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A MINIMUM DIGITAL LIVING STANDARD FOR HOUSEHOLDS WITH CHILDREN

OVERALL FINDINGS REPORT



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A Minimum Digital Living Standard for Households with Children: Overall Findings Report

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March 2024

Executive Summary

1.1 Introduction

- What is the minimum basket of digital goods, services, and skills that households need to live and participate in the digital world?

The Minimum Digital Living Standard (MDLS) project addresses this question through a novel household-based assessment of digital needs. This mixed-methods project was funded by the Nuffield Foundation, Nominet, and the Welsh Government, and used a combination of approaches:

- It drew on the Minimum Income Standard (MIS) methodology to develop (through a series of focus groups with members of the public) a definition of MDLS which set out what the standard should encompass and established a ‘minimum basket of digital goods, services, and skills’ that households with dependent-age children need to meet this standard.
- It used a UK-wide survey and statistical and geographic evaluations of MDLS to explore correspondence with other social, economic, cultural, and digital metrics and to assess regional variations.
- It included in-depth group consultations with stakeholders (e.g. individuals and people from local and national public, private, and third-sector organisations). These explored the relevance of the standard regarding key dimensions of lived experience and intersectionality, such as disability, ethnicity, rurality, and poverty.
- It involved ongoing engagement with government, regional, public, and third-sector organisations to explore the use of MDLS as a tool to inform policy development.
- Additional focus groups with members of the public, interviews with stakeholders, and in-depth interviews with families were conducted in Wales (funded by the Welsh Government).

This report brings together findings from the qualitative and quantitative elements of the MDLS research. In doing so, the report underscores the centrality of MDLS in enhancing digital inclusion in the UK and aligns its commitment to the UN’s global Sustainable Development Goals to reduce inequalities, ensure quality education, and promote inclusive societies.

1.2 Defining the MDLS

Between February and October 2022, we carried out the first part of this study, conducting focus groups with members of the public, rather than experts, to develop a definition of MDLS and to identify the digital goods, services, and skills important in everyday life, from their perspectives. This chapter presents both the methodological framework used to define MDLS and a summary of the digital goods, services, and skills required to meet it. Further details of the method and approach are available in the interim report (Blackwell, Davis, Hill & Padley, 2023).

The definition was an integral aspect of the research, describing the standard of living that groups considered when deciding what would be needed to reach it. The MDLS definition provided a clear reference point for participants and was at the heart of all the focus group discussions around the contents of MDLS and what was needed for this benchmark. The

final lists of digital goods, services, and skills represented a benchmark that households with children should be able to reach.

A total of 17 deliberative focus groups (13 groups with adults, and four groups with young people – ages 11 to 17 years) were carried out. The groups involved four stages, with discussions from one group or stage feeding into the next. Research outcomes, were formed through the following funnelling process:

- **Orientation** > Groups discussed what digital inclusion meant to them and developed a definition of MDLS which could then be presented to subsequent groups. These groups were conducted with working-age people without children, pension-age people, parents, and young people to ensure that the resultant definition was relevant to many household types and not just those with children.
- **Task** > New groups with parents and young people worked together to agree on the digital inclusion needs of hypothetical individuals within households (rather than their own needs) and how these could be met.
- **Checkback** > New groups with parents and young people reviewed the decisions from the task stage to identify any missing or unnecessary items and resolve where previous groups had been unable to agree.
- **Final** > New groups with parents and young people reviewed the lists of goods, services, and skills resulting from the checkback stage and addressed any discrepancies.

Groups with adults included a mix of participants across gender, single and couple households, socio-economic circumstances, and income sources, in work and not working, levels of digital engagement. Most groups also included participants from minority ethnic backgrounds. Adults' groups were held in urban locations in Scotland, Northern Ireland, Wales, and in the North, South, East and West of England. Groups with young people were recruited through direct liaison with secondary schools and held in schools in the East Midlands during the school day, with students aged 11 to 17.

From the orientation stage of our research, our deliberative groups developed the following MDLS definition:

A minimum digital standard of living includes, but is more than, having accessible internet, adequate equipment, and the skills, knowledge and support people need. It is about being able to communicate, connect, and engage with opportunities safely and with confidence.

The full MDLS definition can be found in Table 3 of this report.

1.2.1 Digital goods and services

The MDLS groups defined the minimum digital goods and services required by a household with children to be:

- Home broadband with sufficient reliability and speed to support multiple family members to access the internet at the same time.
- An entry-level smartphone per parent and secondary school child and 5GB data a month, each.
- Plus, an additional 3GB of data per month for parents of a pre-school or primary school child.
- A laptop, tablet, or PC per household – parent(s) and first child share one device with an additional device for every further school-age child.

- A smart TV, TV licence, and TV subscription service.
- Access to gaming and online gaming.

1.2.2 Functional and practical skills

MDLS groups agreed on minimum functional and practical skills that enable households with children to engage online and carry out everyday tasks and activities. These functional and practical skills include:

- **Using digital devices, programmes, and the internet.** Downloading apps, changing device and app settings, and connecting devices to the internet are all examples of the types of functional skills required for performing any online tasks.
- **Engaging online.** These are the skills needed for interacting with others and for accessing online content, as well as for using services. Examples include using school apps to pay for school dinners and school trips, making cashless payments, making video calls, submitting homework online, booking appointments and activities, filling out forms, and ordering prescriptions.
- **Managing and maintaining digital devices and data usage.** These skills enable people to continue to use and get the most out of their devices for the tasks and activities outlined above. Managing data usage requires knowing how to monitor it and understanding how much data different apps use. Maintaining devices includes knowing how to clear and monitor device storage space.

1.2.3 Critical skills for understanding and managing digital risks

MDLS groups agreed on minimum critical skills for understanding and managing digital risks that enable households with children to go online safely and with confidence to participate in society. They are what support families to avoid and manage online harms such as scams and fraudulent links, identity theft, bullying, grooming, and mis/disinformation. Examples of skills for understanding and managing digital risks include:

- **Managing security.** Understanding why and how to create secure passwords, knowing how to remove debit and credit card information from websites, and being able to make secure payments and monitor bank activity online.
- **Interacting with others.** Discerning what information to share online, evaluating the legitimacy of friend requests, and managing different online pressures, such as responding instantly to messages.
- **Sharing and receiving information.** Evaluating online information and knowing where reliable sources of information can be found online or knowing how to avoid or report harmful content.

1.3 National survey

Having established MDLS for households with children, the project next undertook a national survey to assess the extent to which UK households with children met MDLS. In this section, we present the core findings from the survey and present analyses of the demographics and geodemographic characteristics of households meeting and **not** meeting MDLS. This chapter is split into five sections, covering:

- An outline of the survey
- The extent of device ownership and access to broadband, mobile data, and services

- The extent of both functional and critical skills in adults, children, and households as a whole
- The combination of these measures into an overall assessment of households meeting MDLS
- Demographic and geodemographic modelling of meeting and not meeting MDLS

In the following sections, we have taken the current ONS estimate that there were 8,196,000 households with dependent children in the UK¹ when calculating the number of households falling into specific categories.

The final survey was administered in person at home and covered a nationally representative sample of 1,582 UK households from all UK administrations (England, Scotland, Wales, and Northern Ireland) and was undertaken in 2023.

The 1,582 households provide separate data on:

- 2,605 adults with parental responsibility
- 300 other adults
- 891 secondary school children
- 1,162 primary school children
- 681 pre-school children

Therefore, the responses gathered provided data on a total of 4,616 individuals in the 1,582 households. This gives a +/-2.46% margin of error for a 95% confidence level against a population of 8,196,000 households. All data were provided by one parental respondent per household.

1.3.1 Meeting equipment needs

From the survey data, we modelled the likelihood of UK households meeting the equipment requirement for MDLS. We found that 81.5% of households likely meet MDLS for equipment and services, with the remainder either lacking broadband, TV, devices, or a combination of these things.

1.3.2 Meeting equipment needs

From the survey data, we modelled the likelihood of UK households meeting the equipment requirement for MDLS. We found that 81.5% of households likely meet MDLS for equipment and services, with the remainder either lacking broadband, TV, devices, or a combination of these things.

Table 1: Proportions of households in each of the five groups with descriptions

Group	Description	percent
1	Fully MDLS	81.48
2	Partial MDLS – poor broadband via 4G/5G	6.01
3	Partial MDLS – lacks smart TV access	4.80
4	Partial MDLS – lacks enough devices (large screen/gaming)	4.24
5	Significantly below MDLS equipment requirements	3.48

¹ <https://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/families/bulletins/familiesandhouseholds/2022>

1.3.3 Meeting skills needs

Combining the survey findings on household skills, we found that 62% of households meet the MDLS criteria for all skills – both children and parents. We found that 4.8% did not meet the skills requirement at all for both parents and children. A further 23.7% only meet the skills requirements for the children, and 9.4% for parents only.

Table 2: Overall household skills

Overall household skills	Percent
Not Adequate Skills	4.80
Only Children Have Adequate Skills	23.70
Only Parents Have Adequate Skills	9.40
Household Has Adequate Skills	62.20

1.3.4 How many households with children meet the MDLS

MDLS calls for households to have a combination of both equipment and skills. In the next section, we look at combining skills and equipment.

- Taken together, we find that 55% of UK households with children meet MDLS and 45% **do not** meet MDLS.

This implies that **3.69M households with children do not meet our MDLS definition**. This is because they miss out on one or more of the following aspects of digital living:

- Having accessible internet
- Having adequate equipment
- Having the appropriate skills and knowledge

As a result, they may struggle to digitally communicate, connect, and engage with opportunities safely and with confidence. Looking in more detail, we find that the following proportions of all households with children **fail to meet** the MDLS following reasons:

- 8.3% of households specifically lack skills for children (mix of all ages and skills).
- 17.0% of households specifically lack skills for adults (mix of skills).
- 7.2% of households specifically lack equipment.
- 12.5% of households lack a mix of skills and equipment.

We should, perhaps, not be surprised by these figures. First, existing research (Yates, et al., 2020) indicates that around 30% of UK citizens are offline or limited users and that another 20% focus on activities that are smart-device-based and are less likely to require large-screen devices. Ofcom figures also show that 28% of households are struggling with broadband costs². We also know that:

- 27% of UK households with children are in absolute poverty (JRF).
- 44% of UK single-parent households are in absolute poverty (CPAG).
- 42% of children are living in households with incomes below MIS (Padley, et al., 2024).

Our results seem very much in line with these existing findings.

² [https://www.ofcom.org.uk/research-and-data/multi-sector-research/affordability-tracker#:~:text=In%20January%202024%2C%20just%20under,afford%20communications%20service\(s\).](https://www.ofcom.org.uk/research-and-data/multi-sector-research/affordability-tracker#:~:text=In%20January%202024%2C%20just%20under,afford%20communications%20service(s).)

1.3.5 What factors predict meeting (or not) MDLS

We explored an extensive range of social and demographic variables to see which were potential predictors of meeting (or not) MDLS. Combining these together, we built a statistical model of the likelihood of households meeting (or not) MDLS. We found the following factors:

- **Lower socio-economic status households were less likely to meet MDLS**
 - Compared to social grades A and B, social grades C2 and DE are 1.7 and 2.1 times less likely to meet MDLS.
- **Households in deprived areas were less likely to meet MDLS**
 - Each decile of worsening IMD rank position for the household's area decreases the likelihood of meeting MDLS by between 0.05 and 0.03, dropping from 1.0 at the least deprived to 0.59 at the most deprived.
- **Single-parent households were less likely to meet MDLS**
 - Single parents are 1.3 times less likely to meet MDLS as compared to dual-parent households.
- **Households with more than two children were less likely to meet MDLS**
 - Households with more than two children are 1.68 times less likely to meet MDLS as compared to households with fewer than 2 children.
- **Households receiving at least one state benefit were less likely to meet MDLS**
 - Households receiving at least one state benefit are 1.38 times less likely to meet MDLS compared to households that do not receive benefits.
- **Households with the main income earner being unemployed were less likely to meet MDLS**
 - Having the main income earner employed makes a household 1.44 times more likely to meet MDLS than households where they are unemployed.
- **Households where the adult has a long-term health issue were less likely to meet MDLS**
 - Households where the survey respondent has a health issue affecting their daily activity are 2.01 times less likely to meet MDLS than those who do not.
- **Households where survey respondent identified as ethnically non-white were less likely to meet MDLS**
 - Households where the survey respondent identifies as ethnically non-white are 2.01 times less likely to meet MDLS than those who identify as white.
- **Where you lived in the UK affected the likelihood of meeting MDLS**
 - Households in smaller cities or large towns are 2.38, medium towns are 3.45, small towns are 4.71, and rural areas are 4.13 times more likely to meet MDLS than those in large cities.
 - All households living outside London are less likely to meet the MDLS with the worst locations being North East (5.21 times less likely), North West (7.23 times less likely), South West (7.74 times less likely), Scotland (8.18 times less likely) and Northern Ireland (11.92 times less likely)
 - Living in a Low-Skilled, Migrant, or Student Community, makes a household 1.48 times less likely to meet the MDLS compared to other areas.

1.4 Living below the MDLS

We undertook multiple interviews to explore the experiences and perspectives of both households themselves and people from organisations working with households to address digital exclusion. Drawing from these interviews, we can firmly conclude the importance of taking a holistic approach to digital inclusion such as MDLS. This includes the importance of having adequate devices and connection, with digital access being seen as a crucial need, indeed a 'lifeline', for families. These interviews also identified some key barriers households face to meeting MDLS:

- Affordability and the cost of goods and services included in MDLS
- Lacking sufficient (fit for purpose) devices and connection
- Getting good digital access and the limited adequacy of social tariffs
- Housing, location, and infrastructure - barriers to online connectivity
- Acquiring digital skills
- Challenges in households accessing support
- Challenges for organisations delivering digital support and services

Families also explored who is responsible for supporting households to meet MDLS. They stated:

- Schools were seen as a primary source of learning about digital skills and, in particular, digital safety for children.
- Online safety should be a collective, societal responsibility, involving multiple actors and stakeholders including government, schools, platforms, and households.

Key considerations relating to the need for, and challenges around reaching MDLS for families with children that have emerged from this study include:

- Having inadequate devices or connection was inconvenient and time-consuming for families, for example having to be constantly mindful of and planning for device usage and charging or finding different ways to access the internet.
- This was also a source of worry and stress where online access was crucial to a family member.
- Lack of digital access affected interaction with services such as education (the ability to do schoolwork and submit homework online), personal finances (inadequate connection compounded restricted incomes where parents could not get online to make a payment, incurring late payment charges), and the opportunity or experience of online meetings with formal services or agencies.
- Digital inclusion was linked by households and organisations to social inclusion, for parents and children to connect, communicate, and maintain relationships with family and friends.
- Digital access played an important role in the ability to take up opportunities, for example, online courses, which could contribute to wellbeing, as well as potential future opportunities.
- Families' particular circumstances can bring additional needs and demands on digital technology over and above MDLS. Thus, MDLS could be seen as a starting point.
- It cannot be assumed, based on the number of devices alone, that a family's digital needs are being met. While a family may possess several devices, they may be broken, not fit for purpose, or not available for family use. There may be an internet

connection, but it must be reliable for the family to do the online activities they need to.

- Although families may appear to have what they need in terms of digital provision, affording these goods and services may be problematic. Families with low and/or constrained incomes may forego other essentials or accrue debt to provide for digital needs. Meeting MDLS should not be to the detriment of meeting other areas of need.
- ‘Digital poverty’ is closely linked to affordability and low income. From this research, it is clear that if families’ finances were not under strain, they would have more chance of meeting their digital needs. Measures to address digital poverty and the implementation of MDLS need to go alongside broader conversations about social security rates, wage levels, living standards, and poverty more generally.
- There is a need for more affordable broadband that is not currently being met by social tariffs. Affordable broadband needs to be of sufficient speed to cope with the everyday demands on the internet (such as streaming, video calling, and gaming) that are now social norms for a family. This should include additional consideration for people living in areas with limited provision, who are currently excluded from a real ‘choice’ to take up reduced social tariffs and are forced to pay a higher premium for faster speeds, or risk being left behind.
- Being unable to fully get online and engage in digital life is more than just an inconvenience – it can affect people’s social participation, wellbeing, and future opportunities. One parent articulated the need to think of digital connectivity as a human right:

If you want people to survive in this world, you need food, you need water, and that’s your human rights. Now, having connectivity that is usable, affordable, should be on there somewhere, because actually you can’t survive in this world, the day and age that we’re living in without them. And alright, physically, you can survive without it, but actually mentally, how can you? I think it really needs the impact of not having connectivity should be classed as a human right. (Parent)

1.5 Recommendations

Enabling households to meet MDLS does not fall to any single government body or department. Like MDLS, the response needs to be holistic. It requires public, voluntary, and private sector bodies to consider their role, the design and delivery of their products and services, and how they can reduce the digital barriers that a significant minority of parents and children may face.

However, we believe that MDLS can provide a basis for these considerations and a tool for governments – national, regional, and local. A tool they can use in thinking through digital inclusion strategy and the provision of a framework within which others can work.

However, more research is needed to develop MDLS for other household types:

- Single and couple households of retirement or pensionable age
- Single and couple households of working age *without* dependent children

An overall MDLS for all household types will need ‘rebasings’ and refreshing every few years to address both technological and social changes for households.

1.5.1 Core policy recommendations

All stakeholders, including UK national, regional, and local government, private industry regulators, and 3rd sector, should:

- Recognise digital access is essential for families.
- Make digital inclusion a cross-cutting government priority for families.
- Find ways to enable more families to afford suitable connectivity by:
 - Making essential online public and health services free of data charges.
 - Reviewing social tariffs' suitability for households with children - looking at products, price, and promotion.
 - Signposting to emergency support, such as the National Databank.
- Refresh and resource the role of schools in digital inclusion by:
 - Working with teachers, parents, and children to review curricula for digital skills.
 - Working with parents and partner organisations so all children have home access to devices for learning.

1.5.2 Using MDLS

MDLS can be used to review government policies and plans (central, devolved, and local government). Priorities identified by professionals in relevant organisations included:

- Reviewing social security benefits to cover digital access costs.
- Recognising extra digital access costs for families with special educational needs and disability and supporting families to meet these.
- Mitigating risks for families below MDLS in the roll-out of Government Digital Services (such as One Government Login and digital ID verification).
- Mitigating risks for families below MDLS in expanding online NHS and care services (such as the NHS App, NHS Wales App, and NHS Scotland App).
- Embedding digital access into public standards, such as the Decent Homes Standard.
- Supporting families in temporary accommodation and families seeking asylum to access and afford broadband or sufficient mobile data.
- Working with the National Digital Inclusion Network to target provision (including free mobile data, devices, and support) in areas with high levels of families below MDLS.

1.5.3 Key role of digital safety

Digital safety is a key part of a Minimum Digital Living Standard.

- Adults and young people are worried about digital risks and harms.
- Parents and young people felt digital safety is a shared responsibility. They felt:
 - Family members should inform themselves of digital risks.
 - Schools should provide up-to-date information on digital risks.
 - Service providers and manufacturers should give better information on security features and how to use them.
 - Social media companies should make platforms safer, especially for children.
 - Social and traditional media companies should do more on advice and awareness.
 - Greater regulation is needed, recognising the challenge this presents.

The Online Safety Act (2023) makes Ofcom the regulator for online safety.

- Ofcom regulates the telecoms industry with a role to protect consumer interests.
- Ofcom should draw on the MDLS framework and findings, using it to:
 - Close the gaps in critical skills, working with policymakers in education, lifelong learning, and tech platforms.
 - Shape Ofcom's future data collection from children and households, and regulated companies.

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Chapter 1 A Minimum Digital Living Standard for households with children

1.1 Introduction

“What is the minimum basket of digital goods, services, and skills that households need to live and participate in the digital world?”

The Minimum Digital Living Standard (MDLS) project addresses this question through a novel household-based assessment of digital needs. This mixed-methods project was funded by the Nuffield Foundation, Nominet, and the Welsh Government, and used a combination of approaches:

- It drew on the Minimum Income Standard (MIS) methodology to develop (through a series of focus groups with members of the public) a definition of MDLS which set out what the standard should encompass. It also established a ‘minimum basket of digital goods, services, and skills’ that households with dependent-age children need to meet this standard.
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- It involved ongoing engagement with government, regional, public, and third-sector organisations to explore the use of MDLS as a tool to inform policy development.
- Additional focus groups with members of the public, interviews with stakeholders, and in-depth interviews with families were conducted in Wales (funded by the Welsh Government).

This report brings together findings from the qualitative and quantitative elements of the MDLS research. This includes an overview of the development of MDLS and draws on findings from additional MDLS research with organisations and families in Wales – all previously reported in full (Blackwell et al., 2023; Yates et al., 2023; Harris et al., 2023). The report also presents new results from a national survey, geo-mapping, and findings from workshop consultations with stakeholder organisations.

The MDLS project examines an ongoing social issue that the Covid-19 pandemic and subsequent cost-of-living crisis brought sharply to the top of the policy and public agenda – the risks and realities of digital exclusion. The scale and significance of digital systems and media in our everyday lives have never been more apparent. As a result, digital inequalities between those who have access to digital devices and data and the skills and capabilities to use them – and those who do not have never been more consequential. With the cost-of-living crisis placing more pressure on household budgets and people having to make difficult decisions about which bills to pay, those on the lowest incomes are at even greater risk of being digitally excluded.

While there is a complex interplay between levels and types of social and digital inequalities, current policy often focuses on digital access (broadband) and defines digital ‘exclusion’ predominantly in terms of material access to technologies. Many prior academic studies have focused on individuals’ access and skills, as do many measures used by policymakers here in the UK and globally. There is therefore a substantial need for deeper understandings and robust measures to guide interventions. This must build on an in-depth assessment of what individuals, households, and communities need to be digitally included. This report provides a synthesis of the final results of a project to do this via the development of a Minimum Digital Living Standard (MDLS) based on the innovative and established Minimum Income Standard (MIS).

To date, most research on digital inequalities has focused on three issues: first, inequalities in material access to digital devices and internet connection; second, differences in digital skills; and third, differences in digital use. These can relate to socio-economic variations and the personal and economic resources that people have available to them (Hargittai, 2001; Helsper, 2012; Van Deursen et al., 2014; Yates and Lockley, 2018; Yates et al., 2015; Yates and Lockley, 2020). However, this predominantly survey-based research is effectively ‘top-down’ in its assessment of what counts as digital inequalities, inclusion, or exclusion, and derives from a policy or theoretical position rather than citizens’ perceptions of needs.

This MDLS study moves research and policy debate forwards – away from simple individualised measures of access or skills – by taking a new bottom-up, ***citizen- and household-focused*** approach to understanding digital inclusion, exclusion, and inequalities. By utilising the MIS methodology to develop MDLS, we drew directly on the lived experience of citizens but situated the measure at the level of the household. This was particularly relevant in households with children where individual family members’ needs and resources can interlink with each other. This helped us to:

- Understand digital exclusion as the product of a mix of factors (access to goods, services, skills, and knowledge) that limit citizens’ and households’ digital opportunities and participation.
- Understand digital inequalities as complex, relative to time and social context, and deeply linked to other aspects of social inequality.
- Understand which digital inclusion policies and interventions do or might best address the factors and contexts that limit citizens’ and households’ digital capabilities.

As we outline the significance of MDLS in bridging digital divides, it is essential to acknowledge its alignment with the broader Sustainable Development Goals (SDGs). The pursuit of MDLS not only advances digital inclusion within the UK but also resonates with global commitments to reduce inequalities (SDG 10), ensure quality education (SDG 4), and promote inclusive societies for sustainable development (SDG 16). This report highlights how MDLS serves as a critical mechanism in achieving these goals, underpinning the necessity for integrated strategies that address digital inclusivity as part of the UK's commitment to the SDGs.

1.2 Building MDLS on the MIS methodology

The Minimum Income Standard (MIS) methodology was central to developing MDLS. The MIS methodology utilises deliberative methods to determine a minimum budget that meets

material needs but also enables social participation and inclusion and is based on and rooted in public consensus. Full details of how it was drawn on in this project are outlined in Chapter 2.

The MIS approach is founded on the assertion that what constitutes a minimum living standard should be informed by the lived experience of individuals and households in a society. It aims to identify a minimum socially acceptable standard of living; it is a ‘minimum’ in the sense that it refers to a benchmark that people should reach; it is ‘socially acceptable’ in the sense that it is defined by society; and it encompasses participation or connections with others in society, recognising that while it may be possible to survive at a lower level, this is not a dignified or acceptable standard. Within the MIS approach, minimum living standards are viewed as a reflection of the values of a given society. Echoing the roots of MIS, our approach to establishing MDLS focuses on the public’s perspective of what is needed ‘digitally’ to participate in UK society. Just as MIS determines a ‘participation income’ needed to achieve a minimum living standard, so MDLS establishes a ‘digital participation benchmark’ of goods, services, and skills, that individuals and households need to take part in ordinary living patterns, customs, and activities in the UK.

1.3 The MDLS definition

From the orientation stage of our research, our deliberative groups developed the following MDLS definition:

A minimum digital standard of living includes but is more than, having accessible internet, adequate equipment, and the skills, knowledge and support people need. It is about being able to communicate, connect, and engage with opportunities safely and with confidence.

The following set of iterative, deliberative groups then provided a detailed ‘basket’ of devices, services, and skills that a household with children needs to meet this definition. These are outlined in Table 3. We should be clear that this is not a minimum to ‘just survive’ in our digital society. Rather, this is the minimum that households with children think is needed to be engaged safely with our digital society. Below this minimum, households with children would likely experience greater difficulties, greater digital risk, and ever more forms of digital exclusion – for example, greater risks from online harms or levels of exclusion from access to education and health care.

From our survey work, we find that only 55% of households with children meet MDLS as defined by households with children (see Chapter 3). The reasons for this are multifaceted. They include such factors as a lack of equipment **and/or** a lack of skills for both adults and children. Not meeting MDLS strongly corresponds with factors such as socio-economic status, health status, ethnicity, and location. It is very clearly a product of poverty and a lack of economic and cultural capital. We will explore the creation of MDLS and the details behind this headline figure in the following chapters.

1.4 Report structure

This report combines findings from the component elements of the research, synthesising previous publications and new findings from the survey, mapping, and consultations.

Chapter 2 outlines the development of the MDLS definition and an explanation of what

goods, services, and skills households with children need to be digitally included. **Chapter 3** reports the survey findings. **Chapter 4** presents maps of the distribution of MDLS across the UK and UK regions. **Chapter 5** presents qualitative data on how digital needs might vary in different situations, and the challenges of meeting and the consequences of not meeting MDLS from the perspective of stakeholder (public, private, third sector) organisations and families. **Chapter 6** concludes the report with reflections on the implications of MDLS for both families and policymakers.

Chapter 2 Developing the MDLS definition and the ‘basket’ of digital goods, services, and skills for households with children

2.1 Introduction

Between February and October 2022, we carried out the first part of this study, conducting focus groups with members of the public, rather than experts, to develop a definition of MDLS and to identify the digital goods, services, and skills important in everyday life, from their perspectives. This chapter presents both the MDLS definition and a summary of the digital goods, services, and skills required to meet it. Further details of the method and approach are available in the interim report (Blackwell, Davis, Hill & Padley, 2023).

The definition was an integral aspect of the research, describing the standard of living that groups considered when deciding what would be needed to reach it. The MDLS definition provided a clear reference point for participants and was at the heart of all the focus group discussions around the contents of MDLS and what was needed for this benchmark. The final lists of digital goods, services, and skills represented a benchmark that households with children should be able to reach.

A total of 17 deliberative focus groups (13 groups with adults, and four groups with young people) were carried out. The groups involved four stages, with discussions from one group or stage feeding into the next and the research outcomes, formed through a funnelling process explained below:

- **Orientation** > Groups discussed what digital inclusion meant to them and developed a definition of MDLS which could then be presented to the next stages of groups. These groups were conducted with working-age people without children, pension-age people, parents, and young people to ensure that the resultant definition was relevant to many household types and not just those with children.
- **Task** > New groups with parents and young people worked together to agree the digital inclusion needs of hypothetical individuals within households (rather than their own needs) and how these could be met.
- **Checkback** > New groups with parents and young people reviewed the decisions from the task stage to identify any missing or unnecessary items and resolve where previous groups had been unable to agree.
- **Final** > New groups with parents and young people reviewed the lists of goods, services, and skills resulting from the checkback stage and addressed any discrepancies.

Groups with adults included a mix of participants across gender, single and couple households, socio-economic circumstances, income sources, in work and not working, and levels of digital engagement. Most groups also included participants from minority ethnic backgrounds. Adults’ groups were held in urban locations in Scotland, Northern Ireland,

Wales, and in the North, South, East and West of England. The groups with young people were recruited through direct liaison with secondary schools and held in schools in the East Midlands during the school day, with students aged 11 to 17.

2.2 The importance and challenges of digital life

The MDLS project was a proof-of-concept study, aiming to establish the feasibility of adapting the MIS methodology to first, develop a meaningful definition of a minimum digital living standard, and second, to find out what the public identified as digital needs and how to meet them. Foregrounding these aims was a question of whether groups would think that digital inclusion was needed in the first place. Below is a summary of what groups discussed about the importance of being included in this digital world, and the implications of exclusion. Groups noted:

- the prevalence of digital technology across all aspects of life – from work, leisure, shopping, and accessing services, to getting around, with young people highlighting its importance in school life as well as socially. **Lack of access to the online world therefore inhibits participation in the real (offline) world too.**
- the **inevitability of increasing digitalisation**. This was linked to observations of a decrease in non-digital alternatives, for example, loss of in-person services. Groups discussed how the pandemic had accelerated the need to be online and accentuated the difficulties of being left out or left behind.
- the **pace of technological change**, which could be overwhelming. This not only had implications for the risk of being digitally/socially excluded, but participants also noted the cost of technical obsolescence and having to upgrade technology, alongside the need to update their knowledge and, for some, the challenges of having to learn new skills.

People are seldom either digitally included or excluded in a binary way – there is much nuance and there are multiple intersecting aspects to being engaged with technology and sustaining access to the digital world. Discussions demonstrated how those who were hesitant or resistant to some aspects of digitalisation, such as using social media or online banking, could at the same time feel more positively towards other applications, such as using Google Maps or doing online shopping.

The benefits of digital life discussed included:

- **Convenience, efficiency, and extending choice**, for example through access to online shopping, services, information, and tools for navigation and getting around.
- **Communication and connection**, for example keeping in touch with others through video calling, social media, entertainment, playing games online, and expanding horizons (e.g., connecting people with shared interests).

A wide range of challenges and concerns were also raised:

- **Concerns about online harms.**
 - perceived risks from others or what was ‘out there’ online, such as security breaches, identity theft, scams, distrust of automated systems, mis/disinformation, and trolling. In particular, risks for child safety online – grooming, bullying, and exposure to inappropriate content
- **Potential disadvantages or difficulties for the individual or family.**

- Impact on family life and well-being for those under pressure to be contactable online.
- Pressures of navigating social media (particularly for young people), having to present a 'perfect' version of their lives online and of regularly seeing filtered images which could affect their perceptions of themselves.
- Difficulties in finding a balance for parents between setting limits and monitoring activity, giving their child independence, and showing them trust.

2.3 Agreeing an MDLS definition

Group discussions produced rich qualitative data on how they perceived needs. The orientation groups reflected on their experiences to consider what being digitally included would enable a person to do, and what the consequences of digital exclusion would be. From these discussions, the orientation groups developed the following MDLS definition:

A minimum digital standard of living includes but is more than, having accessible internet, adequate equipment, and the skills, knowledge and support people need. It is about being able to communicate, connect, and engage with opportunities safely and with confidence.

The definition relates to a socially acceptable minimum, reflecting social, economic, and cultural norms. **It is based on needs (not wants)** but represents more than survival. When developing the definition, participants were clear that it needed to be multi-faceted. Meeting MDLS is about more than just having devices or an internet connection. As participants pointed out, someone might have a laptop, but if they do not have a sufficient connection or know how to use it properly, then that is not inclusion. The definition has three aspects felt to be integral by participants: **equipment, connectivity, and skills/knowledge**, and to meet MDLS, people's needs must be met across *all* of these areas. These relate to what an individual or household needs as well as having implications for infrastructure (the physical and organisational systems that provide digital services).

Devices and online connection must be adequate and fit for purpose to perform the tasks for which people need them. This has implications for the number of digital devices households need, the features and condition of digital devices and software, and the types of data and broadband packages required.

People need the skills, knowledge, and understanding not only to be able to use devices effectively and confidently but, importantly, to do so safely and so as to participate in society. This relates to concerns expressed around online harms and minimising risks, and what to do when things go wrong. Reflecting group discussions, the definition recognises that this may require support, and this will vary depending on people's different needs – so **should be tailored to the individual**. This could range from receiving formal training to being able to access suitable information when required.

Reflecting MIS, the MDLS definition relates to what people need to feel included and participate in the (digital) world around them, so they can connect, engage, and not miss out on opportunities, for example, work, education, keeping in touch, services, thus grounding the definition in everyday life. Participants felt that the definition provided a 'real world view' of what people need for digital inclusion and what the outcome is.

It is worth reiterating that this process is about establishing *needs*, and the task of meeting these needs and reaching MDLS depends on access to a range of resources. **Affordability is crucial to people being able to meet their digital needs.** However, while what is affordable will vary from household to household and over time, whether someone has sufficient financial resources or not, their needs, in theory, remain the same. Hence, affordability alongside other factors, such as location (for example, rurality) and access to infrastructure (for example, reliable Wi-Fi, mobile signal, services, support), can affect the *ability to meet* digital needs and MDLS, rather than the needs themselves.

2.4 Establishing the contents of MDLS for households with children

This section outlines the contents of the MDLS basket for households with dependent-age children based on the decisions of task groups, checkback groups, and final groups with young people and parents. It also draws on discussions from the groups to give an insight into the reasoning behind their decisions. The contents of MDLS are organised into three components:

- Digital goods and services.
- Functional and practical skills.
- Critical skills and knowledge for digital safety and confidence.

The content of each of these components is detailed below – outlined at the beginning of each section with a summary included at the end of this chapter (Table 3).

2.4.1 Digital goods and services for a MDLS

Groups considered the types of goods and services required to enable households with children to reach an acceptable MDLS, and how these requirements would change with the age of the child or the number of children in the household.

2.4.1.1 Home broadband

Home broadband was included as a core component of the basket of digital goods and services for households with children. Groups described broadband as a prerequisite for using devices at home, essential for family members to access entertainment, information, and opportunities. **A home broadband connection needs to be stable and fast enough to enable all family members to be online at the same time.** A key issue that arose during these discussions related to whether households can access adequate internet speeds, and barriers to doing so, including infrastructure (these are discussed in Chapter 5).

2.4.1.2 Smartphone and data

- An entry-level smartphone per parent and secondary school child and 5GB data a month for each.
- Plus, an additional 3GB of data per month for parents of a preschool or primary school child.

Access to the internet via a smartphone while away from home was critical for social participation, coordinating family, work, school and home activities, and other tasks such as online banking. Secondary school children needed a smartphone and data as they were likely to be travelling and socialising independently. Groups considered an entry-level smartphone to be adequate to meet MDLS for parents and secondary school children.

The inclusion in MDLS of **at least 5GB of mobile data per month** each for parents and secondary school children assumes data being used in combination with a stable home

broadband connection. Younger children of preschool and primary school may access the internet via their parents' phones. The 3GB included in MDLS for younger children was viewed as a flexible resource, which could be added to the parents' data.

2.4.1.3 Large screen devices

- A laptop, tablet, or PC per household – parent(s) and first child share one device with an additional device for every further school-age child.

MDLS includes a large-screen device. This could be a laptop that is sufficient to enable school-age children to complete schoolwork, for everyday personal and school use, such as word processing, searching the internet, and streaming videos. The same resource could also be used to cover the cost of a tablet instead, which might be easier for younger children to use.

2.4.1.4 A smart TV, TV licence, and TV subscription service

A smart TV was included for social participation and entertainment so that family members could watch TV together or with visitors. Groups agreed that a 32-inch screen, as originally presented from the main MIS basket of goods and services, would be the minimum adequate level to meet the needs of households with children. A TV licence was also included as a legal requirement to access live content.

Groups included a streaming service, such as entry-level Netflix to reflect the changing norms around how people access content and watch TV. Being able to watch the same TV shows as friends, colleagues, and classmates was identified as important for cultural participation and feeling socially included.

2.4.1.5 Access to online gaming

Groups agreed that school-age children needed to be able to game online. This offered opportunities to communicate and socialise with friends. While some children could choose to play free games accessed via a tablet or laptop, for other (particularly, older) children social participation could require being able to play multiplayer online games, for example, via a games console and an adequate large screen device. Participants agreed that a second-hand console would be adequate to meet children's needs, alongside access to online gaming with others, whether via an entry-level subscription or other means.

2.4.2 Skills and knowledge for a MDLS

Throughout the research, it was clear that goods and services alone were not sufficient to meet the needs of households with children. Meeting the MDLS definition required a set of skills to ensure that people could use devices and digital services confidently and safely.. Groups worked to compile lists of the skills and knowledge parents and children would need to achieve MDLS. These are presented in two broad categories: functional and practical skills for everyday tasks and activities; and critical skills for understanding and managing risks so as to participate in society.

Groups described the skills covered in this section as necessary for young people as well as parents. They said that parents needed all the skills described, while it was expected that children would acquire and build digital skills depending on their age and stage (see Table 3). Groups agreed that young children would typically look to their parents or older siblings for guidance, but that they would begin to develop digital skills through their friends, especially as they progressed through the education system and engaged with more apps and programmes.

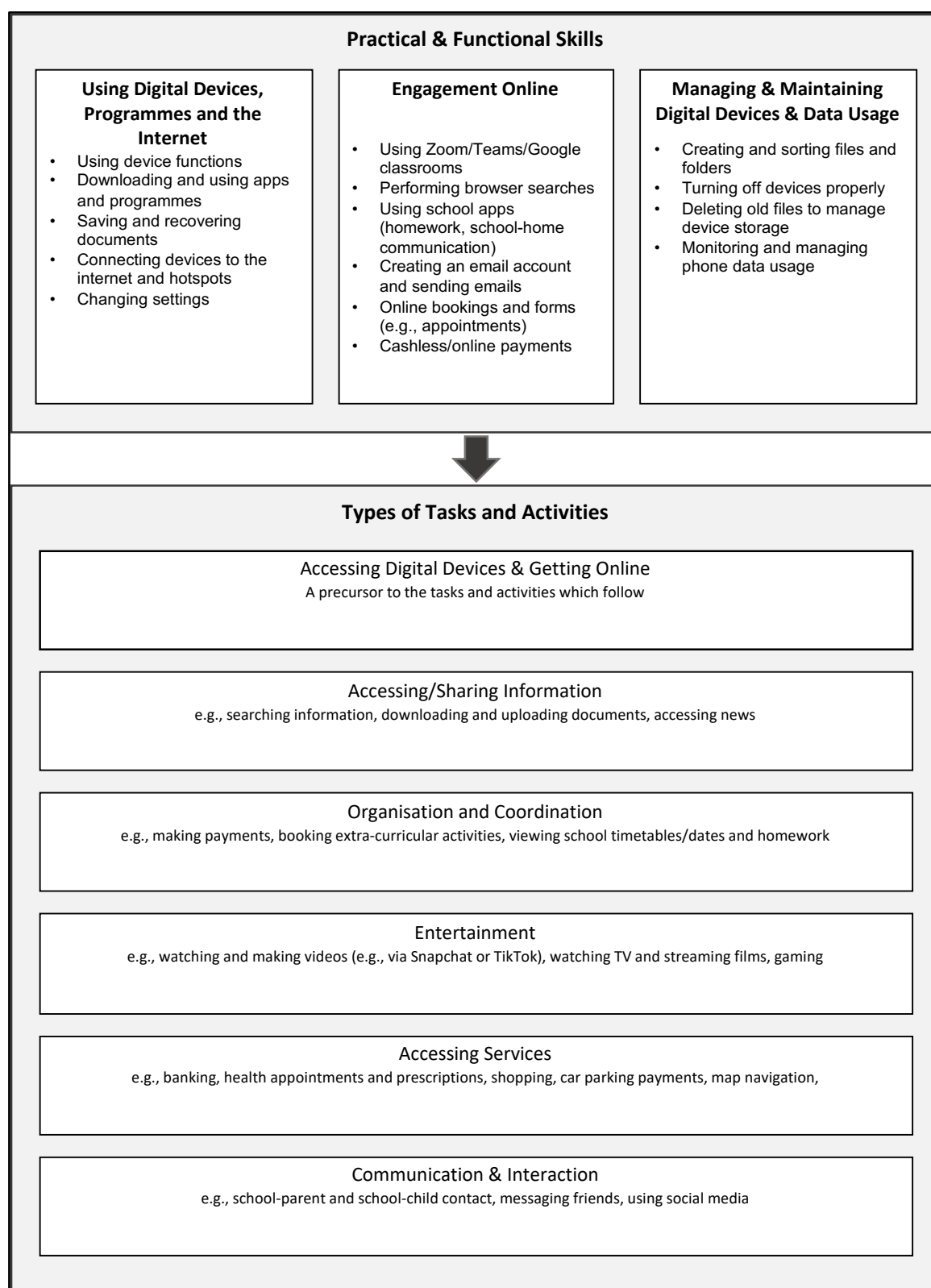


Figure 1: Map of functional and practical skills and the types of tasks and activities they enable parents and young people to undertake

2.4.2.1 Functional and practical skills for everyday tasks and activities

Functional and practical skills are what enable households with children to engage online and carry out everyday tasks and activities (see Figure 1 for examples). These functional and practical skills include:

- **Using digital devices, programmes, and the internet.** Downloading apps, changing device and app settings, and connecting devices to the internet are all examples of the types of functional skills required for performing any online tasks.
- **Engaging online.** These are the skills needed for interacting with others and for accessing online content, as well as for using services. Examples include using school apps to pay for school dinners and school trips, making cashless payments, making video calls, submitting homework online, booking appointments and activities, filling out forms, and ordering prescriptions.
- **Managing and maintaining digital devices and data usage.** These skills enable people to continue to use and get the most out of their devices for the tasks and activities outlined above. Managing data usage requires knowing how to monitor it and understanding how much data different apps use. Maintaining devices includes knowing how to clear and monitor device storage space.

2.4.2.2 Critical skills for understanding and managing digital risks

Critical skills for understanding and managing digital risks are what enable households with children to go online safely and with confidence so as to participate in society (see Figure 2). They are what support families to avoid and manage online harms such as scams and fraudulent links, identity theft, bullying, grooming, and mis/disinformation. Examples of skills for understanding and managing digital risks include:

- **Managing security.** Understanding why and how to create secure passwords, knowing how to remove debit and credit card information from websites, and being able to make secure payments and monitor bank activity online are all examples of skills for managing security.
- **Interacting with others.** Discerning what information to share online, evaluating the legitimacy of friend requests, and managing different online pressures, such as the pressure to respond instantly to messages.
- **Sharing and receiving information.** Evaluating online information and knowing where reliable sources of information can be found online or knowing how to avoid or report harmful content.

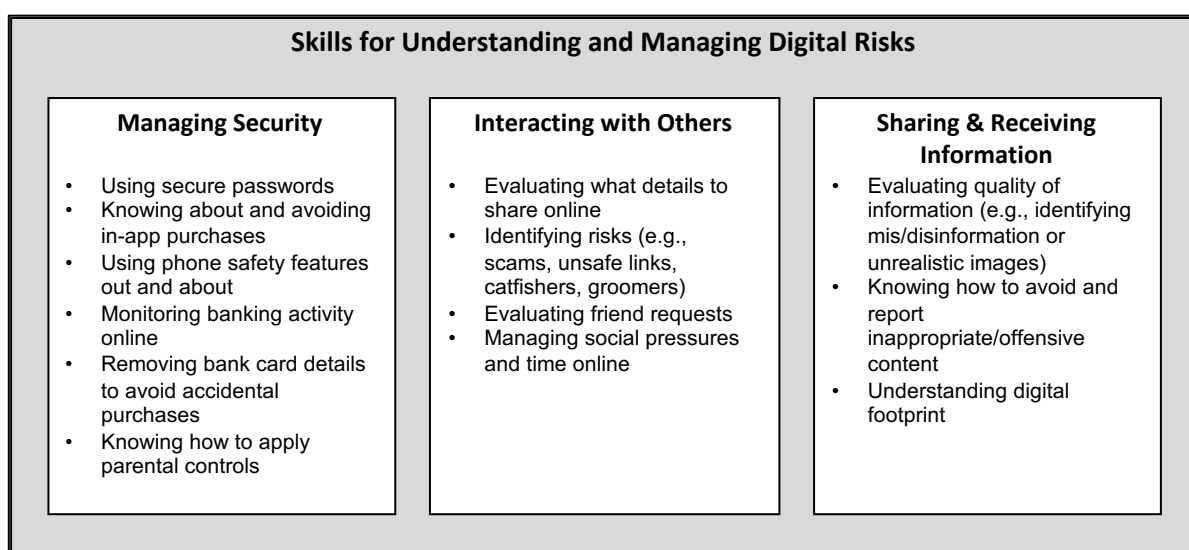


Figure 2: Skills for understanding and managing digital risks

2.5 Summary of MDLS contents

Table 3 summarises the range of goods, services, and skills that are needed to enable households with children to meet MDLS and feel included in the digital world around them. A key aspect of MDLS is that it comprises a package of interdependent goods, digital services, and skills. **To reach MDLS, households need to have or be able to access *all* these elements in combination for digital inclusion, opportunities, and choice.** It is not enough to own technology if it is not fit for purpose, and up-to-date equipment is insufficient without internet access and the skills needed to use it effectively and safely.

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Table 3: MDLS contents for households with children

DIGITAL GOODS AND SERVICES	
Home Broadband	With sufficient reliability and speed to support all family members to access the internet at the same time
Mobile Phone and Data	- An entry-level smart phone per parent and secondary school age child + 5GB data per month each - An extra 5GB of data per month if they have a child of pre-school or primary school age.
Large screen device	- A laptop, tablet or PC per household – parent(s) and first child share one device. - An additional device for every further school age child.
Headphones	A set of headphones for school age children
Television and TV Subscription	- A smart TV, entry-level 32" screen - An entry-level TV subscription service (e.g. Netflix, Disney+) in addition to a TV licence
Access to online gaming	An adequate large screen device and access (via an entry-level subscription or other means) for school age children to be able to participate in online gaming with their peers

PRACTICAL AND FUNCTIONAL SKILLS	
Using digital devices, programmes and the internet	1 Using device functions 2 Using apps and programmes 3 Downloading apps and programmes 3 Saving and recovering documents 3 Connecting devices to the internet/hotspots 4 Changing settings
Engagement online	3 Using Zoom/Teams/Google classrooms 3 Performing browser searches 4 Using school apps (homework, school-home communication) 5 Creating an email account and sending emails 5 Online bookings and forms (e.g., appointments) 5 Cashless/online payments
Managing and monitoring digital devices and data usage	2 Creating and sorting files and folders 2 Turning off devices properly 3 Deleting old files to manage device storage 4 Monitoring and managing phone data usage

CRITICAL SKILLS FOR UNDERSTANDING AND MANAGING DIGITAL RISKS	
Managing security	3 Using secure passwords 3 Knowing about and avoiding in-app purchases 4 Using phone safety features out and about (e.g., 'triple tap' or 'SOS') 5 Monitoring banking activity online 5 Removing bank card details to avoid accidental purchases - Knowing how to apply parental controls
Interacting with others	2 Evaluating what details to share online 2 Identifying risks (e.g., scams, unsafe links, catfishers, groomers) 3 Evaluating friend requests 3 Managing social pressures and time online
Sharing and receiving information	3 Evaluating quality of information (e.g., identifying mis/disinformation or unrealistic images) 3 Knowing how to avoid and report inappropriate/offensive content 4 Understanding digital footprint

Skills
The skills outlined above are needed by parents, and symbols indicate the age/stage by which children need to begin developing these skills, according to parents and young people.

1 Pre-school
2 Early primary school
3 Late primary school
4 Early secondary school
5 Late secondary school

NB: Earlier reports included a smart speaker, which after reflection has been reconsidered. Whilst it serves a range of purposes such as listening to music or radio, or obtaining information, these can be accessed in other ways, rather than the device being needed for digital inclusion in its own right. See Chapter 3 for more details.

The goods, services, and skills listed in the table present what groups felt was **needed** for reaching MDLS. However, MDLS does not set out **how** these needs should be met, nor what should be **provided** by any organisation or government body.

Chapter 3 Understanding the national picture of the MDLS.

3.1 Introduction

Having established MDLS for households with children, the project next undertook a national survey to assess the extent to which UK households with children met MDLS. In this section, we present the core findings from the survey and present analyses of the demographic and geodemographic characteristics of households meeting and **not** meeting MDLS. This chapter is split into five sections, covering:

- an outline of the survey.
- the extent of device ownership and access to broadband, mobile data, and services.
- the extent of both functional and critical skills in adults, children, and households as a whole.
- the combination of these measures into an overall assessment of households meeting MDLS.
- demographic and geodemographic modelling of meeting and not meeting MDLS.

In the following sections, we have taken the current ONS estimate that there were 8,196,000 households with dependent children in the UK³ when calculating the number of households falling into specific categories.

3.1.1 Why survey the MDLS?

We have undertaken a survey as:

- There is a need to robustly understand the demographic factors that underpin meeting (or not) MDLS across the UK.
- Undertaking a national survey of MDLS for households with children provides a baseline for policy makers.
- There are no existing single data sources that integrate all the elements of MDLS.

Unlike MIS, which derives a minimum income for individuals and different household compositions, MDLS is a complex mix of equipment, services, and skills. MIS can utilise existing data on incomes to assess if individuals, households, or demographic groups meet MIS or not. Unfortunately, no existing data sets contain all the elements of MDLS. Ofcom data such as the Technology Tracker⁴ partially collects equipment and service data, though not all items nor their number per household as needed by MDLS. Ofcom media literacy data⁵ provides data on the use of services and devices but not confidence or skills directly. Also, this data is not well linked to demographics for all measures. Finally, Lloyds Consumer Digital Index⁶ data provides figures on Essential Digital Skills but is not open access for deeper statistical analysis. Additionally, not all skills identified by MDLS are in the Lloyds data.

³ <https://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/families/bulletins/familiesandhouseholds/2022>

⁴ <https://www.ofcom.org.uk/research-and-data/data>

⁵ <https://www.ofcom.org.uk/research-and-data/media-literacy-research>

⁶ <https://www.lloydsbank.com/banking-with-us/whats-happening/consumer-digital-index.html>

3.2 Outline of the survey

The final survey was administered in person at home in 2023, and covered a nationally representative sample of 1,582 UK households from all UK administrations (England, Scotland, Wales, and Northern Ireland).

The 1,582 households provide separate data on:

- 2,605 adults with parental responsibility.
- 300 other adults.
- 891 secondary school children.
- 1,162 primary school children.
- 681 pre-school children.

Therefore, the responses gathered provided data on a total of 4,616 individuals in the 1,582 households. This gives a $\pm 2.46\%$ margin of error for a 95% confidence level against a population of 8,196,000 households. All data were provided by one household respondent who was an adult with parental responsibility. We collected data on device ownership and access to the internet. We also collected data from the respondent on their assessment of other household member's confidence with key skills identified in MDLS.

To allow additional analysis, we collected data on a range of demographics including socioeconomic status, household composition, receipt of benefits, health status, location, as well as ages and school stage of children. We collected postcode data allowing us to match household location to detailed geodemographics. Geodemographics is the categorisation of small local areas (e.g. at or close to postcode level) based on features of the population such as their ages, jobs, housing, education, etc. Examples we have used include the level of deprivation in an area, types of housing, and a combination of age, life stage, and ethnicity. This allowed us to add additional characteristics about the household's location to the data without creating an additional burden on the administration of a complex survey. Results are weighted to maximise representativeness across UK household demographics. For full details on the survey design and survey administration, please see the accompanying technical survey report (Yates, 2024).

As we noted in Chapter 1, it was not possible to include all skills questions in the final survey. For an adult, there are 29, and for an older teenager, 27 separate skills. This means that for a household with two adults and two teenage children, we would need to ask over 110 skills questions alone. This would not be possible within a reasonable one-hour maximum time scale for the in-person survey administration. We therefore undertook a pilot survey of 207 households (603 adults and children) asking all skills questions and statistically reduced these to a core set of key skills for the survey. Again, please see the accompanying technical survey report (Yates, 2024) for details.

3.3 Devices and services

3.3.1 Introduction

This section details the extent to which UK households with children have access to the required equipment set out within the Minimum Digital Living Standard. We first look at how many households have access to each of the types of required equipment. We then conclude the chapter with a discussion of how to best assess the proportion of UK households with children who are likely to meet the MDLS requirements.

3.3.2 Large-screen device

MDLS expects that households with children should have a minimum number of large-screen devices, such as a laptop, PC, or tablet, which depends on the composition of the household. MDLS requires one large-screen device for the adults with parental responsibility and the first child. The household then needs a further large-screen device for each additional school-age child. For example:

- A single parent with one child would require one large-screen device.
- A dual-parent household with three school-age children would require three large-screen devices.

We have included tablets in this definition of large-screen devices as this was agreed by participants in the participatory groups. We should note that these are devices useable for any household purpose – i.e., not devices solely dedicated to work use. However, we would also note that there is evidence that children with access only to tablets (e.g., iPad or Android-based devices) may struggle more with education than their peers. This point was clearly made by respondents in our MDLS groups and workshops. Future work should explore with families if different devices are needed at different school stages and what the consequences may be for children who only have access to tablets. We found that 10.3% of UK households with children **do not** meet MDLS criteria for the number of large-screen devices they own. That is 819,600 households.

As noted in previous sections, this number of devices was seen as a minimum. It implies **device sharing among adults, children, or both**. It does not allow all family members to access a large-screen device for any use at any time. Not meeting this minimum therefore implies regular device sharing. Half of the households that do not meet MDLS for large-screen devices are smartphone-only. This means that 5.3% of UK households with children, that is 434,400 households with children, lack a laptop or tablet available to both adults and children and are dependent on smartphone devices for internet access. Most of these households (4% of UK households with children) have children in primary or secondary education.

3.3.3 Smartphone

MDLS requires that all adults with parental responsibilities and all secondary school-age children have individual personal access to a basic smartphone. We found that 7% of UK households with children **do not** meet this requirement. We also found that a small percentage, 1.3% of households with children, lack both adequate large-screen devices and adequate access to smartphones. However, this would be just over 100,000 UK households with children.

3.3.4 Broadband access, broadband speed, and data packages

MDLS requires that households with children have broadband access and speeds that allow all household members to use the internet at the same time. MDLS also expects minimum monthly data allowances for adults and secondary school children of between 5MB and 8MB in total depending on household composition. These minimum data allowances assume broadband at home. This allows downloading of content to smartphones without using data. This data allowance was perceived by the deliberative groups to be a minimum that would not then run out in an average month. However, prior evidence, including anecdotal evidence from our qualitative fieldwork, indicated that many respondents may not accurately know their monthly data allowances or those of other household members.

We therefore asked in the survey if respondents or household members ran out of data regularly, taking this as an indicator of **not having** adequate data per month.

We found that 6.8% of UK households with children **do not** have access to fixed fibre or copper network-based broadband, equal to around 573,700 households with children. We also found that 20.4% of UK households with children indicated that they **do not** have adequate broadband for all household members to use at the same time. That is a potentially staggering 1.64M households with children that do not have good enough broadband to share among all family members. This includes 1.43M households with children in primary or secondary school.

We also found that 10.1% of UK households with children have members who **do not** have adequate mobile data each month. Overall, 2.9% of households with children, 237,700 households, cannot use the internet at the same time *and also* have members who regularly run out of data on a monthly basis. This relationship between broadband access and mobile data use was a key part of the MDLS deliberative discussions. As noted above and in Table 3, the MDLS monthly data allowance assumes adequate broadband at home. Here we have measured whether households run out of data. We are therefore not surprised that there is a correspondence between poor broadband access or speed and then also running short on data.

These results paint a picture that many stakeholder organisations recognised (see Chapter 5): that far from being highly digitally connected, and all children growing up ‘digital natives’, **many families with children struggle to maintain adequate, never mind good, connectivity for all the daily tasks they are faced with.** These points were reiterated in both the deliberative groups (see Chapter 2) and in our discussion with families below MDLS (see Chapter 5). This situation is reflected in work by Ofcom⁷, where 29% of all household types reported struggling to pay for combined costs of internet access via both broadband and mobile services.

3.3.5 Gaming

MDLS requires that households with children have access to a gaming device. This may be a console (e.g., Xbox, PlayStation, Nintendo Switch, etc.), a PC, or a laptop. MDLS focuses on these devices, as it is clear respondents were not discussing smartphone gaming. MDLS includes a requirement that households also have the capacity for all members of school age and older to play age-appropriate games over the internet with friends and family.

Gaming is a key part of contemporary cultural engagement for both children and adults. Gaming is also linked to other digital media content such as TV, films, and social media. A lack of access therefore directly limits potential cultural engagement for all family members. We find that 8.8% of households with children **do not** have gaming-capable devices. We also find that 65.3% of households with children **do not** have access to an online gaming service. However, these results contrast with Ofcom figures⁸ where 38% of adults (16+) and 57% of children (5-15) regularly play games online.

However, percentages of households and individuals are not directly comparable. Our survey results reflect households stating whether they pay for formal services (e.g., Steam, Xbox Live, etc.) and not the level of actual online gaming within households. Many games provide online gaming options without using dedicated services such as Xbox Live. For

⁷ <https://www.ofcom.org.uk/research-and-data/multi-sector-research/affordability-tracker>

⁸ https://www.ofcom.org.uk/data/assets/pdf_file/0029/272288/online-nation-2023-report.pdf

example, the Roblox game, popular with younger children, is free to play online on multiple platforms, as are some mobile games such as Candy Crush on smartphones. In any future ‘re-basing’ of the MDLS definition and in future surveys, we will explore how household members play games online as well as ask if the household pays for a gaming service. This will give a more detailed picture of gaming needs. For this assessment of MDLS, we have looked at whether households with gaming-capable devices (excluding smartphones) also have broadband access. This leaves us with **8.0% of households that do not have the capacity to play games online on an appropriate device.**

3.3.6 Smart TV and TV services

MDLS requires that households with children have access to a smart TV and at least one digital TV service. We find that 6.2% of households with children **do not** have access to a smart TV and that 16.3% of UK households with children **do not** have access to a digital TV service. Digital TV services form part of MIS but are now a core part of everyday cultural life. They are often providing the only route to highly popular TV and film content. Such content is also likely linked directly or through social interaction to social media content. A lack of access directly limits cultural engagement for all family members. Other work by the team on digital access for survivors of modern slavery (Polizzi et al., 2023) found that access to media content, especially for children, was seen as both a key benefit and need by survivors.

3.3.7 Smart speaker

The initial version of MDLS (Blackwell et al., 2023) included a requirement for a smart speaker. This was based on prior MIS research (Davis, 2023) where this was one of the technologies included in the initial basket of goods used in the deliberative group discussions. Respondents retained this in the final version. However, in more recent work conducted as part of the regular re-basing of MIS, respondents have removed the smart speaker from the MIS basket of goods. Also, we find in our survey that smart speakers are not very prevalent in households with children. Only 57.4% households have these. Unlike MIS where the costs of items build an overall minimum income, MDLS equipment relates to specific needs. As a result, many households with children that would otherwise meet the MDLS equipment requirements fall out of scope if the smart speaker is retained. Given the recent MIS results and our findings, we have therefore removed this from the MDLS definition.

Table 4: Percentage of households with children meeting MDLS equipment requirements removing and item at a time

Removing those without adequate:	Percent
Smartphones	93.00
Smartphone data	83.30
Broadband access	78.40
TV service	67.60
Broadband speed	58.80
Large screen devices	54.80
Smart TV	54.80
Gaming	52.40

3.3.8 Basic assessment of MDLS equipment

As a first assessment of households with children meeting all the elements of MDLS, we found that 52.4% of UK households within our survey sample fall within the equipment requirements of MDLS. Therefore, 48% of households with children do not meet MDLS in terms of equipment. This may seem a high proportion, given that on some individual measures such as broadband access most households (90+%) do meet the criteria. Therefore, it is important to emphasise again that this is a combined multi-element measure. There are at least eight criteria on which an individual household can fall out of MDLS. Table 4 details how adding each equipment criterion lowers the number of households meeting the MDLS equipment requirement.

3.3.9 MDLS measure of equipment ownership and service access

We need to remember that MDLS is both a holistic measure and designed by the deliberative groups for a 'typical' household. It is as much designed to help assess and understand individual households or types of households as it is to provide an overall national measure. There is, as a result, variation in how individual households might meet the criteria. For example, all the following would meet or exceed the **minimum** equipment requirement for large-screen devices:

- A single parent with two children with two tablets
- A dual-parent household and two children with one laptop and one tablet
- A dual-parent household and two children with one PC, two laptops, and a tablet

Clearly, these households do not have the same digital capabilities, but they all meet or exceed the minimum. Each of our measures falls within our survey margin of error. Given this variation, we have taken a probabilistic view of our MDLS equipment data.

We can view our survey responses as samples taken from underlying (latent classes) groups of households in the UK. Each of these groups have different probabilities of having the various pieces of equipment and services. There may be a group very likely to have all the equipment and services in some combination. There may be another group where specific services or devices are consistently missing, such as broadband or large-screen devices. We therefore used a statistical technique called Latent Class Analysis to look for these underlying (latent classes) groups. We can view these as groups in the overall UK population of households with children that sit behind the survey data. Full details of this analysis are provided in the accompanying full survey report (Yates et al., 2024).

This analysis found five underlying groups. In the first group, all the households have close to 90% probability of meeting all the equipment and service needs. We have taken this group to represent those types of households in our survey data that are most likely to meet the MDLS equipment needs. The second group we found lacks adequate internet speed and is also very likely to be mobile-only as households within this group have a 68% chance of lacking broadband. The third group lacks access to TV services. The fourth group lacks adequate devices, especially large-screen devices and gaming devices. The fifth group lacks most of the equipment and services. A graph with the probabilities of meeting MDLS equipment needs for each group is presented in Chapter 7.

The percentage of households in each group is presented in Table 5 and we have provided some names to describe each of these groups. In this case, we find the total households with children 'very probably' meeting the equipment requirements for MDLS in the UK population is 81%. We then have 6% of households lacking good broadband, 5% lacking

access to smart TV and digital TV services, and 4% lacking large-screen devices, with the final group lacking nearly all equipment and services being 3% of households with children.

Table 5: Proportions of households in each class for the five classes solution with descriptions

Group	Description	percent
1	Fully MDLS	81.48
2	Partial MDLS – poor broadband via 4G/5G	6.01
3	Partial MDLS – lacks smart TV access	4.80
4	Partial MDLS – lacks enough devices (large screen/gaming)	4.24
5	Significantly below MDLS equipment requirements	3.48

We believe the results from our Latent Class Analysis provide a better take on meeting the MDLS criteria within the context of our sampled data. We use this measure of 81% of households with children meeting MDLS for equipment in the remainder of this report. Overall results for both measures are presented in detail in the accompanying technical survey report (Yates, 2024).

3.4 Skills

3.4.1 Introduction

The MDLS measure contains both equipment and skills. Skills are split into two groups which we can broadly describe as functional and critical skills. Given the extensive list of skill requirements in MDLS, we could not practically cover all skills in a reasonable survey interview session of 30 to 60 minutes, especially as we were asking questions about all household members. To assess skills in this context, we asked respondents to evaluate how confidently they or other household members could undertake specific activities. We accept that both self-reports and reports about others in the household are less reliable than direct testing. We are also aware that interpretations of skills, skill levels, and tasks are relative. However, this approach was the most pragmatic to allow a reasonable administration of an in-home survey of all household members within a reasonable time frame.

As noted in Chapter 3, we therefore undertook a smaller pilot survey of 300 households using all the MDLS skill questions to assess which skills were most representative for each household member group (parents, secondary school children, primary school children) and each skill area (functional or critical). We then subjected this data to a factor analysis to see how the skills effectively grouped together.

The factor analysis grouped skills where respondents reported closely correlated levels of confidence. For example, confidence in saving a document might closely track confidence in searching Google. In most cases, this produced two groups of skills that ‘tracked together’. To reduce the number of questions in the survey we selected the lead items from each group of skills (factor) to represent each group overall. The data, analysis, and details on the selection of skills can be found in the accompanying technical survey report (Yates et al. 2024). This work allowed us to reduce the list of skills to be assessed to the following sets of functional and critical skills. The MDLS definition also indicates the ages within school stage at which children need to acquire these skills.

- Parental and secondary school children's functional skills:
 - Save a document on a computer or laptop.
 - Look for information online using Google or Bing.
 - Create an email account.
 - Make online payments or cashless payments (e.g. through Apple Pay or Google Pay).
 - Manage mobile phone data usage.
 - Use apps to communicate between parents and schools/ check on child's homework etc. **(Parents only)**.
- Primary school children's functional skills:
 - Save a document on a computer or laptop.
 - Look for information online using sites like Google or Bing.
 - Connect a tablet or smartphone to the internet.
 - Fully turn off devices like laptops, mobile phones, or tablets.
- Parental and secondary school children's critical skills:
 - Think about whether online friend requests are genuine (e.g., is the person who they say they are).
 - Think about what personal information should and should not be shared online.
 - Identify risks online (e.g., scams, unsafe links or inappropriate/ offensive content, bullying/trolling, etc.).
 - Manage online pressures when online (e.g., pressures to always be online, to respond immediately, to use social media, to be popular).
 - Think about the quality of the information found online (e.g., is it true, could it be misinformation or unrealistic).
 - Know how to report inappropriate or offensive things online.
 - Can understand that everything that is posted online will leave a mark or 'digital footprint'.
 - Know how to set up parental controls **(Parents only)**.
- Primary school children's critical skills:
 - Think about whether online friend requests are genuine (e.g., is the person who they say they are).
 - Identify risks online (e.g., scams, unsafe links or inappropriate/offensive content, etc.).
 - Think about the quality of the information found online (e.g., is it true, could it be misinformation or unrealistic).
 - Know how to avoid inappropriate or offensive things online.

We have taken any reported level of confidence (fairly or very) as a marker of the respondent or household member having an adequate level of skill. We have then assessed if each adult or child in the household has the required sets of skills considering the ages of the children in line with the full MDLS (see Table 3). To split children into older and younger primary and secondary school groups we have used the age bands from the English National Curriculum Key Stages 1 to 4.

It is important to note that unless we state the result is for the household, we are reporting on skills for all adults and all children in the survey. Therefore, percentages will not match directly between groups of adults or children and the overall results for households.

3.4.2 Functional and practical skills

3.4.2.1 Parental functional skills

We have assessed the functional skills of all adults with parental responsibility in the household. In the case of single-parent households, this would only be the survey respondent. In other households, this would cover the respondent and one other adult. We find that 25.1% of respondents and 21.5% of other adults with parental responsibility **do not** meet the MDLS requirements for functional skills. However, in combination, this leads to 82.7% of households having at least one parent who meets such requirements. 82.7% may seem a reasonable figure but if we look at the list of adults' functional skills these are not particularly complex. Although they do not directly match the skills outlined in the Government's Essential Digital Skills framework⁹, they do match some of the most basic skills. The implication is that 17.3% of UK households with children, 1.42M households, are led by parents who lack clear confidence in some of the core essential functional digital skills. Given the significant contemporary focus on 'digital parenting' and its importance for children's well-being, this is a worrying proportion of households.

Table 6: Adult functional skills

Adult(s) with parental responsibility	Not adequate Functional (%)	Adequate Functional (%)
Respondent parent's skills	25.09	74.91
Other parent's skills	21.51	78.49
Combined overall parental skills	17.32	82.68

If we look at a breakdown of the functional skills of adults with parental responsibility, then we note that the two items with the lowest results are saving a document (88.1%) and using apps to communicate with their children's school (85.8%), both of which are core functional skills for work and parenting. Given the factor analysis process undertaken to reduce the skills used in the survey, a lack of ability in these areas likely implies a lack across many other items of the full set of the MDLS requirement for parents' functional skills.

Table 7: MDLS Parents' functional skills breakdown

Adult skills (all adults with parental responsibility)	Not MDLS adequate (%)	MDLS adequate (%)
Save a document	11.90	88.10
Look for information online	3.26	96.74
Create an email account	8.98	91.02
Make online payments	8.56	91.44
Manage mobile phone data usage	8.87	91.13
Use apps to communicate between parents and school	14.20	85.80

3.4.2.2 School children's functional skills

Notably, the survey respondents (adults with parental responsibility) are more likely to score their secondary school children higher on functional skills. The primary school measure here is challenging. MDLS has a nuanced and age-based approach to skills for pre-secondary school children that is condensed in this survey measure. As a result, our primary school measure covers children expected to have few skills (e.g., those aged 5). Those close

⁹ <https://www.gov.uk/government/publications/essential-digital-skills-framework>

to secondary school age are expected to have a larger skill set. However, from our pilot work, we have selected only four fundamental functional skills for this group to take this variation into account. However, it is notable that between 21% (secondary school children) and 43% (primary school children) **do not** have the MDLS-required functional skills.

Table 8: Overall Secondary school children – Functional skills

Overall secondary school children's functional skills	Percent
Not MDLS adequate	18.20
<i>MDLS adequate</i>	81.80

If we look at a breakdown of older secondary school children's functional skills, then we should note that the two items with the lowest results are making online payments (78%) and managing mobile data (85%). An ability to manage mobile data and costs is key for low-income families.

Table 9: Older secondary school children's functional skills breakdown

Skill	Not MDLS adequate (%)	<i>MDLS adequate (%)</i>
Save a document	7.06	92.94
Look for information online	3.63	96.37
Create an email account	10.69	89.31
Make online payments	21.57	78.43
Manage mobile phone data usage	15.12	84.88

If we look at a breakdown of younger secondary school children's functional skills, then we note that the two with the lowest results are managing mobile phone data usage. We would note that children at Key Stage 3 are already of an age (11-13) where they may be under pressure to join social media if they have not already. At age 13 they can join such platforms and will need to be capable of setting up and managing platform accounts and addressing issues of online payments and in-app purchases.

Table 10: Younger secondary school children's functional skills

Skill	Not MDLS adequate (%)	<i>MDLS adequate (%)</i>
Save a document	13.92	86.08
Look for information online	7.09	92.91
Manage mobile phone data usage	38.99	61.01

Overall, we find that only 68% of primary school children meet the functional skills requirements for MDLS. These are skills that both parents and secondary school-age children thought necessary at Key Stages 1 and 2 of primary education. Looking at the breakdown of skills, there are several basic actions that up to 60% of primary school-age children are seen as being 'not confident' in by their parents.

Table 11: Primary school children - Functional skills

Overall primary school children's functional skills	Percent
Not MDLS adequate	32.00
<i>MDLS adequate</i>	68.00

Table 12: Older primary school children's functional skills breakdown

Skill	Not MDLS adequate (%)	MDLS adequate (%)
Save a document	54.24	45.76
Look for information online	32.41	67.59
Connect a device the internet	42.42	57.58
Fully turn off devices	27.54	72.46

Table 13: Younger primary school children's functional skills breakdown

Skill	MDLS	Percentage
Fully turn off devices	Not MDLS adequate	62.84
	MDLS adequate	37.16

3.4.3 Critical skills

3.4.3.1 Parents critical skills

The results for parents, secondary school, and primary school children are presented in Table 14. As with functional skills, a notable proportion of respondents (37%) and other adults with parental responsibility (30%) did not meet the MDLS criteria. However, as with functional skills, in combination, 73% of households had at least one parental adult with the required critical skills. This again leaves a sizeable number, 27% or 2.21M households with children, being led by adults with parental responsibility who are not confident in some of the more fundamental critical and online safety skills.

Table 14: Other adult with parental responsibilities - Critical skills

Adult(s) with parental responsibility	Not MDLS adequate	MDLS adequate
Respondent parent's skills	37.29	62.71
Other parent's skills	30.11	69.89
Combined overall parental skills	27.24	72.76

Table 15: MDLS Parents' critical skills breakdown

Skill	Not MDLS adequate (%)	MDLS adequate (%)
Identify whether online friend requests are genuine	14.20	85.80
Know what personal information should be shared	11.48	88.52
Identify risks online	16.20	83.80
Manage online pressures	13.93	86.07
Think about the quality of information online	16.16	83.84
Know how to report things online	17.35	82.65
Understand 'digital footprints'	15.01	84.99
How to set up parental controls	16.43	83.57

Table 16: Secondary school children's critical skills

Secondary school children's critical skills	Percent
Not MDLS adequate	30.60
<i>MDLS adequate</i>	69.40

Table 17: Older secondary school children's critical skills breakdown

Skill	Not MDLS adequate (%)	<i>MDLS adequate (%)</i>
Identify whether online friend requests are genuine	23.79	76.21
Know what personal information should be shared	22.58	77.42
Identify risks online	31.05	68.95
Manage online pressures	29.64	70.36
Think about the quality of information online	28.28	71.72
Know how to report things online	28.02	71.98
Understand 'digital footprints'	23.99	76.01

Table 18: Younger secondary school children's critical skills breakdown

Skill	Not MDLS adequate (%)	<i>MDLS adequate (%)</i>
Identify whether online friend requests are genuine	41.77	58.23
Know what personal information should be shared	37.22	62.78
Identify risks online	46.33	53.67
Manage online pressures	44.81	55.19
Think about the quality of information online	46.68	53.32
Know how to report things online	41.77	58.23
Understand 'digital footprints'	42.03	57.97

3.4.3.2 Primary school children's critical skills

These results indicate that only half of the primary school children in the survey were seen as being confident in the MDLS critical skills that parents and secondary school children considered necessary for their age. This perceived lack of both functional and critical skills for younger children is one of the key areas in which households fall short of MDLS. We need to reiterate that these survey findings are parents' perceptions of their children's confidence in these skills. As with all self-assessment measures, we know that these may be over or underestimates. In the case of children, parental concerns over adequacy of skills may be a factor. However, we know from prior work that in general self-assessments and parents' assessments of children's skills are overestimates. This all said, it clearly points to a need to support both children and their parents who need to support them, in developing these key life skills.

Table 19: Primary school children's critical skills

Primary school critical	Percent
Not MDLS adequate	49.50
<i>MDLS adequate</i>	50.50

Table 20: Older primary school children's critical skills breakdown

Skill	Not MDLS adequate (%)	MDLS adequate (%)
Whether online friend requests are genuine	74.97	25.03
Identify risks online	77.33	22.67
Think about the quality of information online	78.16	21.84
Avoid inappropriate or offensive things online	71.21	28.79

Table 21: Younger primary school children's critical skills breakdown

Skill	MDLS	Percentage
Identify risks online	Not MDLS adequate	93.02
	MDLS adequate	6.98

3.4.4 Overall household skills

Combining these results, we find that 62% of households meet the MDLS criteria for overall skills, with 4.8% not meeting the skills requirement at all, 23.7% only meeting it for the children, and 9.4% for parents only.

Table 22: Overall household skills

Overall household skills	Percent
Not Adequate Skills	4.80
Only children have adequate Skills	23.70
Only parents have adequate Skills	9.40
Household has adequate skills	62.20

3.5 Combining results for an overall MDLS

MDLS calls for households to have a combination of both equipment and skills. In the next section, we look at combining skills and equipment. We base this on a combination of the five equipment groups presented in **Error! Reference source not found.** and the proportion of households with all the required skills presented in Table 22.

- Taken together, we find that 55% of UK households with children meet MDLS and 45% **do not** meet MDLS.

This implies that **3.69M households with children do not meet our MDLS definition.** This is because they miss out on one or more of the following aspects of digital living:

- Having accessible internet.
- Adequate equipment.
- Having the appropriate skills and knowledge.

As a result, they may struggle to digitally communicate, connect, and engage with opportunities safely and with confidence.

3.5.1 Why 45% of households?

Taking our MDLS measure, we have 45% of UK households with children not meeting MDLS. This means they are not meeting the MDLS definition that representatives of these types of households deliberatively agreed cover household needs in terms of equipment, services,

and skills. Looking in more detail, we find that the following proportions of all households with children **fail to meet** the MDLS following reasons:

- 8.3% of households specifically lack skills for children (mix of all ages and skills).
- 17.0% of households specifically lack skills for adults (mix of skills).
- 7.2% of households specifically lack equipment.
- 12.5% of households lack a mix of skills and equipment.

We should maybe not be surprised by these figures. First, existing research (Yates, 2020) indicates that around 30% of UK citizens are offline or limited users and that another 20% focus on activities that are smart device-based and are less likely to require large-screen devices. Ofcom figures also show that 28% of households are struggling with broadband costs.¹⁰ We also know that:

- 27% of UK households with children are in absolute poverty (JRF).¹¹
- 44% of UK single-parent households are in absolute poverty (CPAG).¹²
- 42% of children are living in households with incomes below MIS (Padley, et al., 2024).

Our results seem very much in line with these existing findings.

3.6 Understanding the characteristics of households that do not meet the MDLS

3.6.1 Introduction

In this section, we explore how meeting (or not meeting) the MDLS corresponds and correlates with a range of demographic and geodemographic measures. We know from prior research that digital exclusion and low digital skills have a clear correspondence with socio-economic and geographic factors (Hargittai, 2001; Helsper, 2012; Van Deursen et al., 2014; Yates and Lockley, 2018; Yates et al., 2015; Yates and Lockley, 2020). We have found the same with the MDLS. To conduct our analysis, we first looked separately at all the variables in our survey that were likely, according to prior research, to be predictors of digital exclusion and inclusion. Table 23 lists all of these and indicates which of these were predictors of MDLS.

We placed all the separate variables we found to be statistically significantly correlated with MDLS into an overall regression model to predict MDLS. We did this through a stepped set of models outlined in the accompanying technical report. We removed variables found to be strongly colinear and the final model met required checks for goodness of fit. In our accompanying technical survey report (Yates, 2024) we provide full details of the explorations of all the survey and geodemographic variables. In this section, we will start with this overall model and then explore each of the key predictors in turn.

¹⁰ [https://www.ofcom.org.uk/research-and-data/multi-sector-research/affordability-tracker#:~:text=In%20January%202024%2C%20just%20under,afford%20communications%20service\(s\).](https://www.ofcom.org.uk/research-and-data/multi-sector-research/affordability-tracker#:~:text=In%20January%202024%2C%20just%20under,afford%20communications%20service(s).)

¹¹ <https://www.jrf.org.uk/uk-poverty-2024-the-essential-guide-to-understanding-poverty-in-the-uk>

¹² <https://cpag.org.uk/news/official-child-poverty-statistics-350000-more-children-poverty-and-numbers-will-rise#:~:text=44%25%20of%20children%20in%20lone,a%20disability%20were%20in%20poverty>

Table 23: Variables tested as predictors of meeting (or not) the MDLS

Household characteristic	Statistical significance on its own
Urban context – urban or rural	Weak
Town size – large city to village	Yes
UK region	Yes
Socio-economic grade (National Readership Scale)	Yes
Receipt of state benefits	Yes
Employment status of main income earner	Yes
Respondent's health or disability affecting everyday life	Yes
Respondent's declared ethnicity	Yes
Single or dual parents	Yes
Number of children in household	Yes
Output Area Classification Group – a geodemographic categorisation of the household's location	Yes
Index of Multiple Deprivation total rank for the household's location	Yes
Internet User Classification Group – a geodemographic categorisation of internet users in the household's location	No

The final model is presented at the end of this report in Chapter 7, The final model is presented in Table 36. Reference categories for the factor variables are:

- For NRS grade the reference category is 'AB'.
- For town size the reference category is 'Large city'.
- For region the reference category is 'London'.

3.6.2 Goodness of fit and multicollinearity

Hosmer and Lemeshow test (binary model) (X-squared = 5.7865, df = 8, p-value = 0.6711). Test is non-significant indicating no evidence of poor fit. A variance inflation factor (VIF) test was used to detect the extent of multicollinearity in the regression analysis. We find that all the variables in the regression have VIF scores below 2 (acceptable range 1 to 5) indicating that multicollinearity is not an issue in this analysis.

Table 35: VIF scores

Variable	VIF	Variable	VIF	Variable	VIF
SEG	1.401	Benefits	1.565	URBAN	1.225
Single parent	1.209	Working	1.429	REGION	1.110
Two plus children	1.058	Health limitation factor	1.231	oac21SG	1.193
IMD Ranks	1.348	Ethnicity	1.200		

Table 36, Figure 11 to Figure 22, and Equation 1. We can conclude from this model that the following household characteristics reduce the likelihood of meeting MDLS:

- Being in NRS social grades C2, D, or E (e.g., households with parents in lower-skilled jobs, unemployed, or retired from such circumstances).
- Being a single-parent household.
- Having more than two children in the household.
- Living in an area of higher multiple deprivations.
- Receiving at least one state benefit.
- Having the main income earner unemployed.
- The survey respondent having a health issue or disability affecting their daily activity.
- The survey respondent identifying as ethnically non-white.
- Living within a large city.
- Living outside London, with the South West, North East, Scotland, Northern Ireland, and North West having the lowest probability.
- Living in a Low-Skilled, Migrant, or Student Community.

Each of these characteristics has a separate statistical impact on a household's likelihood of meeting (or not) MDLS, considering all the other measures in the model. For example, the following two households may have a similar socioeconomic grade (C2) and both be in employment:

- Household A: A single-parent household with one child living in an area of relative affluence in South East.
- Household B: A single-parent household with more than two children, living in an area of higher multiple deprivation in the North East, where the parent has a long-term health issue.

We find from our model that Household A may be 4.5 times more likely to meet MDLS than Household B.

In the following sections, we will look at each of these characteristics separately grouped by:

- Household socio-economic status.
- Household composition.
- Household employment status, health, benefits status, and ethnicity.
- Household location and geodemographics.

In each case, we provide a cross-tabulation of the household characteristic with meeting (or not) MDLS. We then return to discuss the overall model and its implications for digital inclusion of households with children.

3.6.3 Socio-economic status

We have two measures of socio-economic status. From the survey, we have NRS social grade for each household. We also have, from the geodemographic data, a combined index of deprivation ranking for each household's location. Looking first at NRS social grade, we find a statistically significant correspondence. We find that 64% of households in NRS grades D and E do not meet MDLS compared to 32% in grades A and B. If we look at our combined index of multiple deprivations, we unsurprisingly find the same result. Households not meeting MDLS are more likely to live in an area with a higher level of deprivation. However, interestingly, even *within* social grade groups those living in *relatively* lower areas of

deprivation are more likely to meet MDLS than not. This implies location factors may impact meeting MDLS separate from family socio-economic status.

As we know from digital inclusion research that focused on individuals, socio-economic grade is a key variable. It is not surprising therefore that it is a key variable determining the likelihood of being within MDLS. More detailed analyses in the accompanying technical survey report make clear that this result holds separately for equipment and services and for skills. Combining skills and equipment links both cultural capital (education, training) and economic capital (goods and services) in one measure (see Yates et al., 2018). We know from other work that digital skills and a greater breadth of digital activity strongly correlate with education, especially post-18 education (Yates, et al., 2021). Unfortunately, due to space limitations in the survey, we did not collect data on educational attainment of adults in the household.

Table 24: SEG factor by MDLS LCA
Equipment Skills factor ($\chi^2(3, 1582) = 85.669$,
 $p = 0$, Cramer's $V = 0.233$)

MDLS (LCA):	Not MDLS adequate	MDLS adequate
AB (obs.)	136.00	283.00
(row%)	32.40	67.60
(col.%)	19.10	32.60
C1 (obs.)	176.00	266.00
(row%)	39.80	60.20
(col.%)	24.70	30.50
C2 (obs.)	163.00	187.00
(row%)	46.60	53.40
(col.%)	22.90	21.50
DE (obs.)	238.00	134.00
(row%)	63.90	36.10
(col.%)	33.40	15.40

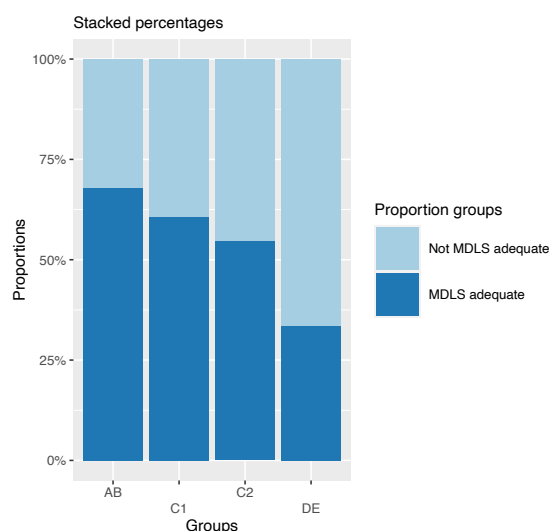


Figure 3: Proportions plot of households (with children) meeting or not MDLS by NRS Grade (LCA)

3.6.4 Household Type

Although prior work has looked at digital divides among children of different social grades and experiences (see Livingstone & Helsper, 2007) and the presence of children in households has been used as a factor in exploring full and relative digital exclusion (see Helsper & Reisdorf, 2016; Yates et al., 2018, 2020, 2021, 2022, 2023), few studies have looked at overall household composition. If we look at the household type in our survey, we find that those households below MDLS are more likely to be **single-parent households or households with more than two children**. This contrasts with the prior findings that having children in the home leads to individual adults being more likely to be online. This highlights a key difference between MDLS and other more individualistic measures. MDLS assesses households' needs not just if the individual respondent is online or uses online services (e.g., as we did in our prior work such as Yates et al. 2020). The MDLS measure assesses whether the whole household can engage fully with digital opportunities. Importantly, even though prior work may have indicated that having children in the home made it more likely for

adults to be online, this did not assess if this access was adequate to support both adults' and children's combined needs. Our MDLS results imply that the picture is more complicated than that implied by prior work.

There are some clear reasons why larger households may fall short of MDLS. Larger households will require more equipment to meet MDLS. In fact, we find that 38.8% of households that lack enough large screen devices (Group 4 in Table 5) are households with more than two children. Similarly, 60.0% of those households significantly below MDLS for all equipment (Group 5 in Table 5) are single-parent households. In both cases, cost and affordability may be an issue – something highlighted in all our qualitative work (see Chapter 2 and Chapter 5). Some multi-child households may struggle to acquire the required equipment and services due to the amount needed. Some single-parent households may struggle to acquire adequate equipment and services as they are reliant on a single income.

However, equipment is just one part of the equation. The picture for skills is more complex. Single-child households appear to be more likely to have the required skills than households with two or more, whether single or dual-parent households. However, single-parent households do not fare as well on the skills measure as one parent carries the requirement to meet all skills. This is why we have considered combined parental skills when assessing if a household meets the parental requirements. Once again this reinforces the importance of exploring digital inclusion of households, and overall household digital needs, to get a full picture of family circumstances.

Table 25: HTYPE factor by MDLS LCA Equipment Skills factor (Row Percentages) ($\chi^2(8, 1582) = 84.801, p = 0$, Cramer's $V = 0.232$) (Tables only show row percentages to reduce complexity)

Household type	Not MDLS adequate	MDLS adequate
1 adult and 1 child (row%)	57.50	42.50
1 adult and 2 children (row%)	62.10	37.90
1 adult and more than 2 children (row%)	62.10	37.90
2 adults and 1 child (row%)	34.30	65.70
2 adults and 2 children (row%)	39.50	60.50
2 adults and more than 2 children (row%)	58.60	41.40
More than 2 adults and 1 child (row%)	51.90	48.10
More than 2 adults and 2 children (row%)	42.00	58.00
More than 2 adults and 2+ children (row%)	87.40	12.60

3.6.5 Social and health demographics

We have in our survey data a range of other social, health, and employment demographics, in particular:

- Whether the household receives at least one state benefit.
- Whether the chief income earner is working.
- Whether the survey respondent has a health issue affecting daily activity.
- Whether the survey respondent identifies as ethnically white or non-white.

The following sections look at each of these in turn.

3.6.5.1 Households receiving state benefits

We find that those receiving at least one state benefit are far more likely **not to meet MDLS (62%)**. We have considered the following benefits in this assessment:

- Income Support
- Income-based Jobseeker's Allowance
- Pensions Credit (Guaranteed Credit)
- Pensions Credit (no Guaranteed Credit)
- Employment and Support Allowance (ESA)
- Universal Credit (and household has other earnings)
- Universal Credit (and household has no other earnings)
- Personal Independence Payment (PIP)
- Disability Living Allowance (DLA)
- Carer's allowance

This result has clear policy implications. Support for digital inclusion is partly means-tested through 'social tariffs' being available for those households on a range of benefits. However, uptake of these tariffs remains very low. As discussed later in Chapter 5, 'social tariffs' may still be too expensive for some households. They may also be too limited (e.g., low broadband speed) such that they do not fully address the minimum needs of some households.

Table 26: Benefits factor by MDLS LCA
Equipment Skills factor ($\chi^2(1, 1582) = 75.138, p = 0$, Cramer's $V = 0.218$)

Household receives benefits	Not MDLS adequate	MDLS adequate
Not on any benefits (obs.)	429.00	696.00
(row%)	38.10	61.90
(col.%)	60.20	80.00
Receives at least one state benefit (obs.)	284.00	174.00
(row%)	62.00	38.00
(col.%)	39.80	20.00

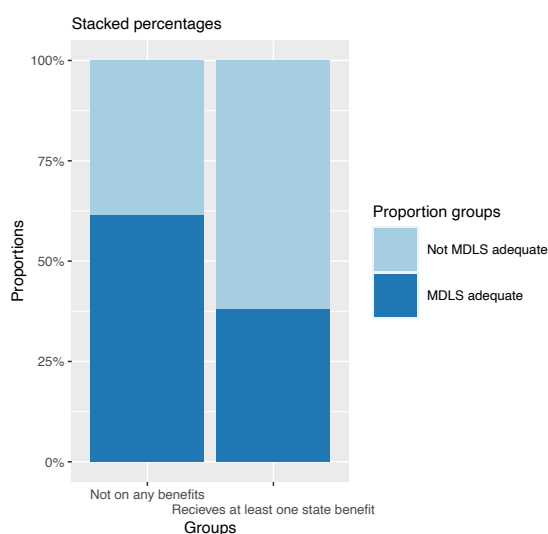


Figure 4: Proportions plot of households (with children) receiving benefits or not by MDLS (LCA)

3.6.5.2 Household employment

Table 29 details the proportion of households where the main income earner is working or not and whether they meet MDLS. Notably, **those not working are more likely not to meet MDLS (68%)**. Again, this result is not unexpected given findings so far, but it also has policy implications. Many individuals, often but not solely those in professional careers, have access to laptops and mobile devices through work. Even though some may only be useable for that purpose, many can be used for multiple activities, even if they cannot be shared with other household members. This takes pressure off demands elsewhere in the household. This is another example of how each of different household circumstances (e.g., socio-economic status, number of parents and children, income/benefits, being in

employment) can add advantages or barriers to the overall ability of a household to be fully digitally engaged.

Table 27: Working factor by MDLS LCA Equipment Skills factor ($\chi^2(1, 1582) = 69.595, p = 0$, Cramer's $V = 0.21$)

	Not MDLS adequate	MDLS adequate
Chief income earner not working (obs.)	180.00	83.00
(row%)	68.40	31.60
(col.%)	25.30	9.60
Chief income earner working (obs.)	532.00	787.00
(row%)	40.40	59.60
(col.%)	74.70	90.40

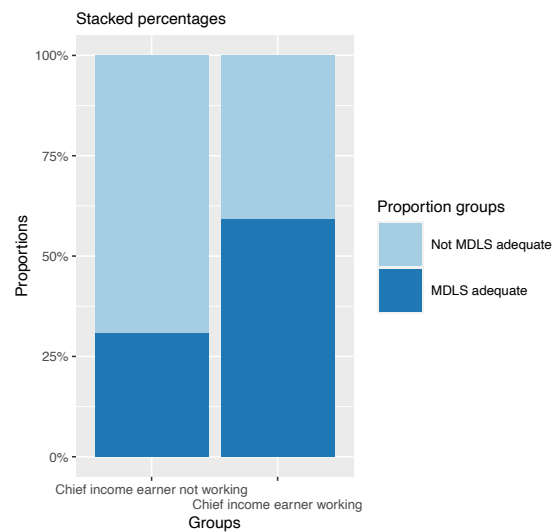


Figure 5: Proportions plot of households (with children) where the chief income earner is employed (or not) by MDLS (LCA)

3.6.5.3 Health and disability

Prior work has clearly established that having a long-term health condition corresponds with a higher likelihood of adults being fully digitally excluded or limited digital users (see Yates et al. 2020). This is the case with our survey: **those with a health issue or disability are more likely not to meet (66%) MDLS**. However, we are here only asking this question of the respondent, even though, of course, other or multiple household members may have long-term health conditions.

Once again, this has policy implications. Many health services are now primarily accessed online. Also, many medical interventions for chronic ill health now involve remote monitoring of patients. Digital tools and services are also of considerable importance for many disabled people allowing them to undertake many everyday tasks and activities. Households where members have chronic health conditions or disabilities are therefore more likely to need digital access. Yet, according to our data, such households are more likely to have limited or stretched digital resources and skills. Future work to be undertaken by the team will look at overall digital needs and experiences of households dealing with long-term health care for children. Similarly, future MDLS research will need to explore health issues across the whole household beyond the survey respondent.

Table 28: Health limitation factor by MDLS LCA Equipment Skills factor ($\chi^2(1, 1582) = 44.631, p = 0$, Cramer's $V = 0.168$)

	Not MDLS adequate	MDLS adequate
Respondent has no health issue affecting daily activity (obs.)	569.00	796.00
(row%)	41.70	58.30
(col.%)	79.90	91.50
Respondent has a health issue affecting daily activity (obs.)	143.00	74.00
(row%)	66.00	34.00
(col.%)	20.10	8.50

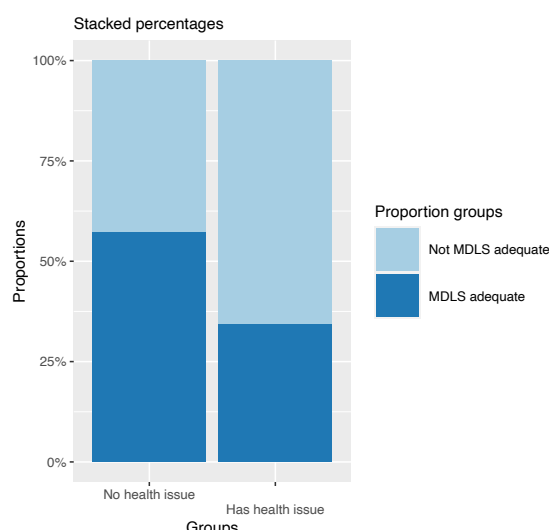


Figure 6: Proportions plot of households (with children) with a health- issue or disability that meet or not MDLS (LCA)

3.6.5.4 Ethnicity

Exploring detailed aspects of ethnicity through our survey is challenging. In a survey of this size, exploring specific ethnic backgrounds (for example, 'Black Caribbean') is limited by the smaller (though hopefully representative) number of cases in the data set. This makes it very difficult to statistically assess potential correspondences and correlations in finer detail, especially when in combination with other variables such as health or socio-economic status. The likelihood of over or underestimating the impact of ethnicity at this level of fidelity therefore becomes too high, leading to misrepresentations. We have therefore reduced our ethnicity measure to a very simple binary one – whether the respondent identified as white (British, Irish, or Other) or identified as any of the non-white categories. We accept that this may be too simplistic but further work, either a larger sample survey or qualitative work with members of specific communities, is needed to fully assess the relevance of ethnicity to MDLS.

Table 29 details the proportion of households where the respondent identified as white or non-white and whether they meet MDLS. Notably, **those identifying as non-white are more likely not to meet (55%) MDLS**. This is an important result as prior work has found that ethnicity, when assessed in this simple binary fashion, was not a significant predictor of being fully digitally excluded, nor being a limited digital user (see Yates et al. 2020). However, prior research, stakeholder engagement, and policy work have identified key communities that are more likely to be at risk from digital exclusion. These include communities where English is not a first language – including Welsh-speaking areas. Similarly, people who are transitioning into UK citizenship and residency such as recent migrants, asylum seekers, or survivors of modern slavery (see Polizzi et al., 2023) are all more likely to lack digital access or skills. However, we find that people in these circumstances need access to digital devices and skills to deal with public services or to access information in their first language. Here we are looking at households and the results imply that these types of factors and circumstances related to ethnicity and background may also impact the household as a whole and not solely the individual.

Table 29: Ethnicity factor by MDLS LCA
Equipment Skills factor ($\chi^2(1, 1582) = 19.01, p = 0$, Cramer's $V = 0.11$)

	Not MDLS adequate	MDLS adequate
Respondent identifies as ethnically white (British, Irish, Other) (obs.)	499.00	692.00
(row%)	41.90	58.10
(col.%)	70.00	79.50
Respondent identifies as ethnically non-white (obs.)	213.00	178.00
(row%)	54.50	45.50
(col.%)	30.00	20.50

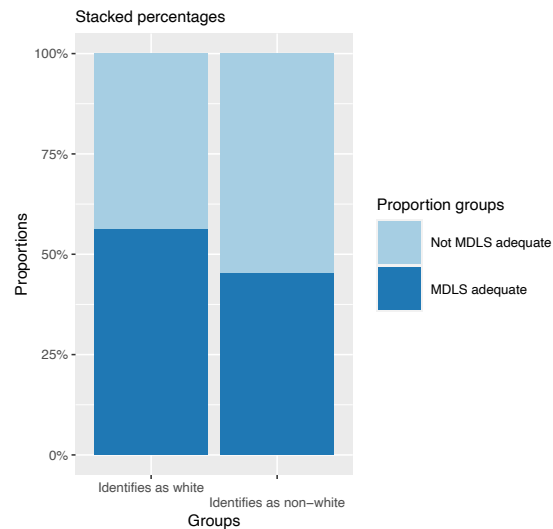


Figure 7: Proportions plot of households (with children) meeting or not MDLS by ethnicity (LCA)

3.6.6 Geography and geodemographics

3.6.7 Broadband access and speed

From our geographic data, we have an average broadband speed for each household location derived from Ofcom data and measurements. Interestingly, we find that being in an area above or below the UK average broadband speed does not correspond with MDLS ($\chi^2(1, 1582) = 1.381, p = 0.275$, Cramer's $V = 0.03$). This implies that local broadband infrastructure may not be a factor in households meeting MDLS. To explore this further, we tested if specific speeds for each household's area correlated with meeting MDLS. Again, we found no statistical relationship ($F(1,1512) = 0.637, p = 0.425$). Even when looking specifically at those households stating that they do not have *MDLS adequate internet*, we also found no significant correlation with local average broadband speeds ($F(1,1512) = 3.00, p = 0.084$). Given the size of the data set, we would have expected even a very weak correspondence to have been statistically significant.

This is an important finding. This would appear to imply that **the quality of infrastructure in a household's area does not correspond with meeting or not meeting MDLS**. Historically, a major policy focus has been on getting good broadband to all residences. This still needs to be the case as we find both rural and urban areas with clear 'not-spots' for both broadband and mobile signal. For a discussion of the reason for urban 'not-spots', see Tyrell et al., 2023. However, when we look at our results, other aspects of MDLS including devices and skills outweigh broadband infrastructure. Households reporting inadequate broadband for everyone to be online are as likely to be in areas above or below the UK average broadband speed. Therefore, other factors such as affordability, household composition, and, as we have found in our MDLS research in Wales and GMCA (Tyrell et al., 2023), building infrastructure can impact broadband quality.

3.6.7.1 Urban vs rural

If we look at a simple measure of urban vs rural location, we do find an exceedingly weak correspondence with MDLS ($\chi^2(1, 1582) = 7.145, p = 0.012$, Cramer's $V = 0.067$). However,

counter to prior work and standard assumptions in digital inclusion work, **rural areas do better**. Looking in more detail at the size of town, we find that, for households with children, **those not meeting MDLS are more likely to be in large cities or larger towns, whereas those meeting MDLS are more likely to be in medium or small towns and rural areas** (see Figure 8). The reason we find this result may reflect the fact that we are only looking at households with children. However, as we will discuss later when looking at our mapping of MDLS across the UK, there appears to be a correspondence between urban and rural poverty. This is not to deny that a lack of broadband in a rural area of Wales, Scotland, North East or South West of England is problematic for families there. Rather, the results indicate that for, the full set of MDLS elements, gross differences by urban or rural location are overshadowed by other social and demographic factors.

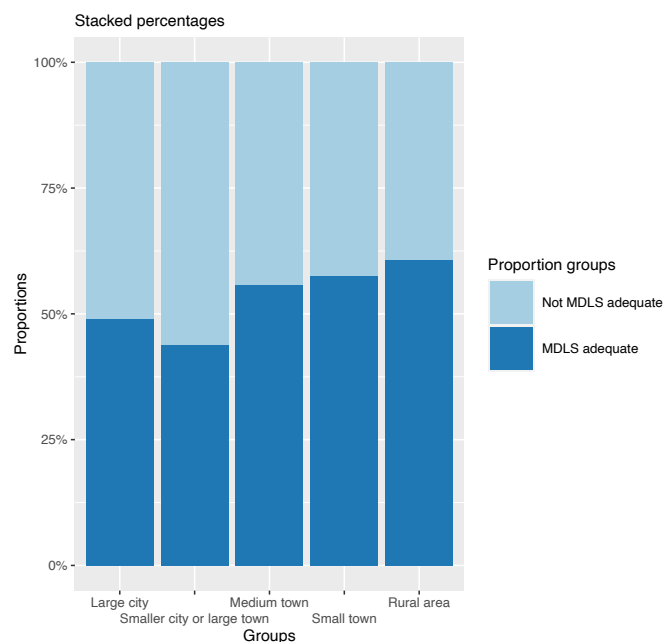


Figure 8: Proportions of MDLS by town size by (LCA)

3.6.7.2 UK regions

However, regional location does matter. Looking at MDLS by UK region (see figure [5.9](#)), we find that those households not meeting MDLS are more likely to be in:

- North East
- North West
- South West
- Scotland
- Northern Ireland

By contrast, those households meeting MDLS are more likely to be in:

- West Midlands
- East of England
- South East
- Wales

Table 30: REGION factor by MDLS LCA Equipment Skills factor (Row Percentages) ($\chi^2(11, 1582) = 36.54, p = 0.001$, Cramer's $V = 0.152$)

UK region	Not MDLS adequate	MDLS adequate
North East (row%)	46.50	53.50
North West (row%)	55.80	44.20
Yorkshire and the Humber (row%)	43.90	56.10
East Midlands (row%)	44.20	55.80
West Midlands (row%)	36.60	63.40
East of England (row%)	31.20	68.80
London (row%)	46.70	53.30
South East (row%)	40.50	59.50
South West (row%)	49.90	50.10
Wales (row%)	36.60	63.40
Northern Ireland (row%)	58.00	42.00
Scotland (row%)	55.80	44.20

3.6.7.3 Geodemographics

We have linked a set of geodemographic variables to our data based on household postcodes. The full details of these are presented in the accompanying technical survey report (Yates et al., 2024). We only include one in this report – the output area classification (OAC) – as we found that others did not provide any additional explanatory power to our final model.

If we look at the set of geodemographic definitions provided by the Output Area Classification (OAC) geodemographic,¹³ we find that **there is a correspondence between the demographics of areas and meeting MDLS**. This geodemographic clusters small areas of the UK according to their population make-up based on census data. The classifications do not mean that every person in the area meets the description but rather that these are the predominant residents. In making this comparison, we are not implying that the households with children surveyed meet the descriptor – rather, that they are living in an area where most of the population meets the descriptor. We find in our mapping work (see Chapter 4) that our sample is well and usefully distributed across all of the relevant OAC groups.

Table 31 provides percentages of each area type by MDLS. Looking at the residuals and contributions underlying this data indicates that those households **not** meeting MDLS are more likely to be in areas defined as:

- Low-Skilled, Migrant, and Student Communities
- Legacy Communities

By contrast, those meeting MDLS are more likely to be in the areas defined as:

- Retired Professionals
- Suburbanites and Peri-Urbanities
- Ethnically Diverse Suburban Professionals

As we can link this geodemographic to UK areas and as it corresponds clearly to MDLS, this forms the basis of our later mapping of MDLS in Chapter 4.

¹³ <https://data.cdrc.ac.uk/dataset/uk-oac>

Table 31: *oac21SG factor by MDLS LCA Equipment Skills factor (Row Percentages) ($\chi^2(7, 1582) = 52.03, p = 0$, Cramer's $V = 0.181$)*

Output area classification	Not MDLS adequate	MDLS adequate
Retired Professionals (row%)	33.50	66.50
Suburbanites and Peri-Urbanities (row%)	40.60	59.40
Multicultural and Educated Urbanites (row%)	42.10	57.90
Low-Skilled Migrant and Student Communities (row%)	56.00	44.00
Ethnically Diverse Suburban Professionals (row%)	30.80	69.20
Baseline UK (row%)	47.80	52.20
Semi-and Un-Skilled Workforce (row%)	44.40	55.60
Legacy Communities (row%)	71.80	28.20

3.7 Putting it all back together

If we return to our overall model, we can consider, holding the other variables constant, how each of the above variables impacts the likelihood of meeting MDLS:

- Compared to social grades A and B, **social grades C2, and DE** are 1.7 and 2.1 times **less likely** to meet the MDLS.
- **Each decile of worsening IMD rank** position for the household's area **decreases** the likelihood of meeting MDLS by between 0.05 and 0.03, dropping from 1.0 at the least deprived to 0.59 at the most deprived.
- **Single parents** are 1.3 times **less likely** to meet MDLS as compared to dual-parent households.
- **Households with more than two children** are 1.68 times **less likely** to meet MDLS as compared to households with less than two children.
- **Households receiving at least one state benefit** are 1.38 times **less likely** to meet MDLS compared to households that do not receive benefits.
- Having the **main income earner employed** makes a household 1.44 times **more likely** to meet MDLS than households where they are unemployed.
- Households where the survey respondent has a **health issue affecting their daily** activity are 2.01 times **less likely** to meet MDLS than those who do not.
- Households with **survey respondent identifying as ethnically non-white** are also 2.01 times **less likely** to meet MDLS than those who are white.
- Households in **smaller cities or large towns** are 2.38, **medium towns** are 3.45, **small towns** are 4.71, and **rural areas** are 4.13 times **more likely** to meet MDLS than those in large cities.
- All households **living outside London** are **less likely** to meet MDLS with the worst locations being North East (5.21 x less likely), North West (7.23 x less likely), South West (7.74 x less likely), Scotland (8.18 x less likely) and Northern Ireland (11.92 x less likely).
- Living in a **Low-Skilled, Migrant, or Student Community**, makes a household 1.48 x **less likely** to meet the MDLS.

3.8 What do these results tell us about not meeting MDLS?

What can we conclude from the data presented in this chapter? None of the results are particularly surprising, even though they each have clear policy implications. We know from much prior research (Hargittai, 2001; Helsper, 2012; Van Deursen et al., 2014; Yates & Lockley, 2018; Yates et al., 2015; Yates & Lockley, 2020) that meeting MDLS or not was always going to have strong correspondences with key socio-economic factors such as social class and deprivation. We also know from the same research that factors such as health status and employment strongly correspond with equipment access and skills-based assessments of digital inclusion. Regional location has also been found to be a consistent factor in UK studies, with the North of England, Scotland, Wales, and Northern Ireland being locations where more people are digitally excluded. It would, in fact, be surprising if MDLS did not follow a similar pattern.

Despite being along the lines of prior work that has predominantly looked individually at adults and children, the results add new features. They highlight how **MDLS identifies combined features of households that complicate or in some cases unpick underlying assumptions**. In prior work, having children in the home is a predictor of residents being digitally included. However, when we take household composition into account within MDLS, then we find that this is not straightforward, as the number of people in the home increases the equipment needs to meet MDLS.

Two results appear to go against expectations. First, regionality. **Those meeting MDLS are more likely to be out of major cities (except London), in the more affluent suburbs, and rural locations**. This may be a product of this being a measure for households with children, not **all** households. Future work will be needed to assess if this is the case. Second, the finding that being above or below average broadband speed for an area does not seem to correspond with meeting or not MDLS. Taken together, the fact that **being rural does not correspond with not meeting MDLS** and, alongside local broadband speeds not having an effect, implies that for households with children it is not infrastructure but maybe cost that is key when looking at broadband access and quality.

Meeting MDLS is a challenge for many households with children, with a large proportion of households falling short on either equipment, skills, or both. To fall short of MDLS is to fall short of what households with children **themselves set** as the minimum equipment and skills needed for:

A minimum digital standard of living includes but is more than, having accessible internet, adequate equipment, and the skills, knowledge and support people need. It is about being able to communicate, connect, and engage with opportunities safely and with confidence.

Not meeting MDLS is therefore about not having the equipment, skills, or both to engage **safely and with confidence** with both the benefits of our digital society and the hazards. It is to be excluded, in part or in full, from leading a life you value in a digital world.

Chapter 4 Mapping the MDLS

4.1 Why map MDLS?

A key request received from many of the stakeholders that we work with is to have access to data on digital exclusion in the form of a local or regional map. **The generation of such maps helps organisations to think about policy and practice in supporting digital inclusion in their local context.** Often, organisations will overlay maps of likely digital exclusions with data on available local resources and support services. From this, they can assess where support need is greatest or where there are gaps in needed provision. These maps also make clear how some of our variables intersect with each other. The correspondence of **not** meeting MDLS with urban and rural poverty is very clear in the maps below.

4.2 How did we estimate the MDLS for local areas and map these outcomes?

We utilized data from the MDLS survey to analyse the outcomes across the regions of the UK. As a sample survey, its design ensured that respondents were representative of families with children in the UK. As shown earlier in this report, this has enabled us with a degree of certainty to produce various UK estimates for overall measure of MDLS and its constituent components alongside drivers of these differentiated patterns. However, as is the case with most surveys, it is imperative to acknowledge the inherent limitations when considering such attributes at more disaggregate geographic scales, where the survey's limited size also prevents direct estimates from being made.

This gap necessitates the adoption of sophisticated methodologies, such as Small Area Estimation (SAE), which estimates probable responses in areas that are not directly represented in the survey data. SAE encompasses a suite of advanced statistical techniques that aim to produce reliable estimates for smaller geographic locales or specific subpopulations (Singleton et al., 2020). However, such methods require much larger survey data sets ($n > 10,000$). Therefore, these advanced small-area estimation techniques were not feasible. In any future MDLS survey, we would seek to have a sample size large enough to undertake such modelling.

Instead, we designed and implemented an alternative approach. This draws strength from the ONS 2021 Census Output Area Classification (OAC) (Wyszomierski et al., 2023), which was supplied for the UK extent by the ESRC Consumer Data Research Centre:

- <https://data.cdrc.ac.uk/dataset/uk-oac>.

OAC is a geodemographic classification that comprises a set of descriptive categories for the smallest zone in which census data are disseminated (Output Areas). This geodemographic was built entirely from the 2021 Census and represents England and Wales in a typology comprising eight supergroups, into which are then nested 21 groups and 52 sub-groups.

Our analysis revealed a good alignment with the Output Area Classification (OAC) system, illustrating the strength of the MDLS survey sample design. Using this alignment, along with weighted survey responses, we computed the survey-weighted average probabilities for both meeting and not meeting the MDLS criteria within each OAC Group. These averages allowed us to estimate the overall aggregated likelihood of failing to meet MDLS standards

at the Middle Layer Super Output Area (MSOA). The following maps for the UK and selected regions visually represent these findings. Areas shaded in yellow indicate the highest risk of not achieving MDLS standards. The maps show MSOA and Local Authority boundaries.

An interactive version of the mapping is available at:

- <https://felt.com/map/Map-8EksfQudQDuGYRWHPkjiAD>

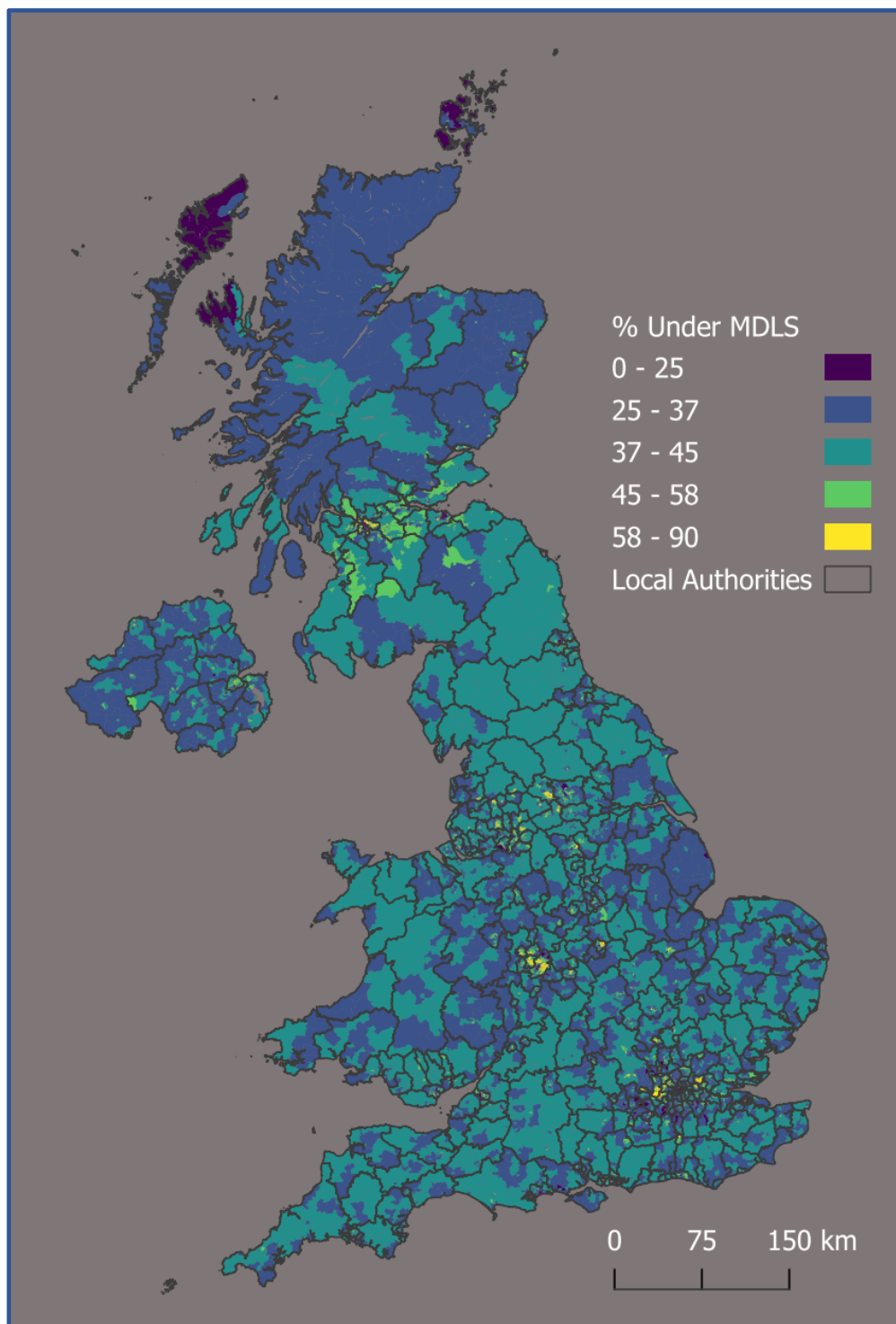
This interactive map has boundaries for the following geographic areas:

- Middle Layer Super Output Area
- Local Authorities
- Parliamentary Constituencies

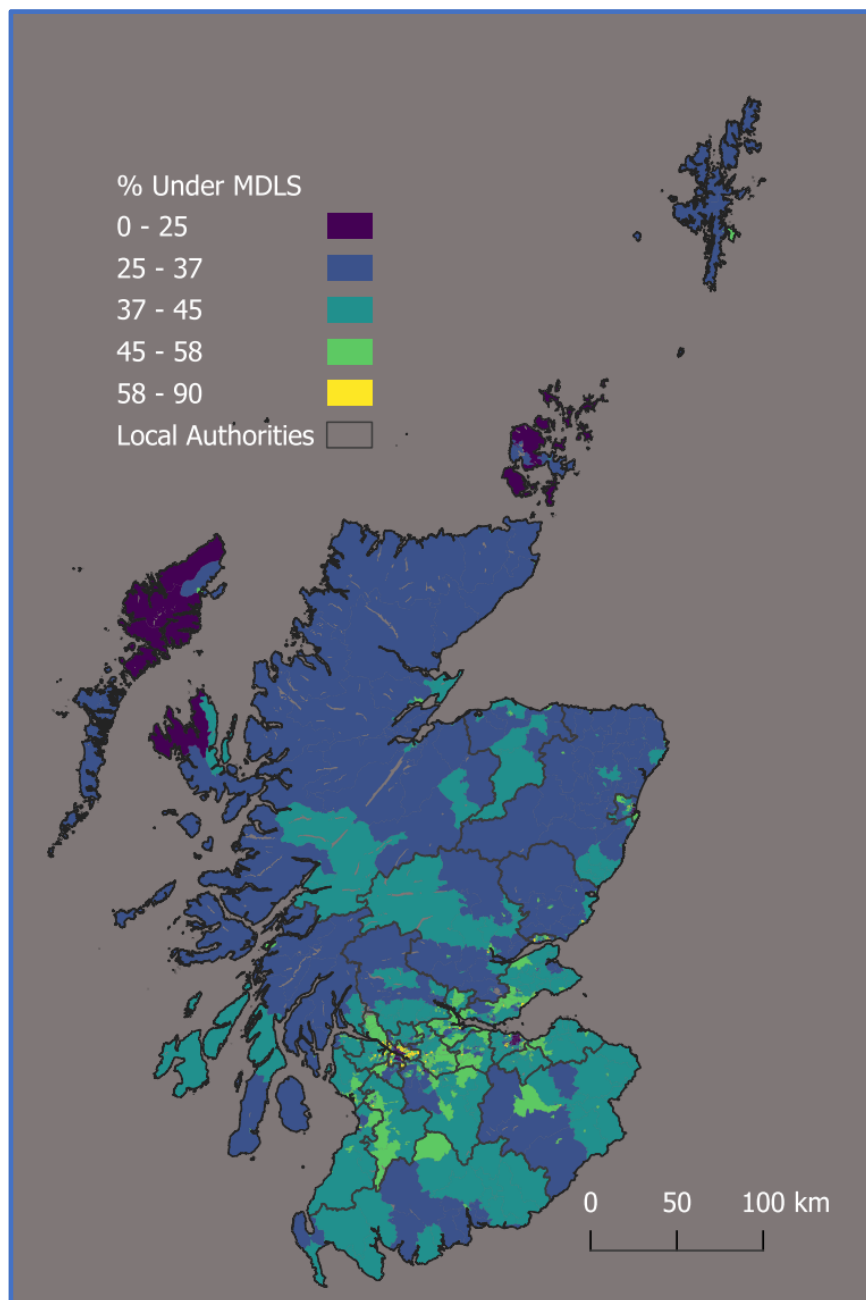
4.3 Interpreting the maps

It is important to interpret the maps correctly given the framing of the sample used in the MDLS survey. As discussed earlier in the report, MDLS has been developed for **families with children**, and as such the maps report these rates at MSOA scale. The mapped rates for not meeting MDLS are therefore only applicable within each area to those households that comprise families with children. Thus, you might have an area highlighted on the map that shows a high percentage not meeting MDLS. However, this only applies to families with children within these areas and there could be other populations (e.g., single people, students, couples, etc.) where this was not the case. Additionally, the maps do not show where there are a lot of families (above or below MDLS), as they only show relative rates, and as such represent the proportion of families within the ascribed characteristics by area.

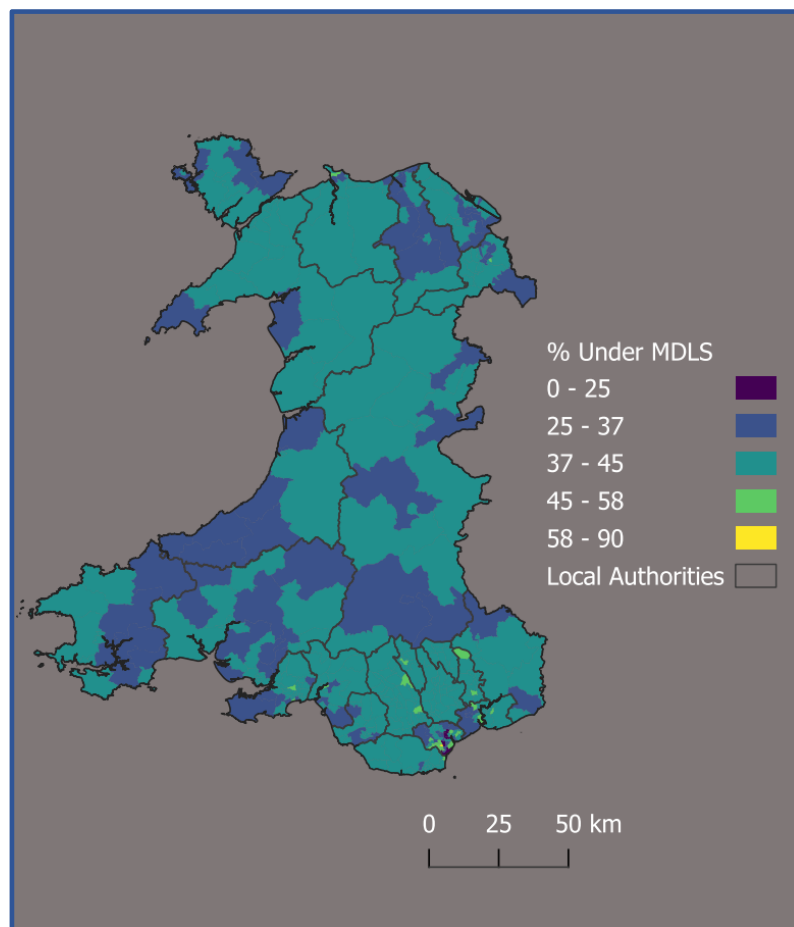
4.4 UK as a whole – MSOA and Local Authority boundaries



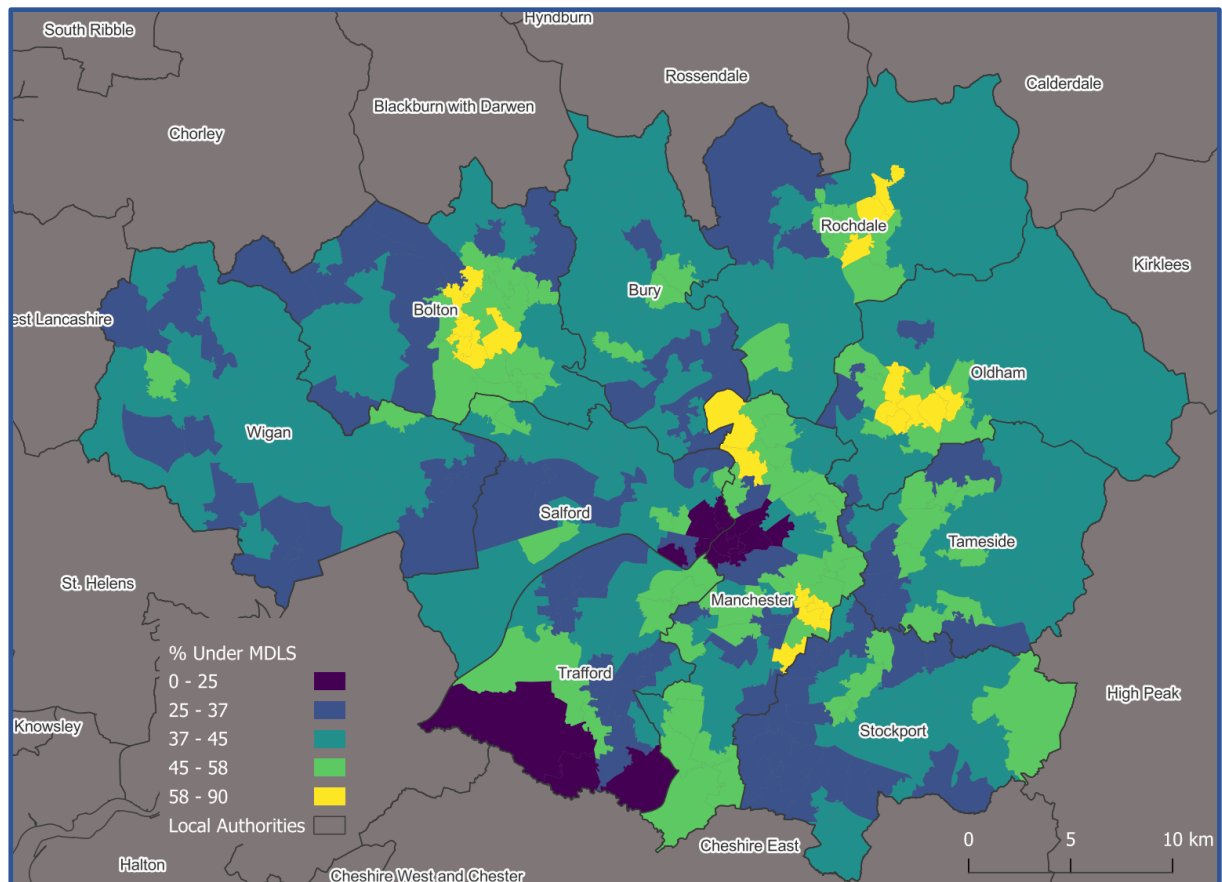
4.5 Scotland – MSOA and Local Authority boundaries



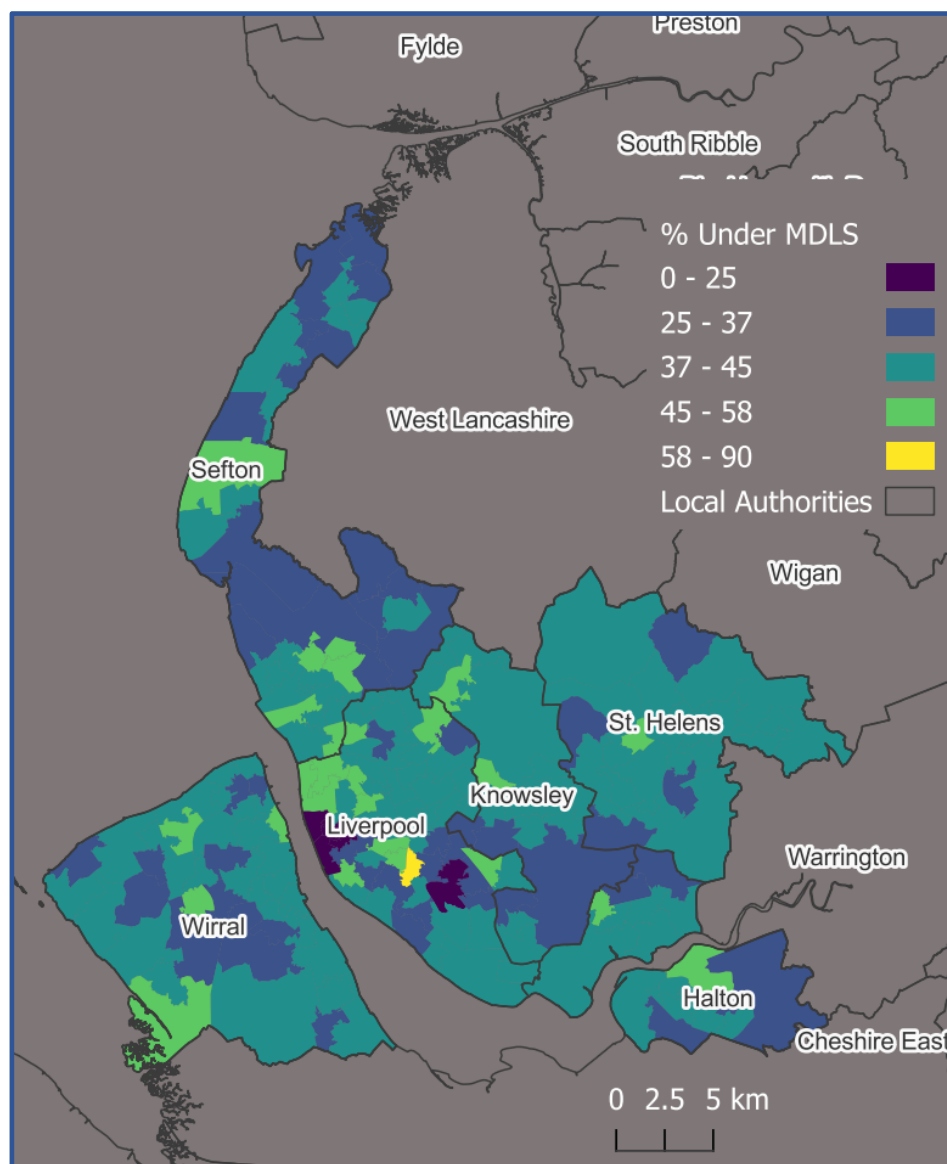
4.6 Wales – MSOA and Local Authority boundaries



4.8 Greater Manchester Combined Authority – MSOA and Local Authority boundaries



4.9 Liverpool City region - MSOA and Local Authority boundaries



Chapter 5 Reaching MDLS: Considerations and challenges – household and stakeholder organisation perspectives

5.1 Introduction

This chapter focuses on variations in needs for families with children in a range of circumstances and the challenges they may face in meeting MDLS. The chapter brings together findings from a range of data sources gathered throughout the MDLS research. It presents findings from three sources.

- First, it includes insights from the initial MDLS deliberative focus groups which are fully reported in Blackwell et al., 2023.
- Second, new data from a series of workshops with professionals in relevant local and national, public, private, and third-sector organisations (referred to as stakeholder organisations) as part of the Nuffield-funded project.
- Third, similar interviews with stakeholders and family interviews (with parents and children) as part of the MDLS project commissioned by the Welsh Government¹⁴.

The chapter is presented **thematically**, given that similar issues emerged across **all** these workshops and interviews. This enables insights into key themes. Such themes include:

- Where people may have additional or different digital needs.
- The challenges they face in reaching MDLS, which include affordability, location, acquiring skills, and access to support.

The chapter considers how these issues can be approached from organisational and infrastructural perspectives as well as, importantly, the implications for the everyday lives and experiences of households with children.

5.1.1 Organisational workshops

New data presented here comes from a set of workshops with key organisations. In June 2023, Good Things Foundation and Loughborough University co-hosted five workshops with a diverse group of people from relevant organisations to discuss the interim MDLS definition and contents. Each session was designed to focus on an area where families may have different or additional needs, the challenges that families might face around digital access and inclusion, and what policy or practical actions might reduce barriers. The aim was to provide an overview of potential issues to consider as a starting point when taking forward

¹⁴ <https://www.gov.wales/towards-welsh-minimum-digital-living-standard-final-report-summary-html>
<https://www.llyw.cymru/tuag-y-safon-ofynnol-ar-gyfer-bywyd-digidol-adroddiad-terfynol-crynodeb-html>
<https://www.gov.wales/towards-welsh-minimum-digital-living-standard-citizen-and-stakeholder-perspectives-html>
<https://www.llyw.cymru/tuag-y-safon-ofynnol-ar-gyfer-bywyd-digidol-safbwyntiau-dinasyddion-rhanddeiliaid>

MDLS and digital inclusion strategies including policy measures directed at disadvantaged groups.

Each session was attended by between 15 and 25 people. In total, nearly 100 attendees contributed their experiences and perspectives. There are five workshop themes related to areas where households can face particular risks of digital exclusion:

- Disability and caring responsibilities
- Minority ethnic communities, including migrant and refugee families
- Housing, including social and private rented and temporary accommodation
- Living in rural and/or remote areas
- Living on a low income

Participants were mainly from public, voluntary and community sector organisations, with some attending from private sector organisations with an interest in digital infrastructure and inclusion. Participants had a mix of roles across policy development, service provision, delivery, research, and advocacy. Some were already knowledgeable on digital inclusion and other participants contributed knowledge of working in sectors related to the workshop theme. For example, working with families with a disabled child, disabled adults, carers, on low incomes, or in specific circumstances such as people seeking asylum. Social housing providers, local authorities, consumer focus organisations, and representatives from the NHS and civil service also attended.

Research shows that non-users of the internet within the UK are twice as likely to have a disability or health condition than those who are extensive users (Good Things Foundation, 2023). Barriers to digital access such as low income and English not being a first language can be compounded by limited access to broadband for people seeking asylum (British Red Cross, 2023). In addition, households in rural communities may experience slower broadband speeds and limited mobile coverage than those in urban areas (DEFRA, 2022; Vodafone, 2023).

We acknowledge that they do *not* represent homogenous or exclusive groups. Rather we found that the issues raised in the workshops were wide-ranging and multifaceted. Importantly, some of the themes for households in one set of circumstances overlapped with those in other circumstances. It is therefore important to note two key points:

1. The wide *heterogeneity* of people and households covered within each area who have hugely diverse needs, experiences, and lives.
2. The *intersectionality* of needs, challenges, and factors that are present across these different areas, with people facing multiple issues. For example, low income, poor housing, refugee status, ill health or disability can all be experienced by a household simultaneously.

MDLS research in Wales also included consultation with stakeholder organisations. Across two phases of research during 2022 and 2023, researchers from the University of Liverpool liaised with members of the Digital Inclusion Alliance Wales to carry out 14 interviews with policymakers, service providers, and people in regional organisations and local groups or charities working with households below MDLS. They also conducted an online Delphi survey with 23 respondents. These research tools explored how people's needs vary in terms of a Welsh MDLS, and the factors that can impact on the ability to reach MDLS in Wales including other social, economic, cultural, and digital metrics. The methodology,

findings, and lists of organisations that took part are reported separately (Harris et al., 2023; Yates et al., 2023).

Throughout the chapter, we also draw on in-depth family interviews conducted as part of the MDLS Wales research. This comprised eight interviews with families with dependent children conducted in August 2023. Interviews were with parent(s) or guardian(s) and most also included children (aged between seven and nineteen). The focus was on households whose circumstances may impact on both their digital needs, and their ability to meet those needs, for example in accessing the range of devices, internet connection, or skills and knowledge outlined in the MDLS framework. To include variation across a range of experiences, the families included: single-parent and couple households, parents who were in paid work and those who were not, parents and/or children with physical and mental health conditions, families from an ethnic minority background, families living in rented accommodation (social, private, temporary) and owner occupiers, and those from urban and rural areas of Wales. This small-scale study was intended to illustrate the issues faced by families in particular circumstances and to hear the views and experiences of parents and young people, rather than to provide generalisable findings. Full methodology and findings are reported in Harris et al., (2023). The perspective of families themselves is also drawn on from the initial MDLS deliberative group discussions with parents and young people. This element of the research is outlined in Chapter 2 and reported in full in Blackwell et al., (2023).

5.2 The importance of digital access and the risk of exacerbating disadvantage

As noted in Chapter 2, participants in the MDLS focus groups emphasised the importance of digital access, with digital technology being integral across most aspects of life. For households with children, digital access was particularly vital in education and communication with school. It is also key for young people's social lives and inclusion in activities that are important to them.

Moreover, with services often requiring online interaction, people observed the difficulties of being digitally excluded in day-to-day life. Digital access can be even more important for households already experiencing challenges where the implications of digital exclusion can be much greater. Disadvantaged households may also have a greater need for services and support that require online access. Stakeholder organisations noted that a lot of services that moved online during the Covid-19 pandemic had not gone back to paper or face-to-face formats, intensifying the negative consequences of digital exclusion. They highlighted the need for digital access and the consequences of digital exclusion including the following:

- **For low-income households**, claiming Universal Credit involves communication and recording activity via an online 'journal', with the risk of sanctions (loss of benefits) if people do not engage or fail to attend appointments.
- **People seeking asylum** need to complete online forms and be contactable for email correspondence with the Home Office to provide information or avoid missing appointments, which could be detrimental to their asylum application progress. Being unable to access an online proof of status account risks missing out on rights.

- **People in temporary housing and precarious housing situations** may need digital access to report themselves as homeless, engage with social housing application processes, and search online for accommodation.
- Health services increasingly require digital interaction. **Disabled people and people with complex health conditions** may need to go online to make medical appointments, access information (for advocacy, care, and medical advice), and to order prescriptions. Difficulty accessing these online services can exacerbate disadvantages, for example, for low-income households, and minority ethnic communities who already face health inequalities.
- **Households in rural or remote areas** have less access to shops, banks, libraries, health facilities, public transport, nearby work opportunities, and can be cut off from services for periods in the winter. These factors increase the importance of reliable internet connection. For example, for remote working or running a business online, accessing shops and services from home, and doing schoolwork online. At the same time, rural communities may be less well served with mobile and broadband connections.

5.3 Variation in needs compared to MDLS contents

For the most part, different experiences, or circumstances, such as income level, housing type, ethnicity, or the difference between rural or urban residence, **did not appear to alter the required contents for MDLS**. Rather, these factors were likely to raise challenges in acquiring the goods, services, and skills for meeting MDLS (as presented below). However, **stakeholders outlined that peoples' needs may differ from those identified in MDLS in relation to disability and health conditions**. This could include a need for additional, different, or specific digital goods, services, and skills relevant to disability or care.

5.3.1 The need for additional or different devices and software

Disability is predominantly the focus of this section, with the intention to provide examples of the variation of needs, rather than to comprehensively list the digital needs of disabled people. People with a disability or limiting health condition can require different or additional digital goods and services to those outlined in MDLS. For example, they may need speech recognition software, screen reading software, magnification software, or a specialist keyboard and mouse to help with accessibility.

As well as the more 'specialist' items, some people with a disability or health condition may have different requirements of the items included in MDLS, where entry-level digital goods are seen as sufficient to meet the needs of families with children. They may need higher capacity and higher performing devices (laptops, personal computers, or tablets) to support additional software or apps for accessibility. People may also look to high-end phones to better suit their needs, such as an iPhone, for their built-in accessibility features. Hence, items that might be considered as 'nice to have', or even a luxury in MDLS for households with children could become a necessity.

Family members may also need their own device, rather than sharing with family members, to meet their developmental, emotional, or communication needs. Some digital items have enhanced importance in certain circumstances. For example, children struggling to attend school may need to have their own laptop for their educational development, and children on the autism spectrum may particularly benefit from online gaming and the space this can provide for communication and social inclusion. **The family interviews highlighted**

the value of online gaming for children who had anxiety, ADHD or were on the autism spectrum – it contributed to their wellbeing and social connections where face-to-face interaction could be difficult.

...the outside world is just somewhere I don't want to be. So online, you know, I can be myself without anyone knowing me. (Young person aged 18)

Greater use and wear can also mean that households require items to have extra durability, or they need to replace equipment more often. This was apparent in the family interviews where parents linked a child's frustration and distress to device breakages, or a parent's phone was often used by a younger child to help cope with anxiety when they were out or in social situations.

It should be noted that these additional or different digital requirements often involve extra costs, which can make it even harder for those on constrained budgets to afford to meet their digital needs. **Stakeholder organisations also noted that disability is not always static, meaning that individuals' needs and ways of meeting them can change**, with potential cost implications if this requires obtaining different or updated equipment.

5.3.2 An enhanced need for a reliable internet connection

Listening to music online, gaming, or streaming videos can provide an important calming space for children with ADHD, anxiety, or on the autism spectrum. The ability to game online can meet an important social need for some children but being able to connect and interact with others in this context without the disruption of 'lagging' or losing connection requires fast and reliable broadband. Parents in the family interviews often reported that a key source of frustration for children on the autism spectrum was losing internet connection and that this could have practical and financial, as well as emotional, implications.

He does lose control and a lot of the time it's because he was mid-game and just about to score and the internet cuts. And he launches his remote. We get through a few remotes that are £59 each. (Parent)

The importance of reliable internet access for video calling was also raised as a particular need for people with sensory impairments: for British Sign Language users to communicate; or to use apps such as 'Be My Eyes', which connects visually impaired people with support. Being able to use Alexa, or Siri on a mobile, can also provide support for visually impaired people, as well as those with other disabilities. The need for immediate internet access for these purposes is crucial in and outside of the home. This greater demand can mean that people require more mobile data to avoid the risk or worry of running out, which can have serious implications in these contexts. This was reflected in the family interviews where **some parents explained that having adequate phone data was vital when a family member had a health condition or disability that could require sudden hospital admission, and important for peace of mind when someone needed access to support during times of anxiety.**

The need for an adequate and stable internet connection was also raised in our interviews by families where children lived apart from a parent, or a parent's family and friends' support networks were a distance away. These families explained that digital access and connectivity were important to maintaining their relationship and talked about the

importance of being able to make video calls rather than phone calls, including for support in times of difficulty.

A phone call is not as nice as a video call, is it? And obviously, with them living so far away, it's better for them to see my face than just hear my voice. (Parent)

5.3.3 Additional considerations around skills and digital interaction

Disabled people can require additional skills to use specialist digital equipment, software, or device features. **Stakeholder organisations talked about the importance of acknowledging that people have different learning needs and ways of taking in information that require different types of support.** For example, in-person support or support delivered via video, audio, easy-to-read documents, or screen-reader applicable formats might be appropriate. The shift to online services and information sources can raise additional challenges for some people. A parent in our family interviews found that, as a dyslexic person, websites that were dense with text and jargon presented significant barriers to accessing information, such as for social security benefits.

Stakeholder organisations observed that families can face difficulties where devices or software used in the home differ from those used at school or work. This inconsistency can lead to anxiety and distress, adding pressure to the individual or household to develop additional digital skills and routines. They also noted that the ages children need certain skills outlined in MDLS will vary for some disabled people and there can be greater potential risks in relation to digital harms and safety for people with a learning disability and for some children on the autism spectrum, - particularly around bullying, miscommunication or sharing information.

5.4 Barriers, challenges, and considerations in meeting MDLS

The discussions with stakeholder organisations drew attention to a range of sometimes intersecting challenges that people face in accessing the digital goods, services, and skills they need to reach MDLS, which were reflected in the experiences of families who took part in the interviews.

5.4.1 Affordability and the cost of goods and services included in MDLS

When compiling the list of contents for MDLS, the deliberative groups focused on what people *needed* rather than what they could *afford*. This is an important distinction. MDLS is about digital needs – what is needed to access and operate safely and with confidence in our digital world. Affordability is therefore a barrier to MDLS – not part of what defines it. As reported in Chapter 3, the survey found that variables and demographics strongly associated with wealth, status, and poverty correspond closely with meeting MDLS. It is therefore hardly surprising that affordability was an issue at the forefront of stakeholder discussions and the interviews with families likely to be below MDLS in Wales.

5.4.1.1 Lacking sufficient (fit for purpose) devices and connection

Low income places significant constraints on the resources that families have to meet their digital needs. This is particularly relevant to those in situations discussed in the stakeholder workshops and by some participants in the family interviews and includes low levels of support payments for people seeking asylum, the vulnerable financial situations of people living in temporary housing, the financial pressures experienced by disabled people and

their families, the prevalence of poverty among minority ethnic groups and lone parent households, and the higher costs incurred by people living in rural or remote areas. **With increased costs of living compounding pressures for families on low incomes, stakeholders observed that a wider range of people are experiencing financial difficulties, including those in work.** Stakeholder organisations and parents noted that with competing demands on stretched budgets, people are having to prioritise and cut back spending, impacting on their ability to afford the type or level of devices and connection outlined in MDLS. This means children not being able to access a laptop for schoolwork, sharing devices, families relying on a mobile phone as their only means of digital access, and having insufficient internet access and data.

MDLS states that devices should be adequate for households' needs. However, digital access and people's ability to do what they need to is limited if they cannot afford to replace devices that are broken or lack functionality. The interviews with families highlighted **the difference between simply having devices in the home, which could theoretically set them above MDLS, and these being adequate and fit for purpose.**

There's two [laptops] that's working...Out of those two, we only typically use the one of them, the other one is a lot older and it's really slow. So, it's like, you know, obviously, I think in today's world, you need it to be fast and efficient, don't you? You know to run all the software that you need and stuff. So yeah, it's only the one of them that ticks all the boxes and does everything, but the other one is not so good. (Parent)

Parents who could not afford to replace a mobile phone were trying to manage with devices that did not have enough storage or had insufficient battery life – this meant constantly having to delete items to free up space and worry about the battery running out. Several young children in one family were using a parent's mobile phone because they did not have enough working devices, such as tablets, to go around – this impacted on the parent's own access to their phone, missing calls and had implications for the durability of the device. Being in a precarious financial situation also limited peoples' options, with families saying that they could not take out or change a mobile contract due to a poor credit rating or being in arrears with payments.

Affordability also impacts access to mobile data, which was limited for some households in our family interviews due to the cost. This included parents and older children sharing their data and 'hotspotting' to devices for siblings who didn't have their own data allocation. To cut costs, one parent had reduced her data to 1GB per month which caused some difficulties when out and about but felt she had to prioritise her teenage son's data needs over her own.

I choose to do it that way to try and save a bit of money. ... something has got to give somewhere. We can't just all have it. It's a necessity for them so they've got a life basically with all their friends in this digital age. (Parent)

Two secondary school children who did not have data (or calls or texts) with their phones said that they depended on friends to share their data when they were out or used free Wi-Fi. However, this was not always straightforward and risked social connections if they missed messages from friends when they were out.

YP 1: If I have to message mum or something and I'm somewhere where there's no free Wi-Fi, I end up connecting to [friend's] internet...My friends don't mind.

YP 2: None of my friends let me....It's annoying. Because most of the time I go places that there's barely any internet anywhere, or if there is internet, you have to sign into a password ... (Young people aged 14 and 12)

Some families had to use their mobile data to compensate for poor or no home broadband connection which limited their ability to cut mobile data costs. For example, one participant wanted to reduce their data package down from 15GB per month to save money, but they were worried that they would run out of data when their home broadband was not working. These accounts highlight the challenges of balancing of individual and family needs within a tight budget, and link to the inclusion of managing mobile data in MDLS functional skills for adults and secondary school children.

5.4.1.2 Meeting digital needs, but at what cost?

It is also important to note that even where families have a range of digital devices or fast broadband, these are not necessarily 'affordable', if covering the cost has a detrimental impact on other areas of the household budget. Some parents discussed how, **despite finances being extremely tight, meeting their families' digital needs, in particular for children, meant that they prioritised broadband and phone payments or replacing a broken device.** This sometimes involved going without food or walking rather than paying for public transport, having to borrow money, using credit, or getting behind with other payments as a result. The recourse to the cutting back of other essentials highlighted the importance for some families of being digitally included, and the difficult decisions and hardships that maintaining digital connection entails on a tight budget:

Realistically, I choose paying for the internet over feeding myself because the need is so massive for my children. (Parent)

5.4.1.3 Having to pay more for equal access

Home broadband with a stable connection and adequate speed is a core component of MDLS, so that family members can engage in a variety of tasks simultaneously without causing each other difficulties. However, the family interviews showed that broadband costs were a significant challenge and cause of consternation, particularly where households have to pay more to obtain sufficient broadband provision – this includes in locations where infrastructure limits options (see section 4.3 of this chapter). Despite being on a tight budget, parents often felt that they were paying a high price (up to £50 a month) for their internet. Some had felt they had no choice but to upgrade to 'fast fibre' to get sufficient Wi-Fi as it was such an important need for their family.

I'm not happy about what I'm paying now that I've upgraded to the superhero broadband...The thing is, for our particular household, it needs to be fast, reliable broadband, and unfortunately, it's literally a case of you have to pay practically double for it. (Parent)

Participants were particularly frustrated if they had upgraded and been promised a better service but were still experiencing a slow or unreliable connection. One parent who could

not afford to upgrade to a faster internet felt that they had no choice but to put up with insufficient service but said that the cost still comprised a significant part of their budget.

It is something that you have no choice, we have to have it at this price, but you get low signal, you get the connection dropping, and when you complain about it, they're like, oh we'll check it and do it and that's the end of [it]. They will do the bare minimum at the price that we're paying, and yet I pay about £25, that's not a little amount. For me, that's quite a [large] amount. (Parent)

A further issue related to the practices of service providers, especially the loyalty premium, where parents reported steep rises in broadband costs, for example from £26 to £39 or over £50 a month. This had caught out a couple of families who, at the time of interview, were paying substantially more than they had expected to or could afford to and were concerned that they were stuck in a contract. In one case, this had led to arrears, and the family was cut off from the internet until they were able to borrow the money to reinstall it.

5.4.2 Access and adequacy of social tariffs

While stakeholder organisations and parents identified the need for cheaper internet access for low-income households, they raised issues about the adequacy of social tariffs. This included low awareness and takeup – as reported elsewhere, only five per cent of households receiving Universal Credit are on a social tariff (Ofcom, 2023). Stakeholder organisations noted a range of barriers to take-up of social tariffs and questioned whether internet providers were doing enough to advertise social tariffs and make them accessible.

Social tariff broadband was also identified as being too slow for the needs of many families, where the sufficiency of provision depends on the number of people in a household and how they use the internet. As well as being seen as still too expensive for many people on low income, stakeholders noted that **households who wanted to switch from a broadband provider to take up a social tariff can find it difficult due to the cost of exit fees**. Parents' experiences reflected these views. One parent had used a social tariff in the past but had since moved to a fast fibre broadband because the speed offered was insufficient to cope with their families' needs. Others pointed out that needs and expectations around what is required as a 'basic service' have evolved with increased digitalisation, and that social tariffs should reflect this:

I've tried a couple of broadbands, especially ones for people on Benefit. So cheaper broadband...Fantastic financially, but useless for internet, because it's like the lowest speed. (Parent)

5.4.3 Housing, location, and infrastructure - barriers to online connectivity

The type of housing and location families lived in also bring significant challenges for households' internet access and have wider implications. Broadband access can be very limited for households living in temporary accommodation. Stakeholders reported difficulties as home broadband was often not provided in temporary accommodation, residents may not be allowed to install it and/or the cost of doing so was prohibitive. While broadband was sometimes available in communal areas, stakeholders questioned how well this would provide the privacy, safety and security required by people potentially experiencing crisis, fleeing violence, or living with a stigmatised health condition.

Households lacking broadband may have to rely solely on mobile phone data but this has cost implications, and may be unstable or run out – it also means that households will require far more mobile data than outlined in MDLS to meet their needs. Furthermore, lack of home internet puts households at risk of social isolation and impacts on their wellbeing, particularly those in difficult situations. This includes children and young people needing to do homework and keep in touch with friends, with lack of space and privacy where families are sharing rooms also adding to difficulties. **Stakeholders also noted a lack of awareness around MiFi, as a stopgap, to enable the use of mobile data on different devices in the home.**

In our research with families, one parent described her experiences of seeking asylum and of living in temporary accommodation. Without home broadband, the family relied on a mobile data package of 20GB per month which did not cover all their internet needs in and outside of the home, so sometimes spent time at a local library so that they and their child could use the Wi-Fi.

Stakeholder organisations highlighted connectivity as a key issue for people living in some parts of the UK, particularly in rural and remote areas. While noting heterogeneity across communities, they raised a range of factors that impacted on internet access, speed or quality, and the cost of broadband provision. These included being unable to access a reasonable broadband speed, for example under 10Mbps was seen as insufficient to meet the needs of a family and (depending on household size and internet use) may not reach the level outlined in MDLS which should cover the use of multiple devices at the same time. **Stakeholders observed that internet connection in rural and remote areas can be more prone to disruption, sometimes due to weather** and especially where one line serves a whole community, which was also reflected in interviews with families living in Wales.

And round here, because we're quite rural, the speeds are not as fast as they should be, so the connection drops all the time. (Parent)

Households may try to improve their internet connection by installing boosters or repeaters. Meeting connectivity needs is not only challenging but can be disproportionately more expensive for households in rural and remote areas. Interviews with families living in more rural and valleys areas of Wales found that they felt forced to pay higher costs to improve their internet quality but that fees were non-negotiable, as families described lacking 'bargaining power' because they did not have multiple providers serving their area to choose from – it was hard to negotiate a better deal or threaten to leave if a provider knew that they had little choice about doing so.

You're quite limited to who you can go with... because the connection's too slow in the areas that we are...I don't know if they need more towers or something, I think they've said it's the mountains that actually affect the connection and you can't move them! They forgot about us down here! (Parent)

To compound matters, some areas also lack mobile connection – 'not-spots'. **Stakeholder organisations noted that statistics on coverage levels tend to mask the reality of the lower range and quality of coverage**, but also the resulting impact on people's day-to-day lives, where they are unable to access mobile data to do things 'on the move'. Families again voiced frustration about limited mobile coverage in their area – in some cases they said just

one or two companies could provide a signal where they lived so they were unable to cut costs or find a better service. Inadequate signal and connectivity raised practical issues and concerns, for example about being able to seek help if their car broke down in an isolated area or during a medical emergency.

Meeting connectivity needs is not only challenging but can be disproportionately more expensive for households in rural and remote areas. People in the stakeholder discussions observed missed opportunities here as, given the lack of access to physical services, digital connection can be a potentially vital aspect of life. Reflecting the MDLS approach, **stakeholders stressed the need for ‘holistic’ connectivity, which goes beyond the home to lead a full life.**

Infrastructural issues represent a significant barrier to the adequate level of home broadband access described as a minimum digital need. While there are clearly issues in rural and remote areas, participants in MDLS focus groups that took place in urban areas identified that households could experience disparate access to home broadband based on what type of property they lived in (for example, in a new development) and where in a town or city the property was located. Family interviews also found that households were experiencing difficulty with broadband provision, in city as well as rural locations. As noted above, some households experiencing poor provision upgrade to receive a reasonable service. However, this results in them paying relatively more than someone living in a better-served area. Given the implications of the MDLS statistical results where rurality is not in and of itself a determining variable, further work is needed to understand this complex infrastructure, housing, and affordability that leads to a lack of adequate broadband for households.

5.4.4 Acquiring digital skills

Having the skills and understanding to be able to use technology and go online confidently and safely is an important aspect of MDLS. This covers both functional digital skills to enable people to carry out the tasks they need to as well as critical skills for living in a digital society such as an awareness of online safety.

Our interviews with families highlighted how practical skills and needs vary across and within households, which is useful to consider when reflecting on the MDLS survey findings. **While people may be confident in one area, it does not necessarily mean that they are equally confident in another.** Several parents discussed how they could navigate their way around a laptop, sometimes using one for work or a voluntary role, but were less confident using their phone or when encountering connection issues or a technical problem. While someone may frequently use WhatsApp or Facetime for video calls, they may not be comfortable using Zoom or Teams in more formal circumstances. Some family members relied on others in the household or asked family or friends for digital support. Older children in the family were often the ‘go-to’ for technical support, but their skill sets could also be mixed, for example, one teenager who helped their parent navigate switching from Android to iPhone turned to her parent for support using a laptop. It was not necessarily obvious to parents how to deal with some of the obstacles they faced.

So, it’s down to you as a parent then isn’t it, to update the thing and I haven’t got no clue. I should educate myself on it. But where would I go, I don’t know. (Parent)

You've got to be on their [school] mailing list for their e-mails. Like, certain things that have been going on, like book sales, cake sales, that sort of thing. He's missed out on a lot because, obviously, I don't use those sort of things very well. And I explained this to [the school], and they were like, oh well, we'll tell you in the future, we'll let you know [but they don't].
(Parent)

During stakeholder discussions, it was noted that in some households where English is not a first language, parents may rely on children for support with digital use and translation. Children's digital literacy can become even more significant in these situations, given that they may be engaging with online tasks that adults might otherwise deal with, and information sources need to be comprehensible for young people where they act as a channel of communication for parents.

Critical skills related to digital risks and online safety were a key concern for parents, in both the initial MDLS deliberative groups and family interviews. They recognised that the digital world was fundamental to children, but being sufficiently aware of digital risks and understanding the types of platforms children engaged with was difficult.

Parents in groups raised several, often interlinked, issues. First, parents' social circles did not necessarily require them to use certain apps and social media platforms, and therefore they were not necessarily engaging with them and learning about them as part of their everyday lives. Second, with busy schedules, parents often felt they had limited time to learn and actively engage with apps that they did not already use. Third, it was hard to keep up with the pace of change, and fourth, **it was difficult to know where to find (reliable) information, with parents describing the results of online searching as 'overwhelming' or a 'minefield' when trying to work out what information they should trust.**

Stakeholders noted that families can be more open to digital harms where parents are not engaged with or do not understand digital risks. For example, parents may not understand what they are signing up for online, if they are being scammed or trolled on social media, or they may lack awareness of child age restrictions. Here, children's needs for critical and digital safety awareness and skills may be even more acute.

Young people in the MDLS deliberative groups expressed less fear of online dangers but disputed the perception that all young people were 'digital natives' who had acquired skills and knowledge through being exposed to technology from an early age, rather than by being taught. Children in the family interviews were generally aware of potential online risks, for example, around sharing information and talking to strangers. Some parents discussed their concerns about digital risks and instilling them in children, including through having open discussions or using age-related safety features. Fears and heightened risk awareness had sometimes stemmed from past experiences, where a child had been involved in an online risk which had shaken the parents and children involved. However, a key issue discussed by parents and young people in the deliberative MDLS groups and family interviews was finding the balance between giving children independence and monitoring their online activity which risks being seen as overly controlling. Young people also recognised the tensions this brought – that while parents cared for their children's safety and wellbeing, they should not 'invade your privacy'.

Once your teenager sees it as control, the conversation is over then, that is finished so you have got to make sure you don't do it. (Parents, Final Group, Liverpool)

If you find your parent doing something on your phone you would lose the trust with them and then you will rebel more. So, having some sort of system, say parents know how much they should be seeing what you're up to would definitely give parents and young people more trust. (Young People Final Group, Leicestershire)

5.4.5 Challenges in accessing support

Support with digital connectivity and/or skills can be central to helping meet digital needs, including the range of skills outlined in MDLS. A few of the families we interviewed had received support with digital access. This included receiving devices from support organisations (a phone, laptop, or tablet) and in one case mobile data. Families said that this had made a huge difference as they would not have been able to afford these otherwise. One family had benefitted from a work scheme that allowed a parent to purchase technology items with deductions from their salary, and they said that this made repayments more manageable.

However, people in the stakeholder discussions noted that accessing and navigating the appropriate support can be complex.. **People do not necessarily know what support they need or what resources may be available, such as social tariffs, support with digital skills, or device provision.** Support can come from multiple sources, which can be confusing and varies geographically.

People working in organisations in this field said that it was difficult to engage with people 'who feel disengaged'. They described how families facing disadvantage often need to deal with multiple stress factors in their lives, which may include home insecurity, job loss, disability or health conditions, caring responsibilities, language barriers, and the ongoing grind of struggling on a low income. **Stress and time pressures can inhibit people from building skills or finding the support to do so, and mistrust of council-facilitated provision can inhibit engagement with schemes.** Stakeholders also noted that some people needed support that 'starts from scratch', without assuming any prior knowledge, and that online registration for support can be a barrier for parents who lack digital confidence or do not have an email address.

Language barriers and low literacy can affect digital inclusion, with implications for accessing services and isolation.

'When you don't have the language skills your world is tiny...but when you are digitally excluded as well, your world is even tinier'. (Stakeholder organisation workshop)

Some people from stakeholder organisations discussed how the need for English language and literacy skills added another layer to meeting digital needs, for example engaging with support with upskilling. Training and support with digital skills therefore takes more time, consideration, and resources where there are language barriers. Support also needs to be tailored to community and cultural needs to gauge what is most accessible and engaging for people. Stakeholders observed that schools were a trusted environment for delivering support to families but, especially in the areas they wanted to target where schools may be

struggling, they can already be overwhelmed and ‘firefighting’ so hard to engage. In terms of alternatives for people who lack devices or connection at home, **stakeholder organisations discussed the impact of diminishing public services, such as libraries (closing and reduced hours)**, on low-income households who may rely on them for digital access. Access was also seen as problematic for people in rural or remote areas who may be some distance from libraries or community digital hubs, especially if they have **limited transport options**. Furthermore, disabled people or those with health conditions may be limited in getting out and reaching such locations or may feel uncomfortable using a library, for example for personal online business.

5.4.6 Challenges in delivering digital support and services

People from organisations who took part in the Welsh MDLS interviews reflected on issues around delivering support and services. Organisations agreed that there is a general need for the government to invest more funding to support people to get online, for the third sector to support volunteers and those on the ground needed to achieve MDLS. **They noted that the sustainability of digital inclusion support through third sector organisations is greatly impacted by the funding available, with some experiencing decreased financial support.**

Libraries, community centres, and village halls were seen as important points of access **providing connectivity, device loan schemes, and digital skills, especially for those living in rural areas**. Observing the difficulties where people do not have suitable devices, stakeholders said that organisations need to collaborate and signpost people to external parties who can provide equipment, including to help with additional needs, and guidance on how to use it. They pointed to a need for a coordinated approach at both local and national government levels to share knowledge of existing resources, with formal communication channels working towards a collective target, and coordination between statutory bodies, third-sector organisations, and other parties responsible for digital inclusion provision.

5.4.7 Views on responsibility for meeting MDLS and the roles of multiple actors

During the initial focus groups, participants discussed where the responsibility for meeting MDLS lay, and the need for the involvement of multiple actors and organisations, particularly regarding digital safety. Young people and parents said that, as individuals, they had some responsibility for learning necessary digital skills, including staying safe online – sometimes blaming themselves if they fell foul of an online scam. However, parents also felt that wider support was needed in terms of time barriers and their own knowledge gaps:

You need someone to support parents when they take their eye off the ball, you have got a couple of difficult weeks in work or something has happened and you're not aware of what is going on, you need that back up that is there. (Parents Final Group, Liverpool)

I think the children should also learn those sorts of things separately at school as well, because it's actually about their personal safety, and that isn't always information that the parents know about as well. (Parents Checkback Group, Norwich)

Schools were seen as a primary source of learning about digital skills and, in particular, the digital safety of children. Schools were trusted and felt to be more informed and up to date

about these issues than parents might be. Some parents felt that, given the ongoing relationship with parents, schools were a good forum for extending digital support to parents, although recognised that this would require funding.

Your family might not necessarily know the way that groomers and stalkers work these days because again it has changed over time. School might have more of an idea on that because they are getting information from like the police and people who know more information and they are able to give that information to everyone else, maybe that be the student, the parent themselves. (Young People Checkback Group, Derbyshire)

However, the clear overall message from parents and young people was that **online safety should be a collective, societal responsibility, involving multiple actors and stakeholders:**

It is society, digital society. Society is made up of all of those groups and everyone has to do something. (Parents Final Group, Liverpool)

I think it's teamwork. Maybe the Government and the social media...if all of them, they combine and do something good, that would be brilliant. Just, let's divide it, let's work together...So you have like the Government and providers and all companies involved trying to prevent [digital harms] and also the Government has responsibility. (Parents Checkback Group, Reading)

This included the need for service providers and device manufacturers to be more responsible for providing information to customers about security features. Groups strongly felt that social media providers should take more responsibility for making their platforms safer, given their role and influence, particularly in the lives of young people, and the potential for digital risks. They suggested the use of their platforms to raise awareness and share safety information.

P1: I think... when you... say you're scrolling through Instagram, I think there should be more pop-up sort of ads and whatever that are specifically like about staying safe online. Because if you have got... if you're scrolling and you see it...

Q: Do you ever see anything like that?

P2: No. (Young People Checkback Group, Derbyshire)

Groups repeatedly emphasised that messages about digital safety were currently lacking and felt that information and campaigns to raise awareness needed to be ongoing, with messages that were 'hard-hitting' so that they got through to people. Parents sometimes referred back to campaigns about road safety or 'stranger danger', which they felt had helped messages to become embedded as they grew up.

Participants' views on the role of government were varied. Some said that it was the Government's responsibility to ensure that key stakeholders took measures to improve internet safety and to promote digital safety awareness. However, others were unsure if the Government was able or could be expected to tackle digital harms effectively, given the global scale of the problem. There were also reservations about the potential for negative

consequences, for example, if the monitoring of online spaces went ‘too far’ resulting in tensions relating to censorship and over-surveillance.

5.4.8 Conclusions and Key points

Drawing on the experiences and perspectives of both households and people from organisations working in this field highlights the value of taking a holistic approach to digital inclusion, which is fundamental to MDLS. This includes the importance of having adequate devices and connection, with digital access being seen as a crucial need, indeed a ‘lifeline’, for families in this day and age. We conclude with some key considerations relating to the need for, and challenges around reaching MDLS for families with children that have emerged from this study.

Having inadequate devices or connection was inconvenient and time-consuming for families, for example, having to be constantly mindful of and planning for device usage and charging or finding different ways to access the internet. It was also a source of **worry and stress where online access was crucial to a family member**. Lack of digital access affected **interaction with services** such as education (the ability to do schoolwork and submit homework online), personal finances (inadequate connection compounded restricted incomes where parents could not get online to make a payment, incurring late payment charges), and the opportunity or experience of online meetings with formal services or agencies.

Digital inclusion also links to **social inclusion**, with parents and children needing to connect, communicate, and maintain relationships with family and friends. This could be inhibited by insufficient broadband at home or lack of mobile data when out which risked missing or being able to respond to messages. Digital access played an important role in the ability to take up **opportunities**, for example, online courses, which could contribute to wellbeing, as well as potential future opportunities.

There are some key points to consider when thinking about taking forward MDLS and the needs of families, in particular those on low incomes, facing financial constraints but also related to other issues we have covered here such as health and disability, different family situations, and the area they live in:

- Families’ particular circumstances can bring additional needs and demands on digital technology over and above MDLS. Thus, MDLS could be seen as a starting point.
 - In some cases, this may mean different or additional items or specifications to those included in MDLS – particular devices or software to support access where someone is disabled or has an impairment.
 - People’s circumstances can also mean that they have increased need for, or greater demands on the items already included in MDLS. These needs may not be so obvious but can be crucial, for example, reliable internet access where gaming can be a ‘lifeline’ for children on the autism spectrum or being able to depend on.
 - A key issue is that people’s circumstances result in them facing greater barriers to meeting their digital needs, from general (in)affordability to specific issues such as their housing situation or language barriers.
 - Some situations pertain to an enhanced importance of and need for digital access but, at the same time, bring additional barriers to achieving this, a key example being living in a rural or remote area.

- It cannot be assumed, based on the number of devices alone, that a family's digital needs are being met. While a family may possess several devices, they may be broken, not fit for purpose, or not available for family use. There may be an internet connection, but it has to be reliable for the family to do the online activities they need to.
- Although families may appear to have what they need in terms of digital provision, affording these goods and services may be problematic. Families with low and constrained incomes may forego other essentials or accrue debt to provide for digital needs. Meeting MDLS should not be to the detriment of meeting other areas of need.
- **'Digital poverty' is closely linked to affordability and low income.** From this research, it is clear that if families' finances were not under strain, they would have more chance of meeting their digital needs, for example being able to buy a laptop, replace a phone, or afford a higher-specification broadband or more phone data. Measures to address digital poverty and the implementation of MDLS need to go alongside broader conversations about social security rates, wage levels, living standards, and poverty more generally.
- There is a need for more affordable broadband that is not currently being met by social tariffs. Affordable broadband needs to be of sufficient speed to cope with the everyday demands on the internet (such as streaming, video calling, and gaming) that are now social norms for a family. This should include additional consideration for people living in areas with limited provision, who are currently excluded from a real 'choice' to take up reduced social tariffs and are forced to pay a higher premium for faster speeds, or risk being left behind.
- Being unable to fully get online and engage in digital life is more than just an inconvenience – it can affect peoples' social participation, wellbeing, and future opportunities. One parent articulated the need to think of digital connectivity as a human right:

If you want people to survive in this world, you need food, you need water, and that's your human rights. Now having connectivity that is usable, affordable, should be on there somewhere, because actually you can't survive in this world, the day and age that we're living in without them. And alright, physically, you can survive without it, but actually mentally, how can you? I think it really needs the impact of not having connectivity should be classed as a human right. (Parent)

Chapter 6 Conclusion – barriers, challenges, and policy

6.1 Introduction

The MDLS project has taken a holistic approach to exploring digital exclusion and inclusion for households with children. The project has undertaken extensive qualitative and quantitative research to build MDLS, explore its usefulness for stakeholders, and listen to the concerns and needs of families.

This has included work beyond the initial scope of the Nuffield-supported project to include partnership with the Welsh Government and Nominet, which expanded our research to consider MDLS in the Welsh context and to ensure that young people's voices were heard in defining MDLS. The further information section below lists all the publications that document the work of the project.

The Minimum Digital Living Standard **defines what households with children view as minimum digital needs**. It sets a benchmark for what *households with children* need to meet their own definition of being digitally included. MDLS does not define some lowest possible level of digital access and skills that is just above no digital access at all. In the same way bare access to food through a food bank is not a reasonable minimum level of access to nutrition. MDLS marks the point *below which* any lack will likely impact a household's ability to digitally take part in society. Like MIS, it is a *minimum standard of living* below which our participants felt families would lose out in our contemporary digital society.

MDLS has key features that separate it from other measures and assessments of digital exclusion/inclusion. It is:

- **Bottom-up:** reflects what members of the public think a household with children needs.
- **Holistic:** MDLS combines digital goods and services as well as practical skills and critical skills and understanding – all are needed, in combination, for a household with children to meet the definition.
- **Not prescriptive:** needs, choices, and contexts vary; additional and/or different ways of meeting MDLS may be needed for some households (e.g., related to disability, ethnicity, housing).
- **Evidence-based:** using the well-respected Minimum Income Standard methodology, followed by a face-to-face survey of over 1,500 households with children (UK nationally representative sample), stakeholder engagement (UK, Wales), and qualitative research with families below MDLS (Wales).
- **Welcomed by relevant local and national, public, private, and third-sector organisations** as providing an evidenced, citizen-defined framework for policymakers and practitioners to identify barriers to digital inclusion, and to consider the best interventions in that context.

6.2 Key findings

We have found that 45% of UK households with children do not meet the minimum requirements as defined by their peers. This means that **around 3,688,000 households with children do not reach:**

A minimum digital standard of living includes but is more than, having accessible internet, adequate equipment, and the skills, knowledge and support people need. It is about being able to communicate, connect, and engage with opportunities safely and with confidence.

They do not have either the equipment or the skills, or a combination of what their peers believe are needed to fully participate in a digital society. Our deliberative research and work with stakeholders and families reported here and in the accompanying reports make clear that **the holistic nature of MDLS is one of its major strengths**. It reminds us that **access, devices, services, and skills have to come together in combination**. In nearly all aspects we find that a notable number of households lack each of these components:

- At best 81% of UK households with children have the necessary equipment and services they need. 19% lack enough equipment for all family members' needs or have poor services.
- Only 62% of UK households with children are likely to have all the basic functional and critical skills. In 24% of households, only the children hold the required skills, and in 5% neither children nor adults meet the required skill levels.

It may be obvious but, as our results show, digital exclusion is inseparable from social exclusion, wealth inequalities, and poverty. The **main predictors of households with children being below MDLS** were:

- Being in NRS social grades C2, D, or E (e.g. households with parents in lower-skilled jobs, unemployed, or retired from such circumstances)
- Being a single-parent household
- Having more than two children in the household
- Living in an area of higher multiple deprivations
- Receiving at least one state benefit
- Having the main income earner unemployed
- The survey respondent having a health issue or disability affecting their daily activity
- The survey respondent identifying as ethnically non-white
- Living within a large city
- Living outside London, with the South West, North East, Scotland, Northern Ireland and North West having the lowest probability
- Living in a low-skilled, migrant, or student community

However, **digital exclusion can and does amplify issues of other aspects of social exclusion and poverty** in the context of an ever-more digital society. This is evidenced in our interviews as noted by both families and stakeholders. Losing individual elements of MDLS, be that equipment or skills, cuts households and individuals off from opportunities and services. It puts them at risk of online harms, and places barriers in the way of everyday tasks. This is not just about practical tasks such as purchases or interacting with public services, it includes all aspects of social life. The multiple conversations we have had with

families make clear the **importance of digital access for contemporary life**, and the implications where it is lacking, not only because of the difference it makes to the convenience of everyday tasks, communication, and family organisation, but because of the impact it has on their social inclusion, wellbeing, and opportunities. This is especially important for children when these limitations may impact their educational attainment and even access to health care.

Digital safety was a major issue for parents and young people, who saw this as a collective responsibility across families, schools, state, and tech platforms. However, our survey data found worrying gaps in critical skills for managing and understanding digital risk: 27% of parents, 31% of secondary school children, and 49% of primary school children did not meet the MDLS requirement for these critical skills.

Different households face specific challenges in meeting MDLS and this needs to be considered in interventions, as do the additional needs of specific households (such as those where a member is disabled). The research makes clear that there is no ‘one-size-fits-all’ solution and that needs vary. For example, households face additional barriers and have additional needs when a parent and/or child is disabled or has a health condition, are living on benefits, or are living in an area with poor mobile provision. MDLS is designed to be flexible and reflect family composition, and the research highlights the specific considerations and challenges for those in various circumstances.

Importantly, the MDLS for households with children is a baseline starting point from which additional and specific needs can be identified. It is also a starting point for further research to explore the needs of other household types.

6.3 Recommendations

Enabling households to meet MDLS does not fall to any single government body or department. Like MDLS, the response needs to be holistic. It requires public, voluntary, and private sector bodies to consider their role, the design and delivery of their products and services, and how they can reduce the digital barriers that a significant minority of parents and children may face. However, we believe that MDLS can provide a basis for these considerations and a tool for governments – national, regional, and local. A tool they can use in thinking through digital inclusion strategy and the provision of a framework within which others can work.

However, more research is needed to develop MDLS for other household types:

- Single and couple households of retirement or pensionable age
- Single and couple households of working age *without* dependent children

An overall MDLS for all household types will need ‘rebasin’ and refreshing every few years to address both technological and social changes for households.

All the recommendations below have relevance for all our stakeholders to one extent or another. This includes:

- Central UK government, especially DCSM, DWP, DfE, DSIT and Home Office
- Devolved national governments in Wales, Scotland, and Northern Ireland and their equivalent departments
- Regional authorities with devolved powers
- Local government

- Service providers such as NHS and social housing organisations
- Private industry including major platforms and employers around online safety and skills
- Regulators, especially Ofcom around digital literacy and online harms
- Third sector organisations helping households with digital, access, skills, welfare, wellbeing, and inclusion.

6.3.1 Core policy recommendations

The recommendations below have relevance for all our stakeholders to one extent or another, we believe that they should:

- **Recognise digital access is essential for families.**
- Make digital inclusion a cross-cutting government priority for families.
- Find ways to enable more families to afford suitable connectivity by:
 - Making essential online public and health services free of data charges.
 - Reviewing social tariffs' suitability for households with children - looking at products, price, and promotion.
 - Signposting to emergency support, such as the National Databank.
- Refresh and resource the role of schools in digital inclusion by:
 - Working with teachers, parents, and children to review curricula for digital skills.
 - Working with parents and partner organisations so all children have home access to devices for learning.

6.3.2 Using MDLS

MDLS can be used to review government policies and plans (central, devolved, and local government). Priorities identified by professionals in relevant organisations included:

- Reviewing social security benefits to cover digital access costs.
- Recognising extra digital access costs for families with special educational needs and disability and supporting families to meet these.
- Mitigating risks for families below MDLS in the roll-out of Government Digital Services (such as One Government Login and digital ID verification).
- Mitigating risks for families below MDLS in expanding online NHS and care services (such as NHS App, NHS Wales App, NHS Scotland App).
- Embedding digital access into public standards, such as the Decent Homes Standard.
- Supporting families in temporary accommodation and families seeking asylum to access and afford broadband or sufficient mobile data.
- Working with the National Digital Inclusion Network to target provision (including free mobile data, devices, and support) in areas with high levels of families below MDLS.

6.3.3 Key role of digital safety

Digital safety is a key part of a Minimum Digital Living Standard.

- Adults and young people are worried about digital risks and harms.
- Parents and young people felt digital safety is a shared responsibility. They felt:
 - Family members should inform themselves of digital risks.
 - Schools should provide up-to-date information on digital risks.

- Service providers and manufacturers should give better information on security features and how to use them.
- Social media companies should make platforms safer, especially for children.
- Social and traditional media companies should do more on advice and awareness.
- Greater regulation is needed, recognising the challenge this presents.

The Online Safety Act (2023) makes Ofcom the regulator for online safety.

- Ofcom regulates the telecoms industry with a role to protect consumer interests.
- Ofcom should draw on the MDLS framework and findings, using it to:
 - Close the gaps in critical skills, working with policymakers in education, lifelong learning, and tech platforms.
 - Shape Ofcom's future data collection from children and households, and regulated companies.

6.3.4 UN sustainable development goals

In formulating our core policy recommendations, we underscore the importance of aligning MDLS initiatives with the UN's SDGs. Recognising digital access as essential for families and making digital inclusion a cross-cutting government priority not only addresses MDLS imperatives but also contributes to the UK's efforts in fulfilling SDGs, particularly those related to reducing inequalities (SDG 10), ensuring quality education (SDG 4), and fostering inclusive societies (SDG 16). By integrating MDLS strategies with SDG commitments, stakeholders can harness a holistic approach to digital inclusion that reflects both national priorities and global responsibilities.

6.4 Further information and links

MDLS Project page:

- www.mdls.org.uk

An interim report details the research done with deliberative groups to develop the definition and identify the goods, services, skills, and understanding required to meet MDLS.

- https://www.lboro.ac.uk/media/www/lboroacuk/content/crsp/downloads/reports/MDLS%20UK%20report_Final.pdf

Separate reports cover the recommendations and research findings from a project commissioned by the Welsh Government to develop a Minimum Digital Living Standard for Wales, undertaken by the MDLS project team with Cwmpas, Swansea University, and Digital Inclusion Alliance Wales:

- <https://www.gov.wales/towards-welsh-minimum-digital-living-standard-final-report-summary-html>
- <https://www.llyw.cymru/tuag-y-safon-ofynnol-ar-gyfer-bywyd-digidol-adroddiad-terfynol-crynodeb-html>
- <https://www.gov.wales/towards-welsh-minimum-digital-living-standard-citizen-and-stakeholder-perspectives-html>
- <https://www.llyw.cymru/tuag-y-safon-ofynnol-ar-gyfer-bywyd-digidol-safbwyntiau-dinasyddion-rhanddeiliaid>

Chapter 7 LCA and Regression models

7.1 Available variables

Separate from the MDLS data on equipment and skills, we collected the following demographic data on the household or the respondent through the questionnaire:

- Gender
- Age
- Urban context - urban or rural, and town size
- UK nation
- UK region
- Socio-economic grade (National Readership Scale)
- House ownership or rental status
- Receipt of state benefits
- Employment status of main income earner
- Respondent's health or disability affecting everyday life
- Respondent's declared ethnicity

7.1.1 Geodemographic data

Through the matching of postcodes and UPRN data for households, we were able to link all cases to a set of geodemographic data sets for the area where the household was located. This data was provided by the Consumer Data Research Centre. These include:

- Output Area 2011 Code
- Lower Layer Super Output Area 2011 Code
- Middle Layer Super Output Area 2011 Code
- Output Area 2021 Code
- Lower Layer Super Output Area 2021 Code
- Middle Layer Super Output Area 2021 Code
- Output Area Classification Supergroup
- Output Area Classification Group
- Output Area Classification Subgroup
- London Output Area Classification Supergroup
- London Output Area Classification Group
- Index of Multiple Deprivation total rank
- Internet User Classification Group
- Proportion of houses built post-1945
- Proportion of houses built post 2016
- Mode of Age Band
- Median Age band
- Median House price in 2020-03
- Median House price in 2021-03
- Median Download Speed (MBit/sec)
- Access to Healthy Assets and Hazards Index

- Energy Performance Certification Energy Efficiency Band/Rating

We will use a number of these variables in the following analysis.

7.2 Analytic tools

All of the analyses were undertaken using either R (v4.3.2) running under R-studio (v2023.12.0+369) or IBM SPSS (v28.0.1.1). The R packages listed in Table 32 were used for analysis and the team has developed bespoke code for reporting results.

Table 32: Main R packages used in this analysis

Data analytic tasks	R packages used
Data import and manipulation	dplyr (1.3.1); haven (2.5.4)
Survey weightings	survey (4.2-1); questionr (0.7.8)
Factor and PCA analysis	factoextra (1.07); FactoMineR (2.9); FactoInvestigate (1.9); psych (2.3.12)
Plotting results	ggplot2 (3.4.4); ggpubr (0.6.0); corrplot (0.92); ggsurvey (0.7.8)
Latent Class Analysis	poLCA (1.6.0.1)
Regression and cross-tabulations	glm(r-base); svyglm(4.2-1); svychisq (4.2-1)
Reporting data tables and results	xtable(1.8-4); report (0.5.8); stargazer (5.2.3); effects (4.2-2)

Copies of data and analytic scripts can be provided on request.

7.2.1 Analytic approach

The final linked data set was subjected to the following analytic steps:

- Data preparation and allocation of MDLS measures
- Descriptive and crosstabulation analyses
- Binary regression models of meeting MDLS

Data preparation and allocation of households to equipment, skills, and combined measures of meeting (or not) the MDLS. Households were processed to identify the number of:

- Adults with parental responsibilities
- Children of each school age (Pre-school through Key Stage 1 to Key Stage 4)¹⁵

The MDLS ‘rules’ were then applied to each house creating binary variables for meeting or not meeting MDLS requirements for both equipment and skills. The results for equipment and skills were combined separately to identify if households met the MDLS requirements for each element separately and in combination.

Descriptive and crosstabulation analyses of data across the following variables were then conducted considering survey weightings. Crosstabulations were interpreted using residuals and contributions plots. All of these results can be found in the accompanying analytical report (Yates, 2024). A set of stepped regression models was developed to explore the predictive value of variables, test for multicollinearity, and overall results. The final model is presented below.

¹⁵ <https://www.gov.uk/national-curriculum>

7.2.2 Details of the LCA

We used Latent Class Analysis to identify (latent) groups in terms of access to digital goods and services. We used the following binary variables, each measuring whether the household met or not the MDLS criteria:

- Broadband access
- Broadband speed
- Gaming device
- Large screen devices
- Smartphones
- Smartphone data
- Smart TV
- TV digital service

The analysis was undertaken in R-studio using the poLCA package (v1.6.0.1) Table 33 and Figure 10 indicate that 5 groups optimise information for the smallest number of groups. We use the established practice of using lowest Bayesian Information Criteria score as the selection criteria. Figure 9 shows the probabilities that each group will meet each of the MDLS good and service items, with the 50% and 75% probability levels marked.

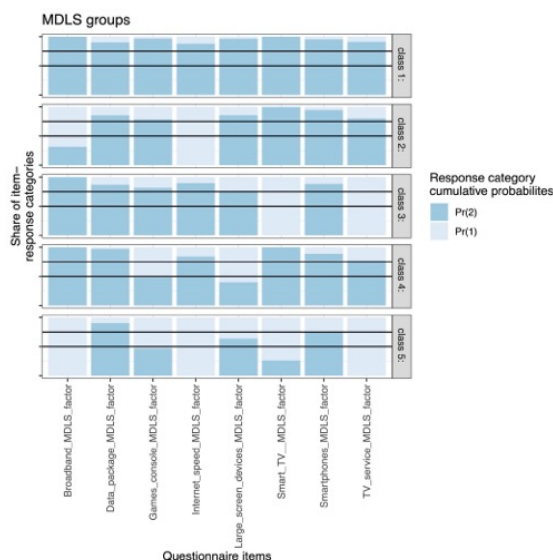


Figure 9: Plot of probabilities of owning devices for latent class groups

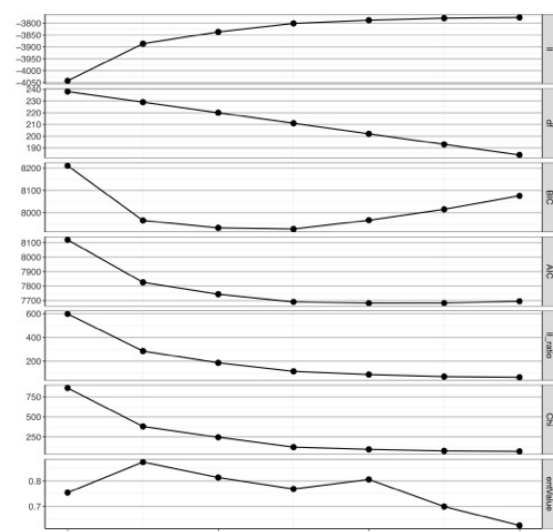


Figure 10: Plot of LCA group measures

Table 33: LCA results for models up to 8 classes (lowest BIC is for 5 classes in bold)

NoClasses	ll	df	BIC	AIC	ll ratio	Chi	entValue
2	-4042.77	238.0	8210.78	8119.55	598.22	860.39	0.75
3	-3886.64	229.0	7964.81	7825.28	285.95	381.36	0.87
4	-3836.86	220.0	7931.55	7743.72	186.39	246.5	0.81
5	-3801.15	211.0	7926.43	7690.31	114.97	123.03	0.77
6	-3787.78	202.0	7965.98	7681.56	88.23	95.53	0.81
7	-3779.14	193.0	8015.0	7682.28	70.95	76.59	0.7
8	-3776.23	184.0	8075.48	7694.46	65.13	70.56	0.63

7.2.3 Final regression model

A set of stepped analyses were conducted including new variables at each stage, checking for goodness of fit and multicollinearity. Removing variables which did not fit required criteria or did not have statistical significance. Table 34 presents the change in AIC score for the five regression models explored. The final model best meeting required criteria for the lowest AIC score.

Table 34: AIC scores for regression models

Adult(s) with parental responsibility	AIC score
Only socioeconomic variables	2,087.600
Only demographic variables	2,072.811
Only geographic variables	2,147.051
All variables	2,001.200
Final model removing co-linear variables	2,003.038

The final model is presented in Table 36. Reference categories for the factor variables are:

- For NRS grade the reference category is 'AB'.
- For town size the reference category is 'Large city'.
- For region the reference category is 'London'.

7.2.4 Goodness of fit and multicollinearity

Hosmer and Lemeshow test (binary model) (X-squared = 5.7865, df = 8, p-value = 0.6711). Test is non-significant indicating no evidence of poor fit. A variance inflation factor (VIF) test was used to detect the extent of multicollinearity in the regression analysis. We find that all the variables in the regression have VIF scores below 2 (acceptable range 1 to 5) indicating that multicollinearity is not an issue in this analysis.

Table 35: VIF scores

Variable	VIF	Variable	VIF	Variable	VIF
SEG	1.401	Benefits	1.565	URBAN	1.225
Single parent	1.209	Working	1.429	REGION	1.110
Two plus children	1.058	Health limitation factor	1.231	oac21SG	1.193
IMD Ranks	1.348	Ethnicity	1.200		

Table 36: Final regression with all covariates on LCA-based MDLS

	Dependent variable:
	MDLS (LCA)
NRS grade C1	−0.267 (0.174)
NRS grade C2	−0.569*** (0.183)
NRS grade DE	−0.774*** (0.212)
Single parent	−0.271** (0.106)
2+ children	−0.521*** (0.125)
Combined IMD rank	−0.00002* (0.00001)
Receives at least one state benefit	−0.318* (0.163)
Chief income earner working	0.363* (0.196)
Respondent has a health issue affecting daily activity	−0.698*** (0.191)
Respondent identifies as ethnically non-white	−0.698*** (0.159)
Smaller city or large town	0.866 (0.561)
Medium town	1.237** (0.558)
Small town	1.550*** (0.546)
Rural area	1.417** (0.573)
EE	−0.932 (0.605)
WM	−1.144* (0.598)
SE	−1.370** (0.598)
YH	−1.290** (0.605)
W	−1.404** (0.635)
SW	−2.046*** (0.611)
EM	−1.461** (0.619)
S	−2.102*** (0.551)
NE	−1.651** (0.654)
NW	−1.978*** (0.608)
NI	−2.478*** (0.655)
Low-Skilled, Migrant, and Student Communities	−0.394** (0.197)
Ethnically Diverse Suburban Professionals	0.370 (0.264)
Constant	0.793** (0.341)
Observations	1,582
Log Likelihood	−973.519
Akaike Inf. Crit.	2,003.038
Note: *p<0.1; **p<0.05; ***p<0.01	

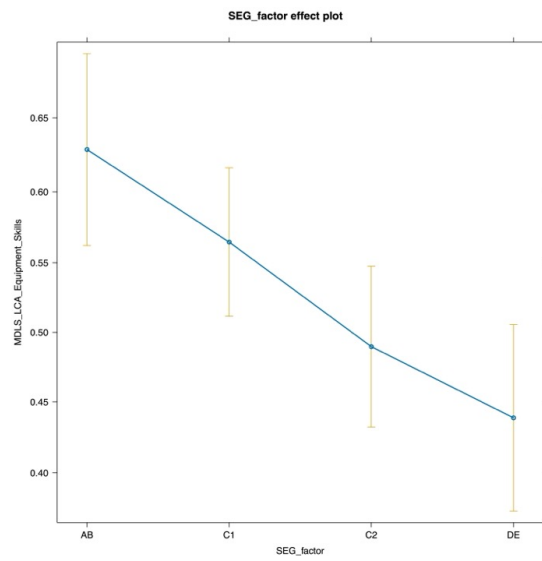


Figure 11: NRS grade regression effects plot

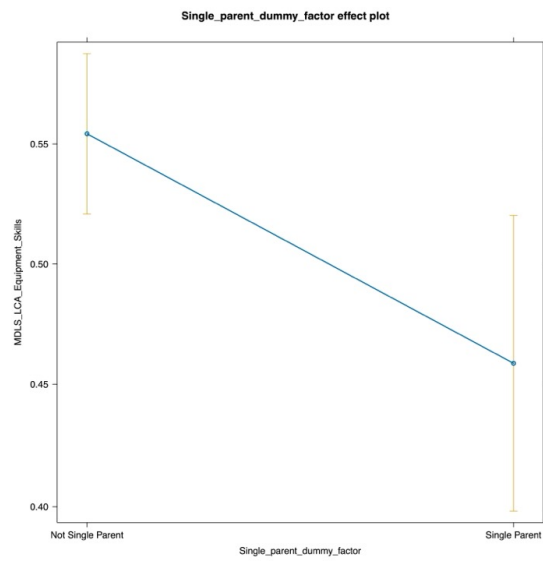


Figure 12: Single parent regression effects plot

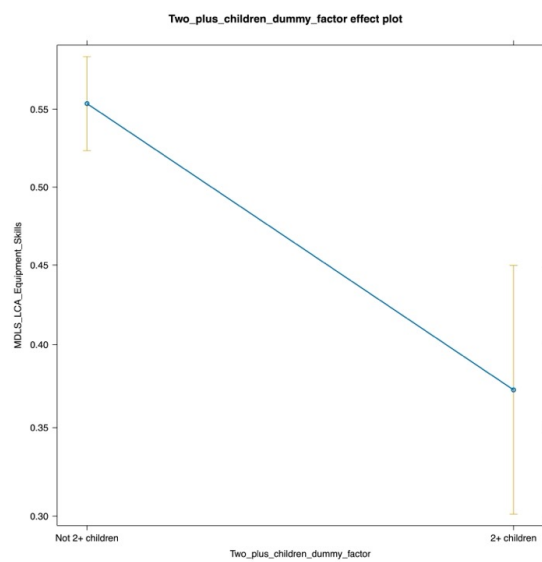


Figure 13: 2+ children regression effects plot

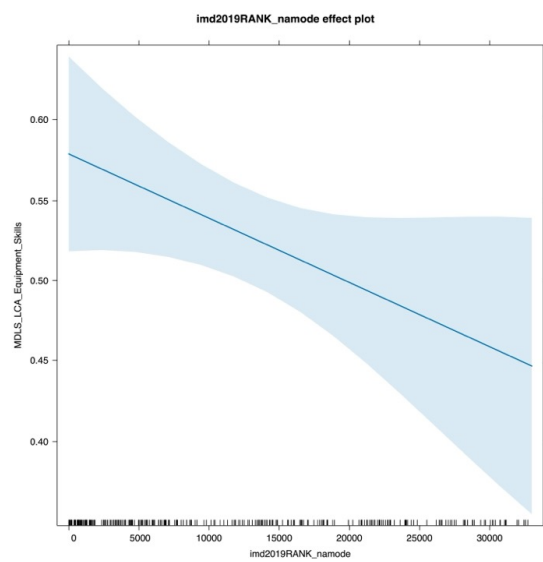


Figure 14: IMD regression effects plot

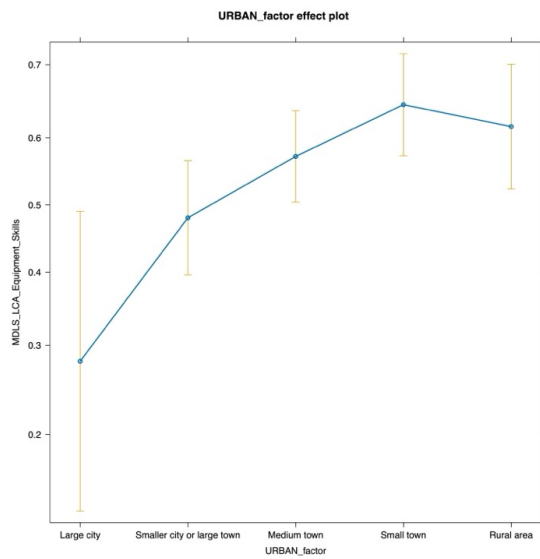


Figure 15: Town size regression effects plot

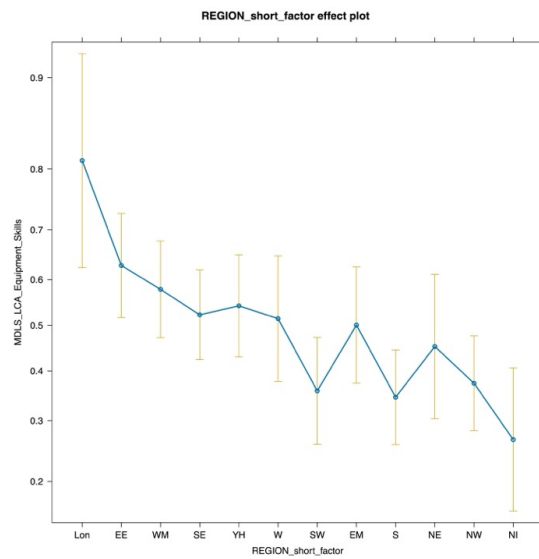


Figure 16: Region regression effects plot

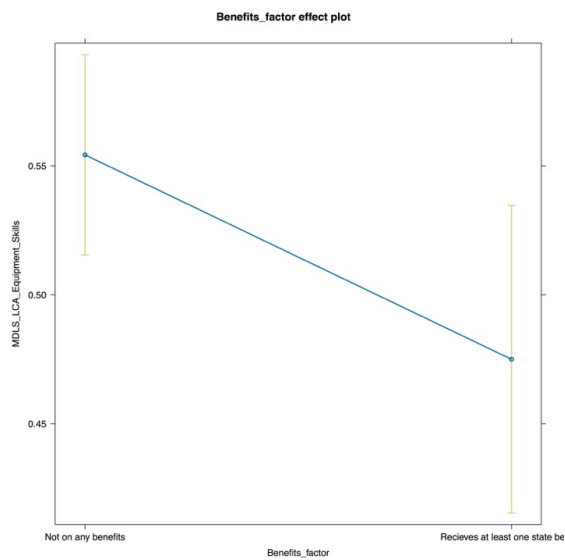


Figure 17: Benefits regression effects plot

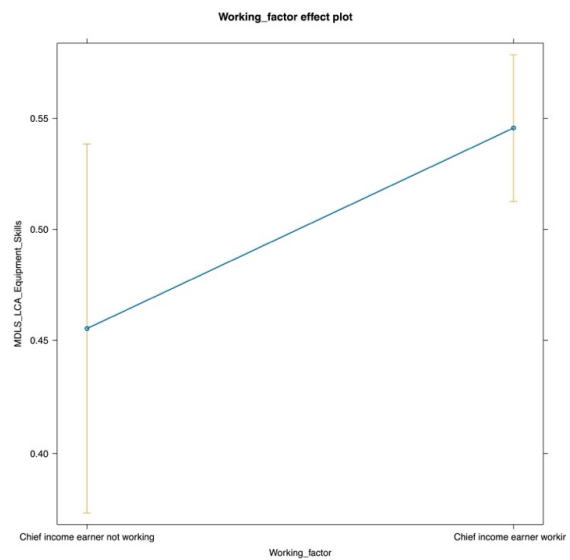


Figure 18: Working regression effects plot

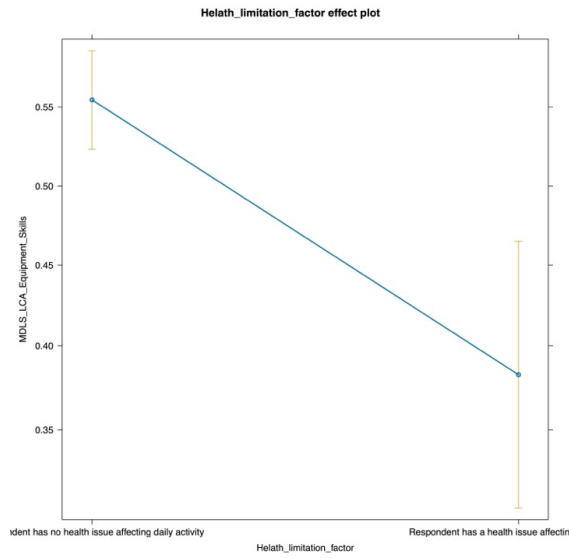


Figure 19: Health regression effects plot

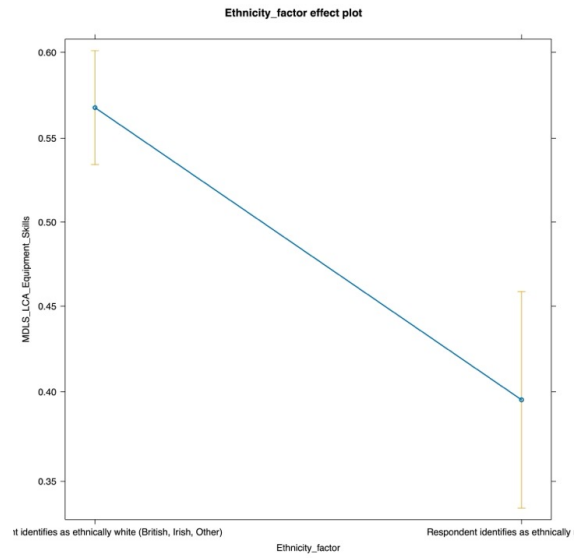


Figure 20: Ethnicity regression effects plot

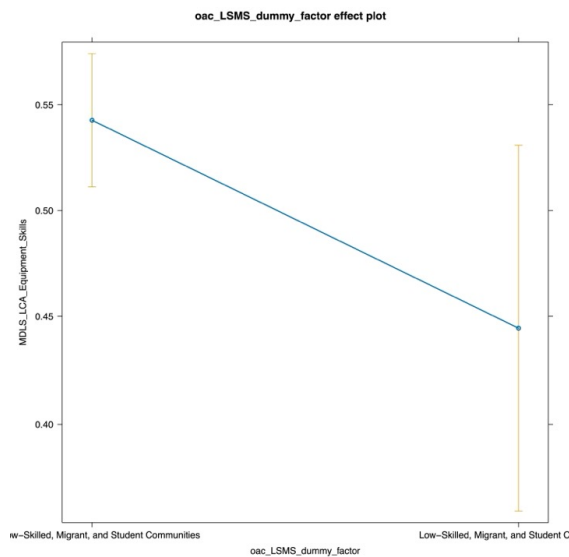


Figure 21: OAC classification regression effects plot

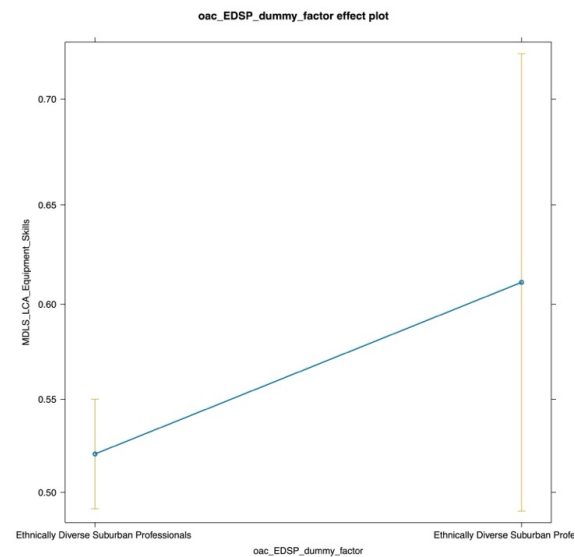


Figure 22: OAC classification regression effects plot

From this result, we have a predictive regression model, with moderate predictive power, of the form:

Equation 1: Final regression model for MDLS (LCA)

$$\begin{aligned}
 MDLS(LCA) = & 0.793 - 0.267 * C1 - 0.569 * C2 \\
 & -0.774 * DE - 0.271 * Singleparent - 0.521 * 2 + children \\
 & -0.162 * IMDrank - 0.318 * Receivesbenefit(s) \\
 & +0.363 * Chiefincomeearnerworking - 0.698 * Respondenthasahealthissue \\
 & -0.698 * Respondentidentifiesasnon - white + 0.866 * Smaller city or large town \\
 & +1.237 * Mediumtown + 1.550 * Smalltown + 1.417 * Ruralarea \\
 & -0.932 * EE - 1.144 * WM - 1.370 * SE - 1.290 * YH - 1.404 * W \\
 & -2.046 * SW - 1.461 * EM - 2.102 * S - 1.651 * NE - 1.978 * NW \\
 & -2.478 * NI - 3.944 * LowSkilledMigrantandStudentCommunities \\
 & +3.699 * EthnicallyDiverseSuburbanProfessionals
 \end{aligned}$$

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The Nuffield Foundation is an independent charitable trust with a mission to advance social well-being. It funds research that informs social policy, primarily in Education, Welfare, and Justice. The Nuffield Foundation is the founder and co-funder of the Nuffield Council on Bioethics, the Ada Lovelace Institute, and the Nuffield Family Justice Observatory. The Foundation has funded this project, but the views expressed are those of the authors and not necessarily of the Foundation. Website: www.nuffieldfoundation.org X (formerly Twitter): @NuffieldFound

Nominet

Nominet supported the additional qualitative fieldwork with young people in defining MDLS. Nominet is a public benefit company that is a force for good in the UK digital economy and the global internet community, with the .UK registry at the centre of their work, delivering services that make our world more connected, inclusive, and secure. Nominet's mission is to provide a world-class .UK namespace; operate critical national infrastructure that is safe, secure, and resilient; and protect public services from cyber threat in the UK and internationally. Website: <https://www.nominet.uk/>. As part of Nominet's Social Impact work, they undertake an annual survey of young people and internet use (<https://digitalyouthindex.uk>) as well as supporting a range of other Public Benefit projects. Nominet has funded part of this project, but the views expressed are those of the authors and not necessarily those of Nominet.

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Advisory board

We would also like to thank our advisory group members for all their support and input throughout the project. Listed below in alphabetical order by organisation.

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