THE UNIVERSITY of EDINBURGH
Moray House School of Education and Sport

Shared Learning Spaces

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# Additional Support for Learning:

## a study of educators' experiences of adapting learning spaces at four education settings in Edinburgh

# FULL REPORT

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University of Edinburgh, November 2023

# Contents

**HOW TO CITE THIS REPORT**

This report was written by Dr Hannah GRAINGER CLEMSON on behalf of the University of Edinburgh.

Any reference to this report, or any part of the text, should include the following:

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Authors should also give the source (webpage link) from which they obtained a copy, if appropriate.

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# EXECUTIVE SUMMARY

**Context**

Over the past ten years, Scottish education policy has grappled with the challenges of inclusion and giving every child the best possible start in life through their Early Years and school learning. This has involved significant government investment in education buildings, some innovation in learning environments and tools, and a focus on health and well-being, particularly since the COVID-19 restrictions.

Organisations and working groups have contributed to the movement by creating frameworks and 'toolkits' to support educators in their reflection and planning. Funded partnership projects have also made the important contribution of bringing together representatives from different disciplines, including universities, to guide schools and Early Years (EY) settings through a process of design and adaptation. Whilst educators have come to new understandings of learning environments and tools, and are adapting their approaches in this post-pandemic context, there remains a significant lack of research in Scotland into how the attributes of a learning space – either indoors or outdoors – influence the teaching and learning process.

This study makes a contribution to education policy and practice by exploring the recent experiences of educators in designing and adapting learning spaces in one local authority. It builds on previous research in the field by responding to the question, **How can the adaptation of school and Early Years (EY) spaces support the learning of pupils with additional needs?**

**Main Findings**

- The national policy *Getting It Right For Every Child* (GIRFEC) states that all children should be and feel Safe, Healthy, Achieving, Nurtured, Active, Respected, Responsible, and Included. The evidence generated by this study shows that the design and adaptation of learning spaces in school and EY settings play an important role in achieving each of these holistic well-being principles that were created for practitioners and organisations.
- The local authority, the EY setting, and schools in this study present a positive example of how the *Learning Estates Guidelines* can work in practice, although educators encounter various challenges along the way. Learning space design and adaptation

processes benefit from ongoing collaboration, including all education stakeholders, and following a cycle of empathetic design, testing, and reflection.

- Educators describe the positive impact of particular elements of learning spaces on pupil engagement and well-being, including that of Additional Support Needs (ASN) pupils. These elements include the learning environment - the buildings, and the style and functioning of the décor, light and sound, as well as the outdoor environment – and the learning tools: the furniture and its layout, and the portable items that are used in learning tasks.
- Adapting environments and providing learning tools does not in itself achieve the pedagogical and social aims of EY settings and schools: the effectiveness of environments and tools depend on the way they are embedded in learning (the pedagogical process), the relationships between educators and pupils, and the culture of the school or setting.
- The capacity of educators is crucial. Adapting learning spaces for pupil needs must look to supporting educator competence and confidence, coupled with adequate resources and the autonomy to test different approaches with pupils in a continuous cycle of change as part of ongoing school improvement.
- This study offers important insights into specific examples of learning space practice in Scotland, but where there is a clear lack of evidence from research to inform the landscape nationally and internationally. This is another challenge worth addressing in the future.

**Recommendations for stakeholders:**

**EDUCATORS may consider:**

- Working with colleagues to test small adaptations of space, considering the blend of spatial and pedagogical approaches, as well as different sensory elements;
- Actively involving pupils in the design and adaptation of learning spaces, including discussing the rationale for different options, and giving them some choice of environments or tools during learning tasks;
- Designing and creating learning spaces that are agile, including hallways and corridors, and have the flexibility for multiple activities as well as to be redesigned when needed;
- Both indoor and outdoor spaces, and bridging the two (biophilic design), and ;
- For those with more experience in learning space design, sharing expertise with colleagues and local networks.

**SCHOOL AND EARLY YEARS SETTING LEADERS may consider:**

- Dedicating staff peer observation and discussion time to the specific topic of learning spaces;
- Ways to ensure that the whole school community is actively included in design processes, including discussing the rationale for different options and making clear links between pedagogical theory and practice;
- Making sure that staff can take some ownership of the learning spaces, as well as appreciating the transition to new staff occupying those spaces;
- Appealing to the local community to offer ideas or resources for learning space adaptation, as long as they conform to fire and safety regulations and are of a high specification for the use of pupils in education settings.

**LOCAL AUTHORITIES (PROFESSIONAL LEARNING, ASN SUPPORT, ESTATES TEAMS) may consider:**

- How best to support professional learning on learning spaces across all schools and EY settings through partnerships and peer sharing of expertise and experiences;
- Providing sustained design guidance and construction support across all schools and EY settings, recognising that additional resources and expectations can be a burden on educators' workloads and that full implementation processes can last years;
- Support (guidance, contacts) for the cost-effective procurement of items by schools and EY settings.

**POLICY MAKERS may consider:**

- Including more explicit references to learning space design and adaptation in future policies regarding inclusion, well-being, and educator professional development;
- Making funding available for the generation and sharing of evidence about learning space design and adaptation.

**RESEARCHERS may consider:**

- Building on this study to investigate a similar topic in other contexts and regions, or using a complementary research methodology such as observation, large-scale survey, or action research. This will help to address current gaps in evidence relating to learning spaces.

# INTRODUCTION

## 1.1 Background

In November 2021, European education ministers adopted a Council Recommendation on blended learning approaches for high-quality and inclusive primary and secondary education.[1] This international concern for improving the use of learning environments and tools had been initiated during the COVID-19 pandemic restrictions but with an eye to the future on how school pupil engagement and attainment in learning could be better supported, along with their social and emotional development, and their health and well-being. Inclusion of pupils with additional learning needs, was identified as a prevailing challenge but one that may be addressed by paying attention to learning environments and tools.

In recent years, researchers at the University of Edinburgh have been investigating the use of various learning environments and tools in primary and secondary schools in different Scottish local authorities. Underpinning these projects is the idea that co-creating agile, shared learning spaces that are physically, cognitively and socially 'fit for purpose', can encourage a sense of value and connectivity that can enhance learning and promote health and well-being.

Despite this work, there remains a significant lack of research in Scotland into how the attributes of a learning space – either indoors or outdoors – influence the teaching and learning process. This is both surprising and troubling, considering the increase in popularity of outdoor education and the re-engagement with learning space design following the COVID-19 restrictions. The lack of robust research was noted internationally[2] and continues to be an area of need if Scottish education is to maintain its aims for inclusion and innovation in education.

This study makes a contribution to this field, focusing on one local authority and the recent experiences of educators as they navigate learning space design in the current social and economic climate.

[1] https://education.ec.europa.eu/news/blended-learning-building-more-resilient-education-and-training-systems

[2] See UNESCO (2012) and Imms, Cleveland & Fisher (2016)

## 1.2 Shared aims of the research in a knowledge exchange partnership

This study is a partnership between the City of Edinburgh Council – Inclusion Supports and Sustainable Development Division - and researchers at the University of Edinburgh, with the participation of headteachers, teachers, Early Years practitioners, learning support and well-being specialists, and an interior designer and manager specialising in educational settings.

The shared aim is to deepen our collective understanding about the design process, tools and practices needed to create more inclusive and supportive formal education (school) settings for pupils with Additional Support Needs.


*Figure 1 - Participants in the knowledge exchange partnership working on learning space design*

***University of Edinburgh***

Moray House School of Education and Sport at the University of Edinburgh is home to a number of researchers who are interested and experienced in the design and use of learning spaces, including in Early Years and school settings. ***Shared Learning Spaces***[3] is an initiative that seeks to connect schools and the university in partnership for the exploration and development of practices which actively benefit pupils, teachers, student teachers and other educators. Their studies have taken different focal points, including STEM, garden learning, well-being, and pupil participatory design, but have not previously focused on pupils with Additional Support Needs (ASN).

The work by the *Shared Learning Spaces (SLS)* research team has led to the creation of different educator (practitioner) tools, with the aim of supporting educators in the learning space design process. The *Shared Learning Space toolkit* (see section 1.3.2 below and Annex) is the most recent, helping learners and educators to collaborate on the co-design of educational spaces. Since it was starting to be used by educators in the local area, an opportunity arose to further investigate its usefulness, alongside other tools previously developed for educators across Scotland.

[3] https://blogs.ed.ac.uk/sharedlearningspaces/

The *Shared Learning Spaces* team participated in a global study on learning spaces led by the University of Melbourne and uniting stakeholders and researchers across 19 countries. This large-scale enterprise encouraged the development of the ***Scottish Alliance***, an interdisciplinary steering group of academics, educators, and industry professionals who recognise the benefit of cross-sector knowledge exchange and have been identifying key strengths and areas for learning environment development across Scotland. The alliance is led by Professor Do Coyle and the SLS research team and includes representatives from Scottish Futures Trust, NORR Architects, Steelcase, Ecophon, two Edinburgh schools, the City of Edinburgh Council, Midlothian Council, and Aberdeenshire Council.

***City of Edinburgh Council***

The City of Edinburgh Council recognise that the Educational Landscape has changed significantly over recent years, and Covid-19 has provided the opportunity to reflect, renew, adapt and change. With the desire to include nearly all learners in mainstream education, schools and local authorities across Scotland are working hard to ensure that schools are ready to support the needs of all learners. The role of well designed, agile learning spaces has started to evolve across the globe, and within City of Edinburgh Council, there has been an ongoing investment in new build and renovation work across the Learning Estate, involving educators and pupils in that process.

The City of Edinburgh Council operates a Devolved School Management model where most education funding is given to schools and managed by the Head Teacher with support from the School Senior Leadership Team. However, many services remain centralised, including: the management of constructing new school buildings; the adaptation of existing buildings; repairs and maintenance; and assisting schools with procurement to upgrade and adapt their spaces with furniture, fittings & equipment. Whilst Scottish Building Regulations inform many of the architectural considerations and standards of newbuilds and alterations to existing spaces, there are numerous other considerations in learning space design demanding time, money and expertise. In response, this research set out to discover what approaches in different building types might have a significant positive influence on pupil learning and development for a low financial cost.

Interest in the research topic was further inspired by an observation, made by City of Edinburgh Council (Corporate Health & Safety Resources team), that the number of injuries to primary and special school staff had increased in 2016. They responded by refurbishing some rooms at a number of school sites, including a pilot space at a special school that informed the interior design of their new building, paying particular attention to acoustics, colour palette and soft furnishings that might provide a more calming, inclusive and accessible environment. Whilst the number of physical incidents involving staff supporting children with additional support needs decreased during 2017, it was not possible to say how far the refurbishment had influenced this, accepting that many different factors were probably influential.

## 1.3 The Scottish policy and practice landscape: learning spaces, inclusion, and well-being

*This section is not an exhaustive discussion of learning spaces and their impact on pupil learning but provides a simple overview of recent developments in Scotland relating to the main study topics.*

### 1.3.1 Learning spaces and buildings fit for purpose

A marked shift in learning spaces policy and investment began just under fifteen years ago with the 2009 Scottish Government and CoSLA joint School Estate Strategy, ***Building Better Schools***, that included a set of guiding principles (updated in 2019, see box below). Scotland' ***Schools for the Future*** programme was launched the same year with an initial plan for 55 new or refurbished schools. This grew over the years until 117 such school buildings had been delivered by 2021 with a total budget of £1.8bn.

The objective of the programme was to create good quality, well-designed and sustainable schools, and to challenge local councils in how they set and managed their design briefs. Their measure of success was that, according to School Estates 2020 statistics, the proportion of schools reported as being in good or satisfactory condition had increased to 89.9%, up 29% since April 2007.[4] The £5m programme, ***Inspiring Learning Spaces***, was added in 2014, enabling 21 councils to work on creative and ambitious projects.[5]

Scotland's **Learning Estate Strategy Guiding Principles** (2019)[6]:

1) Learning environments should support and facilitate excellent joined up learning and teaching to meet the needs of all learners;

2) Learning environments should support the wellbeing of all learners, meet varying needs to support inclusion and support transitions for all learners;

3) The learning estate should be well-managed and maintained, making the best of existing resources, maximising occupancy and representing and delivering best value;

4) The condition and suitability of learning environments should support and enhance their function;

5) Learning environments should serve the wider community and where appropriate be integrated with the delivery of other public services in line with the place principle [shared understanding and collaborative approach];

6) Learning environments should be greener, more sustainable, allow safe and accessible routes for walking, cycling and wheeling and be digitally enabled;

7) Outdoor learning and the use of outdoor learning environments should be maximised;

8) Good consultation about learning environments, direct engagement with learners and communities about their needs and experiences, and an involvement in decision making processes should lead to better outcomes for all;

9) Collaboration across the learning estate, and collaboration with partners in localities, should support maximising its full potential; and finally,

10) Investment in Scotland's learning estate should contribute towards improving learning outcomes and support sustainable and inclusive economic growth.

[4] https://www.gov.scot/news/ten-year-school-plan-delivered/
[5] https://ltl.org.uk/wp-content/uploads/2022/05/scotlands-schools-for-the-future.pdf
[6] https://www.gov.scot/publications/scotlands-learning-estate-strategy-connecting-people-places-learning/pages/5/

Taking the City of Edinburgh's own approach as an example, a designer needs to consider the following:

- Building architecture, including whether the interiors have smaller enclosed rooms with high ceilings (typical of 19th and early 20th century buildings) or open spaces (more typical of mid-late 20th century buildings), and accessibility;
- Specifications for structural items such as walls and floors, finishes that contribute to the style, for example biophilic features (aspects of nature), and their durability with constant use;
- Workstations (tables, side worktops, seating, teacher area), storage (cupboards, bins, trays, shelves), specific enclosures or items for activities (reading cubbyhole or corner, earth or sand pit, arts and crafts); and the layout of these within rooms/open spaces;
- Other shared spaces, such as library, kitchen, laboratory, outdoor, cloakrooms, general purpose spaces;
- Communication of information in classrooms and other spaces, including AV screens, interactive whiteboards, noticeboards, Picture Exchange Communication Systems[7], and places to display pupil creative work.

The Learning Estate Guiding Principles advocate different stakeholder input into the design development of learning spaces. They encourage a process whereby educators and learners have more autonomy and opportunity to co-design and be involved in the specification of decoration finishes, furniture, and fittings to improve the learning space according to their own needs and the needs of their community in the future.

***Future Schools Edinburgh*** is a collaborative project led by the Learning Estates Planning Team and part of a broader vision to holistically develop all types of space, from Early Years to adult community. The goal is to put into practice new classroom designs and new aids to learning, with wellbeing, inclusive and accessibility being key considerations. The project is founded on the belief that learning spaces can only be effectively designed with the participation of all stakeholders. It actively incorporates the knowledge and skills of interior designers, architects, pedagogical experts, teachers, learners and parents/carers to reflect on current school environments and pilot alternative ways of using and adapting learning spaces. Many of the specific design projects and initiatives, such as the creation of learning space environment vision documents to support teachers in pupils in the design process, have been award-winning and recognised at international level.

### 1.3.2 Learning space collaborative work by educators and evidence of the impact on learners

Whilst there is anecdotal evidence (network meetings, informal discussion, online posts) of the challenges and positive influences of learning space design and adaptation, there are relatively few recent systematic collections of school staff experience across different settings. The Edinburgh local authority does conduct valuable post-occupancy reviews on newbuilds and lessons learned after projects, although this is tied to

[7] The Picture Exchange Communication System®, or PECS®, allows people with little or no communication abilities to communicate using pictures. See https://nationalautismresources.com/the-picture-exchange-communication-system-pecs/

the specific school or context of the work. Nationally, ***Learning Places Scotland*** is an annual conference, exhibition and awards ceremony for industry partners.[8]

The competence demands placed on educators are high and, amongst its six pages of detailed requirements, the **General Teaching Council of Scotland Professional Standards for Teachers** (2021)[9] makes specific reference to areas included in this study:

- Understanding health and wellbeing and the importance of positive and purposeful relationships to provide and ensure a safe and secure environment for all learners and colleagues within a caring and compassionate ethos;
- Having a knowledge and understanding of classroom organisation, learning environment and structures; outdoor learning, including direct experience of nature and other learning within and beyond school boundaries;
- Having a knowledge and understanding of inclusion and additional support needs;
- Planning learning (effectively to meet learners' needs) that is creative, sustainable and uses available resources in varied and dynamic learning environments;
- Actively engaging children and young people in decision-making about their education.

This does not automatically mean that all educators are knowledgeable and confident in learning space design.

A wide range of books, websites, and courses, published or hosted in countries around the world, offer advice to educators on how to design their learning spaces and Scotland is no different. Aside from the Learning Estate Strategy Guiding Principles (see section above), two other approaches or sets of principles have been influential in the recent work with schools in the Edinburgh local authority, although their use has not been systematically surveyed.

**Architecture Design Scotland** (A+DS) is an executive non-departmental public body (NDPB) funded by Scottish Government which provides exhibitions, events and an education programme for the public as well as advice, resources and support to practitioners in the built environment sector. In 2017, they worked with Scottish Futures Trust to capture some lessons learned from the *Inspiring Learning Spaces* initiative. They found that when teachers and learners worked with specialists (architects, interior designers) from the beginning of the design process, they created spaces that suited the needs of the users, but also built confidence, enthusiasm, and a sense of ownership. Teachers discovered that their practical approach to learning was shifting - less directing from the 'front' of the classroom and more facilitating exploration and group work by learners. Where spaces were agile and could be easily adapted for different types of tasks, learners were able to take control of their own learning.[10]

In 2019, a prototype of a symbolic language was created as a way of supporting the design of agile learning spaces. A+DS published the original design of the toolkit[11] alongside with examples from case study schools of how this functioned as a process with their 'Test of Change' model (Plan, Do, Act, Study).[12] In early 2020 the City of Edinburgh Councils Interior/ Architectural Designer was seconded to A+DS and the

[8] https://www.learningplaces.scot/home
[9] https://www.gtcs.org.uk/wp-content/uploads/2021/09/standard-for-full-registration.pdf
[10] https://www.ads.org.uk/resource/inspiring-learning-spaces
[11] https://www.ads.org.uk/resource/connecting-people-places-learning
[12] https://www.ads.org.uk/sites/default/files/2023-03/CaseStudy-Studies-in-Shared-Learning-Spaces-2023.pdf

outcome was the creation of a common language of learning space design. The purpose of this tool is to asses, co-design and use agile and shared learning space, combining pedagogical, sustainable and wellbeing considerations modelled on the Scottish Governments National Performance Framework with kindness as its core value.

A&DS then commissioned the University of Edinburgh, working with the Council designer and a local headteacher, to further refine and test the language and proof of concept. The result was a ***Shared Learning Spaces Design Toolkit*** with three dimensions: typologies, values, and design factors.

### Shared Learning Spaces Design Toolkit

This is a resource to support learners and educators to collaborate on the co-design of educational spaces.

It was designed in a partnership project by the University of Edinburgh, Architecture Design Scotland (A+DS), and City of Edinburgh Council to align with existing Scottish Government guidance and educational policies such as GIRFEC Wellbeing (SHANNARI) principles, Curriculum for Excellence, Learning Estate Suitability reporting and the Trauma Informed Practice Toolkit principles.

The Learning **Typologies** refer to different 'types' of learning that are fundamental to schooling. They provide symbols which signify different spaces and can be used to map out how learning spaces can promote different kinds of learning.

The Learning Design **Values** are the values that underpin design for learning in these spaces: Kindness, Inclusivity, Ownership, Sharing, Sustainability, Uncertainty, Wellbeing.

The Learning **Design Factors** are elements such as safety, accessibility and fixtures that must be considered when assessing, adapting and renovating learning environments. They raise awareness of what makes learning spaces designs suitable and fit-for-purpose and remind users of the need to consider factors which are values-driven and promote equality for learning. They are aligned with the factors in Scottish Governments Suitability Assessment reporting framework.

| Name | Symbol |
|---|---|
| **Campfire** (Focused, scaffolded input) | |
| **Cave** (Independent, reflective learning) | |
| **Watering Hole** (Collaborative learning) | |
| **Fields** (Experiential learning) | |
| **Journey to the Mountain Top** (Celebratory, shared learning) | |

In 2019-2022, the *Shared Learning Spaces* research team designed and managed a number of projects with schools across the country, with the aim of supporting pupil and educator experimentation with learning spaces and opening up the 'closed' world of the classroom to allow for critical reflection and sharing practices outside of the original context. Findings from the projects highlighted the sense of ownership and new cross-curricular skills to be gained from a participatory process, as well as the desire for agile (flexible) and accessible learning spaces that are inclusive and support a range of learning approaches.

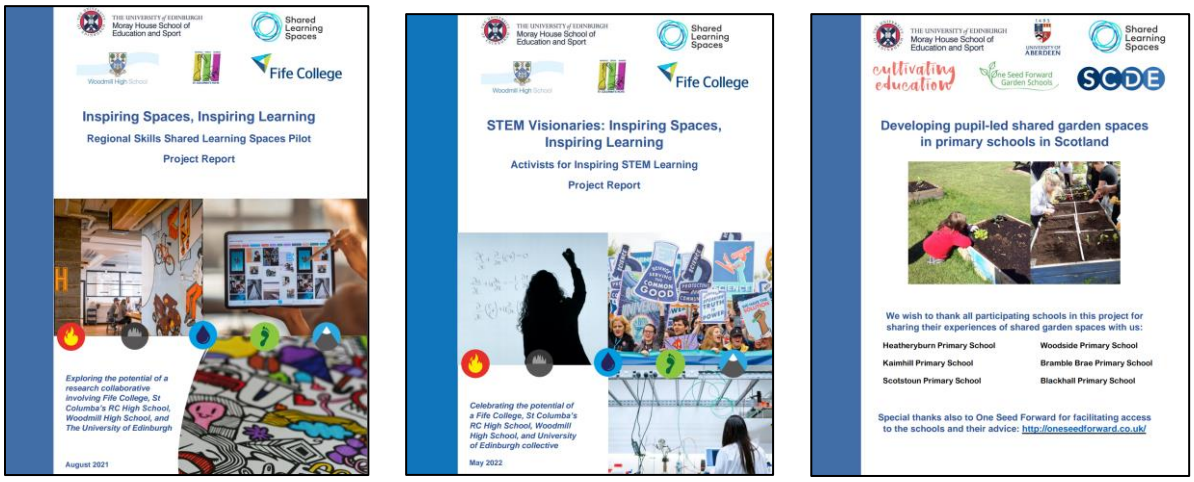



*Figure 2 - Examples of Shared Learning Spaces partnership projects*

In 2021 the Scottish Alliance (including University of Edinburgh and City of Edinburgh Council) participated in a year-long global initiative, the ***Innovative Learning and Student Experience (ILESE) Scoping Study***, hosted by the University of Melbourne.[13] The aim was for academics, educators, and industry partners across the globe to construct and action a deeper, shared understanding of ways in which learning spaces and places are integral to inclusive transformative pedagogies, impacting the quality of learning for all. In 2023, their published White Paper acknowledged that teachers were proving adept at using Innovative Learning Environments (ILEs) and demonstrated a correlation between teacher involvement, student deep learning and measures of quality teaching.

With some evidence emerging from the OECD, European Erasmus+ projects, and small academic studies in individual countries, the ILESE White Paper (2023) reiterates the need for evidence from research in order to support decision-making, policy development, and investment in education. It has identified particular areas where research projects could usefully focus their enquiry: the design strategies and aspects of the design process that produce tangible benefits; the impact of design on students' behavioural, social, and emotional engagement in learning; and the impact on health and well-being. It is apparent from this work that similar questions are being asked by researchers and practitioners globally, but that lessons learned from Scotland may also make a contribution to the international thought and practice on learning space design.

[13] http://ilesescopingstudy.com.au/

### 1.3.3 Inclusion, well-being, and Additional Support for Learning

During this same period of investment in school buildings, the Scottish Government was developing its policy and guidance on ***Getting It Right For Every Child (GIRFEC)***, that "is about enhancing the wellbeing of all children and young people as well as building a flexible scaffold of support: where it is needed, for as long as it is needed."[14] Updated policy documents and guidance for practice were published in 2022, following a public consultation. The holistic well-being principles for practitioners and organisations are typically referred to by their acronym, **SHANARRI**: Safe, Healthy, Achieving, Nurtured, Active, Respected, Responsible, Included.[15] It is also popularly known as the 'Well-being Wheel' and many educators, including school leaders and special needs practitioners are likely to know of it as a framework for professional practice.

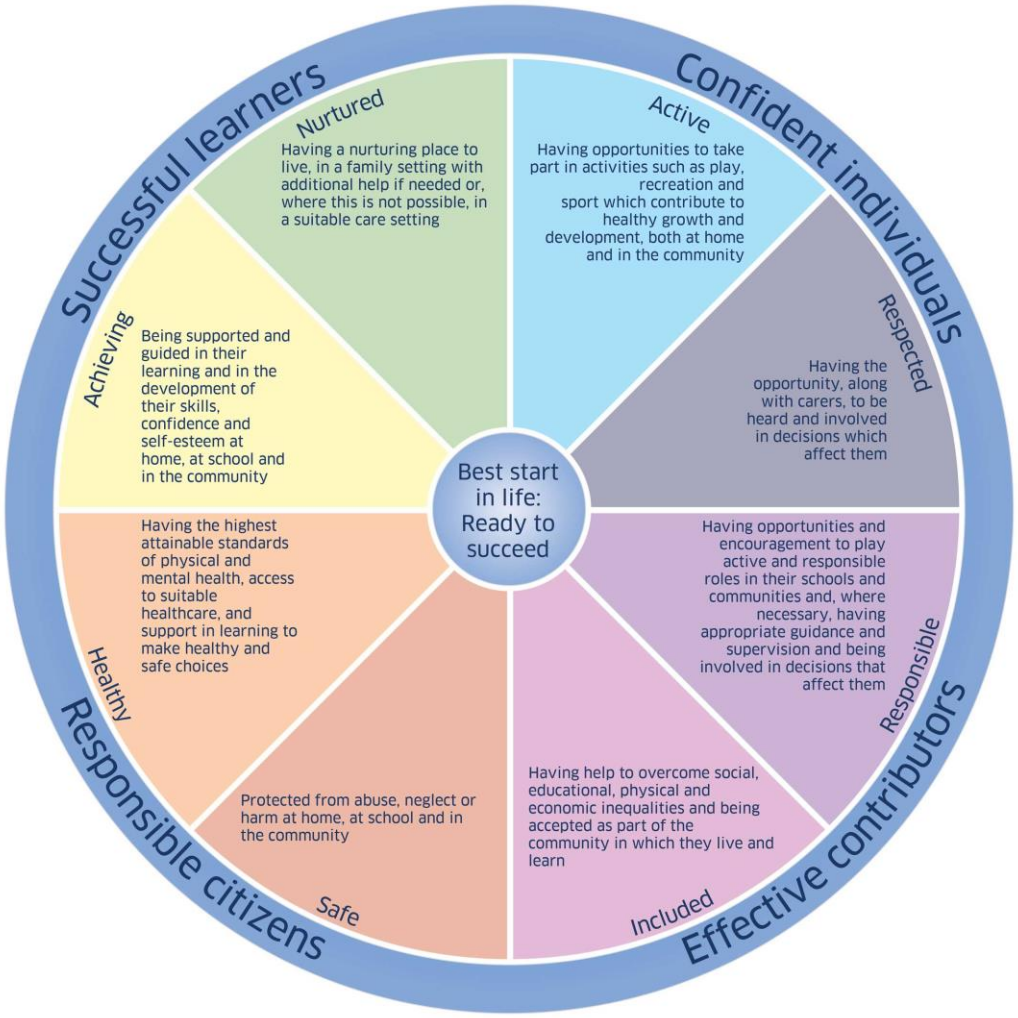



*Figure 3 - The SHANARRI well-being principles. Source: [https://www.gov.scot/publications/child-adolescent-health-wellbeing-scotland-evidence-review/](https://www.gov.scot/publications/child-adolescent-health-wellbeing-scotland-evidence-review/)*

[14] https://www.gov.scot/policies/girfec/principles-and-values/
[15] https://www.gov.scot/policies/girfec/wellbeing-indicators-shanarri/

***'How Good Is Our School' (HGIOS)*** has been a key part of self-evaluation and guiding school improvement planning for nearly three decades. These policy documents reveal the considerations that the system authorities consider important to a school's effective practice and management. In the fourth edition (2015) of published guidance, the indicators include:

1.2 Leadership of learning

- Children and young people leading learning

1.5 Management of resources

- Management of resources and environment for learning

2.4 Personalised support

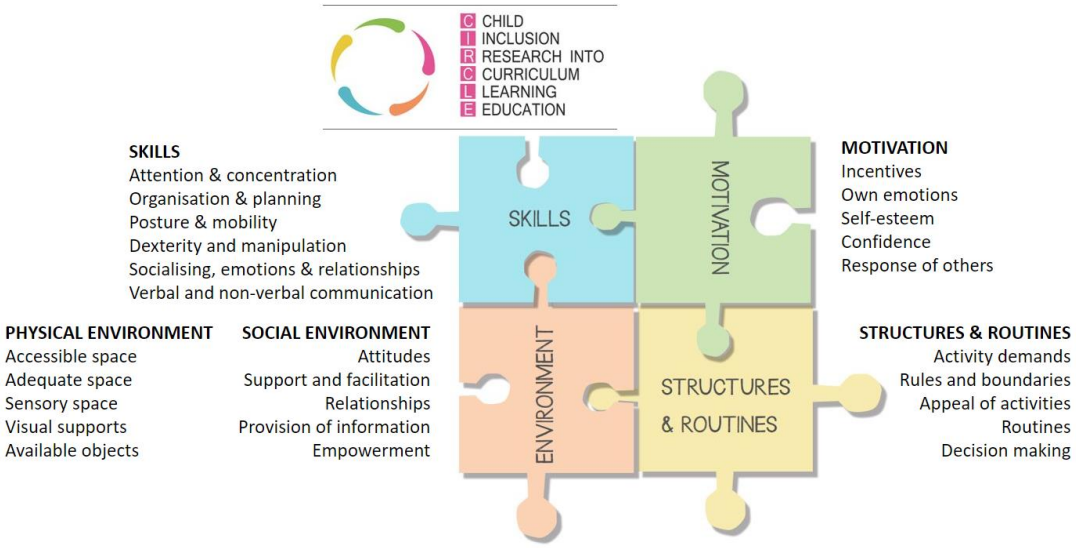
- Universal support
- Targeted support
- Removal of potential barriers to learning[16]

Certain ideas are prominent in these indicators: that pupils should have some ownership of their own learning; that the environment and tools are influential in the learning process (and require managing); and that whilst all pupils require support, this support needs to be differentiated to the needs of the individual.

The **CIRCLE Collaboration©** is a practice/academic partnership consisting of teachers, therapists and academics from the City of Edinburgh Council, NHS Lothian and Queen Margaret University.

**Inclusive Learning and Collaborative Working: Ideas in Practice**

This resource was developed by the Child Inclusion: Research into Curriculum, Learning and Education (CIRCLE) Collaboration©.




[16] https://education.gov.scot/improvement/self-evaluation/hgios4/

In 2015, a team of education staff (including class teachers, support for learning teachers, specialist support teachers and educational psychologists) and therapists, created a framework to support educators in designing inclusive learning spaces, described in the resource ***Inclusive Learning and Collaborative Working: Ideas in Practice*** (see below). A similar framework with the same thematic areas was devised for Early Years practitioners, called ***Up, up and away,*** primarily with the purpose of building foundations for literacy and understanding behaviour (created 2011, revised 2017).[17]

The framework is built with four interlinked factors in mind: Environment, Structures and Routines, Motivation and Skills. These factors are sub-divided into different elements and the resource offers both aims (an ideal) and questions (things to think about) to guide educators. There is a version for primary schools and a similar version for secondary schools.

Since the original publication of the CIRCLE document in 2015 there has been a growing interest in the possibilities created by agile learning environments as well as those created from wireless technology. With the commitment to the inclusion of learners with varying support needs in mainstream education, as well as the continued need for high quality special schools, increased knowledge and understanding about learning spaces remains a crucial part of realising education policy on well-being and inclusion.

Whilst GIRFEC sets out broad expectations for inclusion, there have been recent specific policy developments relating to young people with Additional Support for Learning (ASL) needs. The 2017 ***Statutory Guidance on Additional Support for Learning*** sets out the rights, responsibilities and processes for placing children and young people in schools. Typically, any such school – mainstream or special - will be within the catchment area where the child is living, and only in exceptional circumstances outwith the local authority if a particular school is better able to meet the needs of the individual. As a result, each local authority should ideally be catering to the needs of most, if not all, of its young people.

As of 2022, the data on mainstream and special education[18] showed that:

- Of the publicly funded schools in Scotland, there were 1994 primary schools, 358 secondary schools, 2606 Early Learning Centres, and 109 special schools.
- Out of 705, 874 pupils, a total of 241,639 were listed as having Additional Support Needs, including Co-ordinated Support Plan (CSP), Individualised Education Programme (IEP), Child Plans, Accessed or Declared Disabled, and Other.
- Under Edinburgh City Council, there were 90 primary schools, 23 secondary schools, and 10 special schools.

There is a wide interpretation of learner needs that might result in additional support from educators or other professionals. These can include: autism, literacy difficulties and dyslexia, visually or hearing impaired, other learning and communication difficulties; and those children and young people who experienced trauma, attention deficit/hyperactivity disorder (ADHD), live with parents who are abusing substances, those on the child protection register, those reluctant to attend school or unable due to prolonged illness. From such a wide range, a focus on the crucial nature of learner self- and other-regulation is increasingly gaining attention.

[17] https://jamesgillespiesprimary.co.uk/wp-content/uploads/2021/09/Up-up-and-away-September-2019.pdf
[18] https://www.gov.scot/collections/school-education-statistics/#school-levelsummarystatisticsanddashboards

**Self-regulation**

For the purposes of this study, 'self-regulation' is an action taken by the child independently to manage a moment of intense feeling that inhibits their ability to engage effectively in play, learning, and/or social interaction.

**Mutual regulation**

'Mutual regulation' is understood as a similar moment but requires another – an adult, an educator – to assist in the moment (by making suggestions, by being alongside).[19] It is an important consideration as a condition for learning in terms of being able to remain engaged in a task, and equally important for young people navigating the highly social and complex culture of 'school' on a daily basis as somewhere they are willing to remain. Failure to regulate can lead to not only a resistance to a learning task but can add to feelings of isolation or to aggression between the individual and peers or staff.

The support varies. The City of Edinburgh Council has a policy that outlines how to manage learners' educational, social welfare and behavioural needs. Their four main sources of support are:

- in and around class lessons by the class teacher
- in school with direct support from support for learning or pupil support
- in school with support from partner services or agencies
- at special schools or classes.[20]

The Council provides a central education psychological service and an ASL service that together offer support and advice to educators. It is their policy to take a 'Whole Establishment Approach', where leadership teams are responsible for ensuring that their staff have the capacity to support appropriate relationships, learning and behaviour as role models, and for engaging fully with parents and carers.[21]

Global shifts in curricula priorities and the experiences of teaching and learning during the COVID-19 pandemic restrictions have placed more emphasis on social and emotional well-being and competence, and on physical health. Surveys and anecdotal evidence from schools raised concerns about mental health[22] and the unfamiliarity of pupils with the school space and culture – its layout, furniture, rules, routines and mass social interaction – having spent prolonged periods learning at home, and away from peers and other adults.[23] Also of value – but also concern – is the well-being of educators as they try to provide the best possible conditions for and experience of learning on a daily basis.[24]

How the design of learning spaces can complement the work of schools and educators in well-being merits investigation, particularly in this time of post-COVID recovery.

[19] These definitions arise from the participant interviews as participants were asked what they understood by the term, and were triangulated by a literature search on the concept.
[20] https://www.edinburgh.gov.uk/information-professionals/legislation-policies-asl
[21] https://www.edinburgh.gov.uk/directory-record/1146112/relationships-learning-and-behaviour-procedure
[22] https://www.cso.scot.nhs.uk/wp-content/uploads/COVEDI2016-1.pdf
[23] https://www.gov.scot/publications/covid-19-children-young-people-families-december-2020-evidence-summary/
[24] https://www.covid19inquiry.scot/introductory-academic-research

## 1.4 Research methodology

This research was designed as a small-scale study in one local authority (City of Edinburgh) in Scotland, taking place between November 2022 and April 2023.

The main research question was:

**How can the adaptation of school and Early Years (EY) spaces support the learning of pupils with additional needs?**

This was complemented by three sub-questions:

1. **What adaptations of learning spaces are observed by educators to influence the self and mutual regulation of pupils and with what outcomes?**
2. **What do educators observe to be key adaptations of, and interactions with, learning spaces that have a positive influence on pupil learning processes, and how do educators position themselves?**
3. **How can whole education communities within local authorities effectively collaborate as stakeholders in the process of designing and adapting learning spaces for pupils with additional support needs?**

The focus was on the reported experience of educators – teachers, well-being and ASN specialist practitioners, and school/EY setting leaders -, being those in most contact with pupils in the school setting. Given the limitations of time, limited access to school sites, and the difficulty in gaining informed consent from a sufficient sample of child participants, the data were planned to be generated exclusively via individual and group interviews with educators without any recorded observation of school activity by the researcher.[25]

In order to gather evidence from a range of settings, the sample included **four learning settings** of different types of publicly-funded 0-18 education - mainstream primary and secondary; Early Years; Special Educational Needs - and school buildings of different architectural types[26] – 19th century, early 20th century, and 21st century new build. An example of a mid-20th century Modern/Brutalist building was not included in this study, nor was a post-16 vocational setting.

**17 participants** were recruited for interview: 14 educators with different roles from the four settings and 3 from the local City Council. A researcher visited the school-based participants at their place of work, making it easier to understand and refer to particular aspects of design. Each interview took 40-65 minutes and was based on a pre-defined set of questions with some flexibility to adjust according to the natural flow of conversation (semi-structured approach).

The interviews provided a rich account of educator experiences of learning space design and adaptation. Exploring the reported experiences of educators (via the in-depth interviews) enabled the study to focus on uncovering important interactions between teaching and learning practice and spatial design; as Imms

[25] Future research may incorporate methods considered for this initial study: pre- and post- adaptation investigation; comparative study of learning in different spaces; researcher observation; use of drawn image and photographs; walking tour interviews; practitioner journaling.

[26] https://historicengland.org.uk/images-books/publications/dlsg-education-buildings/heag111-education-lsg/

(2016) concludes, “evaluations of learning environments are about more than just design; they must also include teacher pedagogical practice.”[27]

| SETTING | Early Years | Primary | Secondary | Special | Council |
|---|---|---|---|---|---|
| BUILDING TYPE | Late 19th – early 20th century  | | 21st century  | | |
| PARTICIPANTS | Senior EY Officer<br>EY teacher<br>EY practitioner | Headteacher<br>2 x Class teacher<br>2 x Learning support | 2 x Curriculum lead (Well-being & Enhanced Support Base)<br>Class teacher<br>Pupil support officer | Headteacher<br>Depute teacher | Head Inclusion Support<br>EY & Childcare Manager<br>Strategic Asset Partnership Manager |

*Figure 4 - Participating settings, building types, and educators/Council officers. The images are illustrative of the types of building rather than showing the participating schools.*

This study maintained the collaborative principle of learning space design by creating a team of University of Edinburgh researchers working with Edinburgh City Council’s Interior Architectural Designer and a primary school headteacher, both of whom had previously collaborated on the development of learning space design toolkits and school-based research (see above). Thus, complementary perspectives were able to inform the initial methodological approach of the project, as well as drawing on different expertise for the analysis and reporting, as a form of stakeholder knowledge exchange partnership.

The interview transcripts were reviewed and coded according to themes. These themes are grouped under three headings:

- Environment and tools
- The design and adaptation process
- Educators and pupils within schools and the wider education community

The emerging ideas and supporting evidence (reported in interview) were then discussed by the interdisciplinary research team, taking into account other contemporary research studies and theories on pedagogical and learning space design. It was important to consider and align – or contrast – the findings with other theoretical and research work in order to place them in context and better understand where the evidence sits in terms of a national or global movement. From this point the research team was then able to construct recommendations for future guidance to practitioners, for policy development, and for research in this field.

[27] See Imms, W Cleveland, B & Fisher, K (2016) http://hdl.handle.net/11343/214375

*It is important to note that this study was not proposed as an evaluation of school or educator practice. No objective measures of 'quality' or 'impact' were made; nor were participating schools judged in comparison to their own School Improvement Plan, to other schools, or to local or national standards or guidance.*

## 1.5 How to read and use this report

Despite the focus on ASN pupils, as the participating educators themselves state, the approaches they describe may be equally relevant to all pupils and settings. The report is, therefore, of potential use to a range of education stakeholders: educators (including ASN specialists), middle and senior school leaders, parents, community workers (psychologists, health workers), local authority education officers, public building and service architects, public procurement officers, and policy makers.

The main findings and recommendations are summarised in the **Executive Summary**.

Readers can navigate to the different sections and sub-sections from the **Contents** page.

The **Introduction** gives the background to the study and will be of interest to those wanting to understand learning space design and Additional Support for Learning in the Scottish content.

The **Findings** are discussed in more detail according to their thematic area. Each section outlines the theme and how it is interpreted within the context of this study. Each section then provides evidence from the participating schools, describing the experiences and views of educators including their words verbatim (quotations) where this gives a particular insight into the topic. Quotations are anonymised and referenced by the interview number, e.g. (#4), only for researcher use.

The **Discussion** responds to the original research questions by considering the findings of the study across the thematic areas. It explores the challenges and opportunities raised by the participants and concludes with **Recommendations** for schools and EY settings, local authorities, and the education system.

The **Annex** offers supporting documents for using this report: a Glossary, a Catalogue of learning space fixtures and fittings, and Research resources (list of interview questions; list of books, articles, websites). It also contains two Guides for Practitioners on using the *Shared Learning Space Design Toolkit* and the *Inclusion / CIRCLE framework* in light of this study's findings.

Photographic images used in the report are from the developed spaces as featured in 'Future Schools' projects over the past 8 years and that have holistically informed the development of learning spaces across the City of Edinburgh Council estate. These images are included as an illustration but were not gathered or analysed as research data. They are reproduced with permission of the City of Edinburgh Council.

Readers may wish to refer to the Annexes *Glossary of Terms* and *Catalogue of Fixtures and Fittings* to further understand the conceptual thinking behind some of the language and design references.

# FINDINGS

In this chapter we present a summary of what educators described as positive or negative influences of learning space design on their practice and the learning and development of their pupils. This is complemented by the views of local authority officers, although all of the quotations are exclusively by educators.

The chapter is divided into three sections according to the opinions and experiences raised by educators in their interviews:

**1) Design and adaptation process**. This section explores the ways of designing and adapting a learning space. It discusses the importance of a clear rationale, an inclusive consultation (involving educators and learners), and the challenges of implementing changes on limited budgets.

**2) Learning environment and tools**. This section considers the tangible aspects of the learning space. We consider educators experiences of different aspects of the learning environment: the buildings, and the style and functioning of the décor, light and sound, as well as the outdoor environment. Following this we consider the learning tools: the furniture and its layout, and the portable items that are used in learning tasks.

**3) Educators and pupils within the school/setting and wider Community**. Although the focus of the interviews was on learning spaces, educators frequently described their relationship with pupils (and with parents and other educators) as being crucial to the learning process and entwined with decisions about the environment and tools, particularly for ASN pupils. This section explores these challenges and opportunities.

The next chapter considers the emerging ideas and recommendations across the different sections as a concluding discussion.

## 2.1 Design and adaptation process

### 2.1.1 Rationale – the "why"

Having a clear rationale for adapting a learning space was emphasised by the educators as being important, even "the most powerful" factor in the process, although it was not discussed at length in the interviews. In particular, educators believe that if the pupils can appreciate the rationale and understanding why a space is designed in a certain way, this leads to them using a space – the environment and tools - to its full potential. When given the opportunity, pupils will also appreciate their full range of choice, increasing their independence and sense of ownership that is crucial to their learning.

> "I tell children the why, I go into the science of it. 'This is why this stool is suiting your body, because your body needs that movement'... and I think, regardless of the age of children, tell them the Why. Tell them the science behind and they feel empowered." (#2)

Understanding the rationale is not limited to pupils. One interviewee stated that educators need to have a certain level of 'spatial literacy' and then the capacity – which includes the pedagogical competence and confidence, as well as support from school leadership - to try out approaches to see what works for themselves. This ability to test, observe and be convinced by the positive outcome is, for one educator, a powerful link between their professional theory "head" and conviction in their professional practice "heart" (#2).

Addressing the rationale seems equally important in managing the change process as a school community. One educator identifies the aim of creating a high-quality space, but quality in terms of learning rather than "fancy" fittings and furniture that need higher investment. Parents also need to know the rationale to understand it and see the possibilities. There is also an acceptance that change is not a one-time event. Educators admit to some spaces currently not being used in the way they were intended, which is part of their own discovery process. They believe that future users (educators) also need to understand the rationale if they are new to a space and/or looking to change it because it may not be apparent, and these new occupants may miss an opportunity to work in a new way that was not previously clear to them.

> "You make it look stunning and you then get someone in who couldn't care less, doesn't know or is too busy and focusing on other things, it's going to fail" (#2).

### 2.1.2 Consultation through dialogue and observation

The design process with a school begins with consultation and is shaped by contemporary architectural theory, such as the Stanford Design Thinking Process.[28] The first step in this framework is "Empathize", encouraging designers to better understand the needs and perspectives of the people who will be inhabiting and using the space.

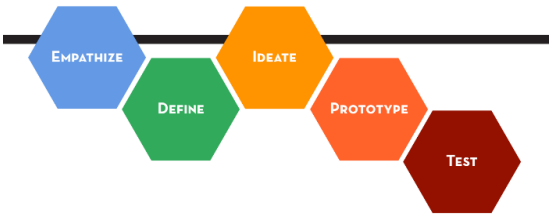



*Figure 5 - Five steps of the Stanford Design Thinking Process*

In the *Inspiring Spaces, Inspiring Learning* pilot project (2021), young people were given a platform to design their own learning spaces that are agile, sustainable, and owned by learners.[29] The high school and college participants described it as a positive experience, sensing the importance of their own voice as well as being able to influence a design that would ultimately benefit many others like them.

[28] https://web.stanford.edu/~mshanks/MichaelShanks/files/509554.pdf
[29] https://www.ed.ac.uk/education/news-events/news-archive/inspiring-learning-inspiring-spaces-project

In interview, educators reflected on the consultation process mainly in terms of their role in including and engaging the pupils in the design process. They referred to “conversations” and “discussions” with pupils about spaces, and the belief that this kind of contextual dialogue provides a way of better understanding learner needs more generally. This is not to say that all pupil desires can be realised. Educators described having conversations with pupils explaining why certain adaptations are not possible due to the high financial cost, or the lack of flexibility.

> “And some of the things ... we couldn't do... Suggestions of an extension out there with a balcony, which was lovely, but I said that the budget wouldn’t stretch that far” (#3).

*Figure 6 - Pupils actively involved in the design process*

Educators described listening to ideas coupled with observation of pupils in spaces, particularly to include non-verbal pupils who would not be able to express their ideas in an oral discussion. Observation then continues to happen as a part of the process of an educator adapting the approach for the pupil. Observation may be the pupils in a mock-up space to move to final design, or in a new space and looking to adapt it. In the architectural process, this would be “prototype” and “test” phase in tandem (see Stanford Design Thinking Process, above).

The question “How do you want to feel in the space?” (#1) by one educator is an example of showing the concern for the pupils’ affective domain as well as a clear signal of co-design. It goes deeper than a superficial choosing from a catalogue of furniture.

Conversely, or complementarily, two educators refer to the process of “stepping back” in order to observe, hinting that observation is (also) effectively done when not closely engaged in activity with the pupils. Educators also described the benefit of observing other learning spaces in action, not just their own, to share ideas with staff across the school.

Educators themselves are also sensitive to their voice in the consultation process. One educator referred to the headteacher taking a lead role in decision-making, consulting mainly with the senior leadership team. The same educator noted that changes in school leadership over the long design phase also meant that new perspectives came in at different points, influencing the evolving design. However, they conceded that asking all staff about every detail seems an “impossible” task (#11) and another admitted that they have even wondered why the designer was asking very detailed questions until they saw the final result and then appreciated the importance of such detail and consultation:

> "Sometimes [the designer was] talking about colours, and things like that. I was just like "I don't really care what colour it's gonna be". And now you look at it and think, "No, that's really, really good" (#11).

Consultation and communication also needs to extend beyond the school to the wider community, including working with the local education authority responsible for overseeing the placement of pupils. One headteacher notes that pupil numbers can fluctuate, particularly in the case of known ASN pupils transitioning into schools (primary to secondary, or from other schools) and schools needing to think ahead to when their spaces will accommodate more learners with particular needs. (#11) Therefore, designing space in the long-term requires vision and forward-planning, especially as design to implementation can take 3 years, and the estates and inclusion policies need to go "hand in hand" (#11).

### 2.1.3 Drawing on external expertise and frameworks

Developing spatial literacy – the capacity to imagine, design, and adapt a space for a particular purpose – will likely have been briefly covered in an educator's initial training in their career but such professional learning also takes place over time in practice as knowledge is shared across the education community. Educators described the benefit of visiting other schools locally and further afield for design ideas where they were inspired both from seeing the spaces but also talking with peers.

Educators referred positively to being associated with education organisations (e.g. LEGO[30]) and projects (e.g. LEANS neurodiversity project[31]), or undertaking master's study, whereby they draw on external expertise to add to their own practice and their capacity for designing learning spaces. This is also a valued part of their Continued Professional Development (see section 3, below).

> "One of the other benefits I should probably say [is] working with external agencies and realising that there's more out there than what's going on in your own school and I think you can't really be inclusive if you don't know what's happening in the neighbouring schools and what's working for other colleagues and being brave enough to say, 'I need a little bit help with this' but also be willing enough to say, 'This is working for us. Why don't you try it?'" (#4).

As described by City of Edinburgh Council's Interior Architectural designer, valuable lessons in design can also come from other settings such as libraries and residential care, bringing a useful cross-disciplinary perspective to the design process. For the educators, whilst they may appreciate this, their concerns are highly specific, based on the pupils they have in school. Some tension was reported by educators who felt that some contractors seemingly did not fully understand the needs of ASN pupils, or who possibly made assumptions based on most mainstream pupils.

Different published guidance was referred to occasionally by the educators with some influence on their spatial literacy and consultation with pupils. A few educators refer to the *Shared Learning Spaces* typologies[32] to either describe how a space already functioning (cave, campfire, mountaintop). Some recall it being useful in designing their learning spaces, particularly in revealing the flexibility of a space with its possible multiple areas. This was because their school had been actively using it. One educator

[30] https://learningthroughplay.com/
[31] https://salvesen-research.ed.ac.uk/leans
[32] https://www.ads.org.uk/resource/shared-learning-toolkit

referred to the GIRFEC SHANARRI principles (see Introduction), whereas no other guidance was referred to explicitly in interview, such as the CIRCLE framework or Scotland Public Health Place tool. Whilst staff in other schools or local authorities may be more familiar with and use different guidance, the interview questions did not enquire about these specifically.

### 2.1.4 Designing an agile space

Designing a space that is agile - or "flexible" as educators called it in interview - is crucial in order to a) enable different learning activities in quick succession or in parallel; b) use the same space in different ways in the same school day/week; c) be able to change the space when a new group of pupils arrive, typically at the start of a new academic year.

Desiring and designing an agile space accepts the pedagogical principle that each child is different with different needs, interests, and skills. Designing a space to be agile also means, in the opinion of two educators, a conscious embracing of inclusion – that spaces cannot be static otherwise this is a rejection of the uniqueness and developmental journey of learners.

> "If you've only got one space in your school that you can redesign, it needs to be agile enough that it can be flexible to meet the needs. It can't be, 'Well I'm so sorry, this is a soft play area and not…' It needs to have the opportunity to change as... your demographic of children changes each year." (#4)

> "If you came back in a year, I would hope to goodness it didn't look the same, right? Because if it did look the same, I've not being listening to these children and I think that's so important!" (#2)

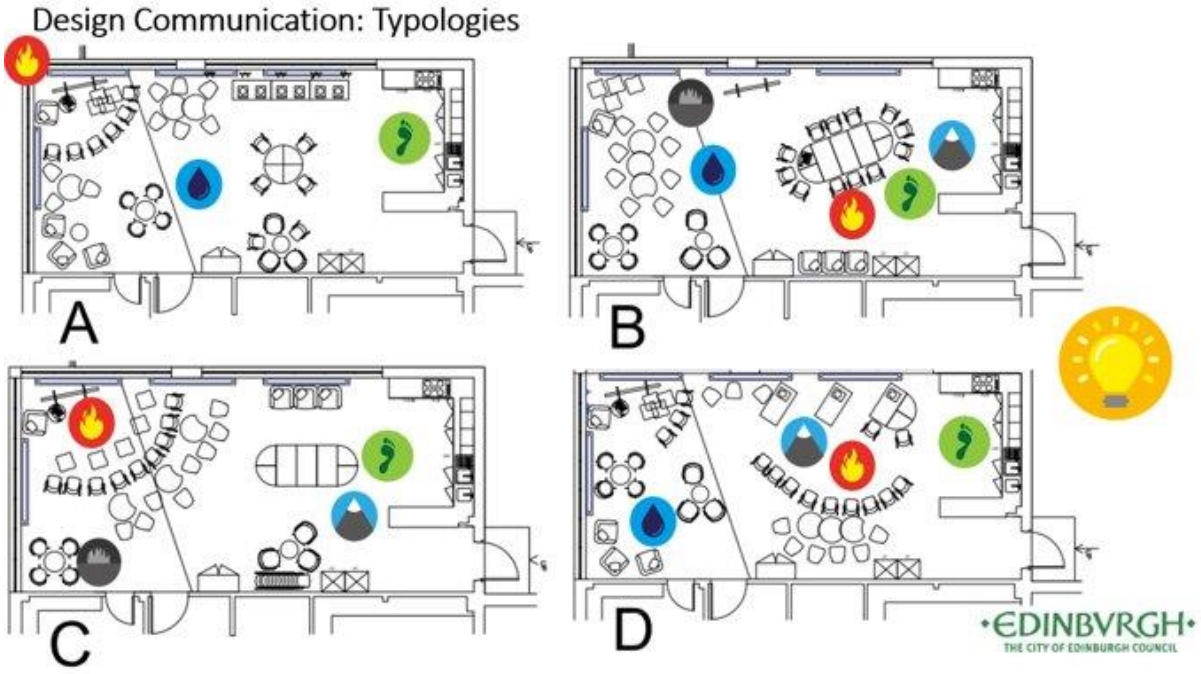



*Figure 7 - Examples of different classroom designs, using the typologies to indicate different learning areas*

One educator believes that all spaces should be designed to be agile, to cover as many needs as possible, and only if this is not feasible then other spaces should be made available, rather than relying on individual pupils having to leave the main classroom for certain tasks. In practical terms, an agile design often means having a large enough space to do different activities and not being cramped with furniture, permanent fittings, or expensive equipment, hence the desire for adequate storage (see Tools, below).

Nevertheless, this study acknowledges that some spaces are a must and need to be a constant, for instance a separate safe space removed from other main learning spaces. It is then something for the school leadership team to take into account and clearly justify such protected spaces when other staff may request it to be more flexible or changed.

"Flexibility" as a concept also means, to the educators, the ability to adapt if an ASN pupil is in a moment of regulation, for example. Adaptation is also not necessarily on a grand scale: learners may simply need to use a different tool, such as a different type of seat (see Tools, below). Other changes to the space are also recommended, by educators, to be sensitive in scale where small changes allow pupils to get used to a new approach before introducing another change.

### 2.1.5 Cost, budget and procurement

Limited school budget has an immediate effect of limiting ideas in the design phase, with educators either knowing certain resources are out of reach or having to explain this to pupils.

> "I think that there are so many resources that we could use here so if we had an endless budget." (#10)

In terms of materials used during construction (by an external contractor) educators note that cheaper materials have sometimes been used and this causes them some concern as to how long these items will last and whether they are safe, considering the erratic movement of pupils in some spaces, particularly in the playground.[33]

> "Then there were decisions made about the quality of the wood used in the gates that are on the patio. And it's really rough and quite splintery… And for a lot of our kids who are kind of at a stage where they explore things orally, it's really not..." (#11)

Educators also seem to have concerns about the longevity of materials and whether they are worth the investment, for instance objects that might break, or wallpaper that will eventually peel off.

Schools have invited donations and initiated fundraising, typically led by parents and a Parent Council, to enable investment in spaces. There is a clear sensitivity to put this limited source to good use. Even though their expectations are lowered, educators expressed some pleasant surprise at the quality of items that have been donated. Some have reached out to the local community (shops, businesses) for items, including bespoke items such as wall vinyl.

> "So the [Parent Teacher organisation] are putting 3000 pounds into it. And what I've been really clear is, we don't want something that cost 25,000 pounds, because that's completely

[33] It is noted that some concerns raised during the interviews may have been addressed sometime afterwards and items repaired or replaced.

unmanageable to maintain, but also it's not an example of good practice if it costs that much." (#4)

The City Council is aware that guidance on procurement, particularly in sourcing materials locally, would be beneficial to the schools and local communities. From the perspective of the local authority, the consideration of sustainable development of space is key. City of Edinburgh Council procurement of materials, furniture and fittings, includes consideration of both materials and social sustainability. Many of the items procured in adaptations are from Scottish Government's 'supported businesses'. These are social enterprises whose main aim is to integrate disabled or disadvantaged people socially and professionally. Materials and equipment are additionally procured with a circular approach.

### 2.1.6 Construction and snagging phases

Only one school in this study is a recent new-build but provides insights into the construction and 'snagging' (post-construction adjustment and rectifying of faults) phases from the perspective of educators.

Educators have found that decisions made in construction have long-term consequences. They have found that either genuine errors have been made (for example, flooded play areas) or that fittings unsuitable for their pupils are not a construction error but do not work well in the end with their pupils and are difficult to change at a later stage. This is a challenge, in particular, for large spaces or where removing something would involve costs and require significant additional work, possibly affecting other areas in addition.

Educators struggle with the different acceptance (or not) of responsibility for the maintenance or subsequent adaptation of spaces. School janitors, facilities management, and landscape management demand different roles with different responsibilities. Potential solutions were not discussed with educators but are worth reflecting on. The failure of some spaces/materials has highlighted to the educators that incremental changes are perhaps safer, cost-wise, than a large investment.

## 2.2 Learning environment and tools

### 2.2.1 Learning environment

*Size and structure of school buildings*

Edinburgh school buildings range from the 19th century to the modern day, from small to large.

Older (Victorian era) buildings are viewed positively by educators because of their large dimensions and high ceilings giving at least a feeling of space, compared to smaller/lower post-war buildings, even if criticisms may be made about energy (electricity) efficiency. Having a large, open (indoor) space is viewed as positive as educators are able to incorporate different activities simultaneously, different types of furniture (e.g. large round tables), or an expansive activity with high levels of physical movement.

On the other hand, there are challenges in the adaptability of these buildings, with educators talking about having "to be creative", including with the effects of sound (acoustics) in large spaces. Educators are also acutely aware of 'wasted' space within school buildings that could be converted, revealing their own active engagement in reimagining uses of space.

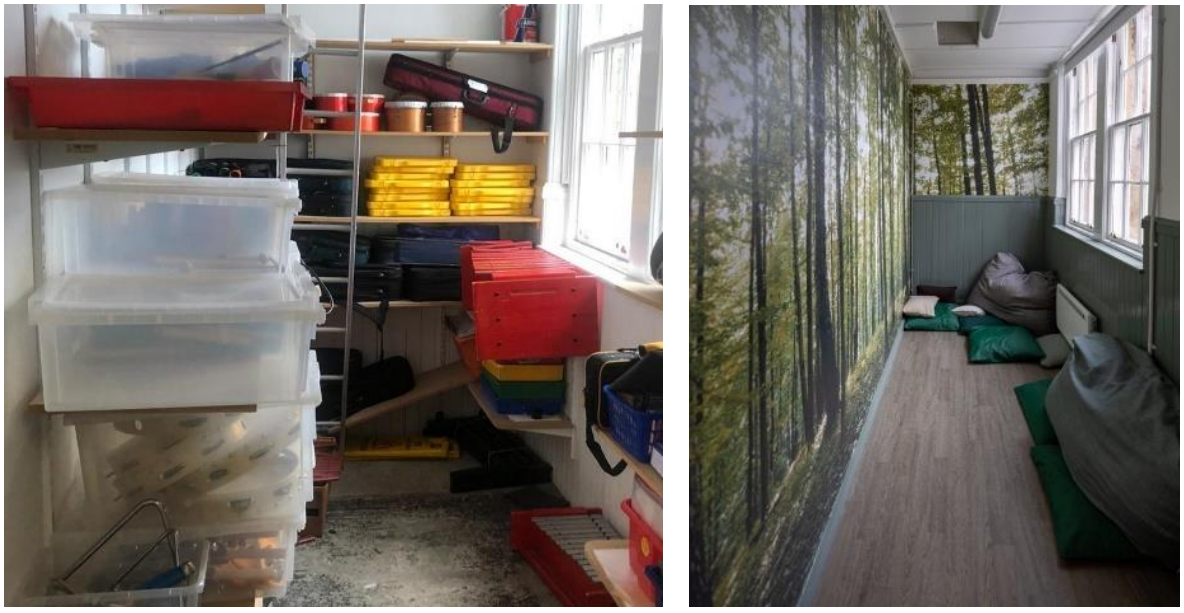


*Figure 8 - An old music store cupboard transformed into a 'forest room' for pupils to relax in*

Participants talked about some educators being "lucky" - or not – in the space they are forced to work in and with. The awareness that some schools have resources that others do not seems tied to the type of building – its structural materials and layout – that limits the adaptability. Whether the school has upper levels with stairs is also a fixed feature that may be difficult to overcome, for instance if a pupil with additional needs is physically distanced from a suitable room on another level.

Access and privacy are both important. Educators were negative about when supportive spaces, such as 'well-being hubs', are located far away from the main central area of the school and are not readily accessible. At the same time, they refer positively to the ability to have a private space away from disturbance, including being able to close doors, and where pupils can go in and out without being watched by their peers and in fear of humiliation.

> "We are lucky that we have an external door here so they don't have to come through the main body of the school. And that has been, it's had a massive impact on some of the young people because they can come straight in here. They're not having it come through past other students, other staff members. And I think that is really, really important." (#9)

Almost the entire school building is imagined by educators to be part of the overall learning space. Although brick walls, wood panels and material can create 'rooms', the connecting spaces – the corridors and hallways – are also described as learning spaces. Educators refer to pupils using them for tasks, including for regulation. Educators also recognise their value as creating a particular atmosphere when moving between rooms. One participant described a corridor space that had been designed with colours and textures conducive to a calm and welcoming atmosphere, whilst another notes the use of colour to denote different spaces within the school as a way to compartmentalise the large building and make it less "daunting".

> "About the calming... when we were looking at the designs it was... really low on my priorities, but actually it's beautiful... It's a beautiful environment. And I think that has ... an effect on all of us, the staff as well as pupils." (#11)

Movement around the school building and entire campus - including the outdoor areas - requires consideration where pupils may be at risk and need extra protection with locked doors and gates that can also be swiftly unlocked in times of need.

### *Style and challenging the traditional institution*

Educators described a domestic, home-like style as having a calming or relaxing, familiar quality that puts pupils at ease. They referred to various school spaces being like "home", someone's "dining room" (office), a "living room" or being similar to a pupil's "bedroom" (classroom). In their opinion, styles that are not conducive to pupil learning and well-being include "institution", "asylum" or "hospital"; in other words, spaces that are blank or sterile in the extreme. The "traditional classroom" was even referred to as a style to potentially avoid. One or more of these styles may trigger or contribute to unease or resistance in the pupil, based on that young person's previous experiences of such spaces.

'Biophillic' design - building principles aiming to increase occupant connection to natural environment - is observed as having a positive, calming effect on pupils. Examples include the use of wood flooring, wicker baskets and chairs, and landscape art on the walls.


*Figure 9 - Examples of domestic and biophilic design*

### *Creating the indoor environment*

In their study of the impact of classroom design on pupils' learning, involving 153 classrooms in 27 schools in England, researchers describe the 'Naturalness principle', referring to the environmental parameters that are required for physical comfort, such as light, sound, temperature, and air quality.[34]

Educators note the need for spaces to be well-ventilated with a regulated temperature, to create a comfortable environment for learning. This would apply to all persons using the space and all building types. Educators in a new build and a school built twenty years previously both mentioned issues with temperature regulation. Temperature can be affected by both sun quantity and quality, i.e. shining through windows, and by mechanical means, for example having a thermostat and/or air conditioning control in the rooms, specific to that space. No participants referred to these technical features, only recalling moments when it became too hot for them and pupils to be comfortable in the space.

Whilst windows permit natural light and are seen as positive by the educators, as opposed to 'institutional' fluorescent lighting, blinds are useful to regulate the natural light. The ability to dim overhead and side lamps is also seen as positive: to be able to create a calm atmosphere, conducive to engaging in a learning task that might require more focus. Varying the light can also simply be something different to the routine that engages pupils.

> "For some children within the school, [light] can be quite overpowering, so we do dim lights at different points." (#6)
>
> "The first thing that's noted is the space is darker ... and they'll come in … their persona will change; their movement will change." (#2)

Casting patterns with light can engage pupils who are lacking focus or lack a desire to be in a space. One educator describes the impact of lighting used by a theatre company that captivated a particular pupil. Side and standard lamps can also colour the space differently to natural or overhead lights, whilst selectively lighting up particular areas of the room.

Educators acknowledge the myth, also believed by themselves previously, that bright wall colours are more conducive to learning. Those educators who referred to colour in their interviews were unanimous

[34] See Barrett et al (2015) https://www.sciencedirect.com/science/article/pii/S0360132315000700#bib28

in seeing the positive, calming effect of more neutral tones (but not sterile white) on both educators and pupils.

> "She started with the Primary One classrooms because they were bright in colour ... they were too stimulating. They needed to be nice and calm... There's not too much stuff on the wall. I think that's really important for children additional support needs." (#5)

One educator also admires the designer's use of colour to denote different spaces within the school as a way to compartmentalise the large building and make it less "daunting".

Sound levels and types of sound add another sensory dimension to creating conditions for learning. Educators recognise that sound created by other pupils interacting with tools and with each other can add to the stress levels or distraction of some pupils, including those with ASN. Educators refer to using noise-cancelling headphones, sound-proofing, or offering an alternative space for some pupils to carry out their tasks.


*Figure 10 - Neutral colours and the opportunity to put on headphones in a classroom reading zone*

This is not to say that silence is the preferred option. Using recorded music is referred to by a few educators as a way in which they are able to create a calm or different atmosphere. This supports recent research that has investigated the effect of sound in classrooms with some suggestion that music, and birdsong, streams or fountain soundscapes, have a positive effect on cognitive performance.[35]

[35] See for example from China (2019) https://www.mdpi.com/1660-4601/16/2/293

### *Working with the outdoor environment*

It still remains that there are relatively few published research studies on outdoor and garden learning in Scottish settings. Those that offer recent evidence (including MacQuarrie 2016, Gray et al 2019, and Barrable 2020) cite a number of positive influences: a diverse environment conducive to interdisciplinary exploration; engagement of pupils in the affective and multiple sensory domains; a sense of care for the natural environment; and supporting autonomous learning. The experiences of educators interviewed for this study support these previous findings.

When talking about the outdoor environment, educators spoke mostly of the positive impact on a pupil's affective domain: that they became calm, serene, or happy.

> "We just find that our kids are quite happy to be outside, come what may, any weather, they are very happy to be outside... A lot of them really benefit from that as well and really need that time and space." (#11)

Educators believe that the outdoor environment appeals to different senses, in that learners gain pleasure from the sight of rich, green spaces; they enjoy the touch of tree bark, grasses, water and other textures; and they have the smell of fresh air, different to indoor spaces or streets congested by traffic.

> "It's a lot of that sensory and physical movement as well that helps to regulate emotions and I think a lot of our children choose to be in the garden, don't they?" (#6)

> "That feel of outdoors and calm and oxygen going through your body." (#4)

Other positive emotional reactions to the outdoor environment might be a learner becoming more excitable in play that is messier with fewer limitations, for example in a 'mud kitchen'. Excitement is also observed in some pupils when there is an opportunity to explore less familiar territory by "going further afield".

On the other hand, some pupils, including those with ASN, still need the option of an enclosed space – for example, a den or a tent – to feel at ease.

> "He struggles to go over to the park. So what we've been working on with him is maybe do we build… a den in the park?" (#1)

Access to the outdoor spaces is of crucial importance. Educators recognise where they are fortunate to have immediate access. This can be access from the school playground to fields or a garden space. For one school it has been crucial that contained outdoor (playground) spaces are accessible from each classroom. This enables individual pupils or whole class groups to move between the indoor and outdoor space as suits their mood or learning task, independent of what other classes are doing.

*Figure 11 - Quick and easy access to secure outdoor environments maintains a fluid boundary with the indoors*. **Source:** *https://pixabay.com/photos/play-area-playground-fence-4458712/*

### 2.2.2 Learning tools

#### *Layout of an indoor space*

The layout of a classroom depends on the class teacher's professional judgement about how learning can best be facilitated, depending on the learners they have and what is being taught at a given time. For instance, in the same school, one class teacher prefers a "lecture" style layout with pupils facing the front compared to another who tends to more frequently adopt a "group work" style with pupils facing each other around tables to work with each other whilst the teacher visits each group. However, agility is required - the same teacher may wish to shift between the two, requiring furniture that can be easily moved.

Having multiple areas within one (class)room space – more typically in Early Years and primary settings - enables the teacher to allow the pupils some choice of activity and engagement in different types simultaneously whilst being supervised. Clearly denoting the purpose of the area helps the pupil to understand what they should be doing, what the rules are, and if using that area is permitted.

> "[A] teaching table for … teaching input and the fact that they've got a coffee table, they've got space to play, they've got space to build, they've got our cosy corner ... It's that balance of different spaces that children can access at different points depending on the task or depending on their needs." (#1)

Educators report using nearby shared spaces/rooms (kitchen, games room) to extend the types of activity they can facilitate with learners.

*Figure 12 - Different zones or areas within one classroom*

### *Furniture and storage*

As described in 'Layout' (above), different table styles offer educators and pupils (often with choice) different ways of learning together or independently. For example, rectangular tables can position pupils in pairs facing the class teacher, whereas square or round tables allow pupils to interact across a central point.

"Pizza" tables (triangular segments) are flexible in that they can be used as individual workstations or create a forum arrangement. "Worm" tables (¼ circle segments to create undulating long table) can give a sense of working side-by-side in a large group or community. "Coffee" low tables can be sat on, sat at with a low chair, or used by sitting on the floor or cushion. Being closer to ground is recognised as being more natural to younger pupils and "emotionally grounding" (#7).

Enabling this agile use of tables requires a space large enough and when it is, it can greatly aid the staff that are supporting the pupils with different needs:

> "So we have classrooms that are big enough to have round tables where a staff member can sit in the middle, and pupils with staff supporting them around the edge can do a group activity... And... you can communicate with pupils, and they can exchange and make requests for things from you. So our space is big enough to support that happening in a really manageable way for a teacher." (#11)


*Figure 13 - Different shapes, sizes, and heights of workstations*

Seating, such as a solid chair to sit at a table or 'desk' is sometimes referred to by educators as having a negative impact on a child's engagement or ability to focus, in the sense that forcing a pupil to sit on a chair may be constraining them against their natural impulse to make small continuous movements and shift their weight. On the other hand, a specific seat may be identified by a pupil as theirs and a place of security and stability. One educator describes how some pupils become anxious when they enter a classroom and someone else has sat in the seat that they had before, which the class teachers need to be aware of.

Having a variety of seating styles is referred to as positive, for pupil choice and feeling of safety, but also for the teacher to create different learning approaches. For example, a sofa can provide physical comfort but also a relaxing, domestic-style setting for individual reading. A rug and an arrangement of cushions can bring pupils closer together for group storytelling and discussion.

> "We're going to give the children a choice of whether they want to do it with a partner or a group, or whether they want to work by themselves. I think the learning spaces are key to that because it's about them choosing where they want to work. They might want to sit around the coffee table with some cushions; they might just want to grab some beanbags and sit outside the classroom; or they might want to work by themselves. They might just want to sit inside the cave by themselves or make their own little cave." (#1)

Specific seating can be crucial to ASN pupil regulation moments. One example is a "wobble stool", referred to by several educators, and which is currently marketed as a type of seating with postural benefits for all

young people, not simple as a device for occupying the physical trunk and legs whilst the mind and arms focus on a learning task.[36] Their popularity with pupils is also emerging in research.[37]

In contrast to the more conventional catalogue of tables and seating, enclosed structures are frequently mentioned as calm, private spaces for pupils to be in, sometimes to regulate, alone or with a peer or member of staff. Those mentioned most by the research participants were tepees, treehouses, tables with material around the legs, and other makeshift dens.

Educators often refer to these enclosures as "cosy spaces", implying comfort, warmth, and relaxation. They also describe them as a "cave", using the *Shared Learning Spaces* typology to refer to a safe and/or reflective area. These have been observed as crucial for moments where pupils need to regulate or simply to be alone and reflect:

> "He would just go into his little space under his table and just put the sheet down. It's almost like another little cave and that's his own..." (#4)
>
> "The treehouse was just amazing because he went up there yesterday and they had that like calm like transitioning..." (#4)

Whilst decorative tepees or treehouse structures may be costly for a school, educators refer to creating their enclosed spaces, or allowing pupils to create their own, using folding bookcases, spare sheets or tarpaulin, or natural resources outdoors. These may be attractive, low-cost high impact approaches.

*Figure 14 - (Left) Wobble stool being used in a classroom, as an alternative to the chair. (Right) Mobile structure creating an enclosed space within a room.*

[36] See for example https://www.schoolchairshop.co.uk/ricochet-wobble-stools
[37] See this classroom research in Turkey (2021) https://files.eric.ed.gov/fulltext/EJ1304613.pdf

Fittings that aid learning are not restricted to the classroom. In one school, a kitchen for pupil use is reported as having various benefits: teaching life skills; adding to the homely, domestic style of the school interior; or simply being a different space away from the classroom for variety. A shared kitchen with a stock of snacks and drinks is also beneficial for those pupils who are lacking adequate access to food and drink:

> "The kitchen's actually really important... We find that when they've had something... So the other day they were... ready to kick-off... I brought them in... and he had made himself a drink of hot chocolate and he had something to eat. And actually that helped because you get the kids that come in and have not had anything at home." (#9)

Educators also note the vital addition of lockable storage or the ability to cover equipment, to protect pupils and the equipment itself. One school has had to remove some useful equipment because it cannot be easily covered up when not in use. They note the difficulty and lack of flexibility of space when adequate storage does not exist for various learning tools. Storage also prevents clutter, keeping equipment organised so that it can be quickly accessed if a pupil needs something urgently, potentially supporting their independence and avoiding additional stress for both the class teacher and pupil.

### *Sensory objects*

For the purpose of this report, sensory objects refers to something educators might use or make available that engages a learner's sense of touch, taste, smell, sight or hearing. The term 'sensory objects' can also refer to those items deliberately available or given to pupils to help regulation moments.

Educators have observed the desire of pupils (and themselves as staff) to engage the different senses or their sensitivity: removing shoes to feel the ground, touching wood, water and other materials; seeing patterned light or feeling calm in dimmed light; hearing (or not) music and other sounds; smelling cooking or scented candles.

Touching whilst learning about the growth of plants and vegetables, or domestic animals, is referred to by the educators as engaging and enjoyable for learners, at the same time as increasing their biological and ecological knowledge.

Sometimes, the educator's aim is to reduce the learner's erratic physical movement so that they can physically and mentally focus on a task. Whether indoors or outdoors, water (trickling, fountains) is cited as having a calming influence. In a different approach sensory objects offer a way of expending energy, such as boomwhackers (soft tubes creating sound) or pummeling chairs. Other sensory objects require smaller acts of movement with a tangible item, such as a "fidgety toy", "sensory circuit basket" or "take a moment basket".

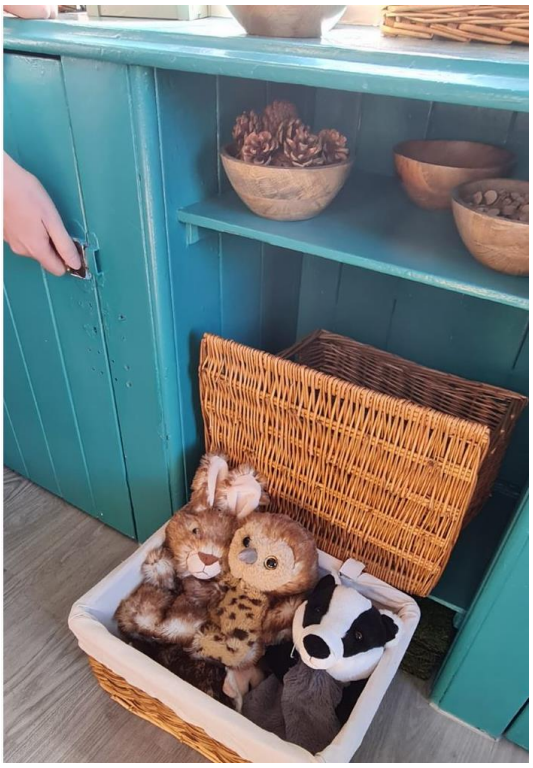


*Figure 15 - Sensory objects within accessible storage*

One educator notes that clear rules need to be conveyed and understood when using such objects, in order to safeguard the pupil and their peers (i.e. not swung around near others). Other educators observe that these objects need to be robust enough to withstand more violent use, which is an important consideration for designers and those buying items for schools.

### *Digital technology*

Despite the prevalence of digital technology in school education, particularly since the COVID-19 pandemic, there were few references to digital technology across the interviews with educators.

Having teaching resources online means that ASN pupils can be remote (in another space in the school) and still engage with learning, which may be easier for them than trying to share the learning space with other pupils. Two educators refer to tablets being useful in that pupils can "take themselves out" if they wish to be alone (#1) and that the class teacher can upload tasks so that a pupil can continue with the same task as their peers but in a supervised well-being hub space or similar. In another example, an educator describes a school assembly being streamed on video conferencing software so that a pupil, who prefers to be in a separate, enclosed space rather than sat with many other pupils, can also listen in and be included.

## 2.3 Educators and Pupils within the School and Wider Community

### 2.3.1 Educator-pupil relationship

For this study, the term 'educator' refers to all professionals guiding the learning process with learners: class teachers, EY practitioners, teaching assistants, well-being workers, SEN specialists, and leaders (middle leaders such as curriculum leads or pastoral leads, and headteachers).

The educators interviewed for this study described how they find working with ASN pupils and facilitating their development very rewarding. There is a sense of wonder and joy when they observe a positive change in a pupil's behaviour or engagement with learning tasks, heightened when they can share this with parents who have been finding their child's behaviour at home somewhat challenging. What is not evident (was not discussed in interview) is whether such an attitude is a prerequisite for working with ASN pupils or whether it develops over time having formed a bond and a sense of caring over time – or both.

The educators describe their position in the relationship as a facilitator or supporter of learning. They do not refer to directing or informing pupils how to behave, except in one case where the educator states that this is precisely how they do not approach pupils. Crucially for this study, the educators position themselves as helping to make the triangular connection between teacher-pupil-space.

> "If you are an open person, you're willing to connect with that child. You're willing to create a space that's going to help them connect to you; a space it's going to help them connect their learning; a space that's helping them connect to their peers; you're set. It's about environment, it's about teacher. It's so so important that all three work together: you, the environment, the child all need to be in that." (#2)

*Figure 16 - A writing wall encourages pupil self-expression and to make their mark on their own space*

The educators displayed a strong understanding of, and belief in, pupil-centred learning. In various ways they talk about working with pupils and refer to listening to, observing, and asking pupils about their opinions and needs. This manifests itself in the educators giving pupils choice in and about their movement around the learning space and their use of tools.

> "In order to encourage independence, you need to support them. We talk about … scaffolding … the education so that you're giving enough support and you can withdraw that... But the support is there when it's needed." (#11)

On the other hand, educators are acutely aware of physical safety concerns as part of their care of pupils within a space, which can take time and attention away from other aspects of the learning task, and can even be "overwhelming" (#2) for some class teachers.

Giving pupils choice in their learning (see below for more on Choice and Ownership) is a sign of trust in the young person and the educator's rejection of the traditional knowledge authority of the adult. This trust is then hopefully reciprocated. Educators describe how the trust that a pupil has in their class teacher or other staff member is an important ingredient in their ability to feel safe in the learning space and thereby ready and willing to engage in learning activities. Some ASN pupils have difficulties communicating with peers or adults or both, hence trust in the educator-pupil relationship being a key factor. The downside is that pupils can feel lost and without that trusted figure if that person changes:

> "He wasn't in class at all for the last six weeks of term, just because... that transition [was] coming... He loved his old teacher they had a really great relationship and she was leaving. So he was going through all that and he just wasn't ready to join." (#1)

Educators refer to their part in motivating and raising the self-efficacy of pupils – the pupil's sense of "can do". One educator refers to a homely feel to the space, as in safety and belonging, as leading to a positive mindset in pupils (see also above on the style of the environment). Pupils need to feel that they can be themselves, which can result from feeling that the space has been designed for them with their needs in mind rather than in any particular style.

Pupils are known to suffer from low self-esteem, particularly in the teenage years. In November 2022, the *End Poverty in Edinburgh* Annual Report set a priority action for 2023-4 to "Deliver inclusive education that supports children to find their passion, with equality of esteem". A visible celebration of achievements, such as simply putting artwork on display, is viewed by educators as motivating for future learning and may be considered part of their building of an overt caring relationship and signaling a valuing of pupils' efforts. In the *Shared Learning Spaces* typologies (see Annex), this is practical space for recognising achievements is labelled the 'Mountain Top', referred to positively by the educators in the school that is actively using this framework.

Motivation is equally important for educators in this relationship, one example being an educator that describes feeling excited and interested in adapting their space for their learners.

*Figure 17 - Pupil work on display alongside sensory objects for use*

### 2.3.2 Pupil choice and ownership

In the analysis of the interviews, the concept of 'ownership' emerged where educators referred to a pupil taking charge of their own activity, to the pupil's relationship with a space (e.g. making it "their own"), and to pupils participating in the design of spaces.

Educators described the act of fostering this sense of ownership as being a guiding principle in their own professional practice and a deeply-held belief. In this way, fostering pupil ownership emerges as being a similar and equally fundamental quality to developing trust in educator-pupil relationship within the learning space.

Ownership was overtly stated by educators as being important to fostering a sense of (the pupil) belonging (to the space and/or the community) and, as a result, the pupil being engaged in – or not dissuaded from – learning. This was described particularly in reference to ASN pupils.

> "Now that everyone's... got the option of... 'You can sit here or you can stay here', he's more willing to join the class because he's got more, you know, ownership... Last week, he joined us on the carpet sitting in the box with cushions, because he's quite happy to do that.... If you'd said 'No, we're all sitting in chairs' then he wouldn't have joined." (#1)

Choice of activity and type of space is widely seen as positive for pupil learning in that they can create their own context. This is reported as particularly important for ASN pupils with sensory needs and in

moments of regulation. Whilst choice is important, educators also refer to having to explain to pupils why something might work or not work, and the reason for certain rules in spaces.

> "It's a lot of that sensory and physical movement as well that helps to regulate emotions and I think a lot of our children choose to be in the garden, don't they? … So you'll have toys, outdoors and indoors, the children can select to play with them themselves. So they choose what they want. They have that choice and I think that is important." (#6)

> "It shouldn't be a distraction to other people. It should be something for themselves. If it becomes a distraction to other people and the class teacher, then we have to look at something else. Or if they're not using it in the right way... if they're flinging it around their head, explain to the children, that's your body telling you and us that's not the right tool for you." (#3)

Ownership of space goes further than merely satisfying pupils' desires. It is described by one educator that the pupils (need to) understand that the way the space is constructed is there to help them as much as the adults as also there to help rather than constrain them. In other words, the environment and/or tools have a positive and active intention.

As a practical example, pupils in one school are able to access objects or spaces without needing specific permission. There are still adult rules that govern the space, and both educators and pupils will often fall into "habits" of only using a space in a certain way, although one educator acknowledges that overtly amending these can help give ownership and independence.

> "If you want that space to reach its full potential we need to be thinking where does the power lie? Where's the autonomy for the child..? When they feel like they belong this space changes for them... It's their space, not the adults in a sense, actually. It should feel like it's designed by children, it should feel like it's got their fingerprints on it." (#2)

### 2.3.3 Peer interaction and learning in shared spaces

Pupils are witnessed, by educators, to be attached to particular spaces (their desk, the sofa, a den) because they offer familiarity and a safe space within the wider shared space of the classroom, playground or school. Some pupils struggle with social interactions and educators have witnessed these pupils starting to build relationships with more ease within the relatively safety of a Well-being Hub or similar room that is not the classroom. For these designated rooms, there may be some stigma attached to them in terms of how other pupils view it, rather than being normalised. One educator relates how having a separate entrance to their Hub space means that pupils can go in less noticed.

Some pupils may be distracted away from their learning task by other activities taking place in the same room. This raises a possible tension with the principle of multi-use spaces and giving a group of pupils a choice of activity. Again, this is where small, enclosed spaces within a larger space of multiple activities can be beneficial. Whilst these enclosed and separate spaces offer areas to be alone, educators are not intentionally keeping pupils away from peers. They refer to encouraging peer interaction and have even witnessed pupils sharing enclosed spaces and private moments with educators and classmates.

> “For many of our kids, they'd probably be quite happy to be in a small place, small space on their own. But actually, what we're trying to teach is we want you to be part of the group, we want you to be able to take a turn.” (#11)
>
> “He works with someone from the ASL service once a week, and they use the tree house, but sometimes it might just be that he goes up with a group of friends there. And that's just helping that... whether it's playing or social skills or a task, group work.” (#1)

A “quiet space” away from the classroom is a tangible example from the educators of how to enable a pupil to speak more freely about their emotions to someone else. However, pupil expression does not only result from a quiet, enclosed space. Educators refer to larger spaces to physically move and explore to “express themselves” or such spaces as a “messy corner”. Arts-based activities, in the educators’ experience, are a similar enabler.

*Figure 18 - Pupils alongside each other at different workstations with a tepee in the background*

### 2.3.4 Well-being and the physical and emotional states of being in a space

‘Well-being’ was used as a catch-all term in the interviews and educators use it to refer to pupil health, literacy, social relationships, ownership and inclusion, as well as their own health and feelings as professionals. It is also referred to as a policy to be “rolled out”. For this particular analysis, ‘well-being’ is broadly understood as the positive feelings in a person that govern their actions as engaged members of the learning community, as well as their physical health.

Educators often refer to trying to create a calm and relaxing space, particularly for pupils who suffer from anxiety. This also extends to the adults: educators report that the designed spaces have a similar effect on themselves, which helps in their role of facilitating the learning with pupils or even in having difficult conversations with parents that need a relaxing context.

Nevertheless, some educators acknowledge and refer to more stimulating spaces and tools that excite and captivate. Educators state the importance of facilitating physical movement when it is needed, rather than constraining pupils, and refer to specific objects that pupils can use (see Tools, above).

A particularly challenging period of time – either in the school day or in the academic year – is transition. Pupils are witnessed by educators to struggle with transition in different ways: from home to school (particularly since the COVID-19 pandemic restrictions); from one school to another; from another institution into school; from class to class within school. ASN specialists refer to themselves and their dedicated spaces as having or creating consistency that can aid pupils in transition. One educator stresses that their Hub needs to maintain a sense of purpose as supporting learning, not simply escapism. At the time of the study one school was designing a common space for parents and pupils to occupy to aid the morning and afternoon home-school transition.

### 2.3.5 Routines and school culture

Although educators suggest that they do not wish pupils to be forced to sit in certain seats, they acknowledge the importance of routine to a pupil's feeling of security and ability to share the space with others. Hence some rooms have designated workstations (desks) that pupils know are theirs. Sometimes whole spaces such as the Well-Being Hub might be the space of consistency for a pupil compared to having to change classrooms throughout the day.

Reference is made to the pattern of the school day, typically structured with a timetable, which can create its own challenges. The start and end are critical moments of transition (see above). In one school with a high number of ASN pupils, the timetable is more at the discretion of the educators of each class in order to respond to the needs and desires of pupils. For example, tasks might not necessarily begin or end at a fixed time, and there may be a continuous or ad hoc movement between indoor and outdoor spaces. One educator describes how difficulties arise when a more agile approach to using a space clashes with a more restrictive, ordered school culture:

> "People are setting up these beautiful... learning spaces and they look great, but they've forgotten about that other layer. So their timetable, the relationship, the movements around that space are still traditional. So it clashes and it doesn't work." (#1)

A pupil's ability to move safely between spaces is a consideration in designing the layout and connecting spaces between rooms, particularly for high ASN pupils who are less able to recall a routine action. Hence there may need to be simplicity in fire evacuation routes, or making sure that coat pegs are at an accessible height to make going outdoors a very simple and more independent process.

Some educators refer to a rejection of the norm of adult policing, for example permitting pupils to take things from storage and fridges, in a deliberate act of giving choice and independence. This is not to suggest a "hands off" culture. They refer to sometimes taking a longer time to achieve something with an ASN pupil and having to be patient, expressing a desire to have more time to attend to the needs of all pupils. They try to couple the idea of the appropriate use of, or behaviour in, a space with memorable phrases, such as "sitting when eating" (#6).

### 2.3.6 Professional role and development, and leadership

The way the educators position themselves and view their professional role and development is so closely related to their reflections on the design and use of the learning space that it was one of the highest referenced themes in the analysis. It therefore merits particular consideration.

Educators describe themselves as supportive enablers of learning in a broad sense, creating the right social, emotional and environmental conditions for and with the pupils. They understand one of their responsibilities as coming to understand the needs of each pupil as an individual. The uniqueness of pupil needs creates an additional challenge for the individual educator, the school staff as a whole, and the wider support officers as they continually adapt to each situation:

> "How do you train your staff? What's your ethos? How you respond to incidents are totally different depending on the pupil." (#11)

> "Where this is proving to be difficult [is] we also have flexible pathways for children and young people who are out of education or who are on really part time timetables. So it's about training, advice, support capacity building, for education settings. And then, you know, meeting the highest need and profile of learners within bespoke packages sometimes." (#12)

Although asked open questions about the learning space and process, educators more frequently referred to the health and well-being of pupils and to their confidence/independence as young people rather than academic achievement (such as literacy, numeracy). This suggests that, in a professional context, the personal development of young people is valued more highly, or at least the same as learning curriculum content. It suggests that this is how educators see their role.

Educators referred to lacking time and resources to attend to all pupil needs, which, by the tone of the interview responses, was conveyed as a source of frustration or disappointment to them. They are acutely aware of wanting to provide immediate attention and solutions, whereas they are sometimes caught unable to do so, often because of the way the space is or is not, and the lack of other staff support. It is a role that they cannot fulfil alone and without certain resources.

> "If there's going to be mutual regulation then there needs to be a staff member available, so staffing is also a big part and also the training of those staff members." (#10)

Educators are aware of their own developing spatial literacy and that competence in others. One refers to "new" educators being less aware of typologies, in a sense that certain colleagues would benefit from professional learning in this area. Another refers to the lack of external support and having "to learn over the past few years in the job while the children are there and adapt and upskill ourselves." (#11). Peer professional learning is critical to sharing practice across a school, but not in a way that may be perceived judgmental:

> "And it's never a 'What is this teacher doing that's better than you?' The question is, 'Look at this environment. Anything that could help the learners in your class?'" (#4)

Educators who have worked with education organisations (such as LEGO) and other projects, have undertaken master's level study, or have participated in in-school development sessions, appear to speak with some authority and depth of understanding, recognising that they are perhaps in a more privileged

position compared to their colleagues or have had unique opportunities to develop their own practice under the guidance of experienced peers.

ASN Specialists understand that they are in some ways different to class teachers in that they can give individual attention to ASN pupils, supervise them in a separate space, and be a constant when class teachers change. They may also help to adapt spaces and make recommendations to class teachers when reintroducing pupils to the shared space. The relationship between them and class teachers, would therefore seem to be crucial to the development of the pupil(s). They also recognise that they are not the sole educators responsible for ASN pupils but that it is a whole staff – including catering and caretaking staff – effort. Whole school professional learning about ASN is seen as beneficial.

The headteacher and other school leaders are cited as being a driving force in space adaptation and changes to practice, and, where they are supportive, are acknowledged positively by educators. On the other hand, the class teachers may be the catalysts for change in a school:

> "We've had practitioners … who maybe haven't been interested in that ... whereas right now we've got teachers that are really soaking everything up. They've become real advocates for it and what they're doing is phenomenal and we're getting ideas from them and they're going to drive it." (#2)

### 2.3.7 School policies and ethos, and a 'whole school community' approach

Educators refer to supporting and caring for pupils, and building trust, not just as part of their own professional practice, but also as a core ethos of their schools. This is particularly evident when talking about sharing practices and about working with pupils across different spaces. Although some educators refer to inspiration from other schools and are aware of the mutual challenges, they reflect deeply on their own immediate context.

In terms of school policies, the School Improvement Plan or an inclusion strategy within that, are understood as being additional drivers of change in the school, of which spatial adaptation is just one of many approaches to inclusion. Inclusion as a policy and space adaptation as a practical response also need not only refer to ASN pupils: educators believe that principles for ASN pupils would work equally well across mainstream settings or simply with all pupils.

More than one educator refers to risk assessment as a key part of safety considerations – protecting the pupil and the educator - within different spaces, and clear procedures for some decision-making processes "so that everyone's on the same page" (#4).

Educators refer to the challenge of communicating closely with parents and families in order for them to appreciate the approach of the school to their child. Equally they rely on parents to share useful information about the child in order to adapt the in-school approach. Some parents will question the departure from a "traditional" classroom space and may also be uncomfortable with their child being outside of mainstream education. On the other hand, some parents are reported to be happy and surprised with the progress of their child, witnessed through changed behaviour at home or being told about in-school episodes. Adaptation of shared spaces in-school is reported to help working with parents, for example a more home-like 'domestic' space to discuss the child, or a transition space for the start and end of the day.

Educators recognise that they are part of a larger education community, including the local authority, educational psychologists, GPs, and Community Child Health workers, although it was more the City Council officers who referred to the benefits of working together. They are seemingly more aware of what other schools have and have not, whilst being predominantly focused on and dedicated to their own immediate school community:

> "Some schools had really good spaces they could use; some schools didn't have good spaces; and two schools had no spaces they could use at all. But it all comes back to the overarching vision of actually what we want as a city." (#11)

# DISCUSSION

*If you couldn't fit the box, then you were told to stop swinging on your chair. Nobody offered a wobble stool. Or you were told to stop fidgeting with your pencil. Nobody offered you something to fidget with that was okay. Or you were told to sit down on your seat rather than sit on the floor because you found a comfier. We need to move because in no other industry, in no other area of learning, in no other capacity, do we, do humans act like that. Humans find what works for them. And so, if you have a one-size-fits-all across education, we're going to fail kids. (#4)*

## 3.1 Learning space theory and practice in the current social and economic climate

As a contribution to the body of research on learning spaces, this study has been inspired by and built upon previous work, reinforcing previous findings on the positive effectiveness of stakeholder collaboration when identifying and address needs. However, this was designed as an enquiry into the realities of the design and adaptation process in different contexts, rather than following one school through a structured intervention project. It enquires about both the opportunities and challenges of that collaborative process in a period of pandemic recovery and cost of living crisis, where the circumstances demand seeking high and rapid impact on pupil development for relatively low financial investment.

This study provides many examples of practice that support contemporary theory about effective social learning communities, about supporting the well-being of young people, particularly post-COVID, and about collaborative approaches to design for agile and sustainable public spaces. Not only are all of these important in themselves but can complement each other in a way that they have a stronger impact as a sum of their parts.

**Communities of Practice** – the idea that people with shared goals learn better how to achieve them as they interact and collaborate – is a powerful concept in the work of schools and in educator professional development. In their 2020 publication, *Learning to Make a Difference*, well-known social learning theorists Wenger-Trayner and Wenger-Trayner identify three key elements: Caring to make a difference; Engaging with uncertainty; and Paying attention.[38] All have been observed in this study as crucial parts of adapting learning spaces specifically for ASN pupils: the way educator perceives and approaches their role with care and a determination to support development; the way unplanned moments with unique pupils are navigated and facilitated, helped by agile spaces; and the close observation and attentive dialogue that underpins the adaption of space with a learner-centred approach as they pay attention to and value their pupils' needs and ideas.

**Well-being and student engagement** are two major concerns for schools and educators, particularly since the restrictions to on-site learning during the COVID-19 pandemic. International education researchers Hargreaves and Shirley have written extensively on these topics. In *Well-being in Schools* (2021) they

[38] Wenger, E. and Wenger-Trayner, B., 2020. *Learning to make a difference: Value creation in social learning spaces*. Cambridge University Press.

identify important goals for all young people that require educator support: personal prosperity, social prosperity, and drawing on the restorative qualities of nature.[39] This study provides evidence of this in action. First, a pupil's personal development is observed to be positively influenced by the learning space when it supports and activates the affective domain. Educators also observe peer interactions and relationships being fostered through the environment and tools. Outdoor learning and biophilic design are observed to have a positive influence and be restorative as the authors describe.

**Learning space design** may be daunting for educators with little previous experience, as much as pedagogical design of the learning process may be unfamiliar to architects and interior designers. The 5 steps of the Stanford Design Thinking[40] process - empathize, design, ideate, prototype, test – suggests a frame for considering not only how architects and interior designers might approach learning spaces but also educators, pupils, and the wider school community; and all these combined. All steps have all been referred to in the study as resulting in positive opportunities for pupils, but not without challenges. The first, empathy – appreciating the perspective, needs and desires of others – is demonstrated as a critical trait for all to possess and links closely to well-being, engagement in learning, and the capacity for a learning community to evolve and work together.

## 3.2 Responding to the research questions

The broad aim of the research question was to respond to the question, **How can the adaptation of school and Early Years (EY) spaces support the learning of pupils with additional needs?** This was complemented by three sub-questions exploring the self and mutual regulation of pupils, the broader influence of learning space adaptations on pupil learning, and stakeholder collaboration in learning space design and adaptation.

We discuss each question in turn before drawing overall conclusions and making recommendations.

**RQ1 - What adaptations of learning spaces are observed by educators to influence the self and mutual regulation of pupils and with what outcomes?**

Through the experiences described by the educators the complex nature of the learning process and the multiple factors influencing each situation are evident.

Like all scenarios and with all pupils, supporting pupils in moments of regulation is not dependent on one single approach or tool. Temporary practical solutions are often coupled with intangible elements such as a relationship of trust fostered over time. Educators see all pupils as unique, which means that there is certainly no one-size-fits-all adaptation. Added to this complexity is that there is no singular aim: regulation does not always mean trying to encourage a pupil to be calm, quiet or still. Likewise, it does not mean obedience to one teacher's dictated rule for behaviour for this is neither self nor mutual regulation. Naturally, the safety and well-being of all pupils is of utmost concern but the educators across the different settings appear in agreement that any adaptation should be with the purpose of supporting

[39] Hargreaves, A. and Shirley, D., 2021. *Well-being in schools: Three forces that will uplift your students in a volatile world*. ASCD.
[40] https://web.stanford.edu/~mshanks/MichaelShanks/files/509554.pdf

the pupil to manage their own intense feelings that are preventing learning or social interaction.

In terms of spatial adaptation, moments of regulation often require going somewhere else – alone, with another adult, or with a peer. This may create a useful distance from a trigger and enable the pupil to focus on themself. Therefore, a physical other space – room, corridor, enclosed area or structure – needs to be available, as well as a quick and easy route to get there (if it is another room or outdoors) and permission and trust to do so need to already be part of the culture of the school. The obvious challenge for self-regulation is if such a space is far away, e.g. on another building level and is a safety concern with that pupil being unsupervised for a prolonged period. Mutual regulation requires a space designed for both child and adult (class teacher, learning support practitioner, parent) to be comfortably – physically and socially – occupying the same space. Enclosed spaces are described as being popularly chosen by pupils but, such as with a treehouse, these spaces can also usefully accommodate adults or peers.

As well as the option to relocate to a different space – either within the same room or a different room – educators describe the use of various tools as being effective in moments of regulation. First of all, these need to be to hand, either in a dedicated position where the pupil can access them or in storage that an educator can easily access without having such items always out or cluttering the space. For the school, there needs to be investment in such items and, for the educator, they have the task of preparing the materials for use and coaching the pupils in how to use them in the most beneficial way (sharing the "why"). Specific examples are described in the Findings section and in the Annex.

Adaptation of space is also beneficial to preventing anxiety or other emotional states getting to a level where regulation is required. Hence there is a need for agile spaces where pupils have the choice and sense of ownership to move around and behave in the space in a way that suits the activity but also their own needs at the time. An example is the choice of seating that might be closer to the ground, grouped with others, or solo on a sofa. Educators refer to specific environmental variation (temperature, light, sound) coupled with the with style of decor (neutral tones, domestic, biophilic) as helping to subconsciously shift pupil behaviour and energy. There are ways of doing this in cost-efficient way, although some educators still express a desire for improvements to their current environment and resources.

**RQ2- What do educators observe to be key adaptations of, and interactions with, learning spaces that have a positive influence on pupil learning processes, and how do educators position themselves?**

Approaches that are observed to have a positive influence on pupil engagement in learning and their well-being and socio-emotional behaviour, rely not only on the provision of suitable environments and tools, but also to the crucial relationship between educator and pupil. Even though the interview questions were directed towards practical examples of space design and adaptation, educators referred to their personal understanding, communication with, and levels of trust between them and the pupils with high frequency, underlining the importance of these factors in combination with the environment and tools.

The type and layout of furniture, coupled with a sufficiently large indoor space, is unsurprisingly instrumental in enabling teacher-directed or pupil choice in ways of learning, for example for teamworking, sharing, social peer learning, student-led tasks (not reliant on teacher knowledge authority), and exploration. These pedagogical approaches and student competences form the basis of

many other research studies and literature and provide strong evidence to support the need for investment in adequate resources and educator spatial literacy. Not to be forgotten is the space in between the tangible items; i.e. the space that maintains comfortable social distance, the space by which pupils freely move around without disturbance, and the space across which staff can observe at a distance or move closer to provide targeted support. It should be noted that such examples are anecdotal in this study and that another study might usefully observe spaces in action to complement the data.

The importance of giving pupils choice and ownership in learning spaces, and the positive impact on their engagement and well-being cannot be underestimated. It was frequently raised by educators in their interviews and expanded on in the experiences they described. The educators position themselves as trusted scaffolders of the learning process, setting up tasks that can be completed in slightly different ways in the space. Particularly following prolonged periods of learning at home, the educators choose not to universally enforce one way of physically being in the space. The focus is on best succeeding in learning and accepting the uniqueness of pupils rather than negatively affecting their learning with an emphasis on conformity.

Motivation for learning and generally being content in the culture of 'school' requires building self-esteem. Again, this is believed to be supported with choice, variety, and positive feedback. Multiple spaces in one room allow a pupil to select and control their own learning micro-environment, for example when feeling "distracted". It should be noted that it is not about separation or isolation of anxious or disruptive pupils. As educators point out, sometimes a different space is necessary but they as role-model adults advocate sharing, interaction and taking turns in the social business of learning and operating in society.

The educators further position themselves as observers and listeners, offering suggestions and advice in how to act and taking cues from the pupils as how they as educators might adapt their own approaches and use of space.

Outdoor spaces are frequently described in a positive, even when the environment may be cold or wet. Educators describe the pleasure gained from both the expanse of open space, as well as the way that plants and other organic matter ignite the senses. This creates a space conducive to play and exploration, as well as a curiosity and desire to learn about nature. Educators remain sensitive to pupils who do not react in this way and require enclosed within the open outdoor space to feel at ease.

Challenges of space transition are not limited to indoor-outdoor. Educators note that some pupils have difficulty leaving the relative safety of the home environment or feel anxious about entering a new and unfamiliar classroom with its shift in routine. Such transitions need consideration and some time to adapt.

**RQ3 - How can whole education communities within local authorities effectively collaborate as stakeholders in the process of designing and adapting learning spaces for pupils with additional support needs?**

In describing their experiences of design and adaptation, educators emphasise the importance of particular approaches and attitudes that will ensure that learning spaces function according to the needs of the pupils and educators that use them most. First, an open-minded approach of listening and observing needs to be adopted by stakeholders based both inside and outside of the school. Empathy – imagining the space from the perspective of the other – is an important quality needed by all.

Engaging all stakeholders, including pupils, in constructive dialogue ensures that the learning space is founded upon a sense of ownership, which then can aid sustained engagement. Active participation may require different approaches depending on the stakeholders involved. For instance, prototyping and testing (for example with cardboard versions) may be necessary for those who are less able to imagine the eventual outcome or may reveal that assumptions have been made in the design and need reviewing. Visits to see other spaces in action in one's own school or setting, or others sites, can inspired educators, although they are conscious that their own contexts are unique and a copy-paste approach will not necessarily be effective. Observation and testing with reflection, and a willingness to adapt later, is a part of informed decision-making and can avoid unused spaces or wasted expense in the long-run.

Educators describe their own challenges of designing for their community, as well as communicating this effectively to external designers and contractors. A shared vocabulary and shared goals are ideal but not always possible, even down to the different interpretations of the words "environment" or "behaviour" by stakeholders in different roles. Multidisciplinary partnerships need to take this into account. There is a practical benefit of frameworks, guidance, toolkits, and working with external organisation. However, studies of professional development highlight that educators are inundated with policy guidance and standards requirements, which often become an administrative burden and checklists to hastily tick off in an annual review rather than frame for the ongoing process of reflection and critical thinking.

Educators need confidence and competence in spatial literacy, including those cases where they are tasked with carrying on the process once designers and contractors have left. They do draw on their own professional networks and peer learning, and some refer to structured learning in the form of master's level courses. They also appreciate their role in helping pupils to reflect on different opportunities and uses of the space, including the learning tools within it. They are careful to explain the rationale and the mechanisms of certain items, as part of a democratic use of space. They are also transparent about the limitations in choice, rather than avoiding or shielding pupils from the reasons why.

Educators are acutely aware of not operating alone with their pupils in spaces. Particularly in the case of ASN pupils, they recognise that inclusion requires communication across broad range of education services, then adding the local authority Learning Estate teams to that complex ecosystem. Where they may feel limited in terms of budget, they are resourceful in approaching the local community for procurement support (fund-raising, second-hand purchases, donations). They recognise the benefit when the school leadership team are supportive of efforts to adapt learning spaces and take a whole-school approach to ASN pupils, driven by the School Improvement Plan. Schools with newly-built spaces require support from other stakeholders in order not to be cast adrift with the responsibility for those spaces. Finally, the parents and carers of pupils are valued members of the community who should be communicated with and with whom successes can be shared, transcending the boundary between in-school and out-of-school development.

## 3.3 Conclusions

In this short section, we refer to the holistic well-being principles for practitioners and organisations that were created as part of the Getting It Right For Every Child (GIRFEC) policy: that all children should be and feel Safe, Healthy, Achieving, Nurtured, Active, Respected, Responsible, and Included. Drawing on the evidence generated by this study, the design and adaptation of learning spaces in school and EY settings are an important part in achieving each of these principles. Such processes benefit from being collaborative and following a cycle of empathetic design, testing, and reflection.

Considering the national Learning Estates guidelines, the local authority and schools in this study present a positive example of how these principles work in practice, although educators encounter various challenges along the way. Educators describe the positive impact of particular elements of learning spaces on pupil engagement and well-being, including that of ASN pupils. These elements include the learning environment - the buildings, and the style and functioning of the décor, light and sound, as well as the outdoor environment – and the learning tools: the furniture and its layout, and the portable items that are used in learning tasks.

What should be highlighted regarding the Learning Estate guidelines is that adapting environments and providing learning tools does not in itself achieve the pedagogical and social aims of EY settings and schools: the effectiveness of environments and tools depend on the way they are embedded in learning (the pedagogical process), the relationships between educators and pupils, and the culture of the school or setting.

This study has focused on the work and experiences of educators, and we end by stressing that the capacity of educators is crucial. Adapting learning spaces for pupil needs must look to supporting educator competence and confidence, coupled with adequate resources and the autonomy to test different approaches with pupils in a continuous cycle of change as part of ongoing school improvement.

This study offers important insights into specific examples of learning space practice in Scotland, but where there is a clear lack of evidence from research to inform the landscape nationally and internationally. This is another challenge worth addressing in the future.

## 3.4 Recommendations

Following on from the Discussion and Conclusions, we offer recommendations to different stakeholder groups based on the key messages from the study.

**EDUCATORS may consider:**

- Working with colleagues to test small adaptations of space, considering the blend of spatial and pedagogical approaches, as well as different sensory elements;
- Actively involving pupils in the design and adaptation of learning spaces, including discussing the rationale for different options, and giving them some choice of environments or tools during learning tasks;
- Designing and creating learning spaces that are agile, including hallways and corridors, and have the flexibility for multiple activities as well as to be redesigned when needed;
- Both indoor and outdoor spaces, and bridging the two (biophilic design), and ;
- For those with more experience in learning space design, sharing expertise with colleagues and local networks.

**SCHOOL AND EARLY YEARS SETTING LEADERS may consider:**

- Dedicating staff peer observation and discussion time to the specific topic of learning spaces;
- Ways to ensure that the whole school community is actively included in design processes, including discussing the rationale for different options and making clear links between pedagogical theory and practice;
- Making sure that staff can take some ownership of the learning spaces, as well as appreciating the transition to new staff occupying those spaces;
- Appealing to the local community to offer ideas or resources for learning space adaptation, as long as they conform to fire and safety regulations and are of a high specification for the use of pupils in education settings.

**LOCAL AUTHORITIES (PROFESSIONAL LEARNING, ASN SUPPORT, ESTATES TEAMS) may consider:**

- How best to support professional learning on learning spaces across all schools and EY settings through partnerships and peer sharing of expertise and experiences;

- Providing sustained design guidance and construction support across all schools and EY settings, recognising that additional resources and expectations can be a burden on educators' workloads and that full implementation processes can last years;

- Support (guidance, contacts) for the cost-effective procurement of items by schools and EY settings.

**POLICY MAKERS may consider:**

- Including more explicit references to learning space design and adaptation in future policies regarding inclusion, well-being, and educator professional development;

- Making funding available for the generation and sharing of evidence about learning space design and adaptation.

**RESEARCHERS may consider**:

- Building on this study to investigate a similar topic in other contexts and regions, or using a complementary research methodology such as observation, large-scale survey, or action research. This will help to address current gaps in evidence relating to learning spaces.

# ANNEXES

## 4.1 Glossary of terms and their use in the context of this study

| TERM | DEFINITION(s) and USE(s) IN THE CONTEXT OF LEARNING SPACES |
|---|---|
| Adaptation | Changing elements of a space or the way it is used for different purposes, but not a complete change. |
| Agile | (also Flexible) Ability for a space to be changed multiple times in the way it is used or configured, over a period of time or for a learning activity, and with ease. |
| ASN | Additional Support Needs for learning. |
| ASN Specialist | Member of staff working with specific pupils, in classroom whilst class teacher facilitates a lesson or outside of classroom. Also known as Special Education Needs (SEN) teacher or practitioner. |
| Behaviour | The way in which a pupil conducts themselves, or acts in response to a stimulus or actions of another. |
| Biophillic | (Building/design industry term) Connecting the occupant of a space to nature through interior fittings or the juxtaposition of indoor and outdoor. |
| Breakout space | A space away from the main activity space, typically encouraging work in smaller groups after beginning an activity as a whole group. |
| Classroom | The room (with boundaries such as walls or partitions) where a class of pupils is taught. |
| Consultation | Discussing ideas with one or more stakeholders (educators, parents, pupils) to better understand their needs and desires. |
| Decoration | The process of adding to a space to make it more pleasing to the occupant. Can also refer to the wall colours, flooring, fixtures, and furniture selected as part of this. |
| Design | A process, and/or the drawings, to show the look and function or workings of a building, space, or objects before they are made or procured. |
| Educator | A person involved in the provision of education, in facilitating teaching and learning. This includes class teachers, Early Years practitioners, teaching assistants, specialist teachers, principal teachers, head teachers and other leaders. |
| Empathy | The ability to understand the feelings of another and see the world from their perspective. |
| (Learning) Environment | This can refer to the physical location, context or culture in which pupils learn. For this study, if refers to the immediate surroundings: the walls, floors, |

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| | windows of the interior, or the ground, air, plants, and other structures outdoors. |
| Fixtures | A piece of equipment that is fixed in position in a space, such as a sink, lighting, or window blinds. |
| Furniture | Movable items that help to make a space inhabitable for work, rest or play. Includes tables, chairs, stools, bookcases etc. |
| Holistic | Taking into account the whole, rather than a part. In the case of pupils, this typically refers to considering their physical, mental and emotional needs; or their school life together with their home or out-of-school life. |
| Hub | In this study, a "hub" is a dedicated room or set of rooms where pupils can go for support or to undertake learning activities separate to their class. Such spaces are typically staffed by specialist educators to offer support. |
| Identity | The qualities, beliefs and personality traits by which a pupil is known and knows themself. Where they position themselves in their community or in wider society. |
| Pedagogy, pedagogical | The theory and practice of teaching and learning. Educators hold their own views about the purpose and effectiveness of certain approaches, thereby constructing their own pedagogy. Pedagogical describes something that relates to this constructed theory and practice. Pedagogical design, describes the process of planning a learning activity based on a pedagogy. |
| Playground | An outdoor area within the school grounds, designed for pupils to play and typically during the time between lessons. Such spaces may also be used for structured learning activities (physical education, science, maths, geography). |
| Practice | An educator's practice is the application of pedagogical theory or thought to facilitating a learning activity. |
| Professional | In schools, relating to the work that educators are employed to do, and for which they are qualified after a period of recognised professional education. |
| Regulation | Action taken by the child independently (self-) or with others (mutual) to manage a moment of intense feeling that inhibits their ability to engage effectively in play, learning, and/or social interaction. |
| Sensory objects | Items that educators use or make available that engage a learner's sense of touch, taste, smell, sight or hearing |
| Spatial literacy, design | Spatial literacy is the ability to use and manipulate the properties of a space for a particular purpose, in this case to support the learning process. Spatial design is the planning part of that process. |
| (Learning) Tool | Learning tools are items that educators and pupils use to assist the learning process. In this study, there are fewer references to the manual tools that all educators and pupils use: pens, books, digital tablets, whiteboards. The focus is on additional tools to support learners in other ways: wobble stools, sensory objects, etc. |

## 4.2 Catalogue of spaces, fixtures, and furnishings referred to by the participants (with images)

*Images not all of the participating school or educator spaces. Centre image credit Phillip Capper on Flickr.*

| **BUILDINGS** | 19th century and early 20th century | Mid-late 20th century 'Modern' | 21st century and new-build |
|---|---|---|---|
| **THUMBNAIL IMAGE** |  |  |  |
| **TYPICAL FEATURES** | High ceilings and windows, 2-3 storeys, large hall(s). | Lower windows and ceilings; open-plan primary; blocks for secondary. | Styles vary but attempt to optimise natural light levels, acoustics and energy efficiency, along with sustainable materials. Include breakout spaces and connect indoor and outdoor. |

| **ITEM** | **THUMBNAIL IMAGE** | **DESCRIPTION OF SOME FEATURES CHOSEN BY/FOR SCHOOLS IN THIS STUDY** |
|---|---|---|
| Wall colours and coverings |  | Participants refer to the calming effect of neutral and natural tones. Wallpaper or vinyl can create patterns or the impression of objects such as trees. |
| Floor materials |  | Wooden and wood-effect floors contribute to the natural, neutral décor.<br>Rugs offer a way to create a zone and a comfortable way to sit on the floor. |
| Indoor biophilic |  | Integrating the natural colours, patterns and rhythms of nature with 'forest' wallpaper, leaf stencils on walls, and plastic garlands can create an impression of the outdoors. Wicker furniture and storage, and the general use of unpainted wood, adds to the biophilia. |
| Outdoor |  | A door directly from classroom to designated playground space facilitates quick or fluid movement in-outdoor, in times of need.<br>Gardens with a range of plants are value sensory spaces. A 'mud kitchen' encourages exploration. |

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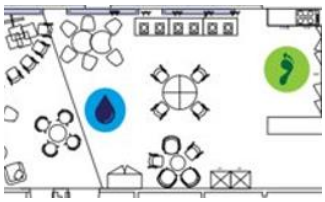
| Layout |  | With large enough dimensions, a classroom can incorporate several designated areas.<br>The layout can complement the pedagogical approach: individual work, group work, whole class. |
| Workstations |  | Table segments can build different formations, e.g. a “pizza” table supporting group work. |
| Seating |  | Participants observe that pupils choose different types of seating: chair, sofa, beanbag, floor.<br>Wobble stools are a popular choice for pupils who need to keep physically active to focus on a task. |
| Storage |  | Equipment needs to be stored to keep it organised, easy to access, and to maximise the space. Storage keeps delicate and/or expensive equipment away from pupils.<br>Storage baskets, cupboards, shelves, and panel covers are all useful. |
| Enclosures |  | Participants refer to tepees, treehouses, tables with material around the legs, and other makeshift dens, as way of creating a safe and calm atmosphere. |
| Specific activity tools |  | The educators in this study report using a variety of tools, particularly when talking about supporting ASN pupils: boomwhackers (musical tubes), textured items, digital tablets. |
| Display (of work) |  | Educators refer to celebrating pupil successes and raising self-esteem by displaying pupil work. |

## 4.3 Using the Shared Learning Spaces typologies, values and design factors: a complementary guide for educators

### Guide for Practitioners

### Working with the Shared Learning Spaces Typologies, Design Values, and Design Factors: evidence from the ASL study

Key messages from recent educator experiences in Edinburgh schools and an EY setting are listed alongside the relevant items and descriptors. For more detail, see the relevant section of the Findings chapter in the report.

**TYPOLOGIES**

| Typology | Meaning | Key messages from ASL study |
|---|---|---|
| **Campfire** (Focused, scaffolded input) | A place for learners to come together, listen to experts and learn from each other. A **sharing space** for problem-creating, goal setting and curriculum-making. | This does not have to be whole-group or on the floor, especially for pupils who prefer to have their own workstation. Configuring tables in a circle or serpent formation can bring learners to work together or alongside, whilst educators can observe or move in to assist. |
| **Cave** (Independent, reflective learning) | A **safe, reflective space** to be alone and to reflect or to work independently, without interruption or distraction from others. | Enclosed spaces – tepees, tents, tables with material surrounds, folding bookcases – have been observed to greatly aid pupils, either in moments of regulation or simply feeling calm, comfortable and safe whilst learning. Another room, including Well-Being Hubs, or corridors may provide similar spaces. |
| **Watering Hole** (Collaborative learning) | A more informal space to gather for learning from peers, exchanging ideas in small groups. A good place to get help and advice when we get 'stuck' or need inspiration. A **problem-solving space.** | Whilst not evidenced specifically, educators recognise the importance of peer collaboration, even though some pupils find the social learning space tricky. Round tables enable interaction across a group workstation. |
| **Fields** (Experiential learning) | Practice, specialist, and creative spaces. Places where we actively try out ideas, test things out, applying our knowledge and skills in the wider world, life spaces. A '**doing,' experimenting and moving space.** | Educators refer to the benefits of engaging with nature outdoors, arts and crafts, and kitchen equipment as offering important opportunities for pupils to develop their skills, which may not be afforded outside of school or at home. |

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| | | Safety is a primary concern. Educators value having sufficient staffing and the ability to supervise multiple activities within the same large space. |
| **Journey to the Mountain Top** (Celebratory, shared learning) | A place to celebrate and share learning with others.<br>A place to feel proud.<br>A wellbeing and '**feeling good'** space. | Pupils are known to suffer from low self-esteem, particularly in the teenage years. A visible celebration of achievements, such as simply putting artwork on display, is viewed by educators as motivating for future learning and may be considered part of their building of an overt caring relationship and signaling a valuing of pupils' efforts. |

**DESIGN VALUES**

| Value | Meaning | Key messages from ASL study |
|---|---|---|
| **Kindness** | Kindness is at the heart of learning and encourages sharing and caring across all learning spaces. | • Educators are explicit about their own personal sense of reward from helping ASN pupils with their learning.<br>• Part of educators demonstrating their care is being transparent about the rationale for design and giving choice. |
| **Inclusivity** | Prioritising inclusive learning spaces (including digital), where all learners feel safe and supported to be themselves. | • Educators recognise that a one-size-fits-all approach will not help all learners to progress.<br>• Creating a relationship of trust, together with enabling pupils to make choices about their learning space, promotes inclusivity. |
| **Ownership** | Ensuring the learner remains at the heart of decision-making about their learning spaces. Engaging learners in making informed, responsible decisions. | • Ownership begins at the start of the design process, which both educators and designers need to involve pupils in.<br>• One the space is occupied, allowing pupils to make some choice in their use of space creates this sense of ownership. |
| **Sharing** | Prioritising collaboration with both local and global communities, exploring shared learning in all indoor, outdoor and digital spaces with others across ages, cultures and capacities. | • Broad stakeholder consultation and ongoing communication is important to the effectiveness of the learning space(s).<br>• Within the learning process itself, shared spaces may be difficult for ASN pupils if they become anxious or distracted and ways to maintain individual spaces within larger shared spaces are valuable. |
| **Sustainability** | Prioritising physical (material), virtual, cognitive and socially sustainable solutions in | • Materials used in new builds, or procured for existing sites, need to be especially robust for continuous and vigorous use. |

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| | our learning spaces based on a commitment to Global responsiveness. | |
| **Uncertainty** | Embracing uncertainty in our learning spaces in order to develop skills, knowledge and capabilities to deal with and be positive about ambiguity and complexity in diverse contexts. | • Educators make a conscious effort to create a safe and trusting physical and emotional context for learning, with few surprises and causes of anxiety.<br>• However, they equally use the available spaces to encourage learner-directed play and exploration, and offer choice within the space to promote independence. |
| **Well-being** | Ensuring that our learning spaces promote mental, emotional, social and physical health and well-being for ourselves and others guided by 'well learning' principles. | • Well-being can be promoted in many ways. In the environment, for example, a more domestic and less institutional style is believed to be supportive.<br>• It is important to combine a supportive approach and educator-pupil relationship with learning tools that promote well-being. |

**DESIGN FACTORS**

| Factor | Meaning | Key messages from ASL study |
|---|---|---|
| **Agile Spaces** | Ensuring that learning spaces are flexible to support a wide variety of teaching and learning activities, with practical and creative spaces for collaborative and independent learning. This includes specialist, community, social, play and recuperative spaces. | • Flexibility was mentioned frequently by educators as an important feature of effective learning spaces.<br>• For some educators, agile means being able to adapt the layout of furniture for different learning tasks.<br>• It is important to have a range of tools easily accessible, or even easily shut away for safety. |
| **Accessibility** | Addressing the physical, intellectual and emotional needs of all learners. | • Whilst it may be ideal that all learners feel motivated and supported in all school spaces, this is unlikely to be the case, particularly with ASN pupils. As described by educators, the same classroom may contain different spaces or zones that are accessible (more suitable) to different learners.<br>• Dedicated spaces, such as Well-being Hubs, have an important role to play for pupils who need targeted support and should be equally accessible. |

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| | | • Education settings should have spaces that parents can comfortably occupy to engage with their child's learning or even to assist with transition from the home environment. |
| **Environment** | Developing nurturing environments that promote physical and emotional health and wellbeing. | • In a broad sense, the environment refers to the physical surroundings, the energy and social relationships between the occupants, and the culture in terms of the rules and routines of behaviour. Participating educators often described these three elements together, emphasizing how they complement each other.<br>• When designing a space in terms of its physical attributes, it is important to consider how it will be occupied and what kind culture is fostered. For the interviewed educators, choice, trust, and a feeling of safety are important. |
| **Safety** | Prioritising safety in all learning spaces and ensuring that all learners feel safe and secure in their learning environments. | • Safety may be considered in a practical sense: storing items and giving clear advice on the use of objects.<br>• A feeling of safety may depend upon what the pupil can construct for themselves, in terms of occupying an enclosed den, or choosing to sit themselves with a few chosen peers. |
| **Furniture, Fixtures and Equipment (FF&E)** | Ensuring the agile FF&E can support all learners and enhance indoor, outdoor and shared learning spaces. | • As with accessibility of space, if is not necessarily that each single item is appropriate to all learners; rather that an adequate variety of tools with pupil choice is likely to attend to the needs and preferences of pupils, supporting their engagement.<br>• Educators observed a positive impact of objects – both indoor and outdoor – that engage different sense. Sensory objects are observed to be particularly influential on ASN pupils. |
| **Digital** | Promoting critical understanding of fit-for-purpose digital and virtual shared learning spaces. | • Digital tools were cited as beneficial to pupils continuing their learning in a separate space to peers via an online connection. |
| **Natural Space** | Connecting learning environments and natural space, bringing the outside in (e.g. biophilic design) and the inside out (e.g. outdoor learning). | • Educators observed the positive impact of outdoor learning on pupil engagement and well-being. |

## 4.4 Using the CIRCLE checklist: a complementary guide for educators

### Guide for Practitioners

### Using the CIRCLE Inclusion Framework: evidence from ASL study

Key messages from recent educator experiences in Edinburgh schools and an EY setting are listed alongside the relevant framework items and descriptors.

For more detail, see the relevant section of the Findings chapter in the report.

It should be noted that many key messages can relate to all pupils in all types of settings and not ASN pupils and learning support specialists alone.

| CIRCLE Framework | Key messages from ASL Study |
|---|---|
| **PHYSICAL ENVIRONMENT** | |
| **Accessibility of Space**<br>Barrier and hazard free<br>Ease of access | • Situating Well-Being Hubs away from the centre of the campus with a separate entrance can maintain privacy; however, it needs to be not too far away to be quickly accessible and also positively embraced as a valued learning space. |
| **Adequacy of Space**<br>Availability of spaces<br>Tailored to needs<br>Set up of spaces including seating | • Multiple spaces can exist within one classroom which gives pupils choice whilst being supervised by educators.<br>• Involving pupils in the design and adaptation gives them ownership of the space, and therefore are more likely to be engaged and comfortable in it. |
| **Sensory Space**<br>Temperature/noise/lighting/odour<br>Adjustability<br>Self-calming | • Natural light as well as the ability to dim the lighting can influence pupil behaviour.<br>• Neutral tones and natural materials have a calming effect and are aesthetically pleasing. Extending the learning spaces to outdoors increases the variety of sensory experiences. |
| **Visual supports**<br>Signs<br>Labels<br>Visual timetables<br>Posters/displays | • Pictorial labels assist with communication where verbal communication or literacy is low.<br>• The display of pupil work, celebrating their achievements, boosts their self-esteem and motivation for future learning. |
| **Availability of Objects**<br>Objects accessible<br>Objects suitable<br>Adaptive devices | • Adequate storage helps to keep objects organised and easily accessible.<br>• Sensory objects can help pupils in moments of regulation.<br>• A variety of seating styles is beneficial in attending to pupil physical states and enables them to focus on tasks. Wobble stools are effective with pupils who need to keep moving. |

| SOCIAL ENVIRONMENT | |
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| **Attitudes**<br>Empathy<br>Understanding<br>Non-judgmental<br>Respecting others | • Empathy – by the external designer and educators – underpins the design and ongoing adaptation process, which is helped by including the pupils, discussing their preferences and explaining the rationale for the space and use of tools.<br>• Fostering a culture of respect, with the educator trusting the pupil, contributes to motivation. |
| **Support and Facilitation**<br>Verbal support<br>Non-verbal support<br>Physical support<br>Appropriate communication | • Communication is crucial to adapting the space according to pupil needs and the demands of the learning task. Where verbal communication is difficult, images can be used.<br>• Enclosed structures and tables of different shapes and heights can support individual and group learning. |
| **Relationships**<br>Staff and peers<br>Accepting atmosphere<br>Sense of belonging<br>Opportunities for relationship building | • Learning in different environments and with different tools is effective only if in tandem with a caring and trusting educator-pupil relationship.<br>• A sense of belonging in the learning community (and thereby engagement in learning) is supported by ownership of space, which educators and pupils co-construct.<br>• Not all pupils are comfortable sharing their immediate space with peers at all times. Independent spaces, within or outwith the classroom, offer a safe place for learning. |
| **Provision of Information**<br>Accessible<br>Clear<br>Variety of formats<br>Parents/carers and learners | • Communication should extend to parents and families, helping them to understand the way each pupil learns in spaces and receiving feedback from the home environment. |
| **Empowerment**<br>Support for autonomy<br>Learner-centred<br>Responding to needs and views | • Giving pupils choice in their environment and use of learning tools encourage them to reflect on their own needs, building their independence in and self-management of learning. |
| **STRUCTURES & ROUTINES** | |
| **Activity demands** | • It is important to discuss the rationale for certain approaches with pupils so that they make informed choices. |
| **Rules and boundaries** | • Some learning tools require clear rules and boundaries in order to keep all pupils safe from physical harm and prevent the unwanted disturbance of others. This is an accepted condition of allowing pupil choice and catering to the needs of those with high levels of physical energy. |
| **Appeal of activities** | • Educators find that learning task appeal is partly governed by the environment – hence requiring agile spaces – and |

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| | also by unseen factors, such as hunger or emotional concerns. |
| **Routines** | • ASN pupils may have difficulty remembering and following certain routines, for example fire procedures, therefore movement around and into/out of the building needs to be simple.<br>• The traditional routine of a school day, governed by a strict timetable, may not suit some or many pupils. Flexibility in timing and use of different spaces may be more in tune with pupils' natural rhythms. |
| **Decision making** | • Educators are unanimous in basing decisions on their own professional expertise (derived from experience and from collaboration) together with ongoing pupil discussion to identity their needs.<br>• As the primary occupants of the space, educators working with pupils should be consulted by senior management when making strategic decisions about design and adaptation. |
| **MOTIVATION** | |
| **Incentives** | • Pupils are observed to be motivated by their own curiosity and basic needs, although public celebration of achievements boosts self-esteem. Learning environments and tools have a positive impact if they invite creativity and exploration. |
| **Own emotions** | • Designated rooms, enclosed structures, and sensory objects are all observed to have a positive impact on pupil regulation, with or without staff support.<br>• Outdoor learning is often observed to positively influence emotions because of the natural environment and sensory stimulus, and the sense of exploration and adventure. |
| **Self-esteem** | • Pupil self-esteem can be boosted by celebrating achievements, as well as by simply completing learning tasks in a manner that best supports them. |
| **Confidence** | • Transition between spaces – from home to learning setting, or within the setting – needs consideration and support.<br>• Confidence within a new space takes time and pupils adjust at different rates.<br>• Some ASN pupils are more confident if they can stay at their own designated and familiar workstation. |
| **Response of others** | • ASN pupils are not only motivated by adult support. They are observed to share enclosed spaces with peers, even in moments of regulation. |

| SKILLS | |
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| **Attention & concentration** | • ASN and all pupils can benefit from certain tools to aid concentration: e.g. wobble stools, headphones or background music, sitting in an enclosed structure. |
| **Organisation & planning** | • Choice of learning environment and tools helps pupils to be more conscious of and understand the conditions for learning.<br>• The organisation of the learning space (zones) and resources (storage) models the design of working and living spaces to pupils. |
| **Posture & mobility (gross motor skills)** | • Variety of furniture and the ability to move around the learning space gives more opportunity to be mobile within the day.<br>• For younger pupils, structures within the classroom can encourage physical movement. |
| **Dexterity and manipulation (fine motor skills)** | • Fixtures and learning tools can encourage fine motor skills other than writing or typing: cooking in a kitchen area, gardening outdoors, arts and crafts. |
| **Socialising, emotions & relationships** | • Whilst some ASN pupils may feel more at ease in independent learning, the shared space and its resources, means that pupils are confronted with social learning alongside peers and learn social skills such as turn-taking. |
| **Verbal and non-verbal communication** | • Co-designing a space and having discussions about adaptation is one way in which pupils can develop verbal and non-vernal communication, particularly in expressing a clear rationale and in understanding the views of others (empathy). |

## 4.5 Research resources

**Contacts for this study**

Principal Investigator: Professor Do Coyle, do.coyle@ed.ac.uk
Data analysis and report author: Dr Hannah Grainger Clemson
Research design and interviews: Ramone Al-Bishawi

**Information on data set**

The data comprises 14 interview transcripts: 11 with educators (2 of these are group interviews) and 3 with City Council employees.

The data will be kept securely for a minimum of 5 years on the University of Edinburgh server. Consent has been given by the participants to use the data in future university research, within this timeframe. Permission may be sought by contacting the Principal Investigator.

**Interview questions for educators**

1. What is your position in the school and how long have you worked here? How frequently do you work with pupils with Additional Support Needs?
2. What are the challenges and rewards for working with pupils with ASN?
3. In what ways, if any, might a learning space impact on the health and wellbeing of pupils? How is this currently evidenced?
4. In what ways, if any, might a learning space impact on a pupil's ability to access their learning? How is this currently evidenced?
5. What other factors contribute to a pupil's ability to access their learning?
6. Can you describe what is meant by self and mutual regulation?
7. Was there anything in particular that influenced the refurbishment or redesign of the school/learning space? If so, can you describe those particular influences?
8. What factors help to make a learning space positive and inspiring for ASN pupils?
9. Can you describe what future learning spaces need to look like? (What is your vision for future learning spaces?)

**References and further reading (reports, articles, websites)**

Architecture & Design Scotland (undated) Our Shared Learning Toolkit (webpage)
https://www.ads.org.uk/resource/shared-learning-toolkit

Architecture & Design Scotland (undated) Connecting people, places and learning (webpage)
https://www.ads.org.uk/resource/connecting-people-places-learning

Architecture & Design Scotland (undated) Inspiring Learning Spaces (webpage)
https://www.ads.org.uk/resource/inspiring-learning-spaces

Architecture & Design Scotland (2021) Studies in Shared Learning Spaces
https://www.ads.org.uk/sites/default/files/2023-03/CaseStudy-Studies-in-Shared-Learning-Spaces-2023.pdf

Barrable, A. Shaping space and practice to support autonomy: lessons from natural settings in Scotland. *Learning Environment Research* 23, 291–305 (2020). https://doi.org/10.1007/s10984-019-09305-x

Barrett, P., Davies, F., Zhang, Y. and Barrett, L., 2015. The impact of classroom design on pupils' learning: Final results of a holistic, multi-level analysis. Building and Environment, 89, pp.118-133. https://www.sciencedirect.com/science/article/pii/S0360132315000700#bib28

Chief Scientist Office (2020) *'In isolation, instead of school' (INISS): vulnerable children's experiences of covid-19 and effects on mental health and education.* https://www.cso.scot.nhs.uk/wp-content/uploads/COVEDI2016-1.pdf

CIRCLE Collaboration © (2011) *Up, Up and Away! Building Foundations for Literacy in the Early Years, Identifying Need*. City of Edinburgh Council, Queen Margaret University and NHS Lothian: Edinburgh. https://jamesgillespiesprimary.co.uk/wp-content/uploads/2021/09/Up-up-and-away-September-2019.pdf

CIRCLE Collaboration © (2015) *Inclusive Learning and Collaborative Working: Ideas in Practice*. City of Edinburgh Council, NHS Lothian and Queen Margaret University.

City of Edinburgh Council (undated) Legislation and policies for ASL (webpage) https://www.edinburgh.gov.uk/information-professionals/legislation-policies-asl

City of Edinburgh Council (undated) Relationships, learning and behaviour procedure (webpage) https://www.edinburgh.gov.uk/directory-record/1146112/relationships-learning-and-behaviour-procedure

Cole, K., Schroeder, K., Bataineh, M. and Al-Bataineh, A., 2021. Flexible Seating Impact on Classroom Environment. Turkish Online Journal of Educational Technology-TOJET, 20(2), pp.62-74. https://files.eric.ed.gov/fulltext/EJ1304613.pdf

Coyle, D., Al Bishawi, R., and Hancock, J. (2022) STEM Visionaries: Inspiring Spaces, Inspiring Learning Project Report, University of Edinburgh. https://www.ed.ac.uk/education/news-events/news-archive/inspiring-learning-inspiring-spaces-project

Education Scotland (2023) How good is our school? - HGIOS 4 (webpage) https://education.gov.scot/improvement/self-evaluation/hgios4/

European Commission (2021) Blended learning: Building more resilient education and training systems (webpage) https://education.ec.europa.eu/news/blended-learning-building-more-resilient-education-and-training-systems

General Teaching Council of Scotland (2021) The Standard for Full Registration: Mandatory Requirements for Registration with the General Teaching Council for Scotland https://www.gtcs.org.uk/wp-content/uploads/2021/09/standard-for-full-registration.pdf

Gray, D., Colucci-Gray, L., Donald, R., Kyriacou, A., and Wodah, D. (2019). From Oil to Soil. Learning for Sustainability and Transitions within the School Garden: a project of cultural and social re-learning. *Scottish Educational Review* 51, 1, 57-70, Available From: Brill https://doi.org/10.1163/27730840-05101007

Hargreaves, A. and Shirley, D., 2021. *Well-being in schools: Three forces that will uplift your students in a volatile world*. ASCD.

Hasso Plattner Institute of Design (2010) An introduction to design thinking: Process guide, Stanford University. https://web.stanford.edu/~mshanks/MichaelShanks/files/509554.pdf

Historic English (2017) Education Buildings https://historicengland.org.uk/images-books/publications/dlsg-education-buildings/heag111-education-lsg/

Imms, W., Cleveland, B. and Fisher, K. eds., 2016. Evaluating learning environments: Snapshots of emerging issues, methods and knowledge. Springer.

Imms, W., Morris, J., Bradbeer, C., and Mahat, M. (2023) *What should be the focus of next generation learning spaces research? An international cross-sector response? The ILESE Scoping Study White Paper.* LEaRN, The University of Melbourne. http://ilesescopingstudy.com.au/

Learning Places Scotland (undated) https://www.learningplaces.scot/home

Macquarrie, S., 2018. Everyday teaching and outdoor learning: developing an integrated approach to support school-based provision. *Education 3-13*, *46*(3), pp.345-361.

National Autism Resources (undated) The Picture Exchange Communication System® (webpage) https://nationalautismresources.com/the-picture-exchange-communication-system-pecs/

Pringle, J. Buelo, A., Alvarado, A., Doonan, J., and Robertson, J. (2020) *The Impact of School Built Environments on Student Learning and Wellbeing: Results of a Rapid Systematic Review: Report for Scottish Futures Trust & Midlothian Council.* University of Edinburgh.

Scottish COVID-19 Enquiry (2023) Introductory Academic Research (webpage) https://www.covid19inquiry.scot/introductory-academic-research

Scottish Futures Trust (undated) Scotland's schools for the future programme https://www.scottishfuturestrust.org.uk/page/current-schools-for-the-future

Scottish Government (2023) School education statistics (webpage) https://www.gov.scot/collections/school-education-statistics/#school-levelsummarystatisticsanddashboards

Scottish Government (2019) Learning estate strategy (webpage) https://www.gov.scot/publications/scotlands-learning-estate-strategy-connecting-people-places-learning/pages/5/

Scottish Government (2021) Coronavirus (COVID-19): children, young people and families - evidence summary - December 2020 (webpage) https://www.gov.scot/publications/covid-19-children-young-people-families-december-2020-evidence-summary/

Scottish Government (2021) Ten year school plan delivered (webpage) https://www.gov.scot/news/ten-year-school-plan-delivered/

Scottish Government (2022) Getting it right for every child (GIRFEC) https://www.gov.scot/policies/girfec/principles-and-values/ and [1] https://www.gov.scot/policies/girfec/wellbeing-indicators-shanarri/

Shu, S., and Hui M. (2019) Restorative Effects of Classroom Soundscapes on Children's Cognitive Performance, *International Journal of Environmental Research and Public Health* 16, no. 2: 293. https://www.mdpi.com/1660-4601/16/2/293

The LEGO Foundation (undated) Learning through play (website) https://learningthroughplay.com/

UNESCO (2012). *A Place to learn*. UNESCO. https://unesdoc.unesco.org/ark:/48223/pf0000215468

University of Edinburgh (2023) Shared Learning Spaces (webpages) https://blogs.ed.ac.uk/sharedlearningspaces/

University of Edinburgh (undated) Learning About Neurodiversity at School (LEANS) (webpage) https://salvesen-research.ed.ac.uk/leans

Wenger, E. and Wenger-Trayner, B., 2020. *Learning to make a difference: Value creation in social learning spaces*. Cambridge University Press.