesses of your school building are by rating certain areas & commenting on aspects you like & dislike.

Terms & conditions

- I understand that I am under no obligation to participate in this questionnaire. I can request for my data to be withdrawn from the study and do not have to respond to all questions.
- I understand that all information I give will be treated with the utmost confidentiality and that my anonymity will be respected at all times.
- I give permission to the University of Strathclyde to maintain records of the data for up to three years.

I agree to these terms and would like to take part in the questionnaire

Yes ○ No ○

Please fill out the name of school where you work.

Please select the area of the school which best describes where you normally work.

- ○ Educational areas (e.g. classrooms, sports facilities)
- ○ Office & administration areas
- ○ Kitchen & catering areas
- ○ Various different areas (e.g. janitorial staff)
- ○ Other, please state:

Q1) Please rate from 1, very poor, to 5, very good, the consultation process that was undertaken for the design of the new school building, giving additional information in the comment box.

	1 Very Poor	2 Poor	3 Average	4 Good	5 Very Good	Don't know
Consultation process	○	○	○	○	○	○

Comment

Q2) Environmental aspects

Please rate from 1, very poor, to 5, very good, the following environmental aspects of the school building, giving additional information in the comment box.

	1 Very Poor	2 Poor	3 Average	4 Good	5 Very Good
Daylight					
Artificial light					
Temperature					
Air quality (ventilation)					
Acoustics					

Comment

Q3) General School Design

Please rate from 1, very poor, to 5, very good, the following aspects related to general school design, giving additional information in the comment box.

	1 Very Poor	2 Poor	3 Average	4 Good	5 Very Good
General layout of school building (ease of movement)					
Space in hallways					
Space in stairways					
General layout of external areas (ease of movement)					
WC - staff					
WC - children					
Office design					
Interior finishes (floor, ceiling wall etc)					
Storage					

Comment

Q4) Educational areas

Please rate from 1, very poor, to 5, very good, the following aspects related to educational areas, giving additional information in the comment box.

	1 Very Poor	2 Poor	3 Average	4 Good	5 Very Good
Classroom - size					
Classroom - furniture					
Classroom - general design					
Classroom - environmental aspects (lighting, air quality etc)					
Variety of education spaces (e.g. small group work & space for children with additional support needs)					
Assembly / dinner hall design					
Gym hall design					
Outdoor sports facilities					
External learning space					
Playground design (space, shape etc)					

Comment

If there is any other aspect of the school design you would like to comment on, please use this box.

You are not required to give your contact details, however this would greatly help the researcher by allowing her to contact you for further information regarding certain answers when required. You will be under no obligation to respond to any correspondence and you will not be identified in the study or any related publications.

Name

Email address

Telephone number (if preferred)

Thank you for taking the time to complete the "10 out of 10 for Scottish School Design?" questionnaire. It is hoped that your input will contribute towards creating school buildings which meet the highest standards of accessible design.

To submit your response Please click the 'next' button below

Please do not hesitate to contact the researcher if you have any questions regarding the study.

Miss Claire Hyland

Department of Architecture,
University of Strathclyde,
Architecture Building,
131 Rottenrow,
Glasgow, G4 0NG

Tel: 0141 548 3989
Email: c.hyland@strath.ac.uk

B4: Example of staff focus group format.

Circulation
Q) Is there an induction loop fitted to the entry system?

Q) Is button positioned high so that children cannot run away / set off the fire alarm?

Q) Have Safety guards over door hinges been put in place by the school or were they there?

Q) What is the purpose of the blue strip along the corridor?

Q) Do you have trouble locking the hydrotherapy pool door?

Q) What resources are upstairs & who uses them?

Classrooms
Q) Are classrooms on the north cold on winter?

Q) Are classrooms in the south too warm in summer?

Q) Do classrooms have hearing aid facilities?

Q) Do you ever need to block out the light in the classroom? If so, can you do this?

Q) Are acoustics ever a problem in the classrooms?

Q) Does the noise of other children playing in the playground disturb the surrounding classes?

Q) Can the temperature be easily adjusted in classrooms?

Q) Do windows open easily?

Q) Is there enough fresh air?

Q) Do staff have seating & desks in the classrooms?

Q) Does the colour coded flooring help orientation?

Q) Do you think children find it easy to find the exit door?

Q) Do you think children find it easy to find the seats / bump into seats?

Communal Areas
Q) Gymnasium – what makes it problematic to use, timetabling / where it is situated? Does this cause problems for all children or just for older children?

Q) Does the general purpose room get stuffy?

Q) Does the soft play room get stuffy?

Q) Do you think the children or staff mind the journey to the dinner hall?

Q) Is the dinner hall used at the same time as the primary?

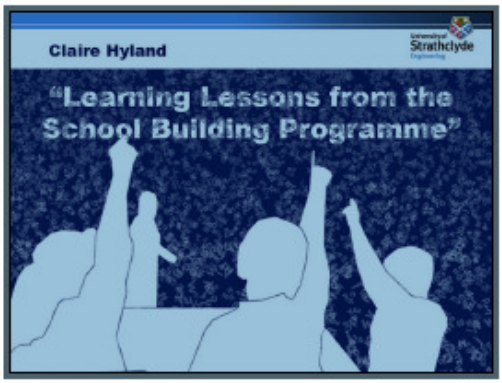
Q) Is using the larger dinner hall problematic?

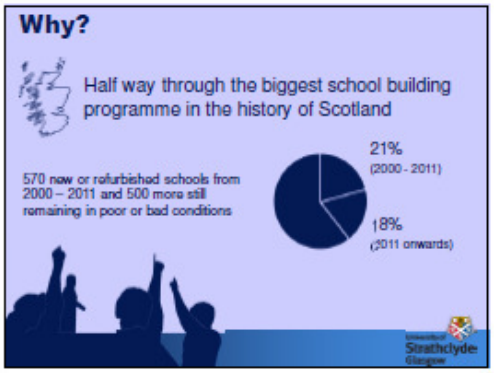
Q) Does the dinner hall become stuffy when full, either the main section or the smaller area?

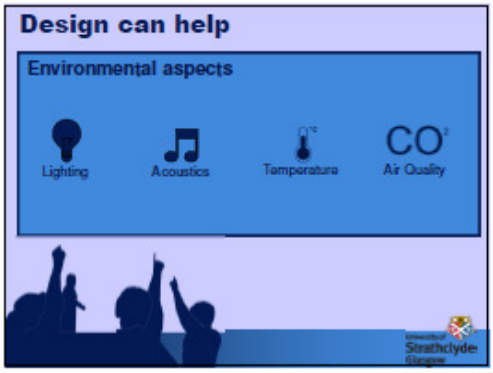
Q) How does the timetabling of the playground work?

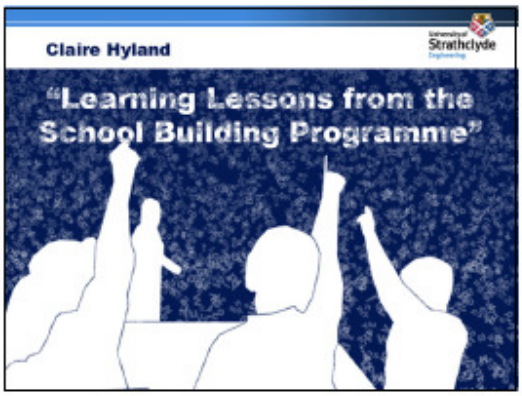
Design process
Q) Do you feel you should have been involved in the consultation process?

B5: Secondary school pupils presentation & focus group questions.









Aim

To cover the following areas:

- Journey to and from school
- Classroom
- Gymnasium
- Dinner Hall
- Circulation
- Social spaces

Journey to and from school

Q) Do you feel safe walking to and from school?
Q) Are there problems with overcrowding on the pavements when school comes out?
Q) Is it easy to cross the road?

Classroom
Noise:
Q) Do you find noise coming from other classrooms or the playground to be a problem in any of your classes?
Lighting control:
Q) Do you often have problems seeing the smart board or presentations because the light cannot be blocked out?
Temperature:
Q) Do you find that classrooms are either too hot or too cold?
Layout:
Q) Do you find the layout of the science classes means it is awkward to see the teacher or the board?

Gymnasium
Lighting control:
Q) Do you ever find that the daylight coming into the gymnasium bothers you?
Contrast of floor markings:
Q) Can you easily see the floor markings when you need to?
Noise of heating:
Q) Does the noise of the heating annoy you?

Dinner hall
Size of dinner hall:
Q) Is there enough room for you to have lunch in the dinner hall?
Size of furniture:
Q) Is the furniture too small for you to sit on?

Circulation
Corridor width:
Q) Do you feel the corridors are wide enough?
Absence of handrail on outer side of stair & absence of contrasting nosings:
Q) Do you feel safe coming up and down the stairs? If not why not?

Social spaces
Size of playground & indoor social spaces for secondary pupils:
Q) Do you feel there is enough room in the playground?
Q) Do you feel there is enough room inside the school for people to spend breaktime or lunchtime?

B6: Primary School Worksheet Sample.

"Learning Lessons from the School Building Programme"
Please fill in this worksheet about your school and ask if you need help with any of the questions.

Journey to school

Q1) Is it easy to cross all the roads on your way to and from school? Circle an answer.

Yes No

If you answered no what makes it difficult to cross?

_____

Classroom

Q2) Is it ever too warm in the classroom? Circle an answer.

Yes No

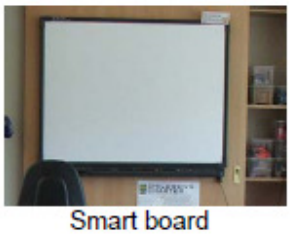
If you answered yes when is it too warm?

_____

_____

Q3a) Below there are pictures of some of the objects that are used in classrooms throughout your school. Circle objects that are easy to use and put a cross through objects that are difficult to use.

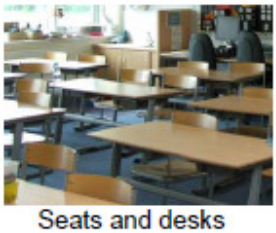

Sink


Smart board


Book shelves


Door


Computers


Seats and desks

Q3b) If you have put a cross through objects that are difficult to use please describe what makes these difficult to use in one or two sentences.

_____

_____

_____

Q4) Do you think there is enough room for everyone in your classroom? Circle an answer.

Yes No

Q5) Underline 3 words that you think best describe your classroom.

Noisy	Hot	Bright
Comfortable	Quiet	Stuffy
Airy	Cold	Dark
Crowded	Sunny	Uncomfortable
Big	Light	Small

Were there any words you thought of that did not appear? Write them below.

_____

Q6) Is it easy to concentrate and hear the teacher when you are sitting with a group in the corridor? Circle an answer.

Yes No

If you answered no what makes it difficult?

_____

_____

Q7) Think of something that you like about your classroom and also something you don't like…what are these things?

☺ **Positive**

_____

☹ **Negative**

_____

Sports Hall

Q8) Is it sometimes difficult to hear the teacher in the sports hall? Circle one of the options.

Yes No

If you answered yes what makes it difficult?

_____

Q9) Do you ever have problems seeing the ball when you are doing activities? Circle one of the options.

Yes No

If you answered yes what makes it difficult?

_____

Q10) Underline 3 words which describe what the sports hall is like when you are doing activities.

Noisy	Hot	Bright
Comfortable	Quiet	Stuffy
Airy	Cold	Dark
Crowded	Sunny	Uncomfortable
Big	Light	Small

Were there any words you thought of that did not appear? Write them below.

_____

Assembly / Dinner Hall

Q11) Can you think of your own three words to describe what it is like when the whole school is in the assembly hall? Write them in the spaces below.

_____

_____

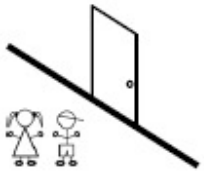
_____

Q12) Can you hear noise coming from other spaces when you are in an assembly?

Yes No

If you answered yes what kind of noise is it?

_____

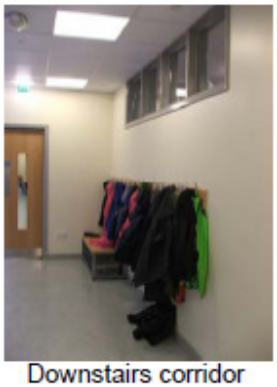


Moving around

Q13) Is it easy to find your way about the school? Circle one of the options.

Yes No

Q14a) Below there are pictures of different corridor spaces that can be found in your school. Are any of these spaces particularly nice or particularly uncomfortable to be in? Circle the spaces that are comfortable and put a cross through the spaces that are uncomfortable to walk through.



Downstairs corridor

Upstairs corridor

'Social Street' corridor

Route through assembly hall

Q14b) Describe why you picked these.

Outdoor spaces

Q15) Is there enough room for everybody in the playground? Circle one of the options.

Yes No

Q16) Do you recognise what your school looks like from above? Here is a picture of your school when it was being built.

Imagine you are the architect and can design the playground. Draw any changes or additions you would like to make to the playground and describe what these are.

Appendix C: Large-Scale Study

C1: Local authority sample interview format.

"Learning Lessons from the School Building Programme"

Council:

Name:

Claire Hyland c.hyland@strath.ac.uk

Objectives

- Find out the scope of issues covered in the accessibility strategies
- Gain an understanding of general perceptions of accessible design
- Understand the pre-design process of site selection, creation of brief and room data sheets
- The type of guidance which is made available for local authorities regarding accessible design
- Discover to what extent accessibility is considered in the school design process & throughout different stages of the RIBA plan of work
- Understand the design process used by each LA, focusing on the relationships between the LA, property developer, architect, and end user
- Discuss possible ways of including people with impairments in the design process
- Find out by which criteria good or best practice design is judged
- Source best practice examples of design processes and finished designs
- Gain access to architects who normally work with the LA on school design

Accessibility Strategy

1) Does the accessibility strategy include access audits of new and refurbished buildings as well as older building stock?
2) Who do you commission to carry out access audits of school buildings in order to inform the accessibility strategy?

Accessible Design Standards

1) Would you expect that compliance with Building Regulations would ensure accessible design?
2) Does a building which meets best practice standards of accessible cost more to design and build than one that meets minimum requirements?
3) Does meeting best practice standards of accessible design conflict with meeting best practice standards in other areas such as sustainable/environmental design?
4) Does the LA have a disability access officer?
5) What guidance is given from the Scottish Government with regards to accessible design and the design process?

6) Do you feel confident that other parties involved in the design process will give adequate consideration to accessible design and have the knowledge to create accessible spaces?
7) Are you concerned that by providing for one group of people with a specific type of impairment another group might inadvertently be disadvantaged?
8) Do you feel that when considering accessible design solutions there is a tendency to consider the needs of people with certain impairments more than others?

Pre-design

1) Who are the parties involved in the site selection?
2) What criteria are used for selecting a site?
3) Is the accessibility of the area surrounding the site considered?
3) Which parties are involved in compiling the brief and room data sheets?
4) Is accessibility considered in the development of the brief and room data sheets?

5) Are access consultants or similar consulted at this stage?
6) What size do you recommend for classrooms (e.g. sqm per child)?

Design Process

1) Please indicate which party of the design team has responsibility for each of the items below during the typical design process, e.g. whether it is the local authority, architect, landscape architect, developer, mechanical engineer etc.

Design aspect	Responsibility
Classroom size	
Classroom layout	
Provision of hearing aid facilities such as induction loops	
Daylight control system (blinds)	
Environmental control systems (artificial lighting, air ducts)	
Type of facilities provided, e.g. no of general purpose rooms, rooms for additional learning support	
Signage specification	
Furniture specification	
Interior finish specification	
Secure entrance system	
Number of vertical circulation towers	
Number of WCs	
WC specification (e.g. colour of sanitary fittings)	
Playground design (zoning etc)	

Exterior ground surface material	
Street furniture specification, e.g. bollards	

2) Does the local authority have special advisors who liaise with the architect concerning issues such as subject specific classroom layout etc?
3) Does the responsibility for the design aspects above change depending on the procurement method?
4) Does the procurement method (e.g. traditional, design & build, PFI/PPP) impact on the local authority's ability to ensure best practice standards of accessible design are met? (e.g. coherence of changes made during construction stage of projects, specification of items such as furniture)

Finished Project

1) What are the criteria for benchmarking good and best practice?
2) Are there any examples of best practice accessible design from the school projects in which you have been involved?
3) Are access audits or Post Occupancy Evaluations (POE) normally undertaken of new and refurbished buildings?

Resources, skills & knowledge

1) What would help you and the rest of the design team to meet best practice standards of accessible design in schools? Please tick (a maximum of five) options which you would find most helpful.

Ability to involve people with impairments in the design process	☐
Continuing Professional Development (CPD) events in accessible design	☐
Workshops events focusing on accessible design	☐
Take a university course in accessible design	☐
Use consultants on a project specific basis	☐
Accessible design being given more priority by other members of the design team	☐
A BREEAM-type standard for accessible design	☐
Gain feedback on completed projects through Post Occupancy Evaluation (POE) or access audits	☐
Join a community of practice - sharing knowledge and experience with others interested in accessible design	☐
More time to consider accessibility at certain stages of the project, please indicate which stages:	☐
Other, please specify:	☐

2) In which particular areas would you like to advance your knowledge and skills in accessible school design? Please indicate all of the subject areas you would be interested in.

Topic	
Introduction to accessible design	☐
Equality and disability legislation, regulations & standards	☐
Participatory design involving people with impairments	☐
Incorporating accessibility in the brief	☐
Classroom design	☐
Colour & materials	☐
Lighting, acoustics & environmental aspects	☐
Circulation through buildings	☐
Exterior areas (e.g. playground, school grounds)	☐
Auxiliary aids (e.g. hearing aid induction loops, wheelchair tracking)	☐
Providing solutions which meet the needs of specific user groups	☐
Other, please specify:	☐

New & refurbished schools

- Source best practice examples of design processes and finished designs
- Gain access to architects who normally work with the LA on school design

1) Are there architects practices the LA has worked with on various occasions and would it be possible to contact these architects in order to identify best practice examples?

2) The researcher would like to send a short questionnaire to the Head Teachers at new and refurbished schools. Is it possible to obtain a list of schools which were built after 2003 when Local Authorities began to prepare and implement accessibility strategies, as required by the “Education (Disability Strategies and Pupils' Educational Records) (Scotland) Act 2002”?

C2: Electronic questionnaire to head teachers.

Default Question Block

"Learning Lessons from the School Building Programme"

This questionnaire contains 8 questions and should take no longer than 10 minutes to complete. Comment spaces are provided after each question if you wish to give additional information.

This investigation is being conducted as part of a PhD in Architecture by Claire Hyland at the University of Strathclyde, Glasgow. The study aims to determine the performance of accessible design in new or refurbished school buildings in order to improve future school design for pupils, staff, parents and the community. The research includes people with cognitive, sensory and physical impairments, and additional support needs. All aspects of building design are being considered, including the school grounds, and environmental aspects such as heating, lighting, acoustics and air quality.

Before continuing, please take a few moments to read and acknowledge the following terms:

I understand that I am under no obligation to participate in this questionnaire. I can request for my data to be withdrawn from the study and do not have to respond to all questions.

I understand that all information I give will be treated with the utmost confidentiality and that my anonymity will be respected at all times.

I give permission to the University of Strathclyde to maintain records of the data for up to three years.

I agree to these terms and would like to take part in the questionnaire

Yes ○ No ○

Please complete the following details. This information will only be used if you want to withdraw your data from the study at a later date.

First name
Surname
Name of school

Please fill out the following details about the school in which you work.

Please describe the type of school in which you work (mainstream/special, primary/secondary) and

indicate whether it is a completely new building, a refurbished older building or a mix of both.

	New building	Refurbished building	Mix
Type of school			

Please indicate the approximate year in which your school building opened.

Please indicate in which of the 7 City Council areas of Scotland your school is situated.

- Aberdeen City Council
- Dundee City Council
- City of Edinburgh Council
- Glasgow City Council
- Highland Council
- Perth & Kinross Council
- Stirling Council
- Other, please specify:

Q1) Please rate the consultation process that took place with each group of school building users during the building design, from 1, very poor, to 5, very good. If NO consultation process was undertaken please tick ´none´ & if you don't know because for example you joined the school at a later date, please tick 'don't know'.

	None	1 Very Poor	2 Poor	3 Average	4 Good	5 Very good	Don´t know
Consultation with Head Teacher							
Consultation with teaching staff							
Consultation with other staff (such as admin, catering)							
Consultation with pupils							

Comment

Q2) Please rate from 1, very poor, to 5, very good, the overall accessibility of each of these three

areas.

	1 Very Poor	2 Poor	3 Average	4 Good	5 Very Good
Educational areas (classroom, sports hall etc)					
Communal areas (corridors, dinner hall, staff accommodation etc)					
Outside (playground, sports field, surrounding area etc)					

Comment

Q3) Considering the use of spaces by people with physical, cognitive or sensory impairments or additional support needs, please rate from 1, very poor, to 5, very good, each of the following features of the school.

Educational areas

	1 Very Poor	2 Poor	3 Average	4 Good	5 Very Good
Classroom - general layout					
Classroom - space					
Classroom - furniture					
Classroom - environmental aspects (lighting, acoustics etc)					
Classroom - interior finishes (floor, wall etc)					
Sports hall					
Variety of educational spaces					
Hearing aid facilities such as induction loops					
Provision of space for children with additional supports needs					
General storage space					

Communal areas

	1 Very Poor	2 Poor	3 Average	4 Good	5 Very Good
Circulation (corridors, stairways, doors etc)					
Assembly hall					
Dinner hall					
Dining hall kitchen					
Office spaces					
WC - staff					
WC - children					
Furniture in communal areas					
General storage space in communal areas					
Hearing aid provision such as induction loops					
Interior finishes of communal areas (floor, wall etc)					

Outside areas

	1 Very Poor	2 Poor	3 Average	4 Good	5 Very Good
Playground					
Educational areas (gardens, sport field etc)					
School grounds (pavements, level changes, car park etc)					
Surrounding area (pavements, crossings, transport connections etc)					

Comment

Q4) Has anyone (e.g. staff, parents, pupils, wider community) ever commented on particular features making access within and outwith the building easier or more difficult? If so, please give as much detail as possible in both categories if required.

Features which make access more difficult:

Q5) How confident are you that the school building would not present any problems if you wished to enrol a child, or employ a member of staff, with an impairment or additional support needs? Please rate from 1, not at all confident (there would be complications), to 5, very confident (there would be no complications) and detail which aspects of the school you think would present problems in the comment box provided.

1 Not at all confident	2 Not very confident	3 Fairly confident	4 Confident	Very confident
○	○	○	○	○

Comment

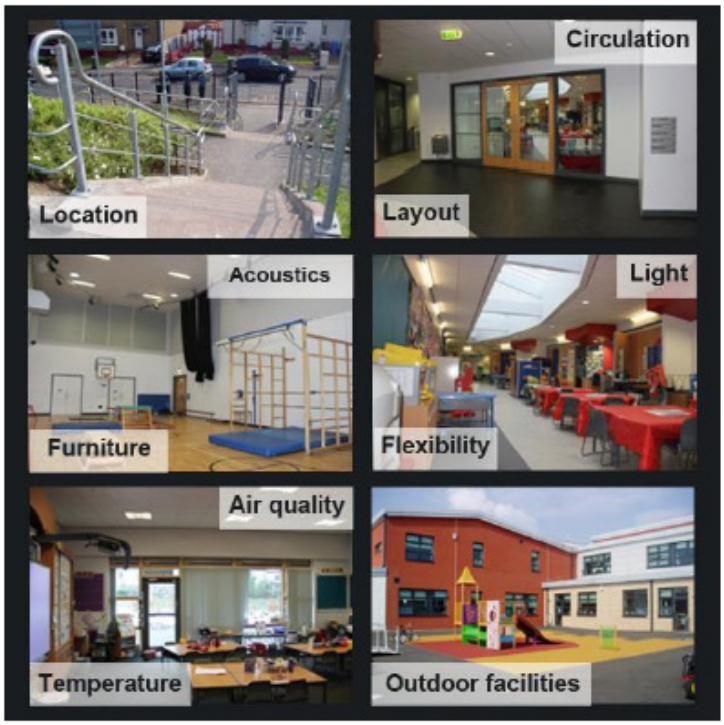
Q6) From the list below please indicate what you think would help to improve your ability to ensure accessible design in schools, selecting all which apply.

- ☐ Involvement of people with impairments in the design process
- ☐ Continuing Professional Development (CPD) events in access related topics, such as building management
- ☐ Workshop events focusing on access related topics, such as building management
- ☐ Take a university course on access related topics, such as building management
- ☐ Schools collaborating with universities on specific projects (both new schools & improvements to existing schools)
- ☐ Users giving feedback on performance of existing buildings
- ☐ Join a community of practice - sharing knowledge and experience with others interested in access related topics
- ☐ Other, please specify:

Comment

C3: Electronic questionnaire to architects.

Default Question Block



Creating Accessible Schools

This questionnaire should take no longer than 5-10 minutes to complete. Most questions are multiple choice but comment boxes are provided if you would like to give more detail to your answer.

Claire Hyland: I am a third year PhD student in the Department of Architecture at the University of Strathclyde.

Aim of study: To determine the strengths and weaknesses of accessible school design, considering the needs of people with sensory, cognitive & physical impairments & children with additional support needs.

Accessible Design: Includes many factors, from the building location & general layout to light, air quality, material finish & space to move around.

Schools included: Primary and secondary. Mainstream and special schools. All areas including educational areas, offices, kitchens & WCs.

Your contribution: Take 10 minutes to tell me what you think would help you to design more accessible spaces. I am also looking for good examples of accessible design so if you think you would like to contribute your expertise in this area please leave your details at the end of the survey.

Terms & conditions

I understand that I am under no obligation to participate in this questionnaire. I can request for my data to be withdrawn from the study and do not have to respond to all questions. I understand that all information I give will be treated with the utmost confidentiality and that my anonymity will be respected at all times (your name will not be published). I give permission to the University of Strathclyde to maintain records of the data for up to three years.

I agree to these terms and would like to take part in the questionnaire

Yes ○ No ○

Please complete the following details - this data will be kept confidential.

First name

Surname

Practice

Q1) To what extent was accessible design covered as part of your training / education? Please rate from 1, not covered at all, to 5, covered in great detail.

1 Not covered at all ○ 2 Partially covered ○ 3 Covered ○ 4 Well covered ○ 5 Covered in great detail ○

Comment

Q2) Do you find it easy to source and specify items from product suppliers which will meet best practice accessible design guidelines (e.g. sanitary fittings, ironmongery, interior finishings, colours, ground surface materials, street furniture)?

Easy - information is normally given about accessible design ○ Could be better - information is only sometimes given about accessible design ○ Difficult - Information is not normally given about accessible design ○

Comment

3a) Do you feel that the emphasis placed on accessible design varies depending on the local authority that you are working with?

Yes, it tends to vary ○ Sometimes ○ No, it is consistent ○ I only have experience of one local authority - proceed to question 3. ○

3b) If so is there a local authority that you feel is more proactive in ensuring best practice standards of accessible design are met? How do they do this?

Comment

4) What form of procurement has been used on the school projects you have been involved with? Please tick all that apply.

- [ ] Traditional
- [ ] One Stage Design & Build
- [ ] Two Stage Design & Build
- [ ] Management Contract
- [ ] Contractor-led Contract
- [ ] Other

Comment

Q5) Do you usually receive feedback regarding accessible design standards in completed projects? Please tick the option that most closely fits your answer.

- ( ) Yes - we normally receive feedback regarding accessible design for most projects
- ( ) We receive feedback but it is not relevant to accessible design
- ( ) We sometimes receive feedback regarding accessible design but not often
- ( ) Never - we have not to date received feedback regarding accessible design

Comment

Q6) Based on your experience, what do you think are the most important factors impacting on your ability to meet best practice standards of accessible design? Please rate the following from 1, not at all important to 5, extremely important.

	1 Not at all important	2 Somewhat unimportant	3 Somewhat important	4 Very important	5 Extremely important
Type of project (e.g. new build / refurbishment)					
Procurement method (e.g. traditional, design & build)					
Priorities of individual education authorities					
Involvement (of architect) throughout the whole project (e.g. site selection, development of the brief, construction stages).					
Conflict with other areas of best practice design (e.g. environmental standards)					
Project budget					
Time to consider accessible design (read guidelines, research design options)					
Confidence in my general knowledge of accessible design (through education, training)					
Feedback from building users					
Involvement of people with impairments in the design process					
Other, please specify:					

Comment

Q7) The Scottish Building Regulations highlight the importance of considering inclusive design from as early as possible, and as an integral part of, the design process, as well as the benefits of including potential building users. At the moment does a framework exist which allows you to easily do this?

- Yes, and it works well. Please detail:
- Yes, but it could be better. Please explain:
- No - I don't think it's necessary.
- No - I think it would be helpful.

Comment

Q8) To your knowledge has the Soft Landings Framework been used in any of the educational projects in which you have been involved?

Yes	Sometimes	No

Comment

Q9) What would help you and the rest of the design team to meet best practice standards of accessible design in schools? From the list below please indicate the options which you would find most helpful, selecting a maximum of 5.

- ☐ Educational events (CPD, workshops, university course) in accessible design
- ☐ Join a community of practice, sharing knowledge and experience with others interested in accessible design
- ☐ Ability to involve people with impairments in the design process
- ☐ More involvement (of architect) during the entire project (e.g. consultation, development of the brief, construction phase)
- ☐ More time to consider accessibility at certain stages of the project (please indicate which stages in the box provided)
- ☐ Use consultants on a project specific basis
- ☐ Accessible design being given more priority by other parties involved in the design process
- ☐ Guidance on specification (of materials, furniture, colour etc.) to meet best practice standards of accessible design
- ☐ A BREEAM-type standard for accessible design
- ☐ One person or party being responsible for ensuring best practice standards of accessible design are met
- ☐ Feedback on accessible design in completed projects e.g. POE or access audits
- ☐ Other, please specify:

Comment

Q10) In which particular areas would you like to advance your knowledge and skills in accessible school design? From the list below please indicate the areas you would be most interested in, selecting a maximum of 5.

- [ ] Introduction to accessible design
- [ ] Equality and disability legislation, regulations & standards
- [ ] Participatory design involving people with impairments
- [ ] Incorporating accessibility in the brief
- [ ] Classroom design
- [ ] Colour & materials
- [ ] Lighting, acoustics & environmental aspects
- [ ] Circulation through buildings
- [ ] Exterior areas (e.g. playground, school grounds)
- [ ] Auxiliary aids (e.g. hearing aid induction loops, wheelchair tracking)
- [ ] Providing solutions which meet the needs of specific user groups, e.g. visually impaired, hearing impaired, children with additional support needs etc.

Other, please specify

Comment

If you would like to comment on any other aspects not outlined in this questionnaire, please do so in the comment box provided below

As part of this project the researcher would like to gain access to examples of best practice accessible design or positive experiences during the design process (e.g. involvement of people with impairments, access panels etc). Would you be willing to discuss this with the researcher? If so, please fill out your relevant contact details.

Yes - I am interested ○ No thank you ○

Please enter your contact details in order to be contacted by the researcher.

First name	
Surname	
Practice	
Email address	
Telephone number	

Thank you for taking the time to complete the "Creating Accessible Schools" questionnaire. It is hoped that your input will contribute towards creating school buildings which meet the highest standards of accessible design.

Please do not hesitate to contact the researcher if you have any questions regarding the study.

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