Wales Centre for Public Policy
Canolfan Polisi Cyhoeddus Cymru

Poverty and social exclusion: review of international evidence on digital exclusion

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Summary

- Digital inclusion facilitates access to services that impact positively on health, employment, education, and housing. Exclusion from, or even partial access to, the digital realm can thus be a source of economic and social inequality.

- Digital exclusion hinders people's ability to participate in social relationships and economic, social, cultural or political activities available to the majority of people in society.

- Without improving digital inclusion in an increasingly digitalised world, the digitally excluded will be increasingly marginalised and left further behind.

- Although there remain knowledge gaps, there are clear indications that policies need to address physical access to ICT, data poverty and digital literacy.

- There are connections between digital exclusion and policy areas covered in other reviews, for instance:

  o **Take-up of cash transfers:** Increasing digitalisation of welfare provision makes improving digital inclusion a priority.

  o **Fuel poverty:** Digital inclusion helps households secure the best energy prices through comparing different deals and increasing the ease of switching providers.

- We conclude the review with some promising actions that can support the role of digital inclusion in improving the life chances of disadvantaged groups in Wales, namely:

  o While affordability is a key element of access, and digital adoption is sensitive to price, successful programmes require a holistic approach and must tackle other aspects related to motivation, skills and training.

  o Differences in use are also driven by perceived relevance to users' needs – which digital accessibility alone cannot change.

  o Digital literacy programmes can reduce digital exclusion. However, there is a lack of high-quality evaluation evidence to help guide 'what works'. There is a need to address motivational barriers and literacy programmes are likely to be more successful when linked to a clear need.

Background

The Wales Centre for Public Policy (WCPP) was commissioned by the Welsh Government to conduct a review of international poverty and social exclusion strategies, programmes and interventions. As part of this work, the Centre for Analysis of Social Exclusion (CASE)[1] at the LSE was commissioned to conduct a review of the international evidence on promising policies and programmes designed to reduce poverty and social exclusion across twelve key policy areas. This report focuses on digital exclusion.

The key questions addressed in each of the twelve policy reviews are:

- What effective international poverty alleviation policies, programmes and interventions exist?

- What are the key or common characteristics/standards and features of these different approaches?

The questions are addressed by providing:

- The Welsh context of each policy area and main initiatives being undertaken by the Welsh Government;

- Detailed information on the relationship between the policy area and poverty and social exclusion;

- A summary of evidence of lived experience, which could help to understand how people may experience and respond to policy interventions;

- An overview of the international evidence of policy effectiveness (including case studies); and

- Challenges and facilitating factors associated with policy implementation.

In addition to the twelve policy reviews, we have produced an overview report which summarises the key evidence from each of the individual reviews, highlights connections between different policy areas and reflects on all the evidence to make a number of policy recommendations, or promising actions, within each of the twelve

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[1] The Centre for Analysis of Social Exclusion (CASE) at the London School of Economics and Political Science (LSE) was established in 1997. It is a multi-disciplinary research centre exploring social disadvantage and the role of social and public policies in preventing, mitigating or exacerbating it. Researchers at CASE have extensive experience in conducting policy reviews covering evidence in the UK and international literature.

areas. Please refer to the Annex for detail on methodology, including how the twelve policy areas of focus were chosen.

This work forms part of a suite of reports produced by WCPP as part of its work on poverty and social exclusion for the Welsh Government. As well as this work by CASE, there are two reports on the nature, scale and trajectory of poverty and social exclusion in Wales – one focusing on quantitative data and evidence, and a second focusing on lived experience evidence (Carter, 2022a; 2022b). WCPP also commissioned the New Policy Institute to conduct a review of international poverty alleviation strategies (Kenway et al., 2022) which examines overarching governmental approaches to tackling poverty.

Introduction

Digital inclusion facilitates access to services that impact positively on health, employment, education, and housing. Exclusion from, or even partial access to, the digital realm can be a source of economic and social inequality, particularly as societies become more reliant on Information and Communication Technologies (ICTs) and digitalisation increases, a process which has been accelerated by the Coronavirus pandemic. Experiences during the pandemic, particularly during lockdowns when most people were expected to work and study from home, highlighted that for digital inclusion people need a suitable device, access to the device at a convenient time, access to reliable connection and sufficient data and skills to use it.

According to the National Survey for Wales, 10% of people in Wales were classified as digitally excluded in 2020 (meaning they have not personally used the internet in the last three months), down from 19% in 2015 (Welsh Government, 2020). However, as we outline above, the concept of digital exclusion is much broader than this definition, and lack of digital skills is more widespread. Of the 90% of people who had used the internet, only 73% were found to have used all five skills considered basic in the Wales Digital Inclusion Framework (National Survey for Wales, 2021; Welsh Government, 2018). Based on the latest ONS report (2019) Wales has the lowest percentage of the population displaying all basic skills across UK regions and the highest percentage displaying zero basic skills.

Disparities are well documented in relation to both outright digital exclusion and lack of digital skills:

- **Education** – 31% of those with no qualifications do not use the internet and only 49% demonstrated all basic skills, compared to 81% of those with degree qualifications or higher.

- **Age** – 48% of the over 75s were digitally excluded and 18% of the over 50s; 53% and 36% of those aged 65-74 and 75+ demonstrated basic skills respectively, compared to 84% for the younger cohort.

- **Housing tenure** – 17% of social housing residents are digitally excluded and only 63% of those using the internet demonstrate all five basic skills – notably, internet access (76%) is also lower than for owner occupiers (90%) and private renters (92%).

- **Disability** – 21% of those with long-term health conditions and disabilities use the internet, compared to 93% of those without.

- **Employment** – disparities across employment status emerge particularly in relation to accessing the internet at home, at 96% among those in employment, 84% among the unemployed and 78% among the economically inactive (Welsh Government, 2019a; 2020; National Survey for Wales, 2021).

Specifically in relation to health in Wales, Davies et al. (2019) found that levels of digital exclusion are higher for more deprived households, older people and those with lower levels of health. In particular, using digital technologies to support health (e.g. acquiring information, managing health conditions and medication, making appointments etc.) is less common for older people (24% of 70+ year olds versus 87% of 16-29 year olds) and those living in areas with higher levels of deprivation (51% compared to 84% among the least deprived).

Policy context

The pandemic has accelerated innovation in a range of policy areas but it has also magnified disparities. On the one hand, it increased the reliance on digital services to stay connected to public services, friends, families and social networks, to purchase goods online and receive vital information. On the other hand, it augmented access challenges (e.g. through closures of schools, libraries, public service offices, and through increased need to share devices, data allowances and broadband bandwidth) (Lucas et al., 2020). Some measures were put in place to ensure pupils maintained access to devices and connectivity necessary for their education, but access to equipment does not guarantee access in the face of affordability

challenges. Of the six million UK households who have fallen behind in at least one household bill during the pandemic, mobile phone and broadband bills were the most common (3.4 million households) (Citizens Advice, 2020).

A 'Digital Strategy for Wales' was published in March 2021 and includes digital inclusion as one of six priority areas (alongside digital services, digital skills, digital economy, data and collaboration, and digital connectivity). For digital inclusion, the overarching aim is to 'equip people with the motivation, access, skills and confidence to engage with an increasingly digital world, based on their needs'. The main outcomes the strategy aims to achieve are:

- Reducing the number of people who are digitally excluded;

- People feeling more supported and confident in developing basic digital skills and accessing help;

- Improving access to public services; and

- Encouraging organisations to design services that remove barriers for those lacking digital confidence.

The focus on improving public services to better serve the needs of users emerges strongly in recent publications – such as the expert panel report 'System reboot: transforming public services through better use of digital' in late 2018 (Welsh Government, 2019b).

A relevant initiative in this space is Digital Communities Wales, a key programme which started in 2019, with an annual budget of £2 million. It supports a range of activities, including digital inclusion assessment, digital training for staff and volunteers, digital equipment loans, volunteer support, digital inclusion accreditation, and partnership building. It also includes innovative approaches to intergenerational skill transfers such as the Digital Hero initiative. Digital skills are also central to the Skills and Employability programme. Other digital inclusion activities that encompass local initiatives have been piloted, like the Community ICT scheme, or Digital Inclusion Charter involving over 280 organisations.

Relationship to poverty and social exclusion

Digital inclusion facilitates access to services that impact positively on health, employment, education, and housing (Ragnedda, 2018). Exclusion from, or even partial access to, the digital realm can thus be a source of social inequality, particularly as societies become more reliant on ICT and digitalisation increases. As digital technologies shape employment opportunities, social networks and private and public services, digital exclusion hinders people's ability to participate in the relationships and economic, social, cultural or political activities available to the majority of people in society. There is evidence of a range of benefits associated with being digitally advantaged in relation to employment opportunities and outcomes, expanded social networks, increased civic and political engagement, and improved health outcomes (van Deursen and Helsper, 2015; Sieck et al., 2021). Higher levels of digital skills are associated with improved employment outcomes and progression in the labour market (Dickerson and Green, 2004; Truong and Sweetman, 2018), and can ultimately reduce the risks of poverty. Consumers can often access the best deals for utilities (for example, energy contracts) and retail prices online, leaving the digitally excluded at a financial disadvantage.

Strong links between social exclusion and digital exclusion have long been established. Digital exclusion is concentrated in vulnerable groups and there is evidence that social exclusion and economic disadvantage have become stronger determinants of digital disengagement (Helsper and Reisdorf, 2016; Helsper, 2014). One of the reasons why living in poverty increases the likelihood of digital exclusion is the cost associated with purchasing technology and internet access (e.g. mobile data and broadband). Limited resources may force families to cut expenditure and face trade-offs, for instance choosing between spending on internet access or other essentials (e.g. food and heating). These coping strategies have consequences on a broad set of employment, health, education outcomes (as discussed in other reviews, e.g. food insecurity, fuel poverty). Arrears on utility bills is also a key component that leads low-income households to incur problem debts.
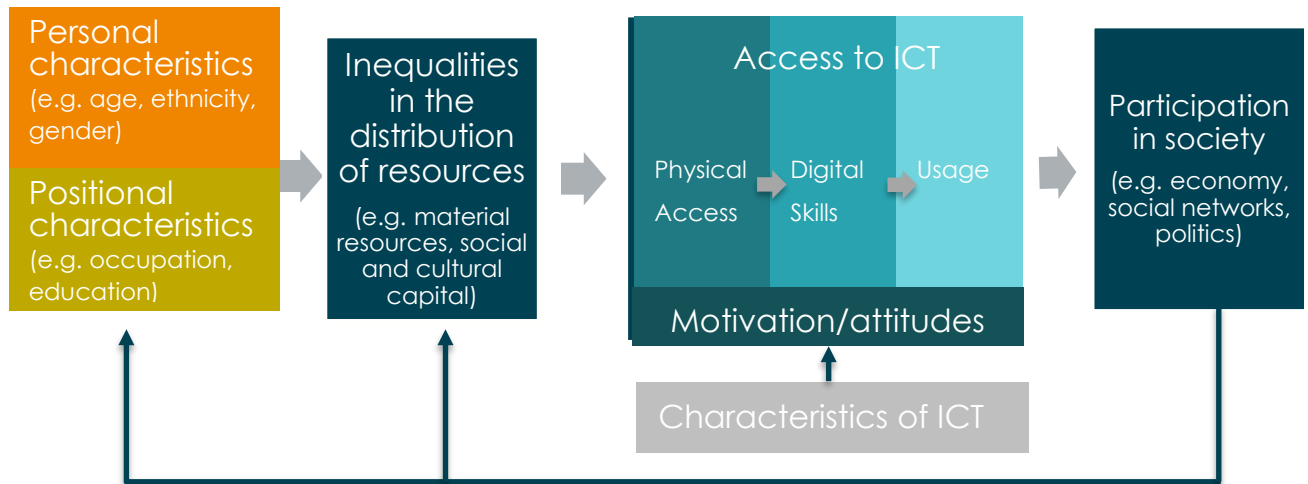
At the same time, the digital divide changes in line with progresses in technology and the changing role of digital technology in society. Access to digital technologies (including affordability and broadband connectivity), digital skills and competence (capacity to use, create, successfully navigate, and evaluate online content effectively and safely), and motivation all underpin the digital confidence necessary for full inclusion. Lack of access and skills remain important barriers to digital

inclusion, but motivational reasons have increased in importance for explaining this digital divide.

In exploring motivational reasons for lack of internet use, Helsper and Reisdorf (2016) showed that it is important to understand how reasons for disengagement are changing and how non-user characteristics intersect. For instance, the increasing importance of lack of interest as a predictor of internet use, in conjunction with exclusion patterns among the elderly and those who are socially isolated, suggest that, rather than age on its own, life stage and social connections/isolation also need to be taken into consideration. Recent research has focused on what has been defined as 'third-level digital divide' (Scheerder et al., 2017): beyond access and skills (characterising first- and second-level divides), this third-level digital divide concerns disparities in returns from internet use and gaps in individuals' capacity to translate their internet access and use into favourable outcomes. Here again, the evidence shows stratification based on socio-economic characteristics (educational levels, occupational status, income) with more advantaged users benefitting the most from internet use (van Deursen and Helsper, 2015).

Figure 1 draws on van Dijk's (2020) framework to understand the way in which the four widely recognised areas of importance (attitudes, access, skills and types of usage), which are shaped by the characteristics of ICT (e.g. available technologies), lead to a range of economic and social outcomes. These in turn reinforce or moderate the existing inequalities resulting from personal characteristics (e.g. age, gender, health, ethnicity) or positional categories (e.g. education level, labour market status, household type). These distinctions are important because bridging access and knowledge divides may not be sufficient to ameliorate poverty and social exclusion if disadvantaged users do not in fact benefit from using ICT.

Figure 1. Access to ICT and relationship to social exclusion

| Personal characteristics (e.g. age, ethnicity, gender) | → | Inequalities in the distribution of resources (e.g. material resources, social and cultural capital) | → | Access to ICT | → | Participation in society (e.g. economy, social networks, politics) |
| Positional characteristics (e.g. occupation, education) | | | | Physical Access → Digital Skills → Usage / Motivation/attitudes | | |

Characteristics of ICT

Source: Adapted from van Dijk (2020) by the authors

Relationship to lived experience of poverty and social exclusion

Personal characteristics, life events and trajectories shape the way in which different people who are at risk of digital exclusion experience ICT and digital technology (Faure et al., 2020). There are both commonalities (e.g. difficulties understanding digital terminology; fear and anxiety of using digital technology and services) and differences across groups (e.g. feeling too old for learning). Great attention has been paid to factors shaping motivation, reflecting the fact that access to ICT is a process that starts with a motivation for and a positive attitude towards using these media. Motivation remains a driver of all following phases, namely the acquisition of digital skills and usage (van Dijk, 2017).

At the same time, awareness of the growing importance of ICT but lack of physical access and/or skills can further add to people's sense of inadequacy and anxiety. In particular, with the growing digitalisation of public services, welfare provision is increasingly premised on use of digital technologies. Digitalisation of welfare services can transform the relationship between citizens and the welfare state, for instance because increasing responsibility is placed on citizens to actively seek out services previously administered by welfare professionals (Schou and Pors, 2018). Lived experience evidence from Wales showed that the 'digital by default' approach being

adopted by many services has exacerbated the social exclusion of people who are digitally excluded (Diverse Cymru, 2020).

The relevance of ICT to users is essential to explain motivation barriers. Research exploring the lived experience of 'digital help seekers' relying on public libraries for a range of support services shows that most are interested in achieving a particular end goal, such as signing up for social security benefits or applying for a specific job (Allman et al., 2021). They are not interested in digital skills per se, but rather they need technology for their immediate, sometimes urgent needs. However, what appears to be a single task in fact requires a range of actions – especially for people who do not have a 'digital footprint' and need to set up email accounts and passwords, and learn to use basic software. These actions also require longer term commitment, as users must be able to return to the accounts set up for basic services, check email notifications and so on. The complexity of these tasks further discourages novice users from developing a broader interest in other digital skills.

These experiences show that even when people have access and motivation to be digitally connected, acquiring the necessary competencies and confidence is an emotional process which requires sustained engagement. Overall, there is growing interest in exploring avenues to include the perspectives and voices of those who are digitally excluded as this can fill important gaps in the design of effective interventions (see Case Study 1).

Case Study 1. Participatory approaches to address digital exclusion

Participatory approaches can help include the perspectives of disadvantaged users in interventions to address digital exclusion by identifying inclusion barriers and formulating policies that are relevant to people's needs. The very process of participation can address the motivational challenges explored above. The adoption of a participatory approach draws directly on the critical perspectives discussed in this review, stressing that ICT is not in itself a panacea but can instead exacerbate existing inequalities (van Deursen and van Dijk, 2014).

Recent examples of participatory approaches to addressing digital exclusion include some which have been adopted to inform the planning of 'smart cities' in Europe – cities in which ICT is central to the improvement of services and urbanisation. Technology can support citizens' participation in 'city-making', but this in itself requires fostering digital inclusion if citizens' 'Right to the City' are to be fulfilled (Breuer et al., 2020) and policy solutions made more effective and sustainable (Laenens, 2019).

Making data available does not necessarily mean engagement or change: the way in which the data are made available and understandable to citizens matters and participatory engagement can inform communication strategies, reveal barriers and highlight citizens' needs. However, authentic participation requires time, for instance to develop citizens' and civil servants' skills and capacity to be able to participate. Laenens et al. (2019) detailed promising participatory practices in the development of 'smart mobility' in the Brussel city region. Underpinning this approach to boost digital inclusion were iterative, bottom-up cycles of problem definition; identification of relevant stakeholders; participation in action planning; and solution formulation. Breuer et al. (2020) highlighted challenges in implementing open data policy in the Smart Flanders programme (which includes thirteen centre cities in Flanders, Belgium).

Evidence of policy effectiveness

Intervention	Strength of evidence	Effectiveness
Access to devices and connectivity	Good	Likely effective (some evidence that broadband subsidies increase adoption in low-income households but other barriers also need to be addressed)
Digital literacy	Good, although weak elements. (for example, identifying what works in terms of course design)	Likely effective (particularly when courses are linked to specific need)

Access to devices and connectivity

Policies tackling digital exclusion originally focused primarily on access – especially physical access to equipment and technological infrastructure – while since the mid-2000s, skills and usage have been growing in importance as key policy areas (van Dijk, 2020; Vassilakopoulou and Hustad, 2021) and more recently attention has turned to 'data poverty' and connectivity. A range of initiatives in high-income

countries have seen governments committing substantial funds (e.g. to support public, private and community-led actions) to expand infrastructure (e.g. the infrastructure required to support and widen coverage of high speed broadband) (European Commission, 2020; OECD, 2019a; DDCMS, 2019). Expanded availability does not automatically translate to adoption (Hauge and Prieger, 2010), and as detailed above, access to devices and connectivity remain critical issues for some disadvantaged groups.

Libraries and other community organisations have been shown to fill the gap between low home adoption (be it due to costs, skills or preference) and high demand for access to technology and connectivity in a number of countries (Powell et al., 2010). In particular, because of the widespread digitalisation of public services that characterises many countries, libraries have increasingly taken on the role of intermediaries in access to digital services, providing both access to devices and connectivity (Jaeger and Bertot, 2010). In fact, in a number of countries in Europe and in the US, libraries play a range of roles to foster digital inclusion, including offering training and providing tailored individual help (e.g. for job applications and access to public services), and running communication and outreach campaigns (Manžuch and Macevičiūtė, 2020; Jaeger et al., 2012; Audunson et al., 2019; Stenstrom et al., 2019). This expanded role, however, requires sufficient resources, for instance to adapt service provision to users' needs (e.g. in terms of opening hours) and to adequately train support staff. There are clearly compromises between the advantages offered by support and lower cost access to devices and connectivity, and the disadvantage of constraints on times of access and availability. The disadvantages were only too apparent when libraries closed during Coronavirus lockdowns and people who were reliant on them for digital services faced digital exclusion.

One way of increasing home access to devices and connectivity is through the use of demand-side subsidies which attempt to expand adoption by making ICT more affordable for disadvantaged groups. Some governments (e.g. Greece, Italy, US) have introduced schemes to support low-income families in accessing broadband services as part of their Coronavirus pandemic response. For example, the Emergency Broadband Benefit provided a monthly discount towards the cost of broadband services to eligible disadvantaged households, made available in the US through the Federal Communications Commission. The pandemic highlighted both a lack of access to equipment for all family members in households (for online schooling and work), and 'data poverty' which refers to broadband and mobile data contracts having insufficient data or download speeds to access online lessons or meetings by multiple members of a household at any one time. Before the pandemic, a significant body of research had evaluated these forms of targeted subsidies in the

US, where they have been in place at different levels (e.g. local, state and federal level) – see Case study 2.

Case Study 2. The Federal Communications Commission
Universal Service Fund and Lifeline Programme

The US Federal Communications Commission (FCC) manages the 'Universal Service Fund' – which has long been in place to guarantee access to a baseline standard of communications services, and thus focuses on supporting access and affordability in rural and low-income communities. The FCC has been active in increasing the adoption of broadband among low-income households. This is in the context of evidence showing that, despite improved infrastructure, between 2003 and 2013, the adoption gap between low-income and high-income households actually increased by five percentage points (Lee and Whitacre, 2017).

Since 2016 the FCC has offered a discount service, the Lifeline Programme, which offers subsidies to increase the affordability of advanced communication services, including broadband access. The expansion of wireless resellers to the programme (i.e. organisations that sell wireless services under their own name, but use the networks of other service providers) saw a sharp increase in take-up (24% each year between 2008 and 2012) but this has been falling since reforms aiming to curb waste and abuse were introduced in 2012.

Evidence that the Lifeline programme has increased adoption is mixed. Some initial evaluations of Lifeline found different participation rates across pilots, together with a preference for lower-speed plans, and little interest in participating in digital literacy training classes which were offered in conjunction with the service (FCC, 2015; Wallsten, 2016). Evaluations also looked at whether Lifeline accounts displace regular accounts (creating inefficiencies and doing little to expand access) but found no or little substitution effects (Ford, 2021). There is also evidence that the expansion of Lifeline to cover wireless services had a significant positive impact on both service quality (crowding out lower quality unsubsidised services) and on households' out-of-pocket spending, saving households more than a cash transfer equivalent to the subsidy (Conkling, 2018).

In 2011 the FCC also supported a private subsidy programme to reduce the cost of broadband access for low-income households, by providing computer equipment for less than $150 and digital literacy programmes. Rosston and Wallsten (2020) found an increase in broadband adoption, but also substitution

effects, and no differences in computer ownership. This literature shows that subsidised access to broadband can increase adoption among low-income households, but does not entirely eliminate gaps, which may be driven by the cost of equipment, digital literacy, attitudes and relevance to users' needs.

More recent work on the digital divide has emphasised the need to go beyond simple measures of digital exclusion (e.g. use of the internet within a specified timeframe) and that with the diffusion of mobile internet devices, it is important to distinguish between those who have access to the internet on mobile devices, those who have broadband access, and individuals who have access to multiple devices. Van Deursen and van Dijk (2019) showed how even in countries with high levels of internet access, it is more likely for people with high income and education to have access to several devices, subscriptions and apps (and faster connectivity). People on low incomes and with lower education levels, while rarely entirely unable to gain access, are likely to rely on one device, often a mobile or smartphone (van Deursen and van Dijk, 2019). These devices are still inferior in several respects (e.g. storage, speed, dedicated broadband connection) compared to PCs and laptops, limiting users' ability to learn or work online, for example. This widespread trend has led some researchers to talk of a 'mobile underclass' (Napoli and Obar, 2014). There is evidence that cost is a key reason underlying choosing smartphones over other devices (Lee and Whitacre, 2017; Rhinesmith et al., 2019).

Users' different needs – for instance shaped by stage of life and occupation – also explain preferences for certain devices: these dynamics link differences in digital use to existing socio-economic disparities (van Dijk, 2020). In fact, this usage gap helps explain what has been termed the 'third level digital divide' (the unequal benefits different groups appear to enjoy from internet use). Users with higher socio-economic status are consistently found to use the internet in more beneficial ways despite more disadvantaged users spending more time online (van Deursen and van Dijk, 2014). Users differ in the types of activities for which they use the internet (e.g. information, news, personal development, commercial transaction, leisure, social interaction and gaming). Van Deursen and van Dijk (2014) showed that people with higher levels of education in the Netherlands use the internet for more productive activities, such as learning and work, than those with lower levels. These findings mirror evidence on mobile phone use in the US (Tsetsi and Rains, 2017). This growing trend in the 'third level digital divide' is a reminder that an effective strategy needs to address wider levels of inequality.

Overall, this literature shows that while affordability of both devices and data is a key element relating to access, and digital adoption is sensitive to price, successful programmes require a holistic approach and must tackle other

aspects related to motivation, skills and training or 'digital literacy'. Differences in use are also shaped by relevance to users' needs, including differences in the position of users in the labour market, which digital accessibility alone cannot change.

Digital literacy

Digital literacy, computer literacy or internet literacy refer to the skills and competencies required to operate safely and effectively online. The American Literacy Association's Digital Literacy Task Force defines digital literacy as 'the ability to use information and communication technologies to find, evaluate, create, and communicate information, requiring both cognitive and technical skills'. Others have defined it as:

> **"…a set of skills to access the internet, find, manage and edit digital information; join in communications and otherwise engage with an online information and communication network. Digital literacy is the ability to properly use and evaluate digital resources, tools and services, and apply it to lifelong learning processes."** (Gilster, 1997, p.220).

Digital literacy and ICT competence are essential elements of digital inclusion. While digital literacy is typically taught to young people in schools, the barriers to gaining these skills faced by adults, particularly older adults, can be somewhat different (Wilfong, 2006). An important element can be overcoming lack of self confidence in relation to learning new ICT skills (Reed, Doty and May, 2005). In addition, concerns about online security are also a deterrent (OECD, 2019a). These concerns can be grounded in negative experiences, such as being the victim of financial loss from a fraudulent online payment or from phishing/pharming, or through the experience of others. Trust can be compromised by re-occurring personal data breaches that have been increasing in terms of scale and profile over recent years (OECD, 2017).

Individuals who lack digital literacy are both more vulnerable to online security problems and lack the skills required to protect themselves online. Concerns about digital security and/or the protection of personal information can severely hamper individuals' willingness to carry out online activities. In several OECD countries, nearly a third of individuals (30%) report that they do not provide personal information on online social networks and, on average (across EU28), 14% do not order goods or services online and refrain from internet banking because of security concerns (OECD, 2019a).

Expanding adult digital literacy is important for reducing exclusion and marginalisation, particularly for vulnerable adults (Jacobs et al., 2014). Digital literacy not only helps keep internet users safe online, but it also helps them cope with large volumes of information and evaluate the reliability of that information (Eshet-Alkalai and Soffer, 2012). Put another way:

> **"Improving adult digital literacy levels is fundamental in the sense that it bridges the digital divide and confronts the issues of exclusion and marginalisation that accompany the increasing importance of ICT-mediated activities in modern social life."** (Jimoyiannis and Gravani, 2011)

With social opportunities increasingly shifting into the digital world, digital literacy is not only empowering – it can also help reduce social isolation (Jacobs et al., 2014). Digital literacy is also key to unlocking widening adult participation in learning and lifelong learning initiatives, as it facilitates flexible learning in terms of time and distance, with the proviso that access to ICT might not, in itself, make people any more likely to participate in education and (re)engage with learning (Gorard, Selwyn and Madden, 2003).

Despite the importance of digital literacy, recent estimates suggest that around 15% of adults in the OECD lack even the most basic computer skills (OECD, 2019b). In 2018, it was estimated that 21% of the UK population lacked full basic digital skills (11.3 million people) and 8% (4.3 million) had no basic digital skills (UK Consumer Digital Index, 2018). To address this deficiency, countries have developed plans to improve digital skills. For example, Hungary has a national development plan which aims to provide digital skills training opportunities to 260,000 low-skilled adults from disadvantaged regions (OECD, 2020a). The EU recently published The Digital Education Action Plan (2021-2027) which offers a long-term strategic vision for high-quality, inclusive and accessible digital education (EU, 2020).
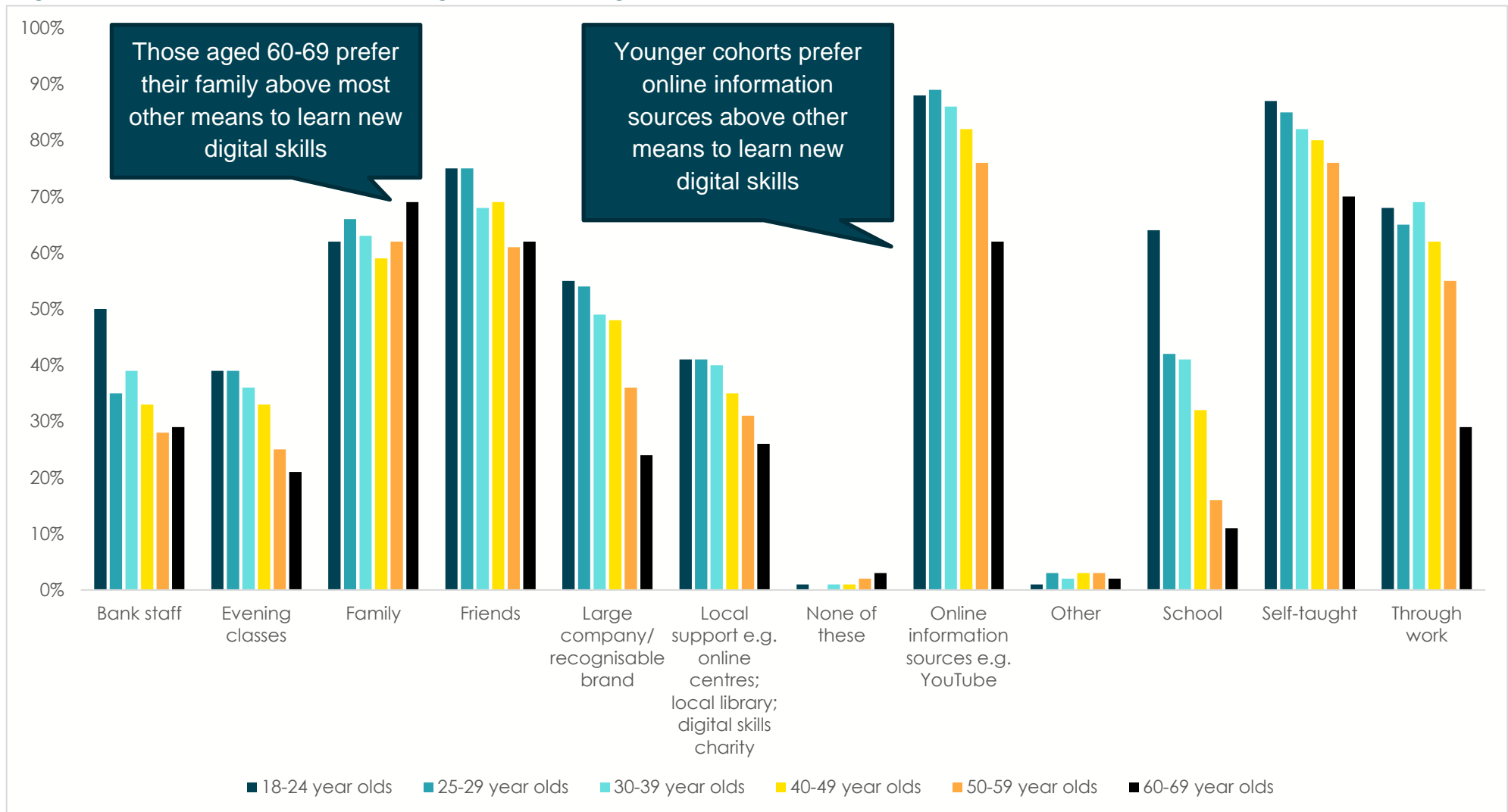
During the pandemic when face-to-face training for job seekers was suspended, in countries where online training was available, public employment services were able to continue to provide training (for a select set of skills that is possible to teach online)[2] (OECD, 2020b). However, people who are out of work are less likely to be digitally literate. Recent estimates for the UK find that nearly one-third (31%) of unemployed people have low or very low digital capability relative to 19% of people in the workforce, and over one-third of UK benefit claimants were found to have very

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[2] For example, in Estonia, the Netherlands, Austria, Denmark, and some regions of Italy and Belgium.

low digital engagement (UK Consumer Digital Index, 2021). Improving digital skills among the unemployed could therefore help increase access to training.

Preferences for how to acquire new digital skills vary by age with younger people happier with being self-taught or using online information sources than older age groups, and the oldest age group preferring to learn new digital skills from family (see Figure 2) (UK Consumer Digital Index, 2021). Around two-thirds (67%) of adults said they would improve their digital skills if they knew there was support available (UK Consumer Digital Index, 2021).

Figure 2: Easiest way to learn new digital skills, by age, 2021

Those aged 60-69 prefer their family above most other means to learn new digital skills

Younger cohorts prefer online information sources above other means to learn new digital skills

Legend: 18-24 year olds, 25-29 year olds, 30-39 year olds, 40-49 year olds, 50-59 year olds, 60-69 year olds

Source: UK Consumer Digital Index, 2021, Figure 30.

Although participation in adult education to improve digital skills is low, at an average of 5-10% of people above school age in developed countries, an increasing number of people feel that they need this form of education (Van Dijk and Van Deursen 2014). For low-skilled adults, special requirements such as personal guidance of a teacher, learning in a classroom and at home and self-directed learning seem to be important (De Greef and Bohnenn 2011; cited in De Greef et al., 2015).

One factor explored in a number of studies is the role of self-efficacy, in particular internet self-efficacy (the belief in one's capabilities to use the internet for particular purposes), in contributing to digital exclusion and differences in digital literacy. Research has found evidence of self-reinforcing relationships, with prior internet experience, outcome expectancies and internet use significantly and positively correlated with internet self-efficacy judgments (Eastin and Larose, 2000). Internet stress and self-disparagement were negatively related to internet self-efficacy (Eastin and Larose, 2000). Self-efficacy can also be an important factor motivating people to participate in digital skills training programmes. Case Study 3 presents an initiative which looked at the role of self-efficacy alongside a digital skills training programme for older adults.

Case Study 3. Digital skills training and the role of self-efficacy among older adults in Hong Kong

This programme studied the impact of digital skills training alongside exploring the role of self-efficacy on older adults' digital skills competences and usage in Hong Kong (Lam and Lee, 2006). The target population was older adults (aged 55 and older) with no or very little computer experience, but who wanted to learn to use the computer to access the internet. This group was selected due to lower rates of digital literacy and different motivational factors relative to younger adults. Self-efficacy (the belief in our own abilities to perform a task) could well be a more important influencing factor for this age group.

Trained tutors taught participants basic computer and internet skills (1,000 participants took part in the study). The four-hour training course included a one-and-a-half-hour lecture/demonstration and practice session. The lecture (45 minutes) provided basic information on computer equipment and the operating system. Participants were shown how to operate the keyboard and mouse to browse websites and exchange e-mails. Tutors followed a fixed course outline, but course-related questions were answered as they arose. Participants were given 45 minutes to practice what they had learned.

After the course participants completed a questionnaire and some undertook a knowledge assessment. Participants were awarded 'certificate of completion' Six months later, participants were invited to take a 'computer and internet knowledge' assessment. The assessment was optional and participants were tested on material that had been taught in the earlier classes. Those who chose to take test and passed it were awarded a certificate of achievement.

This longitudinal study looked at the influence of self-efficacy, anxiety and the role of encouragement by others. Internet self-efficacy had a significant effect on older adults' user competence but as participants acquired the required knowledge and necessary skills, they relied less on self-efficacy for deciding whether to use computers and the internet; what was found was a self-reinforcing relationship between self-efficacy and successful computer use. Outcome expectation also had a significant influence on usage intention and encouragement by others exerted influence on internet self-efficacy and outcome expectations. Although anxiety was negatively related to usage intention, its effect was found to be weak (Lam and Lee, 2006).

The study also found evidence that computer training improved the reported well-being of the participants as self-confidence was boosted and they gained a sense of achievement (Lam and Lee, 2006).

Challenges and facilitating factors

It is necessary to consider the extent to which differential use of ICT can entrench existing socio-economic disparities. Lower levels of digital skills, or even lack of digital skills, are linked to age but also to economic disadvantage, including unemployment. In order for greater digital inclusion to ameliorate poverty and social exclusion, disadvantaged users need to benefit from the increased potential opportunities that come with certain uses of ICT. Since usage is linked to ICT's relevance to people's activities, policies fostering digital inclusion cannot be isolated from those attempting to address existing inequalities.

A summary of the challenges and facilitating factors relating to digital inclusion interventions and their effectiveness in addressing poverty and social exclusion is provided in Table 1.

Table 1: Challenges and facilitating factors

Challenges	Facilitating factors
• Fragmented programme provision risks failing to reach target populations because of lack of awareness. A lack of long-term commitment that is necessary for the development of transversal skills that can allow for sustained progress presents a further barrier.	• The Coronavirus pandemic increased the number of internet users and digital competence in the population in response to everyday life (schooling, work, service provision, retail and social) largely moving online during lockdowns and following the introduction of social distancing rules. Although the pandemic also highlighted stark digital divides, it does provide an opportunity for policy makers to build on these gains.
• Emphasis on increasing digitalisation, especially of public services, risks exacerbating and justifying exclusion by shifting greater responsibility on individuals who are expected to actively engage with technology to acquire essential services. Relatedly, assuming that greater availability of ICT will translate to greater inclusion overlooks barriers to effective access and use, as well as the need to provide offline alternatives.	• Approaches that work best jointly address key ICT access issues (motivation, physical access, skills), consider which of these are most salient for target groups (as well as their relationships), and address both supply- and demand-side factors.
• Low levels of digital literacy among certain groups (older age groups, the unemployed and economically disadvantaged) hamper efforts to reduce digital exclusion. It is not always obvious for individuals with low levels of digital skills how to access training and support, and older age groups prefer to receive assistance from other family members.	• Programmes concretely addressing specific users' needs (e.g. employment or educational needs) are better able to overcome motivational barriers. They also rest on identifying relevant partners and key resources and strategies to address these needs – to this end, it is important to identify key life events and stages.
	• Partnerships with relevant civil society organisations and public services can both increase the reach of digital inclusion activities and improve coordination, avoiding the development of new and similar activities.

- Lack of confidence and concerns about online security act as deterrents. Governments need to do more to ensure that users feel and are safe online.

- Leveraging users' key social relationships can facilitate interventions. Social networks, friends and family provide important emotional and cognitive support, reduce anxiety and increase trust – all of which have a bearing on developing and sustaining the motivation necessary to acquire physical access to ICT, to train and develop skills, and use digital technologies.

Conclusion

Digital inclusion facilitates access to services that impact positively on health, employment, education, and housing. Exclusion from, or even partial access to, the digital realm can thus be a source of economic and social inequality, particularly as digitalisation increases and societies become more reliant on ICT. Digital exclusion hinders people's ability to participate in social relationships and economic, social, cultural or political activities available to the majority of people in society. Strong links between social exclusion and digital exclusion have long been established. Digital exclusion is concentrated in vulnerable groups and there is evidence that social exclusion and economic disadvantage have become stronger determinants of digital disengagement. A more recent concern is the 'third-level digital divide' which focuses on disparities in returns from internet use and gaps in individuals' capacity to translate their internet access and use into favourable outcomes.

A lack of robust evaluation evidence on policies to reduce digital exclusion in the international literature makes it challenging to identify 'what works' in this area. However, there are clear indications that policies need to address physical access to ICT, data poverty and digital literacy. Without improving digital inclusion in an increasingly digitalised world, the digitally excluded will be increasingly marginalised and left further behind.

Transferability to Wales

Policies to reduce digital exclusion such as improving physical access to ICT equipment, reducing data poverty and improving digital literacy and motivation are highly relevant to current priorities identified by the Welsh Government in this policy area. Welsh strategies have so far focused on developing appropriate approaches for what the explored literature defines as 'first' and 'second' levels digital divide (related to access and skills), but there is further room to explore 'third' level disparities (concerning differential returns from internet use and gaps in individuals' capacity to translate their internet access and use into favourable outcomes).

Promising actions

This section concludes with **promising actions** to consider in the Welsh context as emerging from the analysis of the international literature.

1. **Access to devices and connectivity**

   - While affordability is a key element relating to access, and digital adoption is sensitive to price, successful programmes require a holistic approach and must tackle other aspects related to motivation, skills and training.

   - Differences in use are also driven by perceived relevance to users' needs – which digital accessibility alone cannot change.

2. **Digital literacy programmes** can reduce digital exclusion. However, there is a lack of high-quality evaluation evidence to help guide 'what works'. There is a need to address motivational barriers and literacy programmes are likely to be more successful when linked to a clear need.

References

Allmann, K., Blank, G., and Wong, A. (2021). **Libraries on the Front Lines of the Digital Divide: The Oxfordshire Digital Inclusion Project Report**. Centre for Socio-Legal Studies, University of Oxford. Retrieved from: **https://www.law.ox.ac.uk/research-and-subject-groups/oxfordshire-digital-inclusion-project**

Audunson, R., Aabø, S., Blomgren, R., Evjen, S., Jochumsen, H., Larsen, H., Rasmussen, C.H., Vårheim, A., Johnston, J., and Koizumi, M. (2019). **Public libraries as an infrastructure for a sustainable public sphere: A comprehensive review of research.** Journal of Documentation, 75(4), 773-790.

Breuer, J., Walravens, N., van der Graaf, S., and Marien, I. (2020). **The Right to the (Smart) City: Participation and Open Data**, in Figueiredo, S., Krishnamurthy, S., & Schröder, T. (Eds.) *Architecture and the Smart City*. Routledge Critique Series, London, 126-136.

Carter, I. (2022a). **Poverty and social exclusion in Wales.** Cardiff: Wales Centre for Public Policy.

Carter, I. (2022b). **Poverty and social exclusion in Wales: Review of lived experience evidence.** Cardiff: Wales Centre for Public Policy.

Citizens Advice. (2020). **Excess debts - who has fallen behind on their household bills due to coronavirus?** Debt and Money Policy Research. Retrieved from: **https://www.citizensadvice.org.uk/about-us/our-work/policy/policy-research-topics/debt-and-money-policy-research/excess-debts-who-has-fallen-behind-on-their-household-bills-due-to-coronavirus/**

Conkling, T.S. (2018). **Crowd-out or affordability? The lifeline expansion's effect on wireless service spending**. Journal of Policy Analysis and Management, 37 (2) 357-383.

De Greef, M., Segers, M., Nijhuis, J., Lam, J., Van Groenestijn, M., Van Hoek, F., Van Deursen, A. J. A. M., Bohnenn, E., and Tubbing, M. (2015). **The development and validation of testing materials for literacy, numeracy and digital skills in a Dutch context**. International Review of Education, 61(5): 655-671.

Department for Digital, Culture, Media and Sport. (2019). **Guidance for community-led Broadband Options.** Retrieved from:

https://www.gov.uk/government/publications/community-led-broadband-schemes/introduction-to-community-led-schemes

Davies, A.R., Sharp, C.A., Homolova, L., and Bellis, M.A. (2019). **Population health in a digital age: The use of digital technology to support and monitor health in Wales**. Public Health Wales & Bangor University.

Dickerson, A., and Green, F. (2004). **The Growth and Valuation of Computing and Other Generic Skills. Oxford Economic Papers**. 56(3), 371-406.

Diverse Cymru. (2020). **"I just felt so forgotten" – The impacts of digital exclusion.** Retrieved from: https://www.diversecymru.org.uk/i-just-felt-so-forgotten-the-impacts-of-digital-exclusion/?doing_wp_cron=1621943664.6300330162048339843750

Eastin, M.S., and LaRose, R. (2000). **Internet Self-Efficacy and the Psychology of the Digital Divide**. Journal of Computer-Mediated Communication, 6: 0-0.

Enable. (2017). **Outcomes and achievements, Final Report**. Retrieved from: https://co-production.eu/wp-content/uploads/2018/02/ENABLE_0.8_Results.pdf

Eshet-Alkalai, Y., and Soffer, O. (2012). **Guest Editorial - Navigating in the Digital Era: Digital Literacy: Socio-Cultural and Educational Aspects**. Journal of Educational Technology & Society, 15(2), 1-1.

European Commission. (2020). **Digital Economy and Society Index Report 2020 - Connectivity**. Retrieved from: https://digital-strategy.ec.europa.eu/en/policies/desi-connectivity

EU. (2020). **The Digital Education Action Plan (2021-2027): Resetting education and training for the digital age**. European Union. Retrieved from: https://ec.europa.eu/education/education-in-the-eu/digital-education-action-plan_en

Faure, L., Vendramin, P., and Schurmans, D. (2020). **A situated approach to digital exclusion based on life courses**. Internet Policy Review, 9(2), 1-18.

Federal Communications Commission. (2015). **Wireline Competition Bureau. Low-income broadband pilot programme**. Staff Report, WC DOCKET 11-42.

Ford, G. (2021). **Subsidies and substitution: An empirical study of the Lifeline program.** Telecommunication Policy, 45(1), 102075.

Gilster, P. (1997). **Digital literacy**. New York: Wiley.

Gorard, S., Selwyn, N., and Madden, L. (2003). **Logged on to learning assessing the impact of technology on participation in lifelong learning**. International Journal of Lifelong Education, 22(3): 281–296.

Guijt, I. (2014). **Participatory Approaches, Methodological Briefs Impact Evaluation No. 5**. UNICEF: Florence.

Hauge, J.A., and Prieger, J.E. (2010). **Demand-side programs to stimulate adoption of broadband: what works?** Review of Network Economics, 9(3), 1-38.

Helsper, E.J. (2014). **Synthesis Report: Harnessing ICT for Social Action**. Peer Review in Social Protection and Social Inclusion, EU Commission, DG Employment report. Retrieved from: **http://ec.europa.eu/social/BlobServlet?docId=12437&langId=en**

Helsper, E.J., and Reisdorf, B.C. (2016). **The emergence of a "digital underclass" in Great Britain and Sweden: changing reasons for digital exclusion.** New Media & Society.

Howick, J., Chalmers, I., Glasziou, P., Greenhalgh, T., Heneghan, C., Liberati, A., Moschetti, I., Phillips, B., and Thornton, H. (2011). **The 2011 Oxford CEBM Levels of Evidence (Introductory Document)**. Oxford Centre for Evidence-Based Medicine. Retrieved from: **https://www.cebm.ox.ac.uk/resources/levels-of-evidence/ocebm-levels-of-evidence**

Jacobs, G., Castek, J., Pizzolator, A., Reder, S., and Pendell, K. (2014). **Production and Consumption: A Closer Look at Adult Digital Literacy Acquisition**. Journal of Adolescent & Adult Literacy, 57(8): 624-627.

Jaeger, P.T., and Bertot, J.C. (2011). **Responsibility Rolls Down: Public Libraries and the Social and Policy Obligations of Ensuring Access to E-government and Government Information.** Public Library Quarterly, 30(2), 91-116.

Jaeger, P.T., Bertot, J.C., Thompson, K.M., Katz, S.M., and DeCoster, E.J. (2012). **The intersection of public policy and public access: digital divides, digital literacy, digital inclusion, and public libraries**. Public Library Quarterly, 31(1), 1-20.

Jimoyiannis, A., and Gravani, M. (2011). **Exploring Adult Digital Literacy Using Learners' and Educators' Perceptions and Experiences: The Case of the Second Chance Schools in Greece**. Journal of Educational Technology & Society, 14(1): 217-227.

Kenway, P., Ayrton, C., Chandran, C. and Tortajada, I. (2022). **What makes an anti-poverty strategy effective?** London: New Policy Institute.

Laenens, W., Mariën, I., and Walravens; N. (2019). **Participatory Action Research for the Development of E-Inclusive Smart Cities**. Architecture and Culture, 7(3), 457-471.

Levitas, R., Pantazis, C., Fahmy, E., Gordon, D., Lloyd-Reichling, E., and Patsios, D. (2007). **The multi-dimensional analysis of social exclusion**. Bristol: University of Bristol.

Lam, J. C. Y., and Lee, M. K. O. (2006). **Digital Inclusiveness: Longitudinal Study of Internet Adoption by Older Adults**. Journal of Management Information Systems, 22(4), 177–206.

Lucas, P., Robinson, R., and Treacy, L. (2020). **What is data poverty? A rapid research review and stakeholder consultation to understand and define data poverty in Scotland and Wales**. Retrieved from: **https://apo.org.au/node/310124**

Manžuch, Z., and Macevičiūtė, E. (2020). **Getting ready to reduce the digital divide: Scenarios of Lithuanian public libraries**. Journal of the Association for Information Science and Technology, 71(10), 1205-1217.

Napoli, P.M., and Obar J.A. (2014). **The Emerging Mobile Internet Underclass: A Critique of Mobile Internet Access.** The Information Society, 30(5), 323-334.

National Survey for Wales. (2021). **Internet skills and online public sector services (National Survey for Wales): April 2019 to March 2020**. Retrieved from: **https://gov.wales/internet-skills-and-online-public-sector-services-national-survey-wales-april-2019-march-2020-html**

OECD. (2020a). **The potential of online learning for adults: Early lessons from the COVID-19 crisis, OECD Policy Responses to Coronavirus (COVID-19).** Paris: OECD Publishing. Retrieved from: **https://www.oecd.org/coronavirus/policy-responses/the-potential-of-online-learning-for-adults-early-lessons-from-the-covid-19-crisis-ee040002/**

OECD. (2020b). **Public Employment Services in the frontline for employees, jobseekers and employers, OECD Policy Responses to Coronavirus (COVID-19).** Paris: OECD Publishing. Retrieved from: **http://www.oecd.org/coronavirus/policy-responses/public-employment-services-in-the-frontline-for-employees-jobseekers-and-employers-c986ff92/**

OECD. (2019a). **Going Digital: Shaping Policies, Improving Lives**. Paris: OECD Publishing. Retrieved from: **https://www.oecd.org/publications/going-digital-shaping-policies-improving-lives-9789264312012-en.htm**

OECD. (2019b). **Skills Matter: Additional Results from the Survey of Adult Skills**. OECD Skills Studies. Paris: OECD Publishing. Retrieved from: **https://dx.doi.org/10.1787/1f029d8f-en**

OECD. (2019c). **OECD Employment Outlook 2019: The Future of Work**. Paris: OECD Publishing. Retrieved from: **https://dx.doi.org/10.1787/9ee00155-en**

OECD. (2017). **OECD Digital Economy Outlook 2017**, OECD Publishing, Paris. Retrieved from: **https://dx.doi.org/10.1787/9789264276284-en**

Office for National Statistics. (2019). **Exploring the UK's Digital Divide**. Retrieved from: **https://www.ons.gov.uk/peoplepopulationandcommunity/householdcharacteristics/homeinternetandsocialmediausage/articles/exploringtheuksdigitaldivide/2019-03-04**

Powell, A., Bryne, A., and Dailey, D. (2010). **The Essential Internet: Digital Exclusion in Low-Income American Communities.** Policy and the Internet, 2(2), 7.

Ragnedda, M. (2018). **Tackling Digital Exclusion: Counter Social Inequalities Through Digital Inclusion** in Muschert, G. Budd, K., Christian, M. and Perrucci, R. (eds.) *Global Agenda for Social Justice*. Policy Press, 151-157.

Reed, K., Doty, D., and May, D. (2005). **The Impact of Aging on Self-efficacy and Computer Skill Acquisition.** Journal of Managerial Issues, 17(2): 212-228.

Rhinesmith, C., Reisdorf, B., and Bishop, M. (2019). **The ability to pay for broadband.** Communication Research and Practice, 5(2), 121-138.

Scheerder, A., van Deursen, A., and van Dijk, J. (2017). **Determinants of Internet skills, use and outcomes: A systematic review of the second- and third-level digital divide.** Telematics and informatics, 34(8), 1607-1624.

Schou, J., and Pors, A. (2018). **Digital by default? A qualitative study of exclusion in digitalised welfare**. Social Policy Administration, 53(3), 464-477.

Sherman, L. W., Gottfredson, D., Mackenzie, D., Eck, J., Reuter, P., and Bushway, S. (1997). **Preventing Crime: What Works, What Doesn't, What's Promising**. Report to the U.S. Congress. Washington, D.C. U.S. Dept. of Justice.

Sieck, C.J., Sheon, A., Ancker, J.S., Castek, J., Callahan, B., and Siefer, A. (2021). **Digital inclusion as a social determinant of health**. NPJ Digital Medicine, 4(52), 1-3.

Stenstrom, C., Cole, N., and Hanson, R. (2019). **A review exploring the facets of the value of public libraries**. Library Management, 40(6/7), 354-367.

Tsetsi, E., and Rains, S. A. (2017). **Smartphone Internet access and use: Extending the digital divide and usage gap**. Mobile Media & Communication, 5(3), 239–255.

Truong, N., and Sweetman, A. (2018). **Basic Information and Communication Technology Skills among Canadian Immigrants and Non-Immigrants**. Canadian Public Policy / Analyse De Politiques, 44(S1): S91-S112.

UK Consumer Digital Index. (2018). **UK Consumer Digital Index 2018: Benchmarking the digital and financial capability of people in the UK**. Retrieved from: **https://storage.googleapis.com/scvo-cms/assets/media/pdfs/banking_with_us/whats-happening/LB-Consumer-Digital-Index-2018-Report.pdf**

UK Consumer Digital Index. (2021). **UK Consumer Digital Index 2021: The UK's largest study of digital and financial lives**. Retrieved from: **https://www.lloydsbank.com/assets/media/pdfs/banking_with_us/whats-happening/210513-lloyds-consumer-digital-index-2021-report.pdf**

Van Deursen, A.J., and Helsper, E.J. (2015). **The Third-Level Digital Divide: Who Benefits Most from Being Online?,** in Laura Robinson, L., Cotten, S.R., Schulz, J., Hale, T.H., Williams, A. (eds.), *Communication and Information Technologies. Annual Studies in Media and Communications*. Emerald Group Publishing Limited, 29 – 52.

Van Deursen, A.J., and Van Dijk J. (2019). **The first-level digital divide shifts from inequalities in physical access to inequalities in material access**. New Media & Society, 21(2), 354-375.

Van Dijk, J. (2020). **The digital divide.** Cambridge: Polity Press.

Van Deursen, A.J., and Van Dijk, J.A. (2014). **Digital skills: Unlocking the information society.** Springer. New York: Palgrave Macmillan.

Wilfong, J. D. (2006). **Computer anxiety and anger: The impact of computer use, computer experience, and self-efficacy beliefs**. Computers in Human Behavior, 22, 1001–1011.

Vassilakopoulou, P., and Hustad, E. (2021). **Bridging Digital Divides: a Literature Review and Research Agenda for Information Systems Research**. Information Systems Frontiers, pp.1-15.

Wallsten, S. (2016). **Learning from the FCC's Lifeline Broadband Pilot Projects. Technology Policy Institute Working Paper**. Retrieved from: **https://techpolicyinstitute.org/wp-content/uploads/2016/03/Wallsten_Learning-from-the-FCCs-Lifeline-Broadband-Pilot-Projects.pdf**

Welsh Government. (2018). **Improving people's lives through digital technologies, Digital Inclusion Progress Report**. Retrieved from: **https://gov.wales/sites/default/files/publications/2019-05/digital-inclusion-framework-report-and-forward-look.pdf**

Welsh Government. (2019a**). Internet use and digital skills (National Survey for Wales): April 2018 to March 2019**. Statistical Bulletin. Retrieved from: **https://gov.wales/internet-use-and-digital-skills-national-survey-wales-april-2018-march-2019**

Welsh Government. (2019b). **System reboot: transforming public services through better use of digital, Digital Solutions: Expert Panel Report**. Retrieved from: **https://gov.wales/sites/default/files/publications/2019-07/system-reboot-transforming-public-services-through-better-use-of-digital.pdf**

Welsh Government. (2020). **Digital Inclusion Forward Look: towards a digitally confident Wales**. Retrieved from: **https://gov.wales/digital-inclusion-forward-look-towards-digitally-confident-wales-html**

Welsh Government. (2021). **Digital Strategy for Wales**. Retrieved from: **https://gov.wales/digital-strategy-wales-html**

Annex: Methodology

Definition of poverty and social exclusion

For the purposes of this project it was agreed that a multidimensional concept of disadvantage, including social as well as economic dimensions, would be adopted. The Bristol Social Exclusion Matrix (B-SEM) (Levitas et al., 2007) provides the theoretical structure that underpins the selection of policy areas. The B-SEM uses the following working definition of social exclusion:

> **"Social exclusion is a complex and multi-dimensional process. It involves the lack or denial of resources, rights, goods and services, and the inability to participate in the normal relationships and activities, available to the majority of people in a society, whether in economic, social, cultural or political arenas. It affects both the quality of life of individuals and the equity and cohesion of society as a whole."** (Levitas et al., 2007, p.9).

It is structured around three main domains and ten sub-domains (see Table A1).

Table A1: B-SEM domains and sub-domains

A. Resources:	
A1: Material/ economic resources	Includes exclusion in relation to income, basic necessities (such as food), assets, debt and financial exclusion.
A2: Access to public and private services	Relates to exclusion from public and private services due to service inadequacy, unavailability or unaffordability. The range of services encompass public services, utilities, transport, and private services (including financial services).
A3: Social resources	Reflects an increasing awareness of the importance of social networks and social support for individual well-being. A key aspect relates to people who are separated from their family and those who are institutionalised.

B. Participation:	
B1: Economic participation	Includes participation in employment – which is not only important for generating resources but is also an aspect of social inclusion in its own right. Whether work is a positive, inclusionary experience depends partly on the financial rewards it brings, and partly on the nature and quality of work. Work is understood broadly and includes caring activities and unpaid work.
B2: Social participation	Comprises participation in common social activities as well as recognising the importance of carrying out meaningful roles (e.g. as parents, grandparents, children).
B3: Culture, education and skills	Covers cultural capital and cultural participation. It includes the acquisition of formal qualifications, skills and access to knowledge more broadly, for instance digital literacy inclusion. It also covers cultural and leisure activities.
B4: Political and civic participation	Includes both participation in formal political processes as well as types of unstructured and informal political activity, including civic engagement and community participation.
C. Quality of life:	
C1: Health and well-being	Covers aspects of health. It also includes other aspects central to individual well-being such as life satisfaction, personal development, self-esteem, and vulnerability to stigma.
C2: Living environment	Focuses on the characteristics of the 'indoor' living environment, with indicators of housing quality, inadequate housing and exclusion in the form of homelessness; and the 'outdoor' living environment, which includes neighbourhood characteristics.
C3: Crime, harm and criminalisation	Covers exposure to harm, objective/ subjective safety and both crime and criminalisation. This reflects the potentially exclusionary nature of being the object of harm, as well as the exclusion, stigmatisation and criminalisation of the perpetrators.

Notes: the descriptions of the sub-domains are the authors' understanding of what each sub-domain includes based on Levitas et al. (2007).
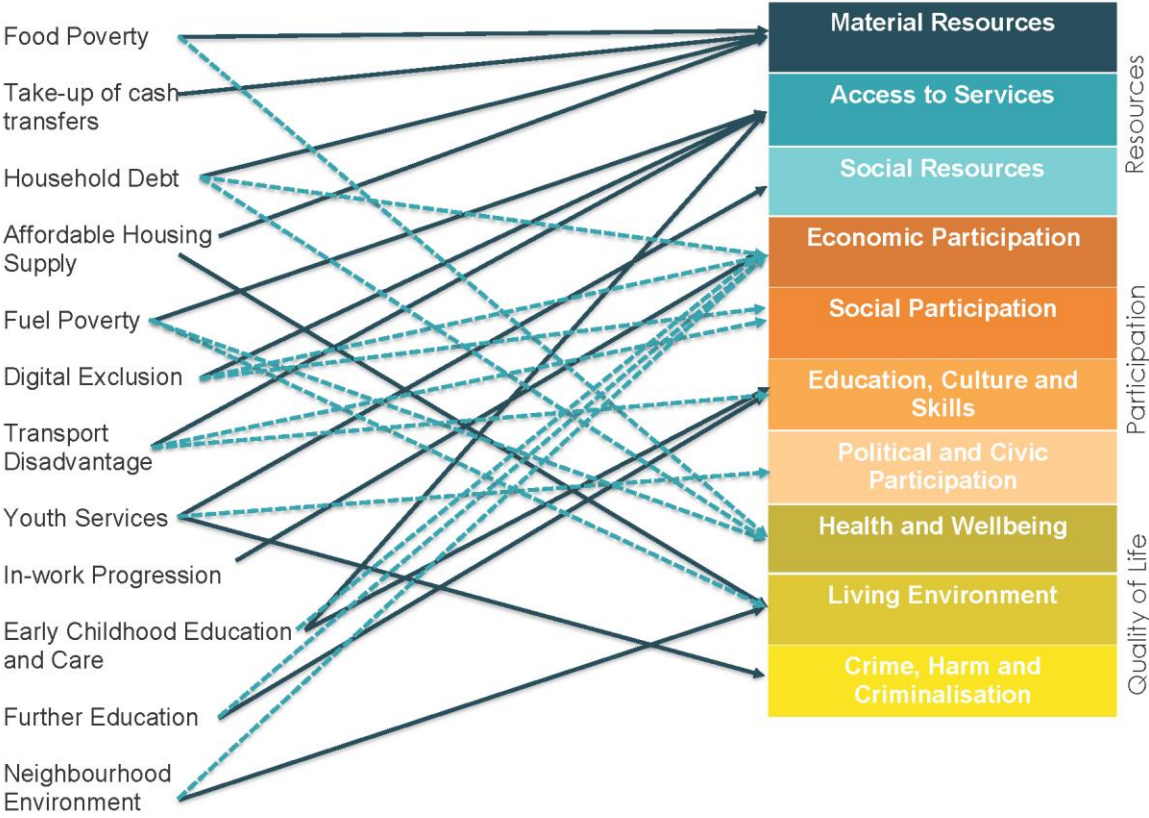
Selection of policy areas

The first step involved the research team identifying a long list of 40 policy areas with reference to the domains and sub-domains of the B-SEM. The long list was, in part, informed by a review of key trends in poverty and social exclusion in Wales, across the ten sub-domains, conducted by WCPP (Carter, 2022a); a consideration of the Welsh Government's devolved powers across policy areas; and meetings with experts. From this long list a shortlist of 12 policy areas was agreed. The shortlisting process took into account advice on priority areas identified by a focus group of experts, but ultimately the final list of 12 policies was selected by the Welsh Government.

The final set of 12 policy areas covers a broad spectrum within the B-SEM, and most are related to more than one sub-domain within the B-SEM (Figure A1). However, the final selection should not be considered exhaustive from a poverty and social exclusion policy perspective. This is because some important policy areas are not devolved to the Welsh Government and, therefore, were not included. For example, while adequacy of social security is a key driver of poverty the Welsh Government currently has no powers to set key elements of social security policy (e.g. rates and eligibility criteria for the main in-work and out of work benefits) and this is the reason why we focus on one aspect of social security, take-up of cash transfers, that the Welsh Government has power to influence.

Another factor was the project's scope and timescales, which limited the selection to 12 policy areas and meant that other important areas had to be excluded (for instance, social care, health care and crime). To make the reviews manageable, it was also necessary to identify a focus for each of the 12 policy areas. The research team identified a focus for each of the reviews on the basis of a brief initial scope of the research evidence and consultation with WCPP who, where relevant, consulted sector and policy experts. This means that there are likely to be additional policies which could be included in a poverty and social exclusion strategy by the Welsh Government *within* the 12 policy areas and *in addition to* the 12 policy areas reviewed.

Figure A1. The selected policy areas mapped to relevant B-SEM sub-domains

Source: prepared by the authors

Notes: The figure outlines the mapping of the 12 selected policy areas to the B-SEM matrix: bold lines show the relationship between each policy area and main B-SEM sub-domain(s), light dotted lines identify selected secondary B-SEM sub-domains the policies are related to (a full list of these 'secondary subdomains' is included in the specific reviews).

Review stages

In the 'evidence of policy effectiveness' section, while it was not possible to produce a full systematic review (although evidence from existing systematic reviews and meta-level analyses were included where available), a structured approach was adopted. This first involved an evaluation of the state of the relevant literature, focusing on whether effectiveness was assessed via methods standardly considered better suited to establish causality (e.g. on the basis of hierarchical grading schemes such as the Maryland Scientific Method Scale (Sherman et al., 1997) or the Oxford Centre for Evidence-Based Medicine's (OCEBM) levels of evidence (Howick et al., 2011) such as randomised controlled trials (RCTs), meta-analyses of RCTs and other quasi-experimental studies. While RCTs are particularly powerful in identifying whether a certain intervention has had an impact in a given context, other forms of evidence, such as quasi-experimental and observational studies with appropriate

controls may be better suited, depending on the type of intervention, to establish the range of outcomes achieved as well as providing an understanding of distributional effects and allowing sub-group analysis (i.e. 'for whom' did the intervention work). In the process of assessing evidence, case studies were selected to further elaborate some of the key findings resulting from the review and to identify specific examples of promising policy interventions.

In a few areas, the literature review highlighted a lack of robust evaluations – the reviews underscore this and present the best available evidence found along with an assessment of the strength of the evidence. Where possible, an evaluation of the underlying mechanisms of change was also considered, allowing an explanation of not just whether, but why a certain intervention works, thus also facilitating the identification of challenges and facilitating factors, which is crucial in thinking about not just 'what' should be done but also 'how' it can best be implemented.

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Cyhoeddus Cymru