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Does assistive technology contribute to social inclusion for people with intellectual disability? A systematic literature review protocol.

Journal:	<i>BMJ Open</i>
Manuscript ID	bmjopen-2017-017533
Article Type:	Protocol
Date Submitted by the Author:	07-May-2017
Complete List of Authors:	Owuor, John; University of Dublin Trinity College, Centre for Global Health ; London School of Hygiene and Tropical Medicine Faculty of Public Health and Policy Larkan, Fiona; University of Dublin Trinity College, Centre for Global Health Kayabu, Bonnix ; University of Dublin Trinity College Fitzgerald , Geraldine ; University of Dublin Trinity College Sheaf, Greg; University of Dublin Trinity College Dinsmore , John ; University of Dublin Trinity College, 3. Trinity Centre for Practice and Healthcare Innovation (TCPHI) McConkey, Roy; University of Ulster , Institute of Nursing and Health Research, School of Nursing Clarke, Mike; All-Ireland Hub for Trials Methodology Research, Centre for Public Health MacLachlan, Malcolm; Maynooth University , Department of Psychology; The World Health Organization , Global Cooperation on Assistive Technology (GATE)
Primary Subject Heading:	Mental health
Secondary Subject Heading:	Global health, Health policy, Health services research, Public health, Qualitative research
Keywords:	Disability, Assistive technology, Social inclusion, Intellectual disability, Interpersonal relationships, Community participation

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Does assistive technology contribute to social inclusion for people with intellectual disability? A systematic review protocol.

Registration

The protocol has been submitted for registration with the International Prospective Register of Systematic Reviews (PROSPERO).

Authors

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5 Policy, London, UK
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7

8 **Contributions**

9
10 JO is the guarantor of the review and drafted the manuscript. GF and GS led the technical
11 development of the methodology. FL, BK, RM, JD, MC and MM provided a critical review
12 of the protocol to ensure rigour and validity based on their extensive expertise in
13 disability, systematic reviews, information management and health and social care
14 research. MC advised on how to keep the review manageable. JO, GF and GS designed
15 and validated the search strategy, will retrieve and screen the data. GS will lead data
16 management and screening.
17
18

19 All authors read and critiqued the draft and approved the final version of this manuscript.
20
21

22 **Amendments**

23 We will seek to minimise the risk of bias by trying to avoid any need to amend this
24 protocol. However, should there be need to revise the protocol, we will provide relevant
25 details and the rationale for such changes. Any potential amendments will be
26 documented and implemented by the first author, with the approval of all the contributing
27 authors.
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29

30 **Support**

31 The overall project, in which the current review is done, is supported by funding from the
32 charity RESPECT and the People Programme (Marie Curie Actions) of the European
33 Union's Seventh Framework Programme (FP7/2007-2013) under Research Executive
34 Agency (REA) grant agreement no. PCOFUND-GA-2013-608728.
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Name of the funder

The Charity RESPECT and EU Marie Curie Actions co-fund as outlined above.

Role of funder

The funder provided the salary and all related research expenses incurred by Trinity College Dublin (TCD) in hosting JO during a two-year fellowship. However, the funder was not involved in the design and implementation of the review.

Conflict of interest

JO receives salary as a research fellow position he holds at TCD. Other authors did not receive any financial support to prepare this protocol and will not receive funding to conduct this review and do not have any conflict of interest.

Abstract

Objective: The aim of the review is to answer the following question; Does assistive technology contribute to social inclusion for people with intellectual disability? Previous research on assistive technology has focused on socioeconomic impacts such as education, employment and access to health care by people with intellectual disability. There is need to consolidate evidence on the interaction between intellectual disability, assistive technology, community living and social inclusion.

Setting: The review will consider studies from all settings; geographical and socioeconomic and care (institutional and community care), published in English. Studies reported in other languages with abstracts in English will be included if they can be translated using google translate, otherwise such studies will be put in the appendix. The review will include both qualitative and quantitative studies.

Intervention: Intervention in the current review refers to the use of assistive technology to promote community participation or interpersonal relationships (social inclusion) for people with intellectual disability.

Outcomes: Behavioural and social benefits of using assistive technology by people with intellectual disability. Enhanced interpersonal relationships and community participation by people with intellectual disability.

Protocol registration: Submitted for registration in PROSPERO.

Study strengths and limitations

This review is the first attempt to consolidate evidence on the role of assistive technology (AT) in supporting social inclusion of people with intellectual disability (ID). As far as we are aware, this could be the first attempt to consolidate the broad body of literature on the subject area post the adoption of the United Nations Convention on the Rights of Persons with Disabilities (UNCRPD) in 2006. On the other hand, the study also has some limitations as outlined below.

- The heterogeneity of the studies to be included; study designs, study populations and interventions that will underpin the ultimate data for this review may affect the review findings. It may be difficult to compare the reported outcomes of different assistive technologies used by people with different intellectual disability levels in different socioeconomic settings. But the review is necessary to initiate broader discussion the role of assistive technology in social inclusion in a broader perspective
- Given the diversity of definitions of the key concepts that underpin the review (assistive technology, social inclusion and intellectual disability), some relevant studies that do not use the key concepts or their derivatives used in data search and retrieval may be lost in the process.
- Limited resources, including time for the review which was very short. With more time and resources, other relevant expertise from other aspects of social inclusion such as educational expert who could support data screening

Introduction

Community living by people with Intellectual Disability

Intellectual disability (ID) in this protocol refers to an individual's reduced ability to comprehend new or complex information, and to learn and apply new skills, which begins before the individual's 18th birthday (i.e., before adulthood). This impairment significantly reduces the affected individual's social functioning, ability to independently cope with daily life circumstances (WHO, 2017b), and results in lifelong need for care and/or support.

Individuals with ID are increasingly becoming part of community processes; living and accessing services in the community. In many countries, they are gradually being relocated from institutional care into community settings (Beadle-Brown, Mansell, & Kozma, 2007; Overmars-Marx, Thomése, Verdonschot, & Meininger, 2014) as more countries adopt the social model of care for people with ID (Virginie Cobigo, Ouellette-Kuntz, Lysaght, & Martin, 2012). The drive to relocate people with ID to community-based care settings, herein called deinstitutionalisation/de-congregation of care, has been a policy priority for a comparatively longer time in countries such as Australia, UK, US and Scandinavia. Deinstitutionalisation of care is ongoing in other countries such as Ireland, Germany and Spain (Kozma, Mansell, Beadle-Brown, & Emerson, 2009; Tatlow-Golden et al., 2014), where many people with ID are now living in community settings, with investments in deinstitutionalisation of care now leading to noticeable decline in numbers of people in institutional care (Linehan et al., 2014).

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3 The national policy contexts highlighted above is underpinned by global policy on social
4 inclusion of people with ID into community processes (described in the next subsection).
5
6 The United Nations Convention on the Rights of Persons with Disabilities (UNCRPD)
7
8 (United Nations, 2006), which can be considered to be a culmination of the normalisation
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10 drive (Kumar, Singh, & Thressiakutty, 2015), advocates for community living for people
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12 with ID. By March 2017, there were 172 ratifications/accessions and 160 countries were
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14 signatories to the convention (United Nations, 2017) , making it the most ratified human
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16 rights treaty (Klimczuk, 2015). The UNCRPD states that people with all types of
17
18 disabilities must enjoy all human rights and fundamental freedoms; everyone with a
19
20 disability should have equal access to societal processes such as education,
21
22 employment, housing and socialisation. Article 19 of the convention emphasises the right
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24 to community living by all people with disabilities and a right to appropriate support to
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26 ensure inclusion (Tatlow-Golden et al., 2014). The current global development agenda
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28 through the Sustainable Development Goals (United Nations, 2015) calls for no one to be
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30 left behind; a call for inclusion of all, including those with ID. People with ID are the focus
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32 of this review because they are one of the groups most vulnerable to social exclusion
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34 (World Health Organization, 2015).
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46 The global push for greater social inclusion of people with disabilities is taking place at a
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48 time of great technological advances (Moriarty, 2017). This presents an opportunity to
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50 enhance the envisaged community living and social inclusion of people with ID in
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52 practices already proven (Guha, 2016; M. C. Young & Courtad, 2016) and to explore new
53
54 approaches that are becoming available because of rapid technological advances. This
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3 review will explore the evidence on how assistive technology, which draws on the
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5 advances in current technology, can enhance community living and social inclusion of
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7 people with ID. There is a need for concerted efforts to ensure that people with ID become
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9 part of community processes, and for members of such communities to also perceive
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11 people with ID as part of their community. Unless community living for people with ID is
12
13 enhanced by all means possible, including technological opportunities, there is a risk of
14
15 'redistributing' institutional isolation to the community rather than progressing genuine
16
17 social inclusion into the community. Without available assistive technology that promotes
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19 access, connectivity and community participation, people with ID could remain highly
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21 dependent on care provided by such 'devolved' institutions.
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30 **Social inclusion**

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32 Cobigo and Hall (2005) noted that the benefits of the shift towards a social model of care,
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34 that should accompany deinstitutionalisation of care for people with ID, have not been
35
36 achieved. People with ID still encounter stigmatisation, discrimination and rejection due to
37
38 several factors. For example, the feeling or experience of inclusion or exclusion are
39
40 dependent on demographic characteristics such as age, gender and environmental
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42 factors. Older adults with mild ID for example are more likely to report stigma than
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44 younger ones (Ali, King, Strydom, & Hassiotis, 2016). As Cobigo et al. (2012) observed,
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46 social inclusion is a product of complex interactions between environmental factors and
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48 opportunities and personal competencies of an individual. Social inclusion is a
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50 multidimensional, dynamic relational process (Díaz Andrade & Doolin, 2016), which is not
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52 about assimilation (enabling people to fit into existing societal parameters (Ratcliffe,
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3 2000) such as being housed in the community), but rather it is about self-determination
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5 (Maidment & Macfarlane, 2009). Combating exclusion involves mitigating disadvantages
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8 whereas facilitating inclusion is about actively creating opportunities. Considerable effort
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10 has been documented on key socioeconomic factors for effective social inclusion, such
11
12 as education (Sarkar, 2015), employment (Walsh, Holloway, McCoy, & Lydon, 2016;
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14 Yeager, Kaye, Reed, & Doe, 2006), and care (Davis, 2014; Saborowski & Kollak, 2015).
15
16 But other social aspects such as interpersonal friendships, sharing of existing resources,
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18 as well as active determination of an individual's or a marginalised group's, life chances
19
20 are also crucial (Díaz Andrade & Doolin, 2016). Thus as a two-way process social
21
22 inclusion of people with ID should involve all stakeholders, including people with ID
23
24 themselves and the general community (Overmars-Marx et al., 2014). It has been argued
25
26 that individuals make meaning of their life through a symbolic interactionism (Blumer,
27
28 1990); presenting an image of themselves which they believe their 'audience' would
29
30 accept and approve of (Mead, 1934). Thus, people with ID may feel part of the community
31
32 based on how they think others around them perceive them and how much they are able
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34 to participate in the community processes in terms of their experiences and what they
35
36 make of the people they interact with, or are supposed to integrate with in a community
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38 setting. On the other hand, people in the community will accept or reject new members
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40 with ID depending on their knowledge and experience of people with ID.
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52 This review seeks to summarise the literature on how AT can facilitate the social inclusion
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54 of people with ID by focusing on the three broad tenets key to effective social inclusion:
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56 interpersonal relationships, community and policy (Simplican, Leader, Kosciulek, &
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3 Leahy, 2015). With regards policy a recent study in Ireland involving people with ID
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5 (Inclusive Research Network, 2010) for example found that the participants felt left out in
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7 policy processes. There is need for people with ID to be involved in the entire policy
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9 process (Overmars-Marx et al., 2014). Including marginalized groups in processes that
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11 aim to promote their inclusion, both in policy and in practice is of paramount importance
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13 (Huss & MacLachlan, 2016; MacLachlan, Manna, Huss, Munthali, & Amin, 2016).
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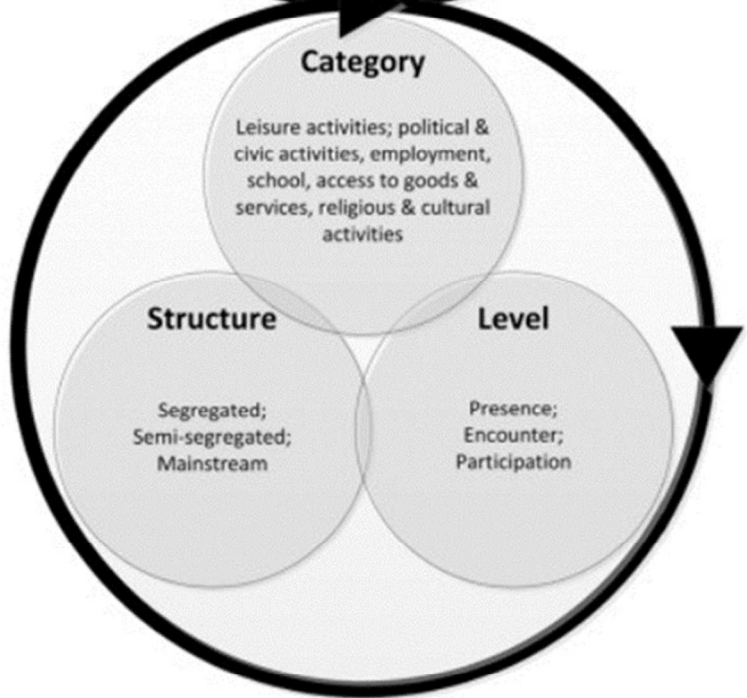
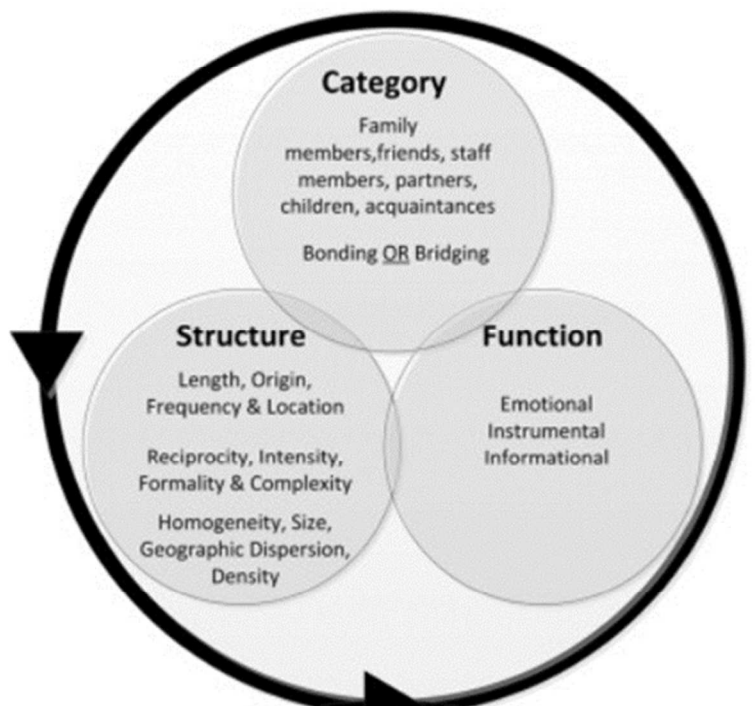
21 People with ID also should be involved in all initiatives aimed at improving their inclusion
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23 into the community through greater self-determination (Maidment & Macfarlane, 2009).
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25 But as Linehan et al. (2014) pointed out, although social inclusion is the key pillar of
26
27 disability policies, vagueness about the meaning of the concept persists. This in itself is
28
29 an obstacle to achieving the social inclusion goals (Simplican et al., 2015) of the UNCRPD
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31 and the Sustainable Development Goals. Different terms such as integration,
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33 participation and belonging (Virginie Cobigo et al., 2012; Overmars-Marx et al., 2014) are
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35 used interchangeably to imply social inclusion. This creates obstacles to inclusions such
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37 as communication challenges between different stakeholders. Simplican et al. proposed
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39 a general definition that could facilitate a common understanding of social inclusion and
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41 possibly lead to standardisation of research and service provision (Simplican et al.,
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43 2015), by enabling all relevant actors to imply a common goal and focus on this.
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53 The working definition of social inclusion used in this review is therefore drawn from the
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55 work of Simplican et al. (2015) who define social inclusion as the interaction between
56
57 interpersonal relationships and community participation. Simplican and colleagues
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3 reviewed literature on social inclusion and found that most research into social inclusion
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5 focused on interpersonal relationships or community participation, even though the
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7 wording used to express these concepts varied across different studies. Our review will
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9 use the social inclusion model (Figure 1) proposed by Simpican et al. to evaluate how AT
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11 affects the various components of interpersonal relationships and community
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13 participation as umbrella themes of social inclusion
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18 Figure 1, social inclusion model.
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Interpersonal Relationships



Community Participation

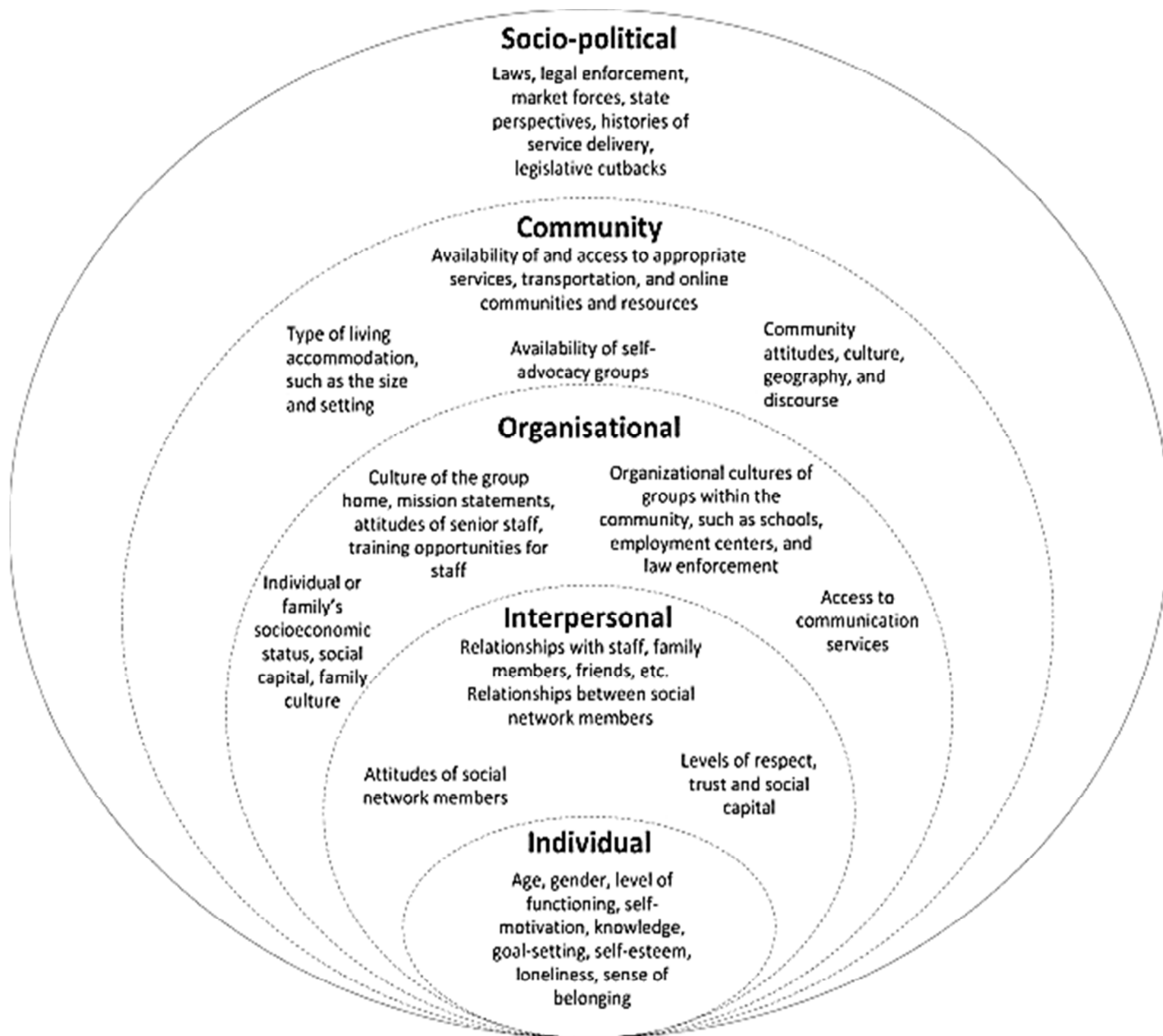
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10 The outcomes of social inclusion to be reviewed will be informed by Simplican et al.'s
11 ecological pathway which views disability, and social inclusion, as a product of the
12 individual, environmental and interpersonal perspectives. The ecological variables
13 outlined in Figure 2; individual, interpersonal, organizational and socio-political factors
14 influence social inclusion both positively and negatively. Our review will therefore look at
15 how assistive technology mediates or moderates (Tebbutt et al., 2016) the effects of
16 these broad variables on social inclusion of people with ID. Different outcomes of social
17 inclusion will thus be evaluated as outlined in Figure 2 and further discussed in the
18 methodology section. The aim is to explore how the new way of exploring social inclusion
19 proposed by Simplican et al. can be used to capture a more holistic understanding of
20 social inclusion outcomes beyond the much reported socioeconomic outcomes such as
21 integration, education (Browning, Nave, White, & Barkin, 1985) and access to services
22 (Maidment & Macfarlane, 2009).
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41 Figure 2, ecological pathway to and from social inclusion by Simplican et al. (2015)
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We will therefore explore the different levels and types of social inclusion indicators illustrated in this model.

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Assistive technologies

Just like social inclusion, Assistive Technology (AT) implies different things to different people (Camlin et al., 2016; Cullen, McAneney, Dolphin, Delaney, & Stapleton, 2012; GATE, 2016; ISO 9999:2011(en), 2016). AT may refer to the use of various technological resources to support people with different disabilities to obtain behavioural and social benefits and to reduce the negative impact of their disabilities on their wellbeing and community participation (Lancioni, Singh, O'Reilly, Sigafos, & Oliva, 2014). AT may also mean a wide spectrum of devices, technological aids, strategies, services and practices whose main objective is to improve the quality of life of people with disabilities (Daughters of Charity, 2012). Irrespective of what the concept may mean to different people, AT can improve individual's functioning and independence, thereby promoting their wellbeing (GATE, 2016).

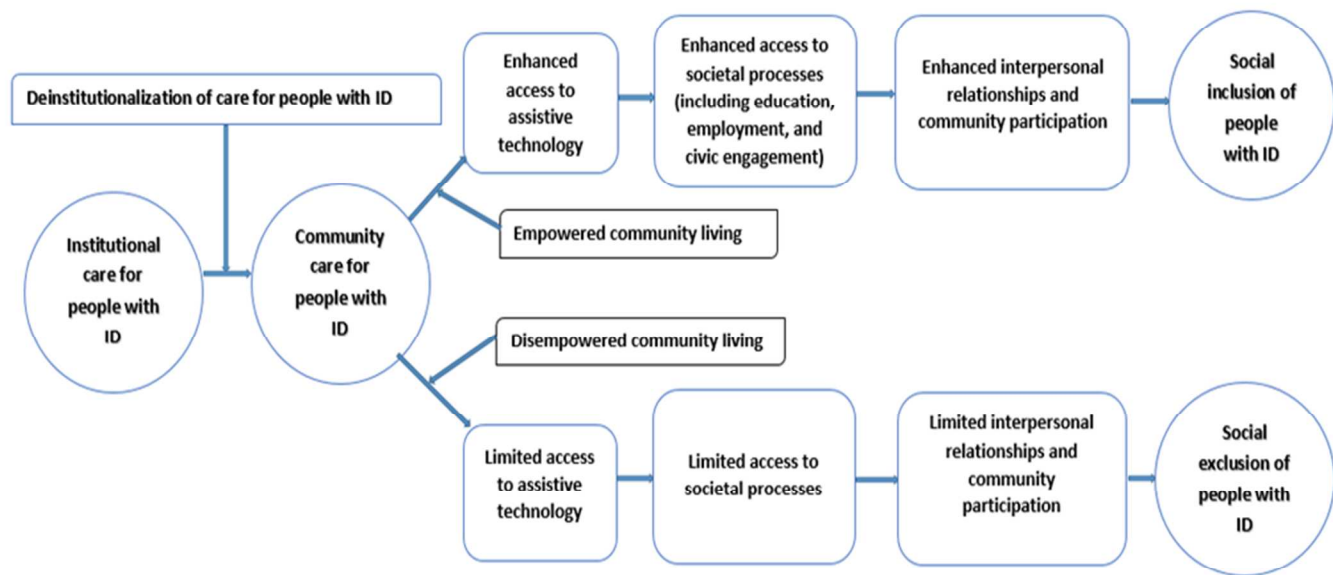
Assistive technology in the context of this review refers to any product or service that can be used by a person with a disability to overcome challenges they may face in carrying out daily activities of their choice that would otherwise be limited by their impairment. AT also includes services and enhanced aspects of the environment through inclusive design (Waller, Bradley, Hosking, & Clarkson, 2015). AT, in this review, is inclusive of 'mainstream' technologies as well as those developed specifically for people with disability (Cook & Polgar, 2014; Savage & Taber-Doughty, 2016). AT encompasses what may be considered as 'normal' technological solutions for the general population such as Skype, pill organizers, wheelchairs, Twitter or Facebook. But we acknowledge that most of these solutions remain largely inaccessible to most people with ID. Furthermore, it

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2
3 could be argued that applications such as Skype don't qualify as AT because they don't
4 constitute provision of immediate functionality of the person with ID (Cullen et al., 2012).
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8 On the other hand, there is evidence suggesting that many people with ID desire to use
9 the mainstream social media, as distinct from some type of specially protected (restricted)
10 platform (Bühler, Dirks, & Nietzio, 2016). However, a recent systematic review on the use
11 of social media by people with ID found that safeguarding concerns, literacy and
12 communication challenges, cyber-etiquette, cyber language and problems with
13 accessibility such as inappropriate equipment were preventing people with ID from
14 effectively utilizing social media (Caton & Chapman, 2016).
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27 **Enhancing social inclusion using appropriate Assistive Technology**

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29 Previous research has shown that effective use of appropriate AT can contribute to the
30 current efforts on deinstitutionalisation of care for people with ID, because they can
31 enhance their independence and community participation by reducing the need for formal
32 support services and long term care. AT can transform what would otherwise be
33 community care into community living (see Figure 3) for people with ID (Owuor, Larkan
34 and MacLachlan, 2017).
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43 Figure 3, framework for AT enhanced social inclusion for people with ID (Owuor et al.,
44 2017)
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However, the full potential of AT to enhance the social inclusion and wellbeing of people with ID is yet to be realized, despite of years of evidence supporting such potential (Guha, 2016; Sarkar, 2015; Seelman, 1993; M. C. Young & Courtad, 2016). By 2017, only about 10% of all people who require AT had access (Khasnabis, MacLachlan, & Mirza, 2015; WHO, 2017a), implying that access to AT is still very low. In fact, the proportion of people with ID without access to AT are unknown (Boot, Dinsmore, Khasnabis, & MacLachlan, 2017). The extent to which social exclusion has been solved for the 10% with access to AT is also unknown. Furthermore, too much focus on AT may divert attention away from other barriers to social inclusion, which may need addressing on their own, or indeed as part of the context of AT. AT could also pose unintended risks to people with ID thereby hindering progress towards their social inclusion. For example, the use of digital AT may create risks such as breach of the user's confidentiality or cyberbullying (Schultze-Krumbholz & Scheithauer, 2015). The focus on AT should not compromise the

1
2
3 overall quality of life of people with ID and their effective social inclusion goals
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5 (McNaughton & Light, 2013)
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10 There is need to review literature on how access to and use of AT supports social
11 inclusion. As illustrated in Figure 3, Owuor et al (2017) pointed out that inadequate
12 access to AT can disempower people with ID, hindering their capacity to participate in
13 community processes and to form and maintain meaningful interpersonal relationships.
14
15 The framework provides a simplified way of visualizing how access to AT directly impacts
16 on the inclusion-exclusion pathway. One possible cause of this lag between demand and
17 supply could be lack of consensus on the meaning of assistive technology. The policy
18 context in many settings also remain unclear (Borg, Lindström, & Larsson, 2009), with
19 most of the existing policies on AT positioning AT as an add-on to their main foci (Cullen
20 et al., 2012). Lack of consensus of the meaning of assistive technologies (Cook & Polgar,
21 2014) and how they should be provided, and to whom, makes it difficult to effectively
22 evaluate the use of AT for social inclusion of people with ID. But access to AT does not
23 eliminate the many barriers to social inclusion which vary with socioeconomic differences
24 within and between countries. Furthermore, people with ID are highly vulnerable to
25 multiple comorbidities than the rest of the population (McCarron et al., 2013). Thus
26 access to and use of AT may minimise their risk of exclusion by moderating the impacts of
27 their comorbidities as well as mediate their social inclusion (Tebbutt et al., 2016). For
28 example, a digital glucometer can support social inclusion of an individual with with ID and
29 diabetes by moderating their blood sugar.
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6 Apart from the needs of the users, environment is another key determinant of effective
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8 use of AT. The current review will explore the reported barriers and facilitators to adoption
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10 and use of AT as well as how the use of AT can enhance the adaptation of the participants
11
12 with ID to their environment. Some of the environmental factors to be explored in the
13
14 review include social support, friendships, access to services, physical environment and
15
16 availability of AT. The literature (Verdonschot, De Witte, Reichrath, Buntinx, & Curfs,
17
18 2009) suggests that these may be key determinants of effective use of AT. The resultant
19
20 information could be useful in informing the design and provision of AT, provide insights
21
22 into facilitators or barriers to adoption of AT and inform policy and practice on
23
24 environmental considerations for successful provision of AT. This knowledge, from other
25
26 countries with diverse socioeconomic compositions and varying levels of access to AT,
27
28 may also be useful for the potential scalability and sustainability of AT provision and use
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30 among people with ID in high income countries such as Ireland.
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42 **Justification**

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44 As far as we are aware, this will be the first review of literature focusing on the role of AT
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46 for advancing social inclusion for people with ID. We expect to identify important
47
48 knowledge gaps on the supportive role of AT for social inclusion, building on previous
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50 (albeit limited) research which has focused on socioeconomic aspects of social inclusion
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52 such as education (Sarkar, 2015), employment (Yeager et al., 2006) and access to health
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54 care (Davis, 2014) for people with ID. There is need to understand best practices for
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consolidating the interaction between ID, AT, community living and social inclusion. The ecosystem model of social inclusion proposed by Simplican et al (2015) offers a framework for consolidating these interactions.

Aim and objectives

The broad question to be answered by consolidating evidence through the proposed review is; Does access to and use of different types of AT promote the social inclusion of users with ID?

Methods

Eligibility criteria

The criteria outlined below will be used to select studies for inclusion in the proposed review.

Study designs

- Both qualitative and quantitative studies
- Case studies. This will include blog posts, biographies and newspapers articles focusing on individual users of AT with ID.
- Case control studies
- Observational studies
- Cross sectional studies
- Longitudinal studies
- All forms of randomised trial

Also to be included are:

- Studies that look at the use of AT to overcome stigma and low expectations that people with ID experience from their neighbours, professionals and the general society as part of the wider social inclusion.
- Studies that consider other conceptual areas that are manifest of social inclusion such as education, employment and independent living.

Participants

All studies that focus on ID will be considered for inclusion. Studies that focus on participants with autism or other disabilities but without a link to ID and studies that do not explore the link between AT and social inclusion of people with ID will be excluded.

Assistive technology

AT in this review will encompass a wide range of solutions accessed and/or used by people with ID from diverse backgrounds. These solutions will include AT used for communication, mobility, personal safety, education, job performance and cognitive functions among others. In addition, they will comprise what may be considered mainstream technologies, technologies designed for people with disability as well as technology adapted to suit the needs of people with disability. As highlighted in the background section, AT means different things to different people and different terminologies such as assistive products, aids, or assistive devices are used invariably to refer to assistive technology. There are many different types and forms of AT that are used in different settings to enhance the lives of people with ID. The types of AT to be included in the current review will thus be data driven.

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3 Our selection for inclusion will be informed by a general definition of AT as any product,
4 solution or service that can be used by or for persons with disability to overcome
5 challenges they may face in carrying out daily activities of their choice that would
6 otherwise be limited by their impairments, but not necessarily due to their ID.
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14 **Intervention**

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16 As outlined above, intervention in this review refers to access to and use of AT for
17 promoting social inclusion or for enabling functional or behavioural accomplishments that
18 lead to social inclusion for people with ID (community participation or interpersonal
19 relationships). Our focus will be on the use of AT in a very broad sense, with a focus on
20 social inclusion of people with diverse levels of ID. These will include for example studies
21 exploring the role of information and communication technology (ICT) on social inclusion
22 of people with ID or studies exploring the role of inclusive design in social inclusion of
23 people with ID.
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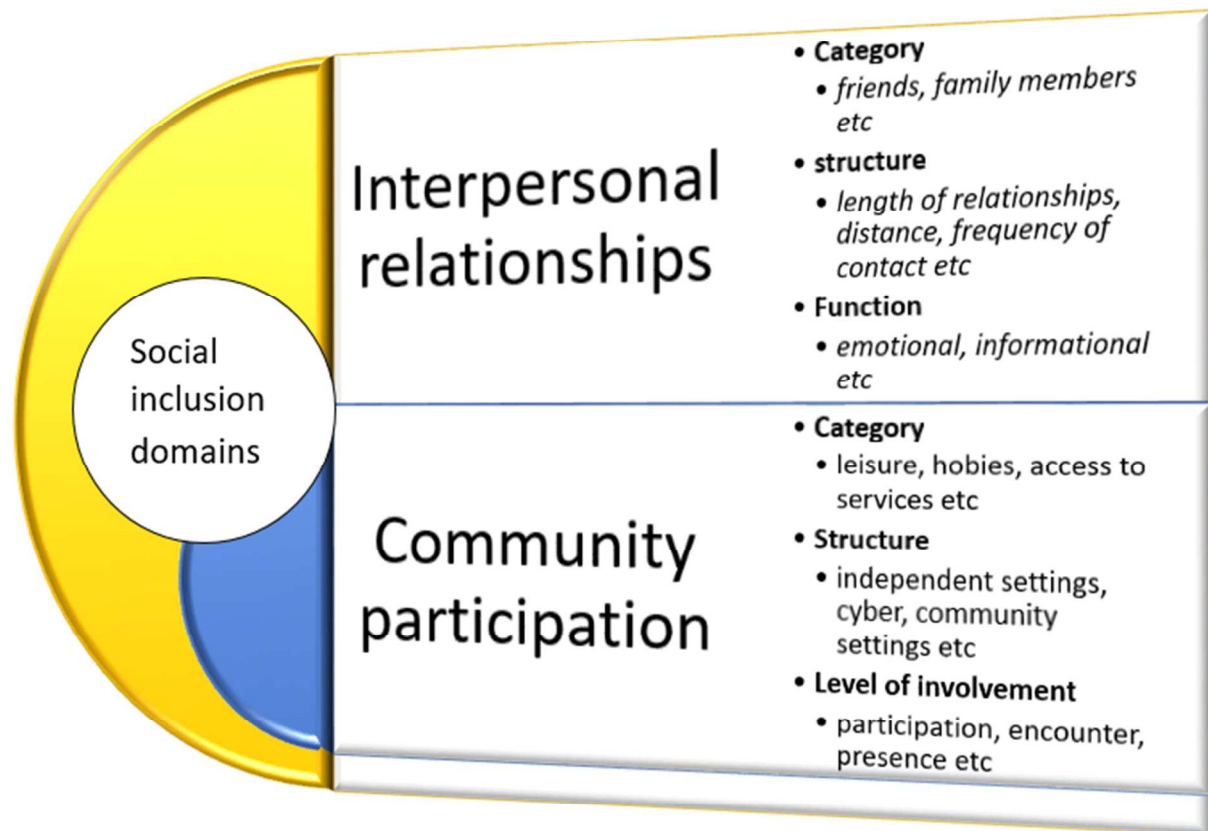
40 **Comparators**

41 For studies that explore different interventions, at least one of them must be AT. We will
42 also explore different levels of ID reported in the studies we retrieve to compare outcome
43 for AT in relation to this variable. For those studies comparing different groups of
44 participants, at least one group should be people with ID (mild, medium, severe or
45 profound) for the study to be included in our review. Additionally, we will also look out for
46 studies comparing settings (low, middle or high income settings, or urban/rural
47 comparisons)
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Outcomes

To assess social inclusion outcomes such as behavioural and social benefits of using AT reported by the relevant studies, we will use the social inclusion model proposed by Simpican et al. (2015). The model looks at social inclusion from interpersonal relationship and community participation domains as illustrated in Figure 4.

Figure 4, illustrating Simpican et al.'s ecosystem social inclusion continuum



We will include any study that reports on the following

Interpersonal relationships

- **Category** – looking at the kind of people in the social network of a person with ID such as family members, friends, keyworkers/carers, acquaintances or intimate relationships. The focus here will be on how AT facilitates bonding (relationships between people with shared commonality) and bridging (bringing people with diverse background and experience together) (Hawkins & Maurer, 2010).
- **Structure** – we will explore studies reporting on interpersonal relationships that focus on issues like the length of the relationships, location of social interactions and frequency of contacts. We will look out for studies reporting on how AT can enhance reciprocity, intensity formality and complexity of interpersonal relationships. We will also consider studies looking at social network in four broad dimensions; the size, homogeneity, geographical location and density.
- **Function** – most relationships serve certain functions to individuals' lives. We will therefore include studies that explore how AT enhances functional value of interpersonal relationships; emotional, informational and instrumental.

Community participation

We will consider studies reporting on three different aspects of community participation:

- **Category** - those reporting on the types of community activities such as leisure, hobbies, civic activities, productive activities such as employment and education, consumption activities such as access to goods and services, and religion and cultural activities and groups.

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- **Structure** – our review is done in the context of ongoing decentralisation of care for people with ID in many high income nations such as Ireland, Germany and Spain. The review will provide evidence that can inform decentralisation practice and policy in these countries. In other high income countries, such as the USA and UK, the decongregation of care for people with ID is a long established standard of care and may facilitate the evidence use. In many low resources countries, institutional care has never been a standard care practice for people with ID and the the evidence from this review may at least initiate the debate about the need to improve access and use of AT. The review will evaluate papers reporting how AT affects the engagement of people with ID in community activities in segregated settings, semi-segregated and community settings aka integrated settings. It is also important to cyber community settings in the review.
 - **Level of involvement** – we acknowledge that people generally have different levels of involvement in their communities which can be categorised as encounter, participation or presence. We will therefore be keen to review literature that reports on how AT facilitates presence, participation or encounter of the community activities by people with ID.

We will also look out for papers that report on a mixture of components of the two broad domains outlined above (interpersonal relationships and community participation), because in real life the two domains interact with each other.

Timing

We will include all studies carried out between 2006 and 2017. Such studies are probably underpinned by the UNCRPD. We will also include studies in press.

Setting

Studies from all settings, geographical and socioeconomic, will be included in the study. Studies from non-english speaking countries published in other languages other than english will be excluded, hence such settings will be excluded on the basis of language restriction.

Language

We will retrieve studies reported in English. We will also include, as appendices, any papers which meet the inclusion criteria and which was published in other languages. However, they should have abstracts or titles in English in order to be considered. We will include such studies into the analysis if they can be easily translated into English using Google Translate. Studies with English headings or abstracts, but that cannot be translated into English, will remain as appendices.

Information sources

Different terminologies that are used to refer to AT, ID and social inclusion will be used to build the search strategy. As outlined in the background, all three key concepts (AT, ID and social inclusion) imply different meanings to different authors. Medical Subject Headings (MeSH) and other controlled vocabularies used by the different databases will be used, through thesaurus searches, to develop a comprehensive search strategy.

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3 The following data sources will be used and more will be included through citation
4 tracking as data is retrieved; MEDLINE/PubMed, ERIC, PsycINFO, Embase, CINAHL,
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8 Scopus Academic Search Complete, Web of Science, ASSIA, the Cochrane CENTRAL
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10 Register, and the Campbell Collaboration Register. Prospective registers of research
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12 (review and trials registers) and institutional/organisational databases such as the World
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14 Health Organization will also be searched. The authors will manually search the websites
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16 of various organisations with a stake in assistive technology. Such organisations include
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18 European Assistive Technology Information Network (EASTIN), Assistive Technology
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20 Industry Association (ATIA), British Assistive Technology Association (BATA), Enable
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22 Ireland, Disability Federation Ireland and Association for Advancement of Assistive
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24 Technology in Europe (AAATE), among many others. We will also search for publications
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26 from government or statutory departments and non-governmental organisations. All the
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28 literature will be restricted to English as outlined above, with a focus on AT, ID and social
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30 inclusion.
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40 Full text references of all full text articles will be reviewed to check if there are any relevant
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42 sources that are not included in the search outcome. 'Author tracking' will also be carried
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44 out to find out if all the work of the authors whose work meet the inclusion criteria are
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46 captured through electronic search. Time permitting, we will share the list of the final
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48 articles for inclusion within the GATE, ASSISTID/DOCTRID network and with other
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50 experts in the field of ID and social inclusion or AT and ID.
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Search strategy

All peer reviewed studies as well as publicly accessible reports and PhD theses will be searched using keyword searches in the relevant databases. The keywords around which comprehensive search will be developed are social inclusion, AT and ID. The following initial search strategies have been developed. The final search strategy, to be developed with support from systematic review experts and information specialists, will be reviewed and approved by the project team and an expert in systematic reviews. The search strategies will be reviewed, if necessary, to include any index or free text terms found in eligible articles.

ASSIA

(AB,TI((Intellectual* OR mental* OR Developmental* OR learning) NEAR/2 (disable* OR disabilit* OR disorder* OR impairment* OR retard* OR handicap* OR defici* OR impair* OR dysfunction OR defect*)) AND yr(2006-2017)) AND ((AB,TI((Social) NEAR/2 (integrat* OR involve* OR inclusion OR inclusive OR support*) OR (belong* OR participat* OR access* OR relat* OR accept* OR independen* OR employ* OR educat* OR wellbeing OR "social networks" OR "community living" OR "universal design")) OR SU.EXACT("Social integration")) AND yr(2006-2017)) AND (AB,TI((Assistive OR "self help" OR "daily living" OR rehabilitat*) NEAR/2 (technolog* OR device* OR equipment OR product* OR aid* OR applicat* OR software OR augmented OR Information)) AND (pd(20060101-20170531) AND yr(2006-2017)))

Web of Science

(Assistive OR "self help" OR "daily living" OR rehabilitat*) NEAR/2 (technolog* OR device* OR equipment OR product* OR aid*) AND (Intellectual* OR mental* OR Developmental* OR learning) NEAR/2 (disab* OR disorder* OR impairment* OR retard* OR handicap* OR defici* OR impair* OR dysfunction OR defect*) AND (Social) NEAR/2 (integrati* OR inclusion OR support) OR (belong* OR participat* OR accessib* OR "universal design")

MEDLINE

TI((Intellectual* OR mental*) N2 (disable* OR disabilit* OR disorder* OR impairment* OR retard* OR handicap* OR defici* OR impair* OR dysfunction OR defect*)) OR AB ((Intellectual* OR developmental* OR mental* OR learning) N2 (disable* OR disabilit* OR disorder* OR impairment* OR retard* OR handicap* OR defici* OR impair* OR dysfunction OR defect*)) OR MH "Intellectual Disability+) AND (TI((Assistive OR "self help" OR "daily living" OR rehabilitat*) N2 (technolog* OR device* OR equipment OR product* OR aid*)) OR AB((Assistive OR 'self help' OR "daily living" OR rehabilitat*) N2 (technolog* OR device* OR equipment OR product* OR aid*)) OR (TI("technical aid" OR "cognitive aid" OR "universal design") OR AB("technical aid" OR "cognitive aid" OR "universal design") AND ((Social) NEAR/2 (integrati* OR inclusion OR support) OR (belong* OR participat* OR accessib* OR "universal design") OR ((augmented OR communication) NEAR/2 technology) OR (MM "Communication Aids for Disabled")

ERIC

((AB, TI((Intellectual* OR mental* OR learning OR developmental*) NEAR/2 (disable* OR disabilit* OR disorder* OR impairment* OR retard* OR handicap* OR defici* OR impair*

OR dysfunction OR defect*)) OR SU.EXACT.EXPLODE("Mental Retardation")) AND (SU.EXACT.EXPLODE("Assistive Technology") OR AB,TI((Assistive OR "self help" OR "daily living" OR rehabilitat*) NEAR/2 (technolog* OR device* OR equipment OR product* OR aid*)) OR AB,TI(("technical aid" OR "cognitive aid" OR "universal design")))) AND (SU.EXACT.EXPLODE("Inclusion") OR (social NEAR/2 (inclusion OR integration OR assimilation OR participation OR engagement OR potential OR opportunity OR opportunities)))

We will also hand-search individual journals from which at least two relevant publications are included in the review, to check for other relevant articles that might have been missed, possibly due to indexing error. We will check the references of the included articles (Horsley, Dingwall, & Sampson, 2011) as well as checking for any relevant articles citing the included articles, to try to identify additional relevant material.

Data management

JO and GF will independently search and retrieve all relevant data using the search terms and the final search strategy to be developed. All retrieved data will be imported into EndNote software for deduplication and basic screening. JO will then export the data to the Covidence software for more rigorous screening of abstracts and full text, risk of bias assessment and to complete data extraction. JO will carry out data screening in Covidence. Some of the key information to be considered for data screening and extraction includes the citation in full, participants' demographics (age, gender, ethnicity, socioeconomic status, level of ID, etc.), study setting (country, locality, urban/rural), study method, duration of intervention, type of intervention (assistive technology), and study quality.

Quality and risk of bias appraisal

We will use Critical Appraisal Skills Programme (CASP) tools (Critical Appraisal Skills Programme (CASP), 2014) as a basis to assess quality of literature retrieved. When appropriate, we will adapt the tools to fit our needs. Depending on the studies retrieved, a Mixed Methods Appraisal Tool (Pace et al., 2012) may be used to assess the methodology of the studies. Contents from theses, conference presentations, blog posts, biographies and/or newspaper articles, if included in the final sample, will be assessed on individual basis using, for example, audience measurement. All these rankings will be relative to the subject area of the journal. The team will decide on the most appropriate tools to use for each type of study when the potentially eligible studies have been identified. JO will then rate the retrieved papers separately and compare the rankings with BK. FL will cross check any differences between JO and BK's assessments, to facilitate consensus.

Data selection

JO and GF will apply the inclusion criteria and search strategy outlined above. The data will be exported to Covidence for further screening. Other members of the team will counter check the data retrieved to ensure reliability and validity of the data retrieval and screening process. After the initial inclusion is complete, JO will then carry out full text screening of the potentially eligible articles for final inclusion. Eligible full text articles will be shared with the rest of the team to review. Any articles that seem relevant but lacking some key information during full text screening will be complemented by seeking clarification from the authors. We will contact authors of the identified missing data by email. Use of emails has been shown to result in timely responses by the relevant authors

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3 when the requests are clear (T. Young & Hopewell, 2011). Any lack of consensus
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5 between the authors during the data screening process will be resolved through
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7 deliberations and coming to a consensus on whether to include the paper in question. JO
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9 will document this process.
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12 13 **Data analyses**

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15 We will analyse studies depending on the methodology used for the study. For example,
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17 we will analyse qualitative studies separately from quantitative studies, survey studies,
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19 in-depth interview studies, quantitative group design versus single subject quantitative
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21 designs. After the separate analyses, a narrative or thematic synthesis will be done for
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23 each group of studies, and develop an overall theme from the review.
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28 29 **Sub-groups analyses**

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31 We will carry out overall data analyses to explore the emerging themes and the findings
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33 will determine the ultimate categorisation. The following examples are some of the comon
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35 categories reported in the literature.
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- 38 • Different levels of ID – low, medium and severe
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- 40 • Gender – males and females
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- 42 • Geographical location (country, region, etc.) where possible
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- 44 • Age – youth, adolescents, adults – generally adults versus young people (15-18,
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46 18 and older)
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- 48 • Type of AT – (communication, mobility, educational, etc.)
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- 50 • Setting – community setting, institutional, work place, educational setting, etc.)
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Dissemination plans

We aim to publish at least one peer reviewed journal article. We may publish more than one article depending on the findings we derive from the sub-group analyses outlined above. We will also present the findings at conferences and seminars, and to internal audience at Trinity College Dublin, within the ASSISTID research programme and within the GATE community. We also aim to produce a briefing paper for service providers such as DOC services and policy makers in Ireland.

References

- Ali, A., King, M., Strydom, A., & Hassiotis, A. (2016). Self-reported stigma and its association with socio-demographic factors and physical disability in people with intellectual disabilities: results from a cross-sectional study in England. *Social Psychiatry and Psychiatric Epidemiology*, 51(3), 465–474. <https://doi.org/10.1007/s00127-015-1133-z>
- Beadle-Brown, J., Mansell, J., & Kozma, A. (2007). Deinstitutionalization in intellectual disabilities. *Current Opinion in Psychiatry*, 20(5), 437–442.
- Blumer, H. (1990). *Symbolic interactionism: Perspectives and methods*. Los Angeles, CA: University of California Press.
- Boot, F. H., Dinsmore, J., Khasnabis, C., & MacLachlan, M. (2017). Intellectual Disability and Assistive Technology: opening the GATE wider. *Frontiers in Public Health*, 5, 10.
- Borg, J., Lindström, A., & Larsson, S. (2009). Assistive technology in developing countries: national and international responsibilities to implement the Convention on the Rights of Persons with Disabilities. *The Lancet*, 374(9704), 1863–1865. [https://doi.org/10.1016/S0140-6736\(09\)61872-9](https://doi.org/10.1016/S0140-6736(09)61872-9)

- 1
2
3 Browning, P., Nave, G., White, W. A. T., & Barkin, P. zembrosky. (1985). Interactive video as an
4
5 Instructional Technology for Handicapped Learners: A Development and Research Program.
6
7 *Australia and New Zealand Journal of Developmental Disabilities*, 11(3), 123–128.
8
9 <https://doi.org/10.3109/13668258508998630>
10
11
12 Bühler, C., Dirks, S., & Nietzio, A. (2016). Easy Access to Social Media: Introducing the Mediata-App (pp.
13
14 227–233). Presented at the International Conference on Computers Helping People with Special
15
16 Needs, Springer.
17
18
19 Camlin, C. S., Seeley, J., Viljoen, L., Vernooij, E., Simwinga, M., Reynolds, L., ... Bond, V. (2016).
20
21 Strengthening universal HIV ‘test-and-treat’ approaches with social science research. *AIDS*
22
23 *(London, England)*, 30(6), 969–970. <https://doi.org/10.1097/QAD.0000000000001008>
24
25
26 Caton, S., & Chapman, M. (2016). The use of social media and people with intellectual disability: A
27
28 systematic review and thematic analysis. *Journal of Intellectual & Developmental Disability*,
29
30 41(2), 125–139. <https://doi.org/10.3109/13668250.2016.1153052>
31
32
33 Cobigo, V., & Hall, H. (2005). Social Inclusion and Mental Health. *Current Opinion in Psychiatry*, 23, 453–
34
35 457.
36
37
38 Cobigo, Virginie, Ouellette-Kuntz, H., Lysaght, R., & Martin, L. (2012). Shifting our conceptualization of
39
40 social inclusion. *Stigma Research and Action; Vol 2, No 2 (2012): Spring*. Retrieved from
41
42 <http://stigmaj.org/article/view/45>
43
44
45 Cook, A. M., & Polgar, J. M. (2014). *Assistive technologies: Principles and practice*. Elsevier Health
46
47 Sciences. Retrieved from
48
49 [https://books.google.ie/books?hl=en&lr=&id=ODWaBQAAQBAJ&oi=fnd&pg=PP1&dq=assistive+](https://books.google.ie/books?hl=en&lr=&id=ODWaBQAAQBAJ&oi=fnd&pg=PP1&dq=assistive+technology+social+inclusion&ots=IE89XsvPY7&sig=98iIVd2V_1jUOA6h34qHqcdR46M&redir_esc=y#v=onepage&q=assistive%20technology%20social%20inclusion&f=false)
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54
55
56
57
58
59
60

- 1
2
3 Critical Appraisal Skills Programme (CASP). (2014). CASP Checklists. Retrieved from
4
5 <http://www.casp-uk.net/casp-tools-checklists>
6
7
8 Cullen, K., McAneney, D., Dolphin, C., Delaney, S., & Stapleton, P. (2012). *Research on the provision of*
9
10 *Assistive Technology in Ireland and other countries to support independent living across the life*
11
12 *cycle* (p. 175). Dublin: National Disability Authority (NDA). Retrieved from
13
14 <http://nda.ie/File-upload/Research-on-the-provision-of-Assistive-Technology1.pdf>
15
16
17 Daughters of Charity. (2012). Assistive Technology. Retrieved 9 October 2016, from
18
19 <http://www.docservice.ie/assistive-technology.aspx>
20
21
22 Davis, T. (2014). Transforming the outpatient experience through the use of assistive technology.
23
24 *International Journal of Integrated Care*, 14(8).
25
26 Díaz Andrade, A., & Doolin, B. (2016). INFORMATION AND COMMUNICATION TECHNOLOGY AND THE
27
28 SOCIAL INCLUSION OF REFUGEES. *MIS Quarterly*, 40(2), 405–416.
29
30
31 GATE. (2016, May). Assistive technology; Fact sheet. Retrieved 28 July 2016, from
32
33 <http://www.who.int/mediacentre/factsheets/assistive-technology/en/>
34
35
36 Guha, S. (2016). Role of Educational Technology in Making Normalization Through Digital Inclusion a
37
38 Reality for Children With Disabilities. *Indian Journal of Applied Research*, 5(6). Retrieved from
39
40 <https://worldwidejournals.in/ojs/index.php/ijar/article/view/8491>
41
42
43 Hawkins, R. L., & Maurer, K. (2010). Bonding, bridging and linking: how social capital operated in New
44
45 Orleans following Hurricane Katrina. *British Journal of Social Work*, 40(6), 1777–1793.
46
47
48 Horsley, T., Dingwall, O., & Sampson, M. (2011). Checking reference lists to find additional studies for
49
50 systematic reviews. *Cochrane Database of Systematic Reviews*, (8).
51
52 <https://doi.org/10.1002/14651858.MR000026.pub2>
53
54
55
56
57
58
59
60

- 1
2
3
4 Huss, T., & MacLachlan, M. (2016). *Equity and Inclusion in Policy Processes (EquIPP) : a framework to*
5
6 *support equity & inclusion in the process of policy development, implementation and evaluation.*
7
8 Dublin: Global Health Press. Retrieved from <http://library.catalogue.tcd.ie/record=b16839480>
9
10 Inclusive Research Network. (2010). *Where we live: A national study done by members of the Inclusive*
11
12 *Research Network through surveys.*
13
14 ISO 9999:2011(en). (2016). ISO 9999:2011(en) Assistive products for persons with disability —
15
16 Classification and terminology [Information]. Retrieved from
17
18 <https://www.iso.org/obp/ui/#iso:std:iso:9999:ed-5:v1:en>
19
20
21 Khasnabis, C., MacLachlan, M., & Mirza, Z. (2015). Opening the GATE to inclusion for people with
22
23 disabilities. *Lancet*, 386. [https://doi.org/10.1016/S0140-6736\(15\)01093-4](https://doi.org/10.1016/S0140-6736(15)01093-4)
24
25
26 Klimczuk, A. (2015). Social Inclusion of People with Disabilities: National and International Perspectives
27
28 by Arie Rimmerman. *Human Rights Review*, 16(4), 397–399.
29
30
31 Kozma, A., Mansell, J., Beadle-Brown, J., & Emerson, E. (2009). Outcomes in different residential settings
32
33 for people with intellectual disability: a systematic review. *American Journal on Intellectual and*
34
35 *Developmental Disabilities*, 114(3), 193–222.
36
37
38 Kumar, A., Singh, R. R., & Thressiakutty, A. T. (2015). Normalization vs. Social Role Valorization: Similar or
39
40 Different? *International Journal of Special Education*, 30(3), 71–78.
41
42
43 Lancioni, G. E., Singh, N. N., O'Reilly, M. F., Sigafos, J., & Oliva, D. (2014). Assistive Technology for
44
45 People with Severe/Profound Intellectual and Multiple Disabilities. In *Assistive Technologies for*
46
47 *People with Diverse Abilities* (pp. 277–313). Springer.
48
49
50 Linehan, C., O'Doherty, S., Tatlow-Golden, M., Craig, S., Kerr, M., Lynch, C., ... Staines, A. (2014).
51
52 *Mapping the National Disability Policy Landscape*. Dublin: School of Social Work and Social
53
54 Policy, Trinity College Dublin. Retrieved from
55
56 <http://socialwork-socialpolicy.tcd.ie/moving-ahead/project.php>
57
58
59
60

- 1
2
3 MacLachlan, M., Manna, H., Huss, T., Munthali, A., & Amin, M. (2016). Policies and Processes for Social
4
5 Inclusion: Using EquiFrame and EquiPP for Policy Dialogue; Comment on 'Are Sexual and
6
7 Reproductive Health Policies Designed for All? Vulnerable Groups in Policy Documents of Four
8
9 European Countries and Their Involvement in Policy Development'. *International Journal of*
10
11 *Health Policy and Management*, 5(3), 193–196. <https://doi.org/10.15171/ijhpm.2015.200>
12
13
14
15 Maidment, J., & Macfarlane, S. (2009). 2.7 Debating the capacity of information and communication
16
17 technology to promote inclusion. In *Theorising Social Exclusion* (p. 95). Retrieved from
18
19 <https://books.google.ie/books?hl=en&lr=&id=YhiPAgAAQBAJ&oi=fnd&pg=PA95&dq=Maidment>
20
21 [+and+Macfarlane+2009+self+determination&ots=OKMU-Qcith&sig=dhRBvPeNSmT56Hdiikweav](https://books.google.ie/books?hl=en&lr=&id=YhiPAgAAQBAJ&oi=fnd&pg=PA95&dq=Maidment)
22
23 [qUNLo&redir_esc=y#v=onepage&q&f=false](https://books.google.ie/books?hl=en&lr=&id=YhiPAgAAQBAJ&oi=fnd&pg=PA95&dq=Maidment)
24
25
26
27 McCarron, M., Swinburne, J., Burke, E., McGlinchey, E., Carroll, R., & McCallion, P. (2013). Patterns of
28
29 multimorbidity in an older population of persons with an intellectual disability: Results from the
30
31 intellectual disability supplement to the Irish longitudinal study on aging (IDS-TILDA). *Research in*
32
33 *Developmental Disabilities*, 34(1), 521–527. <https://doi.org/10.1016/j.ridd.2012.07.029>
34
35
36
37 McNaughton, D., & Light, J. (2013). The iPad and Mobile Technology Revolution: Benefits and Challenges
38
39 for Individuals who require Augmentative and Alternative Communication. *Augmentative and*
40
41 *Alternative Communication*, 29(2), 107–116. <https://doi.org/10.3109/07434618.2013.784930>
42
43
44 Mead, G. H. (1934). *Mind, Self and Society. From the standpoint of a social behaviourist.* (C. W. Morris,
45
46 Ed.) (Vol. 1). Chicago, IL: University of Chicago Press.
47
48 Moriarty, L. J. (2017). *Criminal justice technology in the 21st century.* Charles C Thomas Publisher.
49
50
51 Overmars-Marx, T., Thomése, F., Verdonschot, M., & Meininger, H. (2014). Advancing social inclusion in
52
53 the neighbourhood for people with an intellectual disability: an exploration of the literature.
54
55 *Disability & Society*, 29(2), 255–274. <https://doi.org/10.1080/09687599.2013.800469>
56
57
58
59
60

- 1
2
3 Pace, R., Pluye, P., Bartlett, G., Macaulay, A. C., Salsberg, J., Jagosh, J., & Seller, R. (2012). Mixed
4
5 Methods Appraisal Tool—2011 Version. *PsycTESTS*. <https://doi.org/10.1037/t21090-000>
6
7
8 Ratcliffe, P. (2000). Is the assertion of minority identity compatible with the idea of a socially inclusive
9
10 society. *Social Inclusion: Possibilities and Tensions*, 169–185.
11
12 Saborowski, M., & Kollak, I. (2015). ‘How do you care for technology?’ – Care professionals’ experiences
13
14 with assistive technology in care of the elderly. *Science, Technology and the ‘Grand Challenge’ of*
15
16 *Ageing*, 93, 133–140. <https://doi.org/10.1016/j.techfore.2014.05.006>
17
18
19 Sarkar, R. (2015, February). *Assistive technology and devices: A boon to promote quality education*
20
21 *among children with mild intellectual disability in inclusive set up*. Presented at the National
22
23 seminar on Assistive Technology in Education and Sports for Total Inclusion of Persons with
24
25 Disability, Ramakrishna Mission Vivekananda University, Coimbatore.
26
27
28 Savage, M. N., & Taber-Doughty, T. (2016). Self-operated auditory prompting systems for individuals
29
30 with intellectual disability: A meta-analysis of single-subject research. *Journal of Intellectual &*
31
32 *Developmental Disability*, 1–10. <https://doi.org/10.3109/13668250.2016.1229459>
33
34
35 Schultze-Krumbholz, A., & Scheithauer, H. (2015). Cyberbullying. In T. P. Gullotta, R. W. Plant, & M. A.
36
37 Evans (Eds.), *Handbook of Adolescent Behavioral Problems* (pp. 415–428). Springer US. Retrieved
38
39 from http://dx.doi.org/10.1007/978-1-4899-7497-6_22
40
41
42 Seelman, K. D. (1993). Assistive technology policy: A road to independence for individuals with
43
44 disabilities. *Journal of Social Issues*, 49(2), 115–136.
45
46
47 Simpican, S. C., Leader, G., Kosciulek, J., & Leahy, M. (2015a). Defining social inclusion of people with
48
49 intellectual and developmental disabilities: An ecological model of social networks and
50
51 community participation. *Research in Developmental Disabilities*, 38(0), 18–29.
52
53
54 <https://doi.org/10.1016/j.ridd.2014.10.008>
55
56
57
58
59
60

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4
5
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47
48
49
50
51
52
53
54
55
56
57
58
59
60
- Simplican, S. C., Leader, G., Kosciulek, J., & Leahy, M. (2015b). Defining social inclusion of people with intellectual and developmental disabilities: An ecological model of social networks and community participation. *Research in Developmental Disabilities, 38*, 18–29.
- Tatlow-Golden, M., Linehan, C., O’Doherty, S., Craig, S., Kerr, M., Lynch, C., ... Staines, A. (2014). Living Arrangement Options for People with Intellectual Disability: A Scoping Review. *Dublin: Trinity College Dublin*.
- Tebbutt, E., Brodmann, R., Borg, J., MacLachlan, M., Khasnabis, C., & Horvath, R. (2016). Assistive products and the Sustainable Development Goals (SDGs). *Globalization and Health, 12*(1), 79. <https://doi.org/10.1186/s12992-016-0220-6>
- United Nations. (2006). Convention the Rights of Persons with Disabilities. Retrieved 6 October 2016, from <http://www.un.org/disabilities/convention/conventionfull.shtml>
- United Nations. (2017). Convention on the Rights of Persons with Disabilities [Information]. Retrieved 16 March 2017, from <https://www.un.org/development/desa/disabilities/convention-on-the-rights-of-persons-with-disabilities.html>
- Verdonschot, M. M. L., De Witte, L. P., Reichrath, E., Buntinx, W. H. E., & Curfs, L. M. G. (2009). Impact of environmental factors on community participation of persons with an intellectual disability: a systematic review. *Journal of Intellectual Disability Research, 53*(1), 54–64. <https://doi.org/10.1111/j.1365-2788.2008.01128.x>
- Waller, S., Bradley, M., Hosking, I., & Clarkson, P. J. (2015). Making the case for inclusive design. *Applied Ergonomics, 46*, 297–303.
- Walsh, E., Holloway, J., McCoy, A., & Lydon, H. (2016). Technology-Aided Interventions for Employment Skills in Adults with Autism Spectrum Disorder: A Systematic Review. *Review Journal of Autism and Developmental Disorders, 1–14*. <https://doi.org/10.1007/s40489-016-0093-x>

1
2
3 WHO. (2017a). Assistive devices and technologies. Retrieved 17 March 2017, from

4
5 <http://www.who.int/disabilities/technology/en/>

6
7
8 WHO. (2017b, January 25). Definition: intellectual disability [Health information]. Retrieved from

9
10 [http://www.euro.who.int/en/health-topics/noncommunicable-diseases/mental-health/news/ne](http://www.euro.who.int/en/health-topics/noncommunicable-diseases/mental-health/news/news/2010/15/childrens-right-to-family-life/definition-intellectual-disability)
11
12 [ws/2010/15/childrens-right-to-family-life/definition-intellectual-disability](http://www.euro.who.int/en/health-topics/noncommunicable-diseases/mental-health/news/news/2010/15/childrens-right-to-family-life/definition-intellectual-disability)

13
14
15 Yeager, P., Kaye, S. H., Reed, M., & Doe, T. M. (2006). Assistive technology and employment: experiences
16
17 of Californians with disabilities. *Work*, 27.

18
19
20 Young, M. C., & Courtad, C. A. (2016). Inclusion and Students with Learning Disabilities. In *General and*

21
22 *Special Education Inclusion in an Age of Change: Impact on Students with Disabilities* (Vol. 31,

23
24 pp. 13–29). Emerald Group Publishing Limited. Retrieved from

25
26 <http://dx.doi.org/10.1108/S0270-401320160000031002>

27
28
29 Young, T., & Hopewell, S. (2011). Methods for obtaining unpublished data. *Cochrane Database of*

30
31 *Systematic Reviews*, (11). <https://doi.org/10.1002/14651858.MR000027.pub2>

1
2
3
4
5
6
7
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PRISMA-P (Preferred Reporting Items for Systematic review and Meta-Analysis Protocols) 2015 checklist: recommended items to address in a systematic review protocol*

Section and topic	Item No	Checklist item	Page No
ADMINISTRATIVE INFORMATION			
Title:			1
Identification	1a	Identify the report as a protocol of a systematic review	1
Update	1b	If the protocol is for an update of a previous systematic review, identify as such	1
Registration	2	If registered, provide the name of the registry (such as PROSPERO) and registration number	1
Authors:			1
Contact	3a	Provide name, institutional affiliation, e-mail address of all protocol authors; provide physical mailing address of corresponding author	1-2
Contributions	3b	Describe contributions of protocol authors and identify the guarantor of the review	2
Amendments	4	If the protocol represents an amendment of a previously completed or published protocol, identify as such and list changes; otherwise, state plan for documenting important protocol amendments	2
Support:			
Sources	5a	Indicate sources of financial or other support for the review	2
Sponsor	5b	Provide name for the review funder and/or sponsor	2
Role of sponsor or funder	5c	Describe roles of funder(s), sponsor(s), and/or institution(s), if any, in developing the protocol	2
INTRODUCTION			4-17
Rationale	6	Describe the rationale for the review in the context of what is already known	17
Objectives	7	Provide an explicit statement of the question(s) the review will address with reference to participants, interventions, comparators, and outcomes (PICO)	18
METHODS			
Eligibility criteria	8	Specify the study characteristics (such as PICO, study design, setting, time frame) and report characteristics (such as years considered, language, publication status) to be used as criteria for eligibility for the review	18-24
Information sources	9	Describe all intended information sources (such as electronic databases, contact with study authors, trial registers or other grey literature sources) with planned dates of coverage	24-25
Search strategy	10	Present draft of search strategy to be used for at least one electronic database, including planned limits, such that it could be repeated	26-28

Study records:			
Data management	11a	Describe the mechanism(s) that will be used to manage records and data throughout the review	28
Selection process	11b	State the process that will be used for selecting studies (such as two independent reviewers) through each phase of the review (that is, screening, eligibility and inclusion in meta-analysis)	29
Data collection process	11c	Describe planned method of extracting data from reports (such as piloting forms, done independently, in duplicate), any processes for obtaining and confirming data from investigators	29
Data items	12	List and define all variables for which data will be sought (such as PICO items, funding sources), any pre-planned data assumptions and simplifications	19
Outcomes and prioritization	13	List and define all outcomes for which data will be sought, including prioritization of main and additional outcomes, with rationale	21-23
Risk of bias in individual studies	14	Describe anticipated methods for assessing risk of bias of individual studies, including whether this will be done at the outcome or study level, or both; state how this information will be used in data synthesis	29
Data synthesis	15a	Describe criteria under which study data will be quantitatively synthesised	
	15b	If data are appropriate for quantitative synthesis, describe planned summary measures, methods of handling data and methods of combining data from studies, including any planned exploration of consistency (such as I^2 , Kendall's τ)	
	15c	Describe any proposed additional analyses (such as sensitivity or subgroup analyses, meta-regression)	
	15d	If quantitative synthesis is not appropriate, describe the type of summary planned	30
Meta-bias(es)	16	Specify any planned assessment of meta-bias(es) (such as publication bias across studies, selective reporting within studies)	
Confidence in cumulative evidence	17	Describe how the strength of the body of evidence will be assessed (such as GRADE)	29

*** It is strongly recommended that this checklist be read in conjunction with the PRISMA-P Explanation and Elaboration (cite when available) for important clarification on the items. Amendments to a review protocol should be tracked and dated. The copyright for PRISMA-P (including checklist) is held by the PRISMA-P Group and is distributed under a Creative Commons Attribution Licence 4.0.**

From: Shamseer L, Moher D, Clarke M, Ghersi D, Liberati A, Petticrew M, Shekelle P, Stewart L, PRISMA-P Group. Preferred reporting items for systematic review and meta-analysis protocols (PRISMA-P) 2015: elaboration and explanation. BMJ. 2015 Jan 2;349(jan02 1):g7647.

BMJ Open

Does assistive technology contribute to social inclusion for people with intellectual disability? A systematic review protocol

Journal:	<i>BMJ Open</i>
Manuscript ID	bmjopen-2017-017533.R1
Article Type:	Protocol
Date Submitted by the Author:	07-Sep-2017
Complete List of Authors:	Owuor, John; University of Dublin Trinity College, Centre for Global Health ; London School of Hygiene and Tropical Medicine Faculty of Public Health and Policy Larkan, Fiona; University of Dublin Trinity College, Centre for Global Health Kayabu, Bonnix ; University of Dublin Trinity College Fitzgerald , Geraldine ; University of Dublin Trinity College Sheaf, Greg; University of Dublin Trinity College Dinsmore , John ; University of Dublin Trinity College, 3. Trinity Centre for Practice and Healthcare Innovation (TCPHI) McConkey, Roy; University of Ulster , Institute of Nursing and Health Research, School of Nursing Clarke, Mike; All-Ireland Hub for Trials Methodology Research, Centre for Public Health MacLachlan, Malcolm; Maynooth University , Department of Psychology; The World Health Organization , Global Cooperation on Assistive Technology (GATE)
Primary Subject Heading:	Mental health
Secondary Subject Heading:	Global health, Health policy, Health services research, Public health, Qualitative research
Keywords:	Disability, Assistive technology, Social inclusion, Intellectual disability, Interpersonal relationships, Community participation

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Does assistive technology contribute to social inclusion for people with intellectual disability? A systematic review protocol

Registration

This protocol is registered with the International Prospective Register of Systematic Reviews (PROSPERO) (registration number CRD42017065447).

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8 9 **Contributions**

10 JO is the guarantor of the review and drafted the manuscript. GF and GS led the technical
11 development of the methodology. FL, BK, RM, JD, MC and MM provided a critical review of the
12 protocol to ensure rigour and validity based on their extensive expertise in disability, systematic
13 reviews, information management and health and social care research. MC advised on how to
14 keep the review manageable. JO, GF and GS designed and validated the search strategy, and
15 will retrieve and screen the data. GS will lead data management and screening, and editing of
16 the manuscripts.
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29 All authors read and critiqued the draft and approved the final version of this manuscript.
30
31

32 **Amendments**

33 We will seek to minimise the risk of bias by trying to avoid any need to amend this protocol.
34
35 However, should there be need to revise the protocol, we will provide relevant details and the
36 rationale for such changes. Any potential amendments will be documented and implemented
37 by the first author, with the approval of all the contributing authors.
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45 **Support**

46 This research was supported by funding from the charity RESPECT and the People Programme
47 (Marie Curie Actions) of the European Union's Seventh Framework Programme
48 (FP7/2007-2013) under REA grant agreement no. PCOFUND-GA-2013-608728'
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Name of the funder

The Charity RESPECT and EU Marie Curie Actions co-fund as outlined above.

Role of funder

The funder provided the salary and all related research expenses incurred by Trinity College Dublin (TCD) in hosting JO during a two-year fellowship. However, the funder was not involved in the design and implementation of the review.

Conflict of interest

JO receives a salary at the research fellow position he holds at TCD. Other authors did not receive any financial support to prepare this protocol, will not receive funding to conduct this review, and do not have any conflict of interest.

Abstract

Objective: The aim of the review is to answer the following question: *Does assistive technology contribute to social inclusion for people with intellectual disability?* Previous research on assistive technology has focused on socioeconomic impacts such as education, employment, and access to health care by people with intellectual disability. There is a need to consolidate evidence on the interaction between intellectual disability, assistive technology, community living and social inclusion.

Setting: The review will consider studies from all settings – geographical, socioeconomic and care (institutional and community care) - published in English. Studies reported in other languages with abstracts in English will be included if they can be translated using Google Translate, otherwise such studies will be included in the appendix. The review will include both qualitative and quantitative studies.

Intervention: Intervention in this review refers to the use of assistive technology to promote community participation or interpersonal relationships (social inclusion) for people with intellectual disability.

Outcomes: Behavioural and social benefits of using assistive technology by people with intellectual disability. Enhanced interpersonal relationships and community participation by people with intellectual disability.

Protocol registration: Registered in PROSPERO (registration number CRD42017065447)

Study contribution and limitations

This review seeks to merge evidence on the role of assistive technology (AT) in supporting social inclusion of people with intellectual disability (ID). As far as we are aware, this will be the first study to consolidate the broad body of literature on the subject area since the adoption of the United Nations Convention on the Rights of Persons with Disabilities (UNCRPD) in 2006.

- A systematic review is the most efficient means of integrating the existing data to offer evidence on the interplay between access to and use of AT and social inclusion for people with ID.
- The key element to overcome is the heterogeneity of the studies to be included; the review will include diverse study designs, study populations and interventions. It may be difficult to compare the reported outcomes of various types of AT used by people with different forms of ID in diverse countries. This is because outcomes of AT use by people with ID go beyond the individual's abilities, and are dependent on the interaction between personal, socioeconomic, cultural, political, and environmental factors which vary between local, national, and international settings.
- While comparison of settings will be insightful, generalisation of the findings may be challenging.
- However, the review is necessary because it will stimulate discussion on the role of AT in social inclusion in a broader perspective.

Introduction

Community living by people with intellectual disability

Intellectual disability (ID) in this protocol refers to an individual's reduced ability to comprehend new or complex information, and to learn and apply new skills, beginning before the individual's 18th birthday (i.e., before adulthood). ID interacts with environmental factors to impact on an individual's ability to independently cope with daily life circumstances (1), resulting in a lifelong need for care and/or support.

Individuals with ID are increasingly becoming part of community processes; living and accessing services in the community. In many countries, they are gradually being relocated from institutional care into community settings (2,3). The drive to relocate people with ID to community-based care settings, herein called deinstitutionalisation or de-congregation of care, has been a policy priority for more than three decades in countries such as Australia, the UK, the US and the Scandinavian nations (4). It is ongoing in other countries such as Ireland, Germany and Spain (5,6) where more people with ID are now living in community settings. Significant political and financial commitment to deinstitutionalisation of care has led to a noticeable decline in numbers of people in large institutional care facilities (7) in countries like Ireland. This has involved closure of these larger facilities and relocating people with ID to small-scale community-based care, in some cases congregated care on a smaller scale (8).

The national policy contexts highlighted above reflects international undertakings such as the Universal Declaration of Human Rights (9) and the United Nations Convention on the Rights of Persons with Disabilities (CRPD) (10). For example, Article 19 of the CRPD advocates for community living for people with disability. The ratification and subsequent implementation of

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3 such international guidelines underpins the individual countries' drive for normalisation (11). By
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6 March 2017, there were 172 ratifications/accessions and 160 countries were signatories to the
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9 Convention (12), making it the world's most-ratified human rights treaty (13). The CRPD states
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11 that people with all types of disabilities must enjoy all human rights and fundamental
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13 freedoms; everyone with a disability should have equal access to societal processes such as
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15 education, employment, housing and socialisation. Article 19 of the Convention emphasises the
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17 right to community living by all people with disabilities and a right to appropriate support to
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19 ensure inclusion (6). The current global development agenda through the Sustainable
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21 Development Goals (14) calls for no-one to be left behind - a call for inclusion of all, including
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23 people with ID. People with ID are the focus of this review because they are one of the groups
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25 most vulnerable to social exclusion (15).
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32 The global push for greater social inclusion of people with disabilities is taking place at a time of
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34 great technological advances. This presents an opportunity to enhance the envisaged
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36 community living and social inclusion of people with ID in practices already proven (16,17). It is
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38 also an opportunity to explore new approaches facilitated by these rapid technological
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40 advances. This review will examine the evidence of how AT, which draws on advances in
41
42 technology, can enhance community living and social inclusion of people with ID. There is a
43
44 need for concerted efforts to ensure that people with ID become part of community processes,
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46 and for members of such communities to also perceive people with ID as part of their own
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48 community. Unless community living for people with ID is enhanced by all means possible,
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50 including technological opportunities, there is a risk of 'redistributing' institutional isolation to
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52 the community rather than progressing genuine social inclusion into the community. Without
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3 technology that promotes access, connectivity and community participation, people with ID
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5 may not access services in the community like people without disability. This could lead to
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7 loneliness (3) and dependence on care provided in devolved institutions.
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10 11 Social inclusion

12 Cobigo and Hall (18) have noted that the benefits of the shift towards a rights-based approach
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14 to care, that should accompany deinstitutionalisation of care for people with ID, have not been
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16 achieved. People with ID still encounter stigmatisation, discrimination and rejection due to a
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18 variety of factors. For example, feelings or experiences of inclusion or exclusion are dependent
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20 on demographic characteristics such as age, gender and environmental factors; older adults
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22 with mild ID, for instance, are more likely to report stigma than younger people (19). As Cobigo
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24 et al. (20) observed, social inclusion is a product of complex interactions between
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26 environmental factors and the opportunities and personal competencies of an individual. The
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28 International Classification of Functioning, Disability and Health (ICF) outlines the importance of
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30 recognising the interaction of environmental factors as a key requirement for understanding
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32 functioning and disability (21). Social inclusion is a multidimensional, dynamic relational process
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34 (22), which is not about assimilation (enabling people to fit into existing societal parameters
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36 (23) such as being housed in the community), but rather is about self-determination (24).
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38 Combating exclusion involves mitigating disadvantages, whereas facilitating inclusion is about
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40 actively creating opportunities.
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51 The role of socioeconomic factors such as education (25), employment (26,27), and care (28,29)
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53 on social inclusion are well documented. Social aspects such as interpersonal friendships and
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55 sharing of existing resources, as well as active determination of an individual's or a marginalised
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3 group's life chances, are also crucial (22). Thus as a two-way process social inclusion of people
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5 with ID should involve all stakeholders, including people with ID themselves and the general
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7 community (3).
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11 It has been argued that individuals make meaning of their life through a symbolic
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13 interactionism (30); presenting an image of themselves which they believe their audience
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15 would approve of and accept (31). People with ID may feel part of the community based on
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17 how they think others around them perceive them and how much they are able to participate
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19 in community processes in terms of their experiences. This depends on what they make of the
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21 people they interact with, or are supposed to integrate with, in a community setting. On the
22
23 other hand, people in the community are likely to accept or reject new members with ID from
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25 institutional settings depending on their personal attitudes towards people with ID (32).
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31 This review seeks to summarise the literature on how AT can facilitate the social inclusion of
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33 people with ID by focusing on the three broad tenets key to effective social inclusion:
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35 interpersonal relationships, community, and policy (33). With regards to policy, a recent study
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37 in Ireland involving people with ID (34) found that the participants felt left out of policy
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39 processes. There is a need for people with ID to be involved in the entire policy process (3).
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41 Including marginalised groups in processes that aim to promote their inclusion, both in policy
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43 and in practice, is of paramount importance (35,36).
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51 People with ID should also be involved in all initiatives aimed at improving their inclusion into
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53 the community through greater self-determination (24). But as Linehan et al. (7) pointed out,
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55 although social inclusion is the key pillar of disability policies, vagueness about the meaning of
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3 the concept persists. This in itself is an obstacle to achieving the social inclusion goals (33) of
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5 the UNCRPD and the Sustainable Development Goals. Different terms such as integration,
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7 participation and belonging (3,20) are used interchangeably to imply social inclusion. This
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9 creates obstacles to inclusion such as communication challenges between different
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11 stakeholders. Simplican et al. (37) proposed a general definition that could serve as a common
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13 meaning of social inclusion and possibly lead to standardisation of research and service
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15 provision (33), by enabling all relevant actors to imply a common goal and focus on this.
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21 The working definition of social inclusion used in this review is therefore drawn from the work
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23 of Simplican et al. (33), who define social inclusion as the interaction between interpersonal
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25 relationships and community participation. Simplican and colleagues reviewed literature on
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27 social inclusion and found that most research into social inclusion focused on interpersonal
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29 relationships or community participation, even though the wording used to express these
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31 concepts varied across different studies. Our review will use the social inclusion model (Figure
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33 1) proposed by Simplican et al. to evaluate how AT affects the various components of
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35 interpersonal relationships and community participation as umbrella themes of social inclusion.
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49 The outcomes of social inclusion to be reviewed will be informed by Simplican et al.'s ecological
50
51 pathway, which views disability and social inclusion as products of sophisticated interactions
52
53 between environmental factors, personal competencies and capability, as well as opportunities
54
55 available to the individual (20). The ecological variables outlined in Figure 2 (33) - individual,
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1
2
3 interpersonal, organisational and socio-political factors - influence social inclusion both
4
5 positively and negatively. The present review will therefore look at how AT mediates or
6
7 moderates (38) the effects of these broad variables on social inclusion of people with ID.
8
9 Different outcomes of social inclusion will thus be evaluated as outlined in Figure 2 and further
10
11 discussed in the methodology section. The aim is to explore how the new way of
12
13 conceptualising social inclusion proposed by Simplican et al. can be used to capture a more
14
15 holistic understanding of social inclusion outcomes beyond the more-often reported
16
17 socioeconomic outcomes such as integration, education (39) and access to services (24). The
18
19 ecological model was deemed relevant because it shifts conceptualisation of social inclusion
20
21 beyond acceptance and performance of dominant societal values (20). It isolates the definition
22
23 of social inclusion from the processes that lead to social inclusion and the resulting subjective
24
25 feelings from social inclusion. Using this model, both positive and negative outcomes of social
26
27 inclusion (33) will be considered. Other potential alternative models may not be relevant for
28
29 the present review because they focus on specific aspects of social inclusion such as recreation
30
31 (40) or positive relationships (41). We will explore the different levels and types of social
32
33 inclusion indicators illustrated in Figure 2.
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44 Figure 2 here

47 Assistive technology

48 Just like social inclusion, assistive technology (AT) implies different things to different people
49
50 (42–45). AT may refer to the use of various technological resources to support people with
51
52 different disabilities to obtain behavioural and social benefits and to reduce the negative
53
54 impact of their disabilities on their well-being and community participation (46). AT may also
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1
2
3 refer to a wide spectrum of devices, technological aids, strategies, services and practices whose
4
5 main objective is to improve the quality of life of people with disabilities (47). Irrespective of
6
7 what the concept may mean to different people, AT can improve functioning and independence
8
9 of people with disability, thereby promoting their well-being (43).
10

11
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13
14 AT in the context of this review refers to any product or service that can be used by a person
15
16 with a disability to overcome challenges they may face in carrying out daily activities of their
17
18 choice that would otherwise be limited by their disability. AT will also be understood through
19
20 the broad classification offered by the International Organization for Standardization [ISO
21
22 999:2011 standards] (45). ISO's classification of AT is a useful benchmark because it is
23
24 internationally recognised and used in many international systems including the European
25
26 Assistive Technology Information Network (EASTIN). Thus, AT will be understood as a
27
28 continuum of technological solutions (48). AT includes services and environmental adaptations
29
30 through inclusive design (49). AT, in this review, is inclusive of mainstream technologies as well
31
32 as those developed specifically for people with disability (50,51). AT encompasses what may be
33
34 considered as normal technological solutions for the general population such as Skype, pill
35
36 organisers, wheelchairs, Twitter or Facebook, but we acknowledge that most of these solutions
37
38 remain largely inaccessible to most people with ID. Furthermore, it could be argued that
39
40 applications such as Skype don't qualify as AT because they don't constitute provision of
41
42 immediate functionality for the person with ID (42). There is evidence suggesting that many
43
44 people with ID desire to use mainstream social media, as distinct from some type of specially
45
46 protected (restricted) platform (52). However, a recent systematic review on the use of social
47
48 media by people with ID found that safeguarding concerns, literacy and communication
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1
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3 challenges, cyber-etiquette, cyber language and problems with accessibility such as
4
5 inappropriate equipment were preventing people with ID from effectively utilising social media
6
7
8 (53).
9

10 11 Enhancing social inclusion using appropriate assistive technology

12 Previous research has shown that effective use of appropriate AT can contribute to the ongoing
13
14 deinstitutionalisation of care for people with ID, because they can enhance their independence
15
16 and community participation by reducing the need for formal support services and long-term
17
18 care (54). AT can transform what would otherwise be community care into community living
19
20
21 (see Figure 3) for people with ID (55).
22
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26
27 Figure 3 here
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33 However, the full potential of AT to enhance the social inclusion and well-being of people with
34
35 ID is yet to be realised, despite years of evidence supporting such potential (16,17,25,56). By
36
37 2017, only about 10% of all people who require AT had access (57,58), implying that access to
38
39 AT is still very low. In fact, the proportion of people with ID without access to AT is unknown
40
41
42 (59). The extent to which social exclusion has been solved for the 10% with access to AT is also
43
44 unknown. Furthermore, too much focus on AT may divert attention away from other barriers to
45
46 social inclusion, which may need addressing on their own, or indeed as part of the context of
47
48 AT. AT could also pose unintended risks to people with ID thereby hindering progress towards
49
50 their social inclusion. For example, the use of digital AT may create risks such as confidentiality
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3 concerns or cyberbullying (60). The focus on AT should not compromise the overall quality of
4
5 life of people with ID and their social inclusion goals (61)
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7

8
9 There is a need to review literature on how access to and use of AT supports social inclusion. As
10
11 illustrated in Figure 3, Owuor et al (55) pointed out that inadequate access to AT can
12
13 disempower people with ID, hindering their capacity to participate in community processes and
14
15 to form and maintain meaningful interpersonal relationships. The framework provides a
16
17 simplified way of visualising how access to AT directly impacts on the inclusion-exclusion
18
19 pathway. One possible cause of this lag between demand and supply could be the lack of
20
21 consensus on the meaning of AT. The policy context in many settings also remain unclear (62),
22
23 with most of the existing policies on AT positioning AT as an add-on to their main foci (42). Lack
24
25 of consensus of the meaning of AT (50) and how they should be provided, and to whom, makes
26
27 it difficult to effectively evaluate the use of AT for social inclusion of people with ID. Access to
28
29 AT does not eliminate the many barriers to social inclusion which vary with socioeconomic
30
31 differences within and between countries. Furthermore, people with ID compared to the
32
33 general population are highly vulnerable to multiple comorbidities (63). Thus access to and use
34
35 of AT may minimise people's risk of exclusion by moderating the impacts of their comorbidities
36
37 as well as mediate their social inclusion (38). For example, a digital glucometer can support
38
39 social inclusion of an individual with ID and diabetes by moderating their blood sugar.
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50 Apart from the needs of the users, environmental factors are key determinants of effective use
51
52 of AT. The current review will explore the reported barriers and facilitators to adoption and use
53
54 of AT as well as how the use of AT can enhance the adaptation of the people with ID to their
55
56 environment or adaptation of the environment to facilitate autonomy of people with ID. Some
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1
2
3 of the environmental factors to be explored in the review include social support, friendships,
4
5 access to services, physical environment, and availability of AT. The literature (64) suggests that
6
7 these may be key determinants of effective use of AT. The resultant information could be useful
8
9 in informing the design and provision of AT, provide insights into facilitators or barriers to
10
11 adoption of AT, and inform policy and practice on environmental considerations for successful
12
13 provision of AT. This knowledge, from other countries with diverse socioeconomic compositions
14
15 and varying levels of access to AT, may also be useful for the potential scalability and
16
17 sustainability of AT provision and use among people with ID in high income countries such as
18
19 Ireland.
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25 26 27 **Justification**

28
29 As far as we are aware, this will be the first review of literature focusing on the role of AT for
30
31 advancing social inclusion for people with ID. We expect to identify important knowledge gaps
32
33 on the supportive role of AT for social inclusion, building on previous (albeit limited) research
34
35 which has focused on socioeconomic aspects of social inclusion such as education (25),
36
37 employment (26) and access to health care (28) for people with ID. There is a need to
38
39 understand best practices for consolidating the interaction between ID, AT, community living
40
41 and social inclusion. The ecosystem model of social inclusion proposed by Simplican et al. (37)
42
43 offers a framework for reflecting these interactions.
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49 50 51 **Aim and objectives**

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53 The broad question to be answered by consolidating evidence through the proposed review is:

54
55 *Does access to and use of AT promote the social inclusion of users with ID?*
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Methods

Eligibility criteria

The criteria outlined below will be used to select studies for inclusion in the proposed review:

Study designs

- Both qualitative and quantitative studies.
- Case studies. This will include blog posts, biographies and newspapers articles focusing on individual users of AT with ID.
- Case control studies.
- Observational studies.
- Cross-sectional studies.
- Longitudinal studies.
- All forms of randomized trial.

Also to be included are:

- Studies that look at the use of AT to overcome stigma and low expectations that people with ID experience from their neighbours, professionals and general society as part of the wider social inclusion.
- Studies that consider other conceptual areas that are manifest of social inclusion such as education, employment and independent living.

The authors will also consider the fact that limited research into the role of AT in social inclusion may necessitate the inclusion of descriptive reports which may not necessarily meet the quality standards that can be effectively assessed using tools such as CASP. Furthermore,

1
2
3 most studies tend to focus on technology rather than the individual (65), a source of social
4 exclusion, hence user voices are likely to be omitted in many studies: The present review will
5 include non-peer-reviewed/published material such as blogs and other relevant grey literature.
6
7 Although formal guidelines on undertaking a systematic review provide essential knowledge
8 standards, they may lead to exclusion of vital knowledge sources which illuminate the topic
9 area reviewed but do not qualify as rigorous publications. The review will also provide a
10 platform for relevant AT user experts to inform the review. There is a need to enhance inclusion
11 of people with ID by going beyond the expectations of a standard review protocol, to include
12 the views of people with ID in a review focusing on their social inclusion.
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25 26 27 *Participants*

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29 All studies that focus on ID will be considered for inclusion. Studies that focus on participants
30 with autism or other disabilities but without a link to ID, and studies that do not explore the link
31 between AT and social inclusion of people with ID, will be excluded.
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37 38 39 *Assistive technology*

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41 AT in this review will encompass a wide range of solutions accessed and/or used by people with
42 ID from diverse backgrounds. These solutions will include AT used for communication, mobility,
43 personal safety, education, job performance, environmental adaptations and cognitive
44 functions among others. In addition, they will comprise what may be considered mainstream
45 technologies, technologies designed for people with disability, as well as technology adapted to
46 suit the needs of people with disability. As highlighted in the background section, AT means
47 different things to different people and different terminologies such as assistive products, aids,
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or assistive devices are used to refer to AT. There are many types and forms of AT that are used to enhance the lives of people with ID. The types of AT to be included in the current review will thus be dependent on those reported in the literature retrieved.

Our selection for inclusion will be informed by a general definition of AT as any product, solution or service that can be used by or for persons with disability to overcome challenges they may face in carrying out daily activities of their choice that would otherwise be limited by their personal or environmental factors, but not necessarily due to their ID.

Intervention

As outlined above, the intervention in this review is access to and use of AT for promoting social inclusion or for enabling functional or behavioural accomplishments that lead to social inclusion for people with ID (community participation or interpersonal relationships). Our focus will be on the use of AT in a very broad sense, with a focus on social inclusion of people with ID. These will include, for example, studies exploring the role of information and communication technology (ICT) on social inclusion of people with ID or studies exploring the role of inclusive design in social inclusion of people with ID.

Comparators

For studies that explore different interventions, at least one of them must be AT. The review will also explore the type of ID reported in the studies we retrieve to compare outcome of AT in relation to this variable. For those studies comparing different groups of participants, at least one group should be people with ID (mild, medium, severe or profound) for the study to be

1
2
3 included in our review. Additionally, we will also look for studies comparing settings (low,
4
5 middle or high income settings, or urban/rural comparisons)
6
7

8 9 *Outcomes*

10
11 To assess social inclusion outcomes, such as behavioural and social benefits of using AT
12
13 reported by the relevant studies, we will use the social inclusion model proposed by Simplican
14
15 et al. (33). This model looks at social inclusion from the interpersonal relationship and
16
17 community participation domains, as illustrated in Figure 4.
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22 Figure 4 here
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26 We will include any study that reports on the following:
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28 29 *Interpersonal relationships*

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- 32 • **Category** - we will look at the people in the social network of a person with ID such as
33 family members, friends, keyworkers/carers, acquaintances or intimate relationships.
34
35 The focus here will be on how AT facilitates bonding (relationships between people with
36
37 shared commonality) and bridging (bringing people with diverse background and
38
39 experience together) (66).
40
41
 - 42 • **Structure** - we will explore studies reporting on interpersonal relationships that focus on
43
44 issues like the length of the relationships, location of social interactions and frequency
45
46 of contacts. We will look for studies reporting on how AT can enhance reciprocity,
47
48 intensity formality and complexity of interpersonal relationships. We will also consider
49
50 studies investigating social networks in four broad dimensions: size, homogeneity,
51
52 geographical location, and density.
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- **Function** - we will therefore include studies that explore how AT enhances functional value of interpersonal relationships; emotional, informational, and instrumental.

Community participation

We will consider studies reporting on three different aspects of community participation:

- **Category** - those reporting on the types of community activities such as leisure, hobbies, civic activities, productive activities such as employment and education, consumption activities such as access to goods and services, and religion and cultural activities and groups.
- **Structure** - this review is done in the context of ongoing deinstitutionalisation of care for people with ID in many high-income nations such as Ireland, Germany and Spain. The review will provide evidence that can inform deinstitutionalisation practice and policy in these countries. In other high income countries, such as the USA and UK, deinstitutionalisation of care for people with ID is a long-established standard of care and may facilitate the use of evidence. In many low-income countries, institutionalised care has never been a standard care practice for people with ID and the evidence from this review may at least initiate the debate about the need to improve access to and use of AT. The review will evaluate papers reporting how AT affects the engagement of people with ID in community activities in independent community living, semi-independent community living and smaller institutional care in community settings. It is also important to cyber community settings in the review.

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- **Level of involvement** - we acknowledge that people generally have different levels of involvement in their communities which can be categorised as encounter, participation or presence. We will therefore review literature that reports on how AT facilitates different levels of involvement by people with ID.

14 We will also look for papers that report on a mixture of components of the two broad domains
15 outlined above (interpersonal relationships and community participation), because in real life
16 the two domains interact with each other.
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21 *Date range*

22 We will include all studies carried out between 2006 and 2017; 2006 was chosen as the start
23 date as it was the year when the CRPD was internationally adopted. This review will explore the
24 potential impact of access to and use of AT for social inclusion of people with ID in the context
25 of the global focus on the CRPD. Although the CRPD has not been ratified in countries such as
26 Ireland, its principles are bound to impact on AT and social inclusion policies and practice. We
27 will also include studies in press.
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40 *Language*

41 We will retrieve studies reported in English. We will also include, as appendices, any papers
42 which meet the inclusion criteria and are published in other languages. However, they should
43 have abstracts or titles in English in order to be considered. We will include such studies with
44 English abstracts into the analysis if they can be easily translated into English using Google
45 Translate. Studies with English headings or abstracts, but that cannot be translated into English,
46 will remain as appendices.
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Setting

Studies from all settings, geographical and socioeconomic, will be included in the study. However, as studies published in languages other than English from non-English speaking countries will be excluded, such settings may be excluded based on language restriction.

Information sources

Different terms that are used to refer to AT, ID and social inclusion will be used to construct the search strategy. As outlined in the background, all three key concepts (AT, ID and social inclusion) can imply different meanings to different authors. Medical Subject Headings (MeSH) and other controlled vocabularies used by the different databases will be used, through thesaurus searches, to develop a comprehensive search strategy.

The following data sources will be used and more will be included through citation tracking as data is retrieved: MEDLINE, ERIC, PsycINFO, AMED, CINAHL, Scopus, Academic Search Complete, Web of Science, ASSIA, the Cochrane CENTRAL Register, and the Campbell Collaboration Register. Prospective registers of research (review and trials registers) and institutional/organisational databases such as that of the World Health Organization will also be searched. The authors will manually search the websites of various organisations with a stake in AT and blogs by expert users of AT with ID. Such organisations include the European Assistive Technology Information Network (EASTIN), the Assistive Technology Industry Association (ATIA), the British Assistive Technology Association (BATA), the Academic Network of European Disability Experts (ANED), Enable Ireland, Disability Federation Ireland, the Association for Advancement of Assistive Technology in Europe (AAATE), OpenGrey, GreySource, the Grey

1
2
3 Literature Report, and many others. We will also search for publications from government or
4
5
6 statutory departments and non-governmental organisations. All the literature will be restricted
7
8
9 to English as outlined above, with a focus on AT, ID and social inclusion.

10
11 The reference lists of all articles retrieved for full text screening will be reviewed to check if
12
13 there are any relevant sources that were not retrieved by the primary search. 'Author tracking'
14
15 will also be carried out to find out if all the work of the authors whose work meet the inclusion
16
17 criteria are captured through the prior electronic searches. Time permitting, we will share the
18
19 list of the final articles for inclusion within the GATE (Global Cooperation of on Assistive
20
21 Technology) and ASSISTID/DOCTRID (Assistive Technologies for people with Intellectual
22
23 Disability and Autism/Daughters of Charity-Technology Research into Disability Research
24
25 Institute) networks and with other experts in the field of ID and social inclusion or AT and ID.
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32 **Search strategy**

33 All peer-reviewed studies as well as publicly accessible reports and PhD theses will be searched
34
35 using keyword searches in the relevant databases. The keywords around which comprehensive
36
37 search will be developed are social inclusion, AT and ID. The initial search strategies are
38
39 reproduced below. The final search strategy, to be developed with support from systematic
40
41 review experts and information specialists, will be reviewed and approved by the project team
42
43 and an expert in systematic reviews. The search strategies will be revised, if necessary, to
44
45 include any subject heading or free text terms found in eligible articles.
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ASSIA

(AB,TI((Intellectual* OR mental* OR Developmental* OR learning) NEAR/2 (disable* OR disabilit* OR disorder* OR impairment* OR retard* OR handicap* OR defici* OR impair* OR dysfunction OR defect*)) AND yr(2006-2017)) AND ((AB,TI((Social) NEAR/2 (integrat* OR involve* OR inclusion OR inclusive OR support*) OR (belong* OR participat* OR access* OR relat* OR accept* OR independen* OR employ* OR educat* OR wellbeing OR "social networks" OR "community living" OR "universal design")) OR SU.EXACT("Social integration"))) AND yr(2006-2017)) AND (AB,TI((Assistive OR "self help" OR "daily living" OR rehabilitat*) NEAR/2 (technolog* OR device* OR equipment OR product* OR aid* OR applicat* OR software OR augmented OR Information)) AND (pd(20060101-20170531) AND yr(2006-2017)))

Web of Science

(Assistive OR "self help" OR "daily living" OR rehabilitat*) NEAR/2 (technolog* OR device* OR equipment OR product* OR aid*) AND (Intellectual* OR mental* OR Developmental* OR learning) NEAR/2 (disab* OR disorder* OR impairment* OR retard* OR handicap* OR defici* OR impair* OR dysfunction OR defect*)) AND (Social) NEAR/2 (integrati* OR inclusion OR support) OR (belong* OR participat* OR accessib* OR "universal design")

MEDLINE (EBSCO)

TI((Intellectual* OR mental*) N2 (disable* OR disabilit* OR disorder* OR impairment* OR retard* OR handicap* OR defici* OR impair* OR dysfunction OR defect*)) OR AB ((Intellectual* OR developmental* OR mental* OR learning) N2 (disable* OR disabilit* OR disorder* OR impairment* OR retard* OR handicap* OR defici* OR impair* OR dysfunction OR defect*)) OR

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2
3 MH "Intellectual Disability+) AND (TI((Assistive OR "self help" OR "daily living" OR rehabilitat*)
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6 N2 (technolog* OR device* OR equipment OR product* OR aid*)) OR AB((Assistive OR 'self help'
7
8 OR "daily living" OR rehabilitat*) N2 (technolog* OR device* OR equipment OR product* OR
9
10 aid*)) OR (TI("technical aid" OR "cognitive aid" OR "universal design") OR AB("technical aid" OR
11
12 "cognitive aid" OR "universal design") AND ((Social) NEAR/2 (integrati* OR inclusion OR
13
14 support) OR (belong* OR participat* OR accessib* OR "universal design") OR ((augmented OR
15
16 communication) NEAR/2 technology) OR (MM "Communication Aids for Disabled")
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20 21 *ERIC (EBSCO)*

22
23
24 ((AB,TI((Intellectual* OR mental* OR learning OR developmental*) NEAR/2 (disable* OR
25
26 disabilit* OR disorder* OR impairment* OR retard* OR handicap* OR defici* OR impair* OR
27
28 dysfunction OR defect*)) OR SU.EXACT.EXPLODE("Mental Retardation")) AND
29
30 (SU.EXACT.EXPLODE("Assistive Technology") OR AB,TI((Assistive OR "self help" OR "daily living"
31
32 OR rehabilitat*) NEAR/2 (technolog* OR device* OR equipment OR product* OR aid*)) OR
33
34 AB,TI(("technical aid" OR "cognitive aid" OR "universal design")))) AND
35
36 (SU.EXACT.EXPLODE("Inclusion") OR (social NEAR/2 (inclusion OR integration OR assimilation
37
38 OR participation OR engagement OR potential OR opportunity OR opportunities)))
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45 We will also hand-search individual journals from which at least two relevant studies have been
46
47 selected for inclusion in the review, to check for other relevant articles that might have been
48
49 missed, for example due to the date of journal coverage in the databases. As well as checking
50
51 the references of the included articles (67), we will also check for any relevant articles citing the
52
53 selected studies, to try to identify additional relevant material.
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Data management

JO and GF will independently search and retrieve all relevant data using the search terms and the final search strategy to be developed. All retrieved data will be imported into EndNote software for deduplication. JO will then export the data to the Covidence application for screening at title/abstract level and subsequent full text screening, risk of bias assessment and data extraction. JO will carry out data screening in Covidence. Some of the key information to be considered for data screening and extraction includes the citation in full, participants' demographics (age, gender, ethnicity, socioeconomic status, level of ID, etc.), study setting (country, locality, urban/rural), study method, duration of intervention, type of intervention (assistive technology), and study quality.

Quality and risk of bias appraisal

We will use Critical Appraisal Skills Programme (CASP) tools (68) as a basis to assess the quality of the literature retrieved. When appropriate, we will adapt the tools to fit our needs. Depending on the studies retrieved, a Mixed Methods Appraisal Tool (69) may be used to assess the methodology of the studies. Content from theses, conferences presentations, blog posts, biographies and newspapers articles, if included in the final sample, will be assessed on an individual basis using, for example, audience measurement (69). All these rankings will be relative to the subject area of the source. The team will decide on the most appropriate tools to use for each type of study when the potentially eligible studies have been identified. JO will then rate the retrieved papers separately and compare the rankings with BK. FL will cross-check any differences between JO and BK's assessments, to facilitate consensus.

Data selection

JO and GF will apply the inclusion criteria and search strategy outlined above, with data exported to Covidence for screening. Other members of the team will cross-check the data retrieved to ensure reliability and validity of the data retrieval and screening process. After the initial screening by JO at title/abstract level is complete, eligible full text articles will be shared with the rest of the team to review. Any articles that seem relevant but lacking some key information during full text screening will be complemented by seeking clarification from the authors. We will contact authors of the identified missing data by email; use of email has been shown to result in timely responses by the relevant authors when the requests are clear (70). Any lack of consensus between the authors during the data screening process will be resolved through deliberations and coming to a consensus on whether to include the paper in question. JO will document this process.

Data analyses

We will analyse studies depending on the methodology used for the study. For example, we will analyse qualitative studies separately from quantitative studies, survey studies, in-depth interview studies, quantitative group design versus single subject quantitative designs. After the separate analyses, a narrative or thematic synthesis will be done for each group of studies, and develop an overall theme from the review.

Sub-groups analyses

We will carry out overall data analyses to explore the emerging themes and the findings will determine the ultimate categorisation. The following examples are some of the common categories reported in the literature.

- Intellectual disability - low, medium, severe or profound.
- Gender - males and females.
- Geographical location (country, region, etc.) where possible.
- Age - youth, adolescents, adults – generally young people versus adults (15-18, 18 and older).
- Type of AT - (communication, mobility, educational, etc.).
- Setting - community setting, institutional, work place, educational setting, etc.).

Dissemination plans

We aim to publish at least one peer-reviewed journal article, with the possibility to publish others depending on the findings we derive from the sub-group analyses outlined above. We will also present the findings at conferences and seminars, to the internal audience at Trinity College Dublin, within the ASSISTID research programme, and within the GATE community. We also aim to produce a briefing paper for service providers such as DOC services and policy makers in Ireland.

References

1. WHO. Definition: intellectual disability [Internet]. Mental Health; Health topics. 2017. Available from: <http://www.euro.who.int/en/health-topics/noncommunicable-diseases/mental-health/news/news/2010/15/childrens-right-to-family-life/definition-intellectual-disability>
2. Beadle-Brown J, Mansell J, Kozma A. Deinstitutionalization in intellectual disabilities. *Curr Opin Psychiatry*. 2007;20(5):437–42.
3. Overmars-Marx T, Thomése F, Verdonschot M, Meininger H. Advancing social inclusion in the neighbourhood for people with an intellectual disability: an exploration of the literature. *Disabil Soc* [Internet]. 2014 Feb 7 [cited 2014 Dec 20];29(2):255–74. Available from: <http://dx.doi.org/10.1080/09687599.2013.800469>
4. Mansell J. Deinstitutionalisation and community living: progress, problems and priorities. *J Intellect Dev Disabil*. 2006;31:65–76.
5. Kozma A, Mansell J, Beadle-Brown J, Emerson E. Outcomes in different residential settings for people with intellectual disability: a systematic review. *Am J Intellect Dev Disabil*. 2009;114(3):193–222.
6. Tatlow-Golden M, Linehan C, O'Doherty S, Craig S, Kerr M, Lynch C, et al. *Living Arrangement Options for People with Intellectual Disability: A Scoping Review*. Dublin Trinity Coll Dublin. 2014;
7. Linehan C, O'Doherty S, Tatlow-Golden M, Craig S, Kerr M, Lynch C, et al. *Mapping the National Disability Policy Landscape* [Internet]. Dublin: School of Social Work and Social Policy, Trinity College Dublin.; 2014. Available from: <http://socialwork-socialpolicy.tcd.ie/moving-ahead/project.php>
8. Bigby C, Ozanne E. Shifts in the model of service delivery in intellectual disability in Victoria. *J Intellect Dev Disabil*. 2001 Jan 1;26:177–90.

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9. United Nations. The Universal Declaration of Human Rights (UDHR) [Internet]. United Nations. 1948 [cited 2017 Aug 17]. Available from: <http://www.un.org/en/universal-declaration-human-rights/>
10. United Nations. Convention the Rights of Persons with Disabilities [Internet]. Convention the Rights of Persons with Disabilities. 2006 [cited 2016 Oct 6]. Available from: <http://www.un.org/disabilities/convention/conventionfull.shtml>
11. Kumar A, Singh RR, Thressiakutty AT. Normalization vs. Social Role Valorization: Similar or Different? *Int J Spec Educ*. 2015 Jan 1;30(3):71–8.
12. United Nations. Convention on the Rights of Persons with Disabilities [Internet]. Division for Social Policy and Development Disability. 2017 [cited 2017 Mar 16]. Available from: <https://www.un.org/development/desa/disabilities/convention-on-the-rights-of-persons-with-disabilities.html>
13. Klimczuk A. Social Inclusion of People with Disabilities: National and International Perspectives by Arie Rimmerman. *Hum Rights Rev*. 2015 Dec;16(4):397–9.
14. United Nations. Sustainable Development Goals [Internet]. Sustainable Development. Knowledge Platform. 2015 [cited 2015 Dec 16]. Available from: <https://sustainabledevelopment.un.org/?menu=1300>
15. World Health Organization. WHO Global Disability Action Plan, 2014-2021: Better Health for All People with Disability [Internet]. 2015. 32 p. Available from: http://apps.who.int/iris/bitstream/10665/199544/1/9789241509619_eng.pdf?ua=1
16. Guha S. Role of Educational Technology in Making Normalization Through Digital Inclusion a Reality for Children With Disabilities. *Indian J Appl Res* [Internet]. 2016;5(6). Available from: <https://worldwidejournals.in/ojs/index.php/ijar/article/view/8491>
17. Young MC, Courtad CA. Inclusion and Students with Learning Disabilities. In: *General and Special Education Inclusion in an Age of Change: Impact on Students with Disabilities* [Internet]. Emerald Group Publishing Limited; 2016 [cited 2016 Nov 8]. p. 13–29. (Advances in Special Education; vol. 31). Available from: <http://dx.doi.org/10.1108/S0270-401320160000031002>
18. Cobigo V, Hall H. Social Inclusion and Mental Health. *Curr Opin Psychiatry*. 2005;23:453–7.
19. Ali A, King M, Strydom A, Hassiotis A. Self-reported stigma and its association with socio-demographic factors and physical disability in people with intellectual disabilities: results from a cross-sectional study in England. *Soc Psychiatry Psychiatr Epidemiol*. 2016;51(3):465–74.

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20. Cobigo V, Ouellette-Kuntz H, Lysaght R, Martin L. Shifting our conceptualization of social inclusion. *Stigma Res Action* Vol 2 No 2 2012 Spring [Internet]. 2012 [cited 2012 Jan 1]; Available from: <http://stigmaj.org/article/view/45>
 21. World Health Organization. International classification of functioning, disability, and health : ICF. Version 1.0. Geneva : World Health Organization, [2001] ©2001; 2001.
 22. Díaz Andrade A, Doolin B. INFORMATION AND COMMUNICATION TECHNOLOGY AND THE SOCIAL INCLUSION OF REFUGEES. *MIS Q.* 2016 Jun;40(2):405–16.
 23. Ratcliffe P. Is the assertion of minority identity compatible with the idea of a socially inclusive society. *Soc Incl Possibilities Tens.* 2000;169–85.
 24. Maidment J, Macfarlane S. 2.7 Debating the capacity of information and communication technology to promote inclusion. In: *Theorising Social Exclusion* [Internet]. 2009. p. 95. Available from: https://books.google.ie/books?hl=en&lr=&id=YhiPAgAAQBAJ&oi=fnd&pg=PA95&dq=Maidment+and+Macfarlane+2009+self+determination&ots=OKMU-Qcith&sig=dhRBvPeNSmT56HdiikweavqUNLo&redir_esc=y#v=onepage&q&f=false
 25. Sarkar R. Assistive technology and devices: A boon to promote quality education among children with mild intellectual disability in inclusive set up. National seminar on Assistive Technology in Education and Sports for Total Inclusion of Persons with Disability; 2015 Feb 6; Ramakrishna Mission Vivekananda University, Coimbatore.
 26. Yeager P, Kaye SH, Reed M, Doe TM. Assistive technology and employment: experiences of Californians with disabilities. *Work.* 2006;27.
 27. Walsh E, Holloway J, McCoy A, Lydon H. Technology-Aided Interventions for Employment Skills in Adults with Autism Spectrum Disorder: A Systematic Review. *Rev J Autism Dev Disord.* 2016;1–14.
 28. Davis T. Transforming the outpatient experience through the use of assistive technology. *Int J Integr Care.* 2014;14(8).
 29. Saborowski M, Kollak I. “How do you care for technology?” – Care professionals’ experiences with assistive technology in care of the elderly. *Sci Technol “Grand Challenge” Ageing.* 2015 Apr;93:133–40.
 30. Blumer H. *Symbolic interactionism: Perspectives and methods.* Los Angeles, CA: University of California Press; 1990.
 31. Mead GH. *Mind, Self and Society. From the standpoint of a social behaviourist.* Morris CW, editor. Chicago, IL: University of Chicago Press; 1934. (Works of George Herbert Mead Volume 1; vol. 1).

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32. Lacono T, Lyon K, Johnson H, West D. Experiences of adults with complex communication needs receiving and using low tech AAC: an Australian context*. *Disabil Rehabil Assist Technol*. 2013 Sep;8(5):392–401.
 33. Simplican SC, Leader G, Kosciulek J, Leahy M. Defining social inclusion of people with intellectual and developmental disabilities: An ecological model of social networks and community participation. *Res Dev Disabil* [Internet]. 2015 Mar;38(0):18–29. Available from: <http://www.sciencedirect.com/science/article/pii/S0891422214004223>
 34. Inclusive Research Network. *Where we live: A national study done by members of the Inclusive Research Network through surveys*. 2010.
 35. Huss T, MacLachlan M. *Equity and Inclusion in Policy Processes (EquiPP) : a framework to support equity & inclusion in the process of policy development, implementation and evaluation* [Internet]. Dublin: Global Health Press; 2016. 58 p. Available from: <http://library.catalogue.tcd.ie/record=b16839480>
 36. MacLachlan M, Manna H, Huss T, Munthali A, Amin M. Policies and Processes for Social Inclusion: Using EquiFrame and EquiPP for Policy Dialogue; Comment on “Are Sexual and Reproductive Health Policies Designed for All? Vulnerable Groups in Policy Documents of Four European Countries and Their Involvement in Policy Development”. *Int J Health Policy Manag*. 2016;5(3):193–6.
 37. Simplican SC, Leader G, Kosciulek J, Leahy M. Defining social inclusion of people with intellectual and developmental disabilities: An ecological model of social networks and community participation. *Res Dev Disabil*. 2015;38:18–29.
 38. Tebbutt E, Brodmann R, Borg J, MacLachlan M, Khasnabis C, Horvath R. Assistive products and the Sustainable Development Goals (SDGs). *Glob Health*. 2016;12(1):79.
 39. Browning P, Nave G, White WAT, Barkin P zembrosky. Interactive video as an Instructional Technology for Handicapped Learners: A Development and Research Program. *Aust N Z J Dev Disabil*. 1985 Jan 1;11(3):123–8.
 40. King G, Lawm M, King S, Rosenbaum P, Kertoy MK, Young NL. A Conceptual Model of the Factors Affecting the Recreation and Leisure Participation of Children with Disabilities. *Phys Occup Ther Pediatr*. 2003 Jan 1;23:63–90.
 41. Johnson H, Douglas J, Bigby C, Iacono T. A model of processes that underpin positive relationships for adults with severe intellectual disability. *J Intellect Dev Disabil*. 2012 Dec 1;37:324–36.
 42. Cullen K, McAneney D, Dolphin C, Delaney S, Stapleton P. *Research on the provision of Assistive Technology in Ireland and other countries to support independent living across the life cycle* [Internet]. Dublin: National Disability Authority (NDA); 2012 [cited 2017 Apr

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2
3
4 19] p. 175. Available from:
5 <http://nda.ie/File-upload/Research-on-the-provision-of-Assistive-Technology1.pdf>
6
7 43. GATE. Assistive technology; Fact sheet [Internet]. Media centre. 2016 [cited 2016 Jul 28].
8 Available from: <http://www.who.int/mediacentre/factsheets/assistive-technology/en/>
9
10 44. Camlin CS, Seeley J, Viljoen L, Vernooij E, Simwinga M, Reynolds L, et al. Strengthening
11 universal HIV ‘test-and-treat’ approaches with social science research. *AIDS Lond Engl*.
12 2016 Mar 27;30(6):969–70.
13
14 45. ISO 9999:2011(en). ISO 9999:2011(en) Assistive products for persons with disability —
15 Classification and terminology [Internet]. ISO Online Browsing Platform (OBP). 2016.
16 Available from: <https://www.iso.org/obp/ui/#iso:std:iso:9999:ed-5:v1:en>
17
18 46. Lancioni GE, Singh NN, O’Reilly MF, Sigafoos J, Oliva D. Assistive Technology for People
19 with Severe/Profound Intellectual and Multiple Disabilities. In: *Assistive Technologies for*
20 *People with Diverse Abilities*. Springer; 2014. p. 277–313.
21
22 47. Daughters of Charity. Assistive Technology [Internet]. Daughters of Charity Disability
23 Services. 2012 [cited 2016 Oct 9]. Available from:
24 <http://www.docservice.ie/assistive-technology.aspx>
25
26 48. Andrich R, Mathiassen N-E, Hoogerwerf E-J, Gelderblom GJ. Service delivery systems for
27 assistive technology in Europe: An AAATE/EASTIN position paper. *Technol Disabil*.
28 2013;25:127–46.
29
30 49. Waller S, Bradley M, Hosking I, Clarkson PJ. Making the case for inclusive design. *Appl*
31 *Ergon*. 2015 Jan 2;46:297–303.
32
33 50. Cook AM, Polgar JM. Assistive technologies: Principles and practice [Internet]. Elsevier
34 Health Sciences; 2014 [cited 2017 Apr 19]. Available from:
35 https://books.google.ie/books?hl=en&lr=&id=ODWaBQAAQBAJ&oi=fnd&pg=PP1&dq=assistive+technology+social+inclusion&ots=IE89XsvPY7&sig=98ilVd2V_1jUOA6h34qHqcdR46M&redir_esc=y#v=onepage&q=assistive%20technology%20social%20inclusion&f=false
36
37 51. Savage MN, Taber-Doughty T. Self-operated auditory prompting systems for individuals
38 with intellectual disability: A meta-analysis of single-subject research. *J Intellect Dev*
39 *Disabil*. 2016 Sep 21;1–10.
40
41 52. Bühler C, Dirks S, Nietzio A. Easy Access to Social Media: Introducing the Mediata-App. In
42 Springer; 2016. p. 227–33.
43
44 53. Caton S, Chapman M. The use of social media and people with intellectual disability: A
45 systematic review and thematic analysis. *J Intellect Dev Disabil*. 2016 Apr 2;41(2):125–39.
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54. Hft. Using personalised technology to enable transition - How personalised technology, including assistive technology and telecare, has enabled the transition from registered care to supported living for individuals with learning disabilities. *J Assist Technol*. 2010;4(4):46–50.
 55. Owuor JO., Larkan F, MacLachlan M. Leaving no-one behind: using assistive technology to enhance community living for people with intellectual disability. *Disabil Rehabil Assist Technol* [Internet]. 2017; Available from: <http://www.tandfonline.com/doi/pdf/10.1080/17483107.2017.1312572>
 56. Seelman KD. Assistive technology policy: A road to independence for individuals with disabilities. *J Soc Issues*. 1993;49(2):115–36.
 57. Khasnabis C, MacLachlan M, Mirza Z. Opening the GATE to inclusion for people with disabilities. *Lancet* [Internet]. 2015;386. Available from: [http://dx.doi.org/10.1016/S0140-6736\(15\)01093-4](http://dx.doi.org/10.1016/S0140-6736(15)01093-4)
 58. WHO. Assistive devices and technologies [Internet]. Disability and rehabilitation. 2017 [cited 2017 Mar 17]. Available from: <http://www.who.int/disabilities/technology/en/>
 59. Boot FH, Dinsmore J, Khasnabis C, MacLachlan M. Intellectual Disability and Assistive Technology: opening the GATE wider. *Front Public Health*. 2017;5:10.
 60. Schultze-Krumbholz A, Scheithauer H. Cyberbullying. In: Gullotta TP, Plant RW, Evans MA, editors. *Handbook of Adolescent Behavioral Problems* [Internet]. Springer US; 2015. p. 415–28. Available from: http://dx.doi.org/10.1007/978-1-4899-7497-6_22
 61. McNaughton D, Light J. The iPad and Mobile Technology Revolution: Benefits and Challenges for Individuals who require Augmentative and Alternative Communication. *Augment Altern Commun* [Internet]. 2013 Jun 1 [cited 2015 Feb 11];29(2):107–16. Available from: <http://dx.doi.org/10.3109/07434618.2013.784930>
 62. Borg J, Lindström A, Larsson S. Assistive technology in developing countries: national and international responsibilities to implement the Convention on the Rights of Persons with Disabilities. *The Lancet*. 2009;374(9704):1863–5.
 63. McCarron M, Swinburne J, Burke E, McGlinchey E, Carroll R, McCallion P. Patterns of multimorbidity in an older population of persons with an intellectual disability: Results from the intellectual disability supplement to the Irish longitudinal study on aging (IDS-TILDA). *Res Dev Disabil*. 2013 Jan;34(1):521–7.
 64. Verdonschot MML, De Witte LP, Reichrath E, Buntinx WHE, Curfs LMG. Impact of environmental factors on community participation of persons with an intellectual disability: a systematic review. *J Intellect Disabil Res* [Internet]. 2009;53(1):54–64. Available from: <http://dx.doi.org/10.1111/j.1365-2788.2008.01128.x>

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65. Pal J, Viswanathan A, Chandra P, Nazareth A, Kameswaran V, Subramonyam H, et al. Agency in assistive technology adoption: Visual impairment and smartphone use in Bangalore. In ACM; 2017. p. 5929–40.
66. Hawkins RL, Maurer K. Bonding, bridging and linking: how social capital operated in New Orleans following Hurricane Katrina. *Br J Soc Work*. 2010;40(6):1777–93.
67. Horsley T, Dingwall O, Sampson M. Checking reference lists to find additional studies for systematic reviews. *Cochrane Database Syst Rev* [Internet]. 2011;(8). Available from: <http://dx.doi.org/10.1002/14651858.MR000026.pub2>
68. Critical Appraisal Skills Programme (CASP). CASP Checklists [Internet]. 2014. Available from: <http://www.casp-uk.net/casp-tools-checklists>
69. Pace R, Pluye P, Bartlett G, Macaulay AC, Salsberg J, Jagosh J, et al. Mixed Methods Appraisal Tool—2011 Version. *PsycTESTS* [Internet]. 2012; Available from: <http://elib.tcd.ie/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=pst&AN=9999-21090-000&site=eds-live&scope=site>
70. Young T, Hopewell S. Methods for obtaining unpublished data. *Cochrane Database Syst Rev* [Internet]. 2011;(11). Available from: <http://dx.doi.org/10.1002/14651858.MR000027.pub2>

Figure legends

FIGURE 1: SOCIAL INCLUSION MODEL (33).

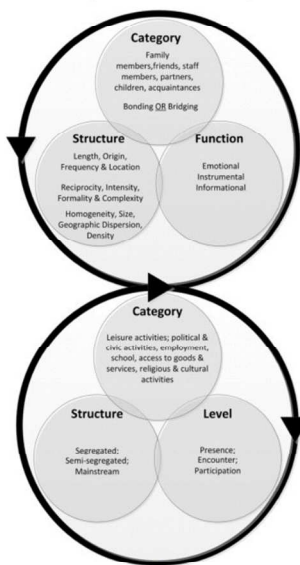
FIGURE 2: ECOLOGICAL PATHWAY TO AND FROM SOCIAL INCLUSION BY SIMPLICAN ET AL. (33).

FIGURE 3: FRAMEWORK FOR AT ENHANCED SOCIAL INCLUSION FOR PEOPLE WITH ID (55).

FIGURE 4: ILLUSTRATING SIMPLICAN ET AL.'S ECOSYSTEM SOCIAL INCLUSION CONTINUUM (33).

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Interpersonal Relationships

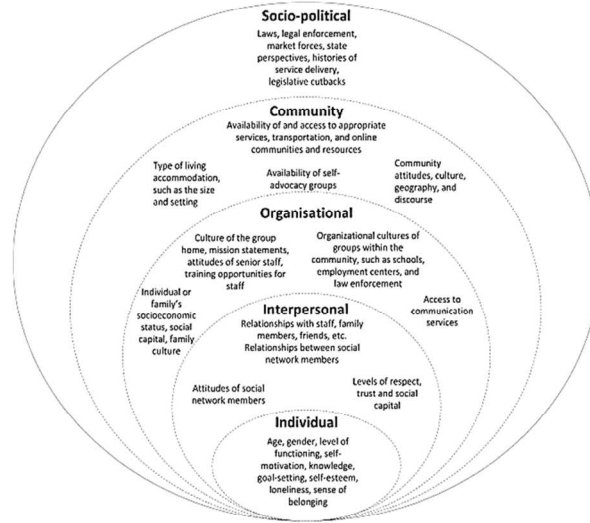


Community Participation

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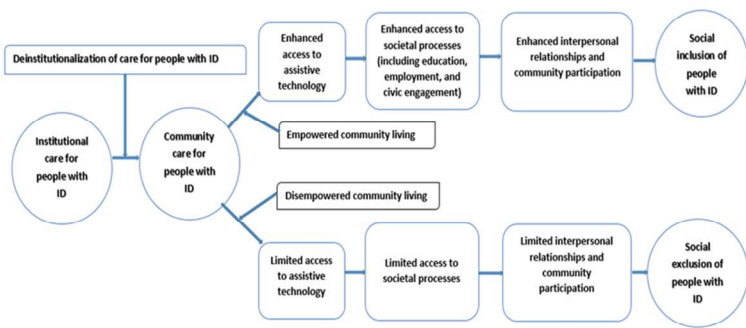
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Review only

PRISMA-P (Preferred Reporting Items for Systematic review and Meta-Analysis Protocols) 2015 checklist: recommended items to address in a systematic review protocol*

Section and topic	Item No	Checklist item	Page No
ADMINISTRATIVE INFORMATION			
Title:			1
Identification	1a	Identify the report as a protocol of a systematic review	1
Update	1b	If the protocol is for an update of a previous systematic review, identify as such	1
Registration	2	If registered, provide the name of the registry (such as PROSPERO) and registration number	1
Authors:			1
Contact	3a	Provide name, institutional affiliation, e-mail address of all protocol authors; provide physical mailing address of corresponding author	1-2
Contributions	3b	Describe contributions of protocol authors and identify the guarantor of the review	2
Amendments	4	If the protocol represents an amendment of a previously completed or published protocol, identify as such and list changes; otherwise, state plan for documenting important protocol amendments	2
Support:			
Sources	5a	Indicate sources of financial or other support for the review	2
Sponsor	5b	Provide name for the review funder and/or sponsor	3
Role of sponsor or funder	5c	Describe roles of funder(s), sponsor(s), and/or institution(s), if any, in developing the protocol	3
INTRODUCTION			6-17
Rationale	6	Describe the rationale for the review in the context of what is already known	17
Objectives	7	Provide an explicit statement of the question(s) the review will address with reference to participants, interventions, comparators, and outcomes (PICO)	18
METHODS			
Eligibility criteria	8	Specify the study characteristics (such as PICO, study design, setting, time frame) and report characteristics (such as years considered, language, publication status) to be used as criteria for eligibility for the review	18-25
Information sources	9	Describe all intended information sources (such as electronic databases, contact with study authors, trial registers or other grey literature sources) with planned dates of coverage	25-26
Search strategy	10	Present draft of search strategy to be used for at least one electronic database, including planned limits, such that it could be repeated	26-28

Study records:			
Data management	11a	Describe the mechanism(s) that will be used to manage records and data throughout the review	28-
Selection process	11b	State the process that will be used for selecting studies (such as two independent reviewers) through each phase of the review (that is, screening, eligibility and inclusion in meta-analysis)	30
Data collection process	11c	Describe planned method of extracting data from reports (such as piloting forms, done independently, in duplicate), any processes for obtaining and confirming data from investigators	30
Data items	12	List and define all variables for which data will be sought (such as PICO items, funding sources), any pre-planned data assumptions and simplifications	18-25
Outcomes and prioritization	13	List and define all outcomes for which data will be sought, including prioritization of main and additional outcomes, with rationale	21-24
Risk of bias in individual studies	14	Describe anticipated methods for assessing risk of bias of individual studies, including whether this will be done at the outcome or study level, or both; state how this information will be used in data synthesis	29
Data synthesis	15a	Describe criteria under which study data will be quantitatively synthesised	30
	15b	If data are appropriate for quantitative synthesis, describe planned summary measures, methods of handling data and methods of combining data from studies, including any planned exploration of consistency (such as I^2 , Kendall's τ)	N/A
	15c	Describe any proposed additional analyses (such as sensitivity or subgroup analyses, meta-regression)	N/A
	15d	If quantitative synthesis is not appropriate, describe the type of summary planned	30
Meta-bias(es)	16	Specify any planned assessment of meta-bias(es) (such as publication bias across studies, selective reporting within studies)	
Confidence in cumulative evidence	17	Describe how the strength of the body of evidence will be assessed (such as GRADE)	19

*** It is strongly recommended that this checklist be read in conjunction with the PRISMA-P Explanation and Elaboration (cite when available) for important clarification on the items. Amendments to a review protocol should be tracked and dated. The copyright for PRISMA-P (including checklist) is held by the PRISMA-P Group and is distributed under a Creative Commons Attribution Licence 4.0.**

From: Shamseer L, Moher D, Clarke M, Ghersi D, Liberati A, Petticrew M, Shekelle P, Stewart L, PRISMA-P Group. Preferred reporting items for systematic review and meta-analysis protocols (PRISMA-P) 2015: elaboration and explanation. BMJ. 2015 Jan 2;349(jan02 1):g7647.

BMJ Open

Does assistive technology contribute to social inclusion for people with intellectual disability? A systematic review protocol

Journal:	<i>BMJ Open</i>
Manuscript ID	bmjopen-2017-017533.R2
Article Type:	Protocol
Date Submitted by the Author:	23-Oct-2017
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Primary Subject Heading:	Mental health
Secondary Subject Heading:	Global health, Health policy, Health services research, Public health, Qualitative research
Keywords:	Assistive technology, Social inclusion, Intellectual disability, Interpersonal relationships, Community participation

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Does assistive technology contribute to social inclusion for people with intellectual disability? A systematic review protocol

Registration

This protocol is registered with the International Prospective Register of Systematic Reviews (PROSPERO) (registration number CRD42017065447).

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7

8 9 **Contributions**

10 JO is the guarantor of the review and drafted the manuscript. GF and GS led the technical
11 development of the methodology. FL, BK, RM, JD, MC and MM provided a critical review of the
12 protocol to ensure rigour and validity based on their extensive expertise in disability, systematic
13 reviews, information management and health and social care research. MC advised on how to
14 keep the review manageable. JO, GF and GS designed and validated the search strategy, and
15 will retrieve and screen the data. GS will lead data management and screening, and editing of
16 the manuscripts.
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29 All authors read and critiqued the draft and approved the final version of this manuscript.
30
31

32 **Amendments**

33 We will seek to minimise the risk of bias by trying to avoid any need to amend this protocol.
34
35 However, should there be need to revise the protocol, we will provide relevant details and the
36 rationale for such changes. Any potential amendments will be documented and implemented
37 by the first author, with the approval of all the contributing authors.
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45 **Support**

46 This research was supported by funding from the charity RESPECT and the People Programme
47 (Marie Curie Actions) of the European Union's Seventh Framework Programme
48 (FP7/2007-2013) under REA grant agreement no. PCOFUND-GA-2013-608728'
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Name of the funder

The Charity RESPECT and EU Marie Curie Actions co-fund as outlined above.

Role of funder

The funder provided the salary and all related research expenses incurred by Trinity College Dublin (TCD) in hosting JO during a two-year fellowship. However, the funder was not involved in the design and implementation of the review.

Conflict of interest

JO receives a salary at the research fellow position he holds at TCD. Other authors did not receive any financial support to prepare this protocol, will not receive funding to conduct this review, and do not have any conflict of interest.

Abstract

Introduction: The aim of this review is to answer the following question: *Does assistive technology contribute to social inclusion for people with intellectual disability?* Previous research on assistive technology has focused on socioeconomic impacts such as education, employment, and access to health care by people with intellectual disability. There is a need to consolidate evidence on the interaction between intellectual disability, assistive technology, community living and social inclusion.

Methods and analysis: The review will consider studies from all settings – geographical, socioeconomic and care (institutional and community care)- published in English. Studies reported in other languages with abstracts in English will be included if they can be translated using Google Translate, otherwise such studies will be included in the appendix. The review will include both qualitative and quantitative studies. The intervention in this review refers to the use of assistive technology to promote community participation or interpersonal relationships (social inclusion) for people with intellectual disability. The outcomes will be behavioural and social benefits of using assistive technology by people with intellectual disability. Enhanced interpersonal relationships and community participation by people with intellectual disability. Data analysis will be in two phases. The first phase will involve analysis of individual study designs separately. The second phase will be narrative/thematic synthesis of all study groups.

Ethics: The review will not create any ethical or safety concerns.

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3 **Dissemination:** At least one peer-reviewed article in a leading journal such as the BMJ is
4
5 planned. The findings will also be disseminated through a seminar session involving internal
6
7 audience at Trinity College Dublin and within the ASSISTID research programme.
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11 **Protocol registration:** Registered in PROSPERO (registration number CRD42017065447)
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14 **Study strengths and limitations**

- 15 • The eligibility criteria for the review are broad and exhaustive hence the review will
16 consolidate the best available evidence on how AT can support social inclusion for people
17 with ID.
18
- 19 • The use of social inclusion model (by Simplican et al.) to assess reported social inclusion
20 outcomes may exclude some relevant studies that don't report on the outcomes stipulated
21 by the chosen model.
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- 23 • The review may overlook significant contributions from non-English language publications
24 because only papers published in English will be included
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Introduction

Community living by people with intellectual disability

Intellectual disability (ID) in this protocol refers to an individual's reduced ability to comprehend new or complex information, and to learn and apply new skills, beginning before the individual's 18th birthday (i.e., before adulthood). ID interacts with environmental factors to impact on an individual's ability to independently cope with daily life circumstances (1), resulting in a lifelong need for care and/or support.

Individuals with ID are increasingly becoming part of community processes; living and accessing services in the community. In many countries, they are gradually being relocated from institutional care into community settings (2,3). The drive to relocate people with ID to community-based care settings, herein called deinstitutionalisation or de-congregation of care, has been a policy priority for more than three decades in countries such as Australia, the UK, the US and the Scandinavian nations (4). It is ongoing in other countries such as Ireland, Germany and Spain (5,6) where more people with ID are now living in community settings. Significant political and financial commitment to deinstitutionalisation of care has led to a noticeable decline in numbers of people in large institutional care facilities (7) in countries like Ireland. This has involved closure of these larger facilities and relocating people with ID to small-scale community-based care, in some cases congregated care on a smaller scale (8).

The national policy contexts highlighted above reflects international undertakings such as the Universal Declaration of Human Rights (9) and the United Nations Convention on the Rights of Persons with Disabilities (CRPD) (10). For example, Article 19 of the CRPD advocates for community living for people with disability. The ratification and subsequent implementation of

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3 such international guidelines underpins the individual countries' drive for normalisation (11). By
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5
6 March 2017, there were 172 ratifications/accessions and 160 countries were signatories to the
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9 Convention (12), making it the world's most-ratified human rights treaty (13). The CRPD states
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11 that people with all types of disabilities must enjoy all human rights and fundamental
12
13 freedoms; everyone with a disability should have equal access to societal processes such as
14
15 education, employment, housing and socialisation. Article 19 of the Convention emphasises the
16
17 right to community living by all people with disabilities and a right to appropriate support to
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19 ensure inclusion (6). The current global development agenda through the Sustainable
20
21 Development Goals (14) calls for no-one to be left behind - a call for inclusion of all, including
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23 people with ID. People with ID are the focus of this review because they are one of the groups
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25 most vulnerable to social exclusion (15).
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32 The global push for greater social inclusion of people with disabilities is taking place at a time of
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34 great technological advances. This presents an opportunity to enhance the envisaged
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36 community living and social inclusion of people with ID in practices already proven (16,17). It is
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38 also an opportunity to explore new approaches facilitated by these rapid technological
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40 advances. This review will examine the evidence of how AT, which draws on advances in
41
42 technology, can enhance community living and social inclusion of people with ID. There is a
43
44 need for concerted efforts to ensure that people with ID become part of community processes,
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46 and for members of such communities to also perceive people with ID as part of their own
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48 community. Unless community living for people with ID is enhanced by all means possible,
49
50 including technological opportunities, there is a risk of 'redistributing' institutional isolation to
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52 the community rather than progressing genuine social inclusion into the community. Without
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3 technology that promotes access, connectivity and community participation, people with ID
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5 may not access services in the community like people without disability. This could lead to
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7 loneliness (3) and dependence on care provided in devolved institutions.
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10 11 Social inclusion

12 Cobigo and Hall (18) have noted that the benefits of the shift towards a rights-based approach
13
14 to care, that should accompany deinstitutionalisation of care for people with ID, have not been
15
16 achieved. People with ID still encounter stigmatisation, discrimination and rejection due to a
17
18 variety of factors. For example, feelings or experiences of inclusion or exclusion are dependent
19
20 on demographic characteristics such as age, gender and environmental factors; older adults
21
22 with mild ID, for instance, are more likely to report stigma than younger people (19). As Cobigo
23
24 et al. (20) observed, social inclusion is a product of complex interactions between
25
26 environmental factors and the opportunities and personal competencies of an individual. The
27
28 International Classification of Functioning, Disability and Health (ICF) outlines the importance of
29
30 recognising the interaction of environmental factors as a key requirement for understanding
31
32 functioning and disability (21). Social inclusion is a multidimensional, dynamic relational process
33
34 (22), which is not about assimilation (enabling people to fit into existing societal parameters
35
36 (23) such as being housed in the community), but rather is about self-determination (24).
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38 Combating exclusion involves mitigating disadvantages, whereas facilitating inclusion is about
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40 actively creating opportunities.
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51 The role of socioeconomic factors such as education (25), employment (26,27), and care (28,29)
52
53 on social inclusion are well documented. Social aspects such as interpersonal friendships and
54
55 sharing of existing resources, as well as active determination of an individual's or a marginalised
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3 group's life chances, are also crucial (22). Thus as a two-way process social inclusion of people
4
5 with ID should involve all stakeholders, including people with ID themselves and the general
6
7 community (3).
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11 It has been argued that individuals make meaning of their life through a symbolic
12
13 interactionism (30); presenting an image of themselves which they believe their audience
14
15 would approve of and accept (31). People with ID may feel part of the community based on
16
17 how they think others around them perceive them and how much they are able to participate
18
19 in community processes in terms of their experiences. This depends on what they make of the
20
21 people they interact with, or are supposed to integrate with, in a community setting. On the
22
23 other hand, people in the community are likely to accept or reject new members with ID from
24
25 institutional settings depending on their personal attitudes towards people with ID (32).
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31 This review seeks to summarise the literature on how AT can facilitate the social inclusion of
32
33 people with ID by focusing on the three broad tenets key to effective social inclusion:
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35 interpersonal relationships, community, and policy (33). With regards to policy, a recent study
36
37 in Ireland involving people with ID (34) found that the participants felt left out of policy
38
39 processes. There is a need for people with ID to be involved in the entire policy process (3).
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41 Including marginalised groups in processes that aim to promote their inclusion, both in policy
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43 and in practice, is of paramount importance (35,36).
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51 People with ID should also be involved in all initiatives aimed at improving their inclusion into
52
53 the community through greater self-determination (24). But as Linehan et al. (7) pointed out,
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55 although social inclusion is the key pillar of disability policies, vagueness about the meaning of
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1
2
3 the concept persists. This in itself is an obstacle to achieving the social inclusion goals (33) of
4
5 the UNCRPD and the Sustainable Development Goals. Different terms such as integration,
6
7 participation and belonging (3,20) are used interchangeably to imply social inclusion. This
8
9 creates obstacles to inclusion such as communication challenges between different
10
11 stakeholders. Simplican et al. (37) proposed a general definition that could serve as a common
12
13 meaning of social inclusion and possibly lead to standardisation of research and service
14
15 provision (33), by enabling all relevant actors to imply a common goal and focus on this.
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21 The working definition of social inclusion used in this review is therefore drawn from the work
22
23 of Simplican et al. (33), who define social inclusion as the interaction between interpersonal
24
25 relationships and community participation. Simplican and colleagues reviewed literature on
26
27 social inclusion and found that most research into social inclusion focused on interpersonal
28
29 relationships or community participation, even though the wording used to express these
30
31 concepts varied across different studies. Our review will use the social inclusion model (Figure
32
33 1) proposed by Simplican et al. to evaluate how AT affects the various components of
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35 interpersonal relationships and community participation as umbrella themes of social inclusion.
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42 Figure 1 here
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49 The outcomes of social inclusion to be reviewed will be informed by Simplican et al.'s ecological
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51 pathway, which views disability and social inclusion as products of sophisticated interactions
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53 between environmental factors, personal competencies and capability, as well as opportunities
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55 available to the individual (20). The ecological variables outlined in Figure 2 (33) - individual,
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1
2
3 interpersonal, organisational and socio-political factors - influence social inclusion both
4
5 positively and negatively. The present review will therefore look at how AT mediates or
6
7 moderates (38) the effects of these broad variables on social inclusion of people with ID.
8
9 Different outcomes of social inclusion will thus be evaluated as outlined in Figure 2 and further
10
11 discussed in the methodology section. The aim is to explore how the new way of
12
13 conceptualising social inclusion proposed by Simplican et al. can be used to capture a more
14
15 holistic understanding of social inclusion outcomes beyond the more-often reported
16
17 socioeconomic outcomes such as integration, education (39) and access to services (24). The
18
19 ecological model was deemed relevant because it shifts conceptualisation of social inclusion
20
21 beyond acceptance and performance of dominant societal values (20). It isolates the definition
22
23 of social inclusion from the processes that lead to social inclusion and the resulting subjective
24
25 feelings from social inclusion. Using this model, both positive and negative outcomes of social
26
27 inclusion (33) will be considered. Other potential alternative models may not be relevant for
28
29 the present review because they focus on specific aspects of social inclusion such as recreation
30
31 (40) or positive relationships (41). We will explore the different levels and types of social
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33 inclusion indicators illustrated in Figure 2.
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44 Figure 2 here

47 Assistive technology

48 Just like social inclusion, assistive technology (AT) implies different things to different people
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50 (42–45). AT may refer to the use of various technological resources to support people with
51
52 different disabilities to obtain behavioural and social benefits and to reduce the negative
53
54 impact of their disabilities on their well-being and community participation (46). AT may also
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1
2
3 refer to a wide spectrum of devices, technological aids, strategies, services and practices whose
4
5 main objective is to improve the quality of life of people with disabilities (47). Irrespective of
6
7 what the concept may mean to different people, AT can improve functioning and independence
8
9 of people with disability, thereby promoting their well-being (43).
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14 AT in the context of this review refers to any product or service that can be used by a person
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16 with a disability to overcome challenges they may face in carrying out daily activities of their
17
18 choice that would otherwise be limited by their disability. AT will also be understood through
19
20 the broad classification offered by the International Organization for Standardization [ISO
21
22 999:2011 standards] (45). ISO's classification of AT is a useful benchmark because it is
23
24 internationally recognised and used in many international systems including the European
25
26 Assistive Technology Information Network (EASTIN). Thus, AT will be understood as a
27
28 continuum of technological solutions (48). AT includes services and environmental adaptations
29
30 through inclusive design (49). AT, in this review, is inclusive of mainstream technologies as well
31
32 as those developed specifically for people with disability (50,51). AT encompasses what may be
33
34 considered as normal technological solutions for the general population such as Skype, pill
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36 organisers, wheelchairs, Twitter or Facebook, but we acknowledge that most of these solutions
37
38 remain largely inaccessible to most people with ID. Furthermore, it could be argued that
39
40 applications such as Skype don't qualify as AT because they don't constitute provision of
41
42 immediate functionality for the person with ID (42). There is evidence suggesting that many
43
44 people with ID desire to use mainstream social media, as distinct from some type of specially
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46 protected (restricted) platform (52). However, a recent systematic review on the use of social
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48 media by people with ID found that safeguarding concerns, literacy and communication
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3 challenges, cyber-etiquette, cyber language and problems with accessibility such as
4
5 inappropriate equipment were preventing people with ID from effectively utilising social media
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7
8 (53).
9

10 11 Enhancing social inclusion using appropriate assistive technology

12 Previous research has shown that effective use of appropriate AT can contribute to the ongoing
13
14 deinstitutionalisation of care for people with ID, because they can enhance their independence
15
16 and community participation by reducing the need for formal support services and long-term
17
18 care (54). AT can transform what would otherwise be community care into community living
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21 (see Figure 3) for people with ID (55).
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27 Figure 3 here
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33 However, the full potential of AT to enhance the social inclusion and well-being of people with
34
35 ID is yet to be realised, despite years of evidence supporting such potential (16,17,25,56). By
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37 2017, only about 10% of all people who require AT had access (57,58), implying that access to
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39 AT is still very low. In fact, the proportion of people with ID without access to AT is unknown
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41
42 (59). The extent to which social exclusion has been solved for the 10% with access to AT is also
43
44 unknown. Furthermore, too much focus on AT may divert attention away from other barriers to
45
46 social inclusion, which may need addressing on their own, or indeed as part of the context of
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48 AT. AT could also pose unintended risks to people with ID thereby hindering progress towards
49
50 their social inclusion. For example, the use of digital AT may create risks such as confidentiality
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3 concerns or cyberbullying (60). The focus on AT should not compromise the overall quality of
4
5 life of people with ID and their social inclusion goals (61)
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8
9 There is a need to review literature on how access to and use of AT supports social inclusion. As
10
11 illustrated in Figure 3, Owuor et al (55) pointed out that inadequate access to AT can
12
13 disempower people with ID, hindering their capacity to participate in community processes and
14
15 to form and maintain meaningful interpersonal relationships. The framework provides a
16
17 simplified way of visualising how access to AT directly impacts on the inclusion-exclusion
18
19 pathway. One possible cause of this lag between demand and supply could be the lack of
20
21 consensus on the meaning of AT. The policy context in many settings also remain unclear (62),
22
23 with most of the existing policies on AT positioning AT as an add-on to their main foci (42). Lack
24
25 of consensus of the meaning of AT (50) and how they should be provided, and to whom, makes
26
27 it difficult to effectively evaluate the use of AT for social inclusion of people with ID. Access to
28
29 AT does not eliminate the many barriers to social inclusion which vary with socioeconomic
30
31 differences within and between countries. Furthermore, people with ID compared to the
32
33 general population are highly vulnerable to multiple comorbidities (63). Thus access to and use
34
35 of AT may minimise people's risk of exclusion by moderating the impacts of their comorbidities
36
37 as well as mediate their social inclusion (38). For example, a digital glucometer can support
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39 social inclusion of an individual with ID and diabetes by moderating their blood sugar.
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49 Apart from the needs of the users, environmental factors are key determinants of effective use
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51 of AT. The current review will explore the reported barriers and facilitators to adoption and use
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53 of AT as well as how the use of AT can enhance the adaptation of the people with ID to their
54
55 environment or adaptation of the environment to facilitate autonomy of people with ID. Some
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3 of the environmental factors to be explored in the review include social support, friendships,
4
5 access to services, physical environment, and availability of AT. The literature (64) suggests that
6
7 these may be key determinants of effective use of AT. The resultant information could be useful
8
9 in informing the design and provision of AT, provide insights into facilitators or barriers to
10
11 adoption of AT, and inform policy and practice on environmental considerations for successful
12
13 provision of AT. This knowledge, from other countries with diverse socioeconomic compositions
14
15 and varying levels of access to AT, may also be useful for the potential scalability and
16
17 sustainability of AT provision and use among people with ID in high income countries such as
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19 Ireland.
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25 26 27 **Justification**

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29 As far as we are aware, this will be the first review of literature focusing on the role of AT for
30
31 advancing social inclusion for people with ID. We expect to identify important knowledge gaps
32
33 on the supportive role of AT for social inclusion, building on previous (albeit limited) research
34
35 which has focused on socioeconomic aspects of social inclusion such as education (25),
36
37 employment (26) and access to health care (28) for people with ID. There is a need to
38
39 understand best practices for consolidating the interaction between ID, AT, community living
40
41 and social inclusion. The ecosystem model of social inclusion proposed by Simplican et al. (37)
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43 offers a framework for reflecting these interactions.
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49 50 **Aim and objectives**

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52 The broad question to be answered by consolidating evidence through the proposed review is:

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54 *Does access to and use of AT promote the social inclusion of users with ID?*
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Methods

Eligibility criteria

The criteria outlined below will be used to select studies for inclusion in the proposed review:

Study designs

- Both qualitative and quantitative studies.
- Case studies. This will include blog posts, biographies and newspapers articles focusing on individual users of AT with ID.
- Case control studies.
- Observational studies.
- Cross-sectional studies.
- Longitudinal studies.
- All forms of randomized trial.

Also to be included are:

- Studies that look at the use of AT to overcome stigma and low expectations that people with ID experience from their neighbours, professionals and general society as part of the wider social inclusion.
- Studies that consider other conceptual areas that are manifest of social inclusion such as education, employment and independent living.

The authors will also consider the fact that limited research into the role of AT in social inclusion may necessitate the inclusion of descriptive reports which may not necessarily meet the quality standards that can be effectively assessed using tools such as CASP. Furthermore,

1
2
3 most studies tend to focus on technology rather than the individual (65), a source of social
4
5 exclusion, hence user voices are likely to be omitted in many studies: The present review will
6
7 include non-peer-reviewed/published material such as blogs and other relevant grey literature.
8
9 Although formal guidelines on undertaking a systematic review provide essential knowledge
10
11 standards, they may lead to exclusion of vital knowledge sources which illuminate the topic
12
13 area reviewed but do not qualify as rigorous publications. The review will also provide a
14
15 platform for relevant AT user experts to inform the review. There is a need to enhance inclusion
16
17 of people with ID by going beyond the expectations of a standard review protocol, to include
18
19 the views of people with ID in a review focusing on their social inclusion.
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25 26 *Participants*

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28 All studies that focus on ID will be considered for inclusion. Studies that focus on participants
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30 with autism or other disabilities but without a link to ID, and studies that do not explore the link
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32 between AT and social inclusion of people with ID, will be excluded.
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37 38 *Assistive technology*

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40 AT in this review will encompass a wide range of solutions accessed and/or used by people with
41
42 ID from diverse backgrounds. These solutions will include AT used for communication, mobility,
43
44 personal safety, education, job performance, environmental adaptations and cognitive
45
46 functions among others. In addition, they will comprise what may be considered mainstream
47
48 technologies, technologies designed for people with disability, as well as technology adapted to
49
50 suit the needs of people with disability. As highlighted in the background section, AT means
51
52 different things to different people and different terminologies such as assistive products, aids,
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or assistive devices are used to refer to AT. There are many types and forms of AT that are used to enhance the lives of people with ID. The types of AT to be included in the current review will thus be dependent on those reported in the literature retrieved.

Our selection for inclusion will be informed by a general definition of AT as any product, solution or service that can be used by or for persons with disability to overcome challenges they may face in carrying out daily activities of their choice that would otherwise be limited by their personal or environmental factors, but not necessarily due to their ID.

Intervention

As outlined above, the intervention in this review is access to and use of AT for promoting social inclusion or for enabling functional or behavioural accomplishments that lead to social inclusion for people with ID (community participation or interpersonal relationships). Our focus will be on the use of AT in a very broad sense, with a focus on social inclusion of people with ID. These will include, for example, studies exploring the role of information and communication technology (ICT) on social inclusion of people with ID or studies exploring the role of inclusive design in social inclusion of people with ID.

Comparators

For studies that explore different interventions, at least one of them must be AT. The review will also explore the type of ID reported in the studies we retrieve to compare outcome of AT in relation to this variable. For those studies comparing different groups of participants, at least one group should be people with ID (mild, medium, severe or profound) for the study to be

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2
3 included in our review. Additionally, we will also look for studies comparing settings (low,
4
5 middle or high income settings, or urban/rural comparisons)
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7

8 9 *Outcomes*

10
11 To assess social inclusion outcomes, such as behavioural and social benefits of using AT
12
13 reported by the relevant studies, we will use the social inclusion model proposed by Simplican
14
15 et al. (33). This model looks at social inclusion from the interpersonal relationship and
16
17 community participation domains, as illustrated in Figure 4.
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22 Figure 4 here
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26 We will include any study that reports on the following:
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28 29 *Interpersonal relationships*

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- 32 • **Category** - we will look at the people in the social network of a person with ID such as
33 family members, friends, keyworkers/carers, acquaintances or intimate relationships.
34
35 The focus here will be on how AT facilitates bonding (relationships between people with
36
37 shared commonality) and bridging (bringing people with diverse background and
38
39 experience together) (66).
40
41
 - 42 • **Structure** - we will explore studies reporting on interpersonal relationships that focus on
43
44 issues like the length of the relationships, location of social interactions and frequency
45
46 of contacts. We will look for studies reporting on how AT can enhance reciprocity,
47
48 intensity formality and complexity of interpersonal relationships. We will also consider
49
50 studies investigating social networks in four broad dimensions: size, homogeneity,
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52 geographical location, and density.
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- **Function** - we will therefore include studies that explore how AT enhances functional value of interpersonal relationships; emotional, informational, and instrumental.

Community participation

We will consider studies reporting on three different aspects of community participation:

- **Category** - those reporting on the types of community activities such as leisure, hobbies, civic activities, productive activities such as employment and education, consumption activities such as access to goods and services, and religion and cultural activities and groups.
- **Structure** - this review is done in the context of ongoing deinstitutionalisation of care for people with ID in many high-income nations such as Ireland, Germany and Spain. The review will provide evidence that can inform deinstitutionalisation practice and policy in these countries. In other high income countries, such as the USA and UK, deinstitutionalisation of care for people with ID is a long-established standard of care and may facilitate the use of evidence. In many low-income countries, institutionalised care has never been a standard care practice for people with ID and the evidence from this review may at least initiate the debate about the need to improve access to and use of AT. The review will evaluate papers reporting how AT affects the engagement of people with ID in community activities in independent community living, semi-independent community living and smaller institutional care in community settings. It is also important to cyber community settings in the review.

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- **Level of involvement** - we acknowledge that people generally have different levels of involvement in their communities which can be categorised as encounter, participation or presence. We will therefore review literature that reports on how AT facilitates different levels of involvement by people with ID.

14 We will also look for papers that report on a mixture of components of the two broad domains
15 outlined above (interpersonal relationships and community participation), because in real life
16 the two domains interact with each other.
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21 *Date range*

22 We will include all studies carried out between 2006 and 2017; 2006 was chosen as the start
23 date as it was the year when the CRPD was internationally adopted. This review will explore the
24 potential impact of access to and use of AT for social inclusion of people with ID in the context
25 of the global focus on the CRPD. Although the CRPD has not been ratified in countries such as
26 Ireland, its principles are bound to impact on AT and social inclusion policies and practice. We
27 will also include studies in press.
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40 *Language*

41 We will retrieve studies reported in English. We will also include, as appendices, any papers
42 which meet the inclusion criteria and are published in other languages. However, they should
43 have abstracts or titles in English in order to be considered. We will include such studies with
44 English abstracts into the analysis if they can be easily translated into English using Google
45 Translate. Studies with English headings or abstracts, but that cannot be translated into English,
46 will remain as appendices.
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Setting

Studies from all settings, geographical and socioeconomic, will be included in the study. However, as studies published in languages other than English from non-English speaking countries will be excluded, such settings may be excluded based on language restriction.

Information sources

Different terms that are used to refer to AT, ID and social inclusion will be used to construct the search strategy. As outlined in the background, all three key concepts (AT, ID and social inclusion) can imply different meanings to different authors. Medical Subject Headings (MeSH) and other controlled vocabularies used by the different databases will be used, through thesaurus searches, to develop a comprehensive search strategy.

The following data sources will be used and more will be included through citation tracking as data is retrieved: MEDLINE, ERIC, PsycINFO, AMED, CINAHL, Scopus, Academic Search Complete, Web of Science, ASSIA, the Cochrane CENTRAL Register, and the Campbell Collaboration Register. Prospective registers of research (review and trials registers) and institutional/organisational databases such as that of the World Health Organization will also be searched. The authors will manually search the websites of various organisations with a stake in AT and blogs by expert users of AT with ID. Such organisations include the European Assistive Technology Information Network (EASTIN), the Assistive Technology Industry Association (ATIA), the British Assistive Technology Association (BATA), the Academic Network of European Disability Experts (ANED), Enable Ireland, Disability Federation Ireland, the Association for Advancement of Assistive Technology in Europe (AAATE), OpenGrey, GreySource, the Grey

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3 Literature Report, and many others. We will also search for publications from government or
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6 statutory departments and non-governmental organisations. All the literature will be restricted
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9 to English as outlined above, with a focus on AT, ID and social inclusion.

10
11 The reference lists of all articles retrieved for full text screening will be reviewed to check if
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13 there are any relevant sources that were not retrieved by the primary search. 'Author tracking'
14
15 will also be carried out to find out if all the work of the authors whose work meet the inclusion
16
17 criteria are captured through the prior electronic searches. Time permitting, we will share the
18
19 list of the final articles for inclusion within the GATE (Global Cooperation of on Assistive
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21 Technology) and ASSISTID/DOCTRID (Assistive Technologies for people with Intellectual
22
23 Disability and Autism/Daughters of Charity-Technology Research into Disability Research
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25 Institute) networks and with other experts in the field of ID and social inclusion or AT and ID.
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32 **Search strategy**

33 All peer-reviewed studies as well as publicly accessible reports and PhD theses will be searched
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35 using keyword searches in the relevant databases. The keywords around which comprehensive
36
37 search will be developed are social inclusion, AT and ID. The initial search strategies are
38
39 attached as a supplementary file. The final search strategy, to be developed with support from
40
41 systematic review experts and information specialists, will be reviewed and approved by the
42
43 project team and an expert in systematic reviews. The search strategies will be revised, if
44
45 necessary, to include any subject heading or free text terms found in eligible articles.
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52 We will also hand-search individual journals from which at least two relevant studies have been
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54 selected for inclusion in the review, to check for other relevant articles that might have been
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missed, for example due to the date of journal coverage in the databases. As well as checking the references of the included articles (67), we will also check for any relevant articles citing the selected studies, to try to identify additional relevant material.

Data management

JO and GF will independently search and retrieve all relevant data using the search terms and the final search strategy to be developed. All retrieved data will be imported into EndNote software for deduplication. JO will then export the data to the Covidence application for screening at title/abstract level and subsequent full text screening, risk of bias assessment and data extraction. JO will carry out data screening in Covidence. Some of the key information to be considered for data screening and extraction includes the citation in full, participants' demographics (age, gender, ethnicity, socioeconomic status, level of ID, etc.), study setting (country, locality, urban/rural), study method, duration of intervention, type of intervention (assistive technology), and study quality.

Quality and risk of bias appraisal

We will use Critical Appraisal Skills Programme (CASP) tools (68) as a basis to assess the quality of the literature retrieved. When appropriate, we will adapt the tools to fit our needs. Depending on the studies retrieved, a Mixed Methods Appraisal Tool (69) may be used to assess the methodology of the studies. Content from theses, conference presentations, blog posts, biographies and newspaper articles, if included in the final sample, will be assessed on an individual basis using, for example, audience measurement (69). All these rankings will be relative to the subject area of the source. The team will decide on the most appropriate tools to use for each type of study when the potentially eligible studies have been identified. JO will

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2
3 then rate the retrieved papers separately and compare the rankings with BK. FL will cross-check
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5 any differences between JO and BK's assessments, to facilitate consensus.
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7

8 9 **Data selection**

10 JO and GF will apply the inclusion criteria and search strategy outlined above, with data
11
12 exported to Covidence for screening. Other members of the team will cross-check the data
13
14 retrieved to ensure reliability and validity of the data retrieval and screening process. After the
15
16 initial screening by JO at title/abstract level is complete, eligible full text articles will be shared
17
18 with the rest of the team to review. Any articles that seem relevant but lacking some key
19
20 information during full text screening will be complemented by seeking clarification from the
21
22 authors. We will contact authors of the identified missing data by email; use of email has been
23
24 shown to result in timely responses by the relevant authors when the requests are clear (70).
25
26 Any lack of consensus between the authors during the data screening process will be resolved
27
28 through deliberations and coming to a consensus on whether to include the paper in question.
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30 JO will document this process.
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40 **Data analyses**

41 We will analyse studies depending on the methodology used for the study. For example, we will
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43 analyse qualitative studies separately from quantitative studies, survey studies, in-depth
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45 interview studies, quantitative group design versus single subject quantitative designs. After the
46
47 separate analyses, a narrative or thematic synthesis will be done for each group of studies, and
48
49 develop an overall theme from the review.
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Sub-groups analyses

We will carry out overall data analyses to explore the emerging themes and the findings will determine the ultimate categorisation. The following examples are some of the common categories reported in the literature.

- Intellectual disability - low, medium, severe or profound.
- Gender - males and females.
- Geographical location (country, region, etc.) where possible.
- Age - youth, adolescents, adults – generally young people versus adults (15-18, 18 and older).
- Type of AT - (communication, mobility, educational, etc.).
- Setting - community setting, institutional, work place, educational setting, etc.).

Dissemination plans

We aim to publish at least one peer-reviewed journal article, with the possibility to publish others depending on the findings we derive from the sub-group analyses outlined above. We will also present the findings at conferences and seminars, to the internal audience at Trinity College Dublin, within the ASSISTID research programme, and within the GATE community. We also aim to produce a briefing paper for service providers such as DOC services and policy makers in Ireland.

References

1. WHO. Definition: intellectual disability [Internet]. Mental Health; Health topics. 2017. Available from: <http://www.euro.who.int/en/health-topics/noncommunicable-diseases/mental-health/news/news/2010/15/childrens-right-to-family-life/definition-intellectual-disability>
2. Beadle-Brown J, Mansell J, Kozma A. Deinstitutionalization in intellectual disabilities. *Curr Opin Psychiatry*. 2007;20(5):437–42.
3. Overmars-Marx T, Thomése F, Verdonshot M, Meininger H. Advancing social inclusion in the neighbourhood for people with an intellectual disability: an exploration of the literature. *Disabil Soc* [Internet]. 2014 Feb 7 [cited 2014 Dec 20];29(2):255–74. Available from: <http://dx.doi.org/10.1080/09687599.2013.800469>
4. Mansell J. Deinstitutionalisation and community living: progress, problems and priorities. *J Intellect Dev Disabil*. 2006;31:65–76.
5. Kozma A, Mansell J, Beadle-Brown J, Emerson E. Outcomes in different residential settings for people with intellectual disability: a systematic review. *Am J Intellect Dev Disabil*. 2009;114(3):193–222.
6. Tatlow-Golden M, Linehan C, O’Doherty S, Craig S, Kerr M, Lynch C, et al. *Living Arrangement Options for People with Intellectual Disability: A Scoping Review*. Dublin Trinity Coll Dublin. 2014;

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41
42
43
44
45
46
47
48
49
50
51
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54
55
56
57
58
59
60
7. Linehan C, O'Doherty S, Tatlow-Golden M, Craig S, Kerr M, Lynch C, et al. Mapping the National Disability Policy Landscape [Internet]. Dublin: School of Social Work and Social Policy, Trinity College Dublin.; 2014. Available from: <http://socialwork-socialpolicy.tcd.ie/moving-ahead/project.php>
8. Bigby C, Ozanne E. Shifts in the model of service delivery in intellectual disability in Victoria. *J Intellect Dev Disabil*. 2001 Jan 1;26:177–90.
9. United Nations. The Universal Declaration of Human Rights (UDHR) [Internet]. United Nations. 1948 [cited 2017 Aug 17]. Available from: <http://www.un.org/en/universal-declaration-human-rights/>
10. United Nations. Convention the Rights of Persons with Disabilities [Internet]. Convention the Rights of Persons with Disabilities. 2006 [cited 2016 Oct 6]. Available from: <http://www.un.org/disabilities/convention/conventionfull.shtml>
11. Kumar A, Singh RR, Thressiakutty AT. Normalization vs. Social Role Valorization: Similar or Different? *Int J Spec Educ*. 2015 Jan 1;30(3):71–8.
12. United Nations. Convention on the Rights of Persons with Disabilities [Internet]. Division for Social Policy and Development Disability. 2017 [cited 2017 Mar 16]. Available from: <https://www.un.org/development/desa/disabilities/convention-on-the-rights-of-persons-with-disabilities.html>
13. Klimczuk A. Social Inclusion of People with Disabilities: National and International Perspectives by Arie Rimmerman. *Hum Rights Rev*. 2015 Dec;16(4):397–9.
14. United Nations. Sustainable Development Goals [Internet]. Sustainable Development. Knowledge Platform. 2015 [cited 2015 Dec 16]. Available from: <https://sustainabledevelopment.un.org/?menu=1300>
15. World Health Organization. WHO Global Disability Action Plan, 2014-2021: Better Health for All People with Disability [Internet]. 2015. 32 p. Available from: http://apps.who.int/iris/bitstream/10665/199544/1/9789241509619_eng.pdf?ua=1
16. Guha S. Role of Educational Technology in Making Normalization Through Digital Inclusion a Reality for Children With Disabilities. *Indian J Appl Res* [Internet]. 2016;5(6). Available from: <https://worldwidejournals.in/ojs/index.php/ijar/article/view/8491>
17. Young MC, Courtad CA. Inclusion and Students with Learning Disabilities. In: *General and Special Education Inclusion in an Age of Change: Impact on Students with Disabilities* [Internet]. Emerald Group Publishing Limited; 2016 [cited 2016 Nov 8]. p. 13–29. (Advances in Special Education; vol. 31). Available from: <http://dx.doi.org/10.1108/S0270-401320160000031002>
18. Cobigo V, Hall H. Social Inclusion and Mental Health. *Curr Opin Psychiatry*. 2005;23:453–7.

19. Ali A, King M, Strydom A, Hassiotis A. Self-reported stigma and its association with socio-demographic factors and physical disability in people with intellectual disabilities: results from a cross-sectional study in England. *Soc Psychiatry Psychiatr Epidemiol*. 2016;51(3):465–74.
 20. Cobigo V, Ouellette-Kuntz H, Lysaght R, Martin L. Shifting our conceptualization of social inclusion. *Stigma Res Action Vol 2 No 2 2012 Spring* [Internet]. 2012 [cited 2012 Jan 1]; Available from: <http://stigmaj.org/article/view/45>
 21. World Health Organization. International classification of functioning, disability, and health : ICF. Version 1.0. Geneva : World Health Organization, [2001] ©2001; 2001.
 22. Díaz Andrade A, Doolin B. INFORMATION AND COMMUNICATION TECHNOLOGY AND THE SOCIAL INCLUSION OF REFUGEES. *MIS Q*. 2016 Jun;40(2):405–16.
 23. Ratcliffe P. Is the assertion of minority identity compatible with the idea of a socially inclusive society. *Soc Incl Possibilities Tens*. 2000;169–85.
 24. Maidment J, Macfarlane S. 2.7 Debating the capacity of information and communication technology to promote inclusion. In: *Theorising Social Exclusion* [Internet]. 2009. p. 95. Available from: https://books.google.ie/books?hl=en&lr=&id=YhiPAgAAQBAJ&oi=fnd&pg=PA95&dq=Maidment+and+Macfarlane+2009+self+determination&ots=OKMU-Qcith&sig=dhRBvPeNSmT56HdiikweavqUNLo&redir_esc=y#v=onepage&q&f=false
 25. Sarkar R. Assistive technology and devices: A boon to promote quality education among children with mild intellectual disability in inclusive set up. National seminar on Assistive Technology in Education and Sports for Total Inclusion of Persons with Disability; 2015 Feb 6; Ramakrishna Mission Vivekananda University, Coimbatore.
 26. Yeager P, Kaye SH, Reed M, Doe TM. Assistive technology and employment: experiences of Californians with disabilities. *Work*. 2006;27.
 27. Walsh E, Holloway J, McCoy A, Lydon H. Technology-Aided Interventions for Employment Skills in Adults with Autism Spectrum Disorder: A Systematic Review. *Rev J Autism Dev Disord*. 2016;1–14.
 28. Davis T. Transforming the outpatient experience through the use of assistive technology. *Int J Integr Care*. 2014;14(8).
 29. Saborowski M, Kollak I. “How do you care for technology?” – Care professionals’ experiences with assistive technology in care of the elderly. *Sci Technol “Grand Challenge” Ageing*. 2015 Apr;93:133–40.
 30. Blumer H. *Symbolic interactionism: Perspectives and methods*. Los Angeles, CA: University of California Press; 1990.
- 29

- 1
- 2
- 3
- 4 31. Mead GH. *Mind, Self and Society*. From the standpoint of a social behaviourist. Morris CW, editor. Chicago, IL: University of Chicago Press; 1934. (Works of George Herbert Mead Volume 1; vol. 1).
- 5
- 6
- 7
- 8 32. Lacono T, Lyon K, Johnson H, West D. Experiences of adults with complex communication needs receiving and using low tech AAC: an Australian context*. *Disabil Rehabil Assist Technol*. 2013 Sep;8(5):392–401.
- 9
- 10
- 11
- 12
- 13 33. Simplican SC, Leader G, Kosciulek J, Leahy M. Defining social inclusion of people with intellectual and developmental disabilities: An ecological model of social networks and community participation. *Res Dev Disabil* [Internet]. 2015 Mar;38(0):18–29. Available from: <http://www.sciencedirect.com/science/article/pii/S0891422214004223>
- 14
- 15
- 16
- 17
- 18
- 19 34. Inclusive Research Network. *Where we live: A national study done by members of the Inclusive Research Network through surveys*. 2010.
- 20
- 21
- 22
- 23 35. Huss T, MacLachlan M. *Equity and Inclusion in Policy Processes (EquIPP) : a framework to support equity & inclusion in the process of policy development, implementation and evaluation* [Internet]. Dublin: Global Health Press; 2016. 58 p. Available from: <http://library.catalogue.tcd.ie/record=b16839480>
- 24
- 25
- 26
- 27
- 28
- 29 36. MacLachlan M, Manna H, Huss T, Munthali A, Amin M. Policies and Processes for Social Inclusion: Using EquiFrame and EquIPP for Policy Dialogue; Comment on “Are Sexual and Reproductive Health Policies Designed for All? Vulnerable Groups in Policy Documents of Four European Countries and Their Involvement in Policy Development”. *Int J Health Policy Manag*. 2016;5(3):193–6.
- 30
- 31
- 32
- 33
- 34
- 35
- 36 37. Simplican SC, Leader G, Kosciulek J, Leahy M. Defining social inclusion of people with intellectual and developmental disabilities: An ecological model of social networks and community participation. *Res Dev Disabil*. 2015;38:18–29.
- 37
- 38
- 39
- 40
- 41 38. Tebbutt E, Brodmann R, Borg J, MacLachlan M, Khasnabis C, Horvath R. Assistive products and the Sustainable Development Goals (SDGs). *Glob Health*. 2016;12(1):79.
- 42
- 43
- 44
- 45 39. Browning P, Nave G, White WAT, Barkin P zembrosky. Interactive video as an Instructional Technology for Handicapped Learners: A Development and Research Program. *Aust N Z J Dev Disabil*. 1985 Jan 1;11(3):123–8.
- 46
- 47
- 48
- 49 40. King G, Lawm M, King S, Rosenbaum P, Kertoy MK, Young NL. A Conceptual Model of the Factors Affecting the Recreation and Leisure Participation of Children with Disabilities. *Phys Occup Ther Pediatr*. 2003 Jan 1;23:63–90.
- 50
- 51
- 52
- 53
- 54 41. Johnson H, Douglas J, Bigby C, Iacono T. A model of processes that underpin positive relationships for adults with severe intellectual disability. *J Intellect Dev Disabil*. 2012 Dec 1;37:324–36.
- 55
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59
60
42. Cullen K, McAnaney D, Dolphin C, Delaney S, Stapleton P. Research on the provision of Assistive Technology in Ireland and other countries to support independent living across the life cycle [Internet]. Dublin: National Disability Authority (NDA); 2012 [cited 2017 Apr 19] p. 175. Available from: <http://nda.ie/File-upload/Research-on-the-provision-of-Assistive-Technology1.pdf>
 43. GATE. Assistive technology; Fact sheet [Internet]. Media centre. 2016 [cited 2016 Jul 28]. Available from: <http://www.who.int/mediacentre/factsheets/assistive-technology/en/>
 44. Camlin CS, Seeley J, Viljoen L, Vernooij E, Simwinga M, Reynolds L, et al. Strengthening universal HIV 'test-and-treat' approaches with social science research. *AIDS Lond Engl*. 2016 Mar 27;30(6):969–70.
 45. ISO 9999:2011(en). ISO 9999:2011(en) Assistive products for persons with disability — Classification and terminology [Internet]. ISO Online Browsing Platform (OBP). 2016. Available from: <https://www.iso.org/obp/ui/#iso:std:iso:9999:ed-5:v1:en>
 46. Lancioni GE, Singh NN, O'Reilly MF, Sigafoos J, Oliva D. Assistive Technology for People with Severe/Profound Intellectual and Multiple Disabilities. In: *Assistive Technologies for People with Diverse Abilities*. Springer; 2014. p. 277–313.
 47. Daughters of Charity. Assistive Technology [Internet]. Daughters of Charity Disability Services. 2012 [cited 2016 Oct 9]. Available from: <http://www.docservice.ie/assistive-technology.aspx>
 48. Andrich R, Mathiassen N-E, Hoogerwerf E-J, Gelderblom GJ. Service delivery systems for assistive technology in Europe: An AAATE/EASTIN position paper. *Technol Disabil*. 2013;25:127–46.
 49. Waller S, Bradley M, Hosking I, Clarkson PJ. Making the case for inclusive design. *Appl Ergon*. 2015 Jan 2;46:297–303.
 50. Cook AM, Polgar JM. Assistive technologies: Principles and practice [Internet]. Elsevier Health Sciences; 2014 [cited 2017 Apr 19]. Available from: https://books.google.ie/books?hl=en&lr=&id=ODWaBQAAQBAJ&oi=fnd&pg=PP1&dq=assistive+technology+social+inclusion&ots=IE89XsvPY7&sig=98ilVd2V_1jUOA6h34qHqcdR46M&redir_esc=y#v=onepage&q=assistive%20technology%20social%20inclusion&f=false
 51. Savage MN, Taber-Doughty T. Self-operated auditory prompting systems for individuals with intellectual disability: A meta-analysis of single-subject research. *J Intellect Dev Disabil*. 2016 Sep 21;1–10.
 52. Bühler C, Dirks S, Nietzio A. Easy Access to Social Media: Introducing the Mediata-App. In Springer; 2016. p. 227–33.

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46
47
48
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57
58
59
60
53. Caton S, Chapman M. The use of social media and people with intellectual disability: A systematic review and thematic analysis. *J Intellect Dev Disabil*. 2016 Apr 2;41(2):125–39.
 54. Hft. Using personalised technology to enable transition - How personalised technology, including assistive technology and telecare, has enabled the transition from registered care to supported living for individuals with learning disabilities. *J Assist Technol*. 2010;4(4):46–50.
 55. Owuor JO., Larkan F, MacLachlan M. Leaving no-one behind: using assistive technology to enhance community living for people with intellectual disability. *Disabil Rehabil Assist Technol* [Internet]. 2017; Available from: <http://www.tandfonline.com/doi/pdf/10.1080/17483107.2017.1312572>
 56. Seelman KD. Assistive technology policy: A road to independence for individuals with disabilities. *J Soc Issues*. 1993;49(2):115–36.
 57. Khasnabis C, MacLachlan M, Mirza Z. Opening the GATE to inclusion for people with disabilities. *Lancet* [Internet]. 2015;386. Available from: [http://dx.doi.org/10.1016/S0140-6736\(15\)01093-4](http://dx.doi.org/10.1016/S0140-6736(15)01093-4)
 58. WHO. Assistive devices and technologies [Internet]. Disability and rehabilitation. 2017 [cited 2017 Mar 17]. Available from: <http://www.who.int/disabilities/technology/en/>
 59. Boot FH, Dinsmore J, Khasnabis C, MacLachlan M. Intellectual Disability and Assistive Technology: opening the GATE wider. *Front Public Health*. 2017;5:10.
 60. Schultze-Krumbholz A, Scheithauer H. Cyberbullying. In: Gullotta TP, Plant RW, Evans MA, editors. *Handbook of Adolescent Behavioral Problems* [Internet]. Springer US; 2015. p. 415–28. Available from: http://dx.doi.org/10.1007/978-1-4899-7497-6_22
 61. McNaughton D, Light J. The iPad and Mobile Technology Revolution: Benefits and Challenges for Individuals who require Augmentative and Alternative Communication. *Augment Altern Commun* [Internet]. 2013 Jun 1 [cited 2015 Feb 11];29(2):107–16. Available from: <http://dx.doi.org/10.3109/07434618.2013.784930>
 62. Borg J, Lindström A, Larsson S. Assistive technology in developing countries: national and international responsibilities to implement the Convention on the Rights of Persons with Disabilities. *The Lancet*. 2009;374(9704):1863–5.
 63. McCarron M, Swinburne J, Burke E, McGlinchey E, Carroll R, McCallion P. Patterns of multimorbidity in an older population of persons with an intellectual disability: Results from the intellectual disability supplement to the Irish longitudinal study on aging (IDS-TILDA). *Res Dev Disabil*. 2013 Jan;34(1):521–7.
 64. Verdonschot MML, De Witte LP, Reichrath E, Buntinx WHE, Curfs LMG. Impact of environmental factors on community participation of persons with an intellectual
- 32

- 1
2
3 disability: a systematic review. *J Intellect Disabil Res* [Internet]. 2009;53(1):54–64.
4 Available from: <http://dx.doi.org/10.1111/j.1365-2788.2008.01128.x>
5
6
7 65. Pal J, Viswanathan A, Chandra P, Nazareth A, Kameswaran V, Subramonyam H, et al.
8 Agency in assistive technology adoption: Visual impairment and smartphone use in
9 Bangalore. In *ACM*; 2017. p. 5929–40.
10
11 66. Hawkins RL, Maurer K. Bonding, bridging and linking: how social capital operated in New
12 Orleans following Hurricane Katrina. *Br J Soc Work*. 2010;40(6):1777–93.
13
14 67. Horsley T, Dingwall O, Sampson M. Checking reference lists to find additional studies for
15 systematic reviews. *Cochrane Database Syst Rev* [Internet]. 2011;(8). Available from:
16 <http://dx.doi.org/10.1002/14651858.MR000026.pub2>
17
18 68. Critical Appraisal Skills Programme (CASP). CASP Checklists [Internet]. 2014. Available
19 from: <http://www.casp-uk.net/casp-tools-checklists>
20
21 69. Pace R, Pluye P, Bartlett G, Macaulay AC, Salsberg J, Jagosh J, et al. Mixed Methods
22 Appraisal Tool—2011 Version. *PsycTESTS* [Internet]. 2012; Available from:
23 [http://elib.tcd.ie/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=pst&](http://elib.tcd.ie/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=pst&AN=9999-21090-000&site=eds-live&scope=site)
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25
26 70. Young T, Hopewell S. Methods for obtaining unpublished data. *Cochrane Database Syst*
27 *Rev* [Internet]. 2011;(11). Available from:
28 <http://dx.doi.org/10.1002/14651858.MR000027.pub2>
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Figure legends

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47 **FIGURE 1: SOCIAL INCLUSION MODEL (33).**

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49 **FIGURE 2: ECOLOGICAL PATHWAY TO AND FROM SOCIAL INCLUSION BY SIMPLICAN ET AL. (33).**

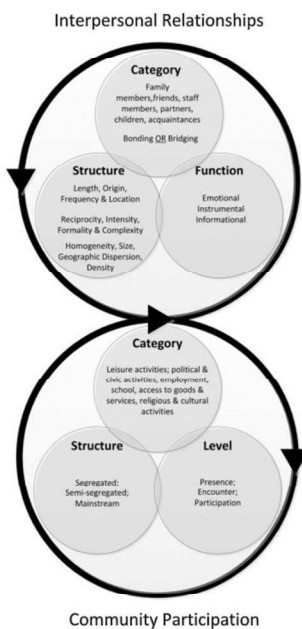
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51 **FIGURE 3: FRAMEWORK FOR AT ENHANCED SOCIAL INCLUSION FOR PEOPLE WITH ID (55).**

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53 **FIGURE 4: ILLUSTRATING SIMPLICAN ET AL.'S ECOSYSTEM SOCIAL INCLUSION CONTINUUM (33).**

For peer review only

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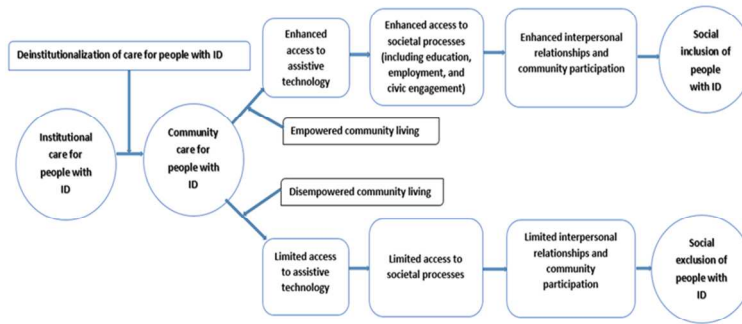
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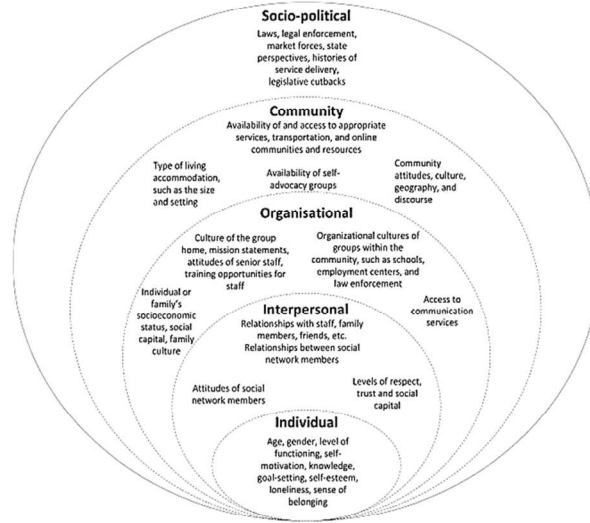
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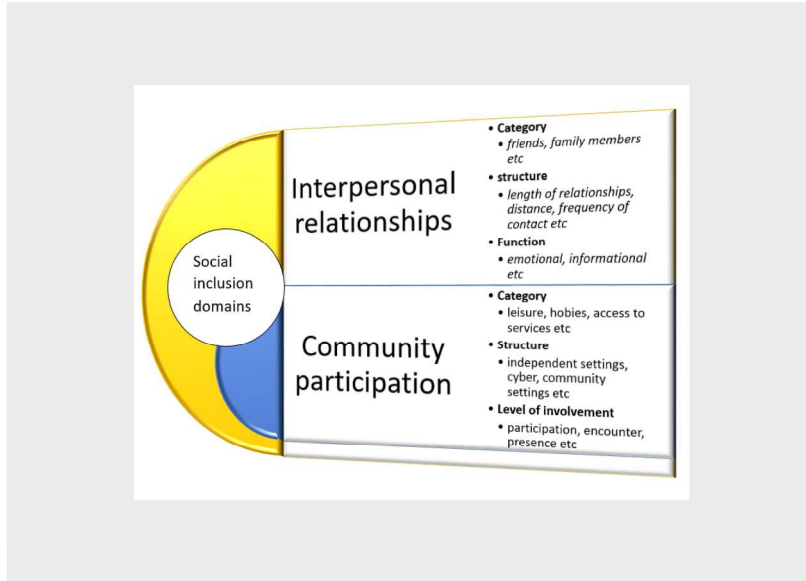
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Search strategy

Below are the initial search strategies that were developed by the time this protocol was written.

ASSIA

(AB,TI((Intellectual* OR mental* OR Developmental* OR learning) NEAR/2 (disable* OR disabilit* OR disorder* OR impairment* OR retard* OR handicap* OR defici* OR impair* OR dysfunction OR defect*)) AND yr(2006-2017)) AND ((AB,TI((Social) NEAR/2 (integrat* OR involve* OR inclusion OR inclusive OR support*) OR (belong* OR participat* OR access* OR relat* OR accept* OR independen* OR employ* OR educat* OR wellbeing OR "social networks" OR "community living" OR "universal design"))) OR SU.EXACT("Social integration")) AND yr(2006-2017)) AND (AB,TI((Assistive OR "self help" OR "daily living" OR rehabilitat*) NEAR/2 (technolog* OR device* OR equipment OR product* OR aid* OR applicat* OR software OR augmented OR Information)) AND (pd(20060101-20170531) AND yr(2006-2017)))

Web of Science

(Assistive OR "self help" OR "daily living" OR rehabilitat*) NEAR/2 (technolog* OR device* OR equipment OR product* OR aid*) AND (Intellectual* OR mental* OR Developmental* OR learning) NEAR/2 (disab* OR disorder* OR impairment* OR retard* OR handicap* OR defici* OR impair* OR dysfunction OR defect*)) AND (Social) NEAR/2 (integrati* OR inclusion OR support) OR (belong* OR participat* OR accessib* OR "universal design")

MEDLINE (EBSCO)

TI((Intellectual* OR mental*) N2 (disable* OR disabilit* OR disorder* OR impairment* OR retard* OR handicap* OR defici* OR impair* OR dysfunction OR defect*)) OR AB ((Intellectual* OR developmental* OR mental* OR learning) N2 (disable* OR disabilit* OR disorder* OR impairment* OR retard* OR handicap* OR defici* OR impair* OR dysfunction OR defect*)) OR MH "Intellectual Disability+) AND (TI((Assistive OR "self help" OR "daily living" OR rehabilitat*) N2 (technolog* OR device* OR equipment OR product* OR aid*)) OR AB((Assistive OR 'self help' OR "daily living" OR rehabilitat*) N2 (technolog* OR device* OR equipment OR product* OR aid*)) OR (TI("technical aid" OR "cognitive aid" OR "universal design") OR AB("technical aid" OR "cognitive aid" OR "universal design") AND ((Social) NEAR/2 (integrati* OR inclusion OR support) OR (belong* OR participat* OR accessib* OR "universal design") OR ((augmented OR communication) NEAR/2 technology) OR (MM "Communication Aids for Disabled")

ERIC (EBSCO)

((AB,TI((Intellectual* OR mental* OR learning OR developmental*) NEAR/2 (disable* OR disabilit* OR disorder* OR impairment* OR retard* OR handicap* OR defici* OR impair* OR dysfunction OR defect*)) OR SU.EXACT.EXPLODE("Mental Retardation")) AND (SU.EXACT.EXPLODE("Assistive Technology") OR AB,TI((Assistive OR "self help" OR "daily living" OR rehabilitat*) NEAR/2 (technolog* OR device* OR equipment OR product* OR aid*)) OR AB,TI(("technical aid" OR "cognitive aid" OR "universal design")))) AND (SU.EXACT.EXPLODE("Inclusion") OR (social NEAR/2 (inclusion OR integration OR assimilation OR participation OR engagement OR potential OR opportunity OR opportunities)))

PRISMA-P (Preferred Reporting Items for Systematic review and Meta-Analysis Protocols) 2015 checklist: recommended items to address in a systematic review protocol*

Section and topic	Item No	Checklist item	Page No
ADMINISTRATIVE INFORMATION			
Title:			1
Identification	1a	Identify the report as a protocol of a systematic review	1
Update	1b	If the protocol is for an update of a previous systematic review, identify as such	1
Registration	2	If registered, provide the name of the registry (such as PROSPERO) and registration number	1
Authors:			1
Contact	3a	Provide name, institutional affiliation, e-mail address of all protocol authors; provide physical mailing address of corresponding author	1-2
Contributions	3b	Describe contributions of protocol authors and identify the guarantor of the review	2
Amendments	4	If the protocol represents an amendment of a previously completed or published protocol, identify as such and list changes; otherwise, state plan for documenting important protocol amendments	2
Support:			
Sources	5a	Indicate sources of financial or other support for the review	2
Sponsor	5b	Provide name for the review funder and/or sponsor	3
Role of sponsor or funder	5c	Describe roles of funder(s), sponsor(s), and/or institution(s), if any, in developing the protocol	3
INTRODUCTION			6-17
Rationale	6	Describe the rationale for the review in the context of what is already known	17
Objectives	7	Provide an explicit statement of the question(s) the review will address with reference to participants, interventions, comparators, and outcomes (PICO)	18
METHODS			
Eligibility criteria	8	Specify the study characteristics (such as PICO, study design, setting, time frame) and report characteristics (such as years considered, language, publication status) to be used as criteria for eligibility for the review	18-25
Information sources	9	Describe all intended information sources (such as electronic databases, contact with study authors, trial registers or other grey literature sources) with planned dates of coverage	25-26
Search strategy	10	Present draft of search strategy to be used for at least one electronic database, including planned limits, such that it could be repeated	26-28

Study records:			
Data management	11a	Describe the mechanism(s) that will be used to manage records and data throughout the review	28-
Selection process	11b	State the process that will be used for selecting studies (such as two independent reviewers) through each phase of the review (that is, screening, eligibility and inclusion in meta-analysis)	30
Data collection process	11c	Describe planned method of extracting data from reports (such as piloting forms, done independently, in duplicate), any processes for obtaining and confirming data from investigators	30
Data items	12	List and define all variables for which data will be sought (such as PICO items, funding sources), any pre-planned data assumptions and simplifications	18-25
Outcomes and prioritization	13	List and define all outcomes for which data will be sought, including prioritization of main and additional outcomes, with rationale	21-24
Risk of bias in individual studies	14	Describe anticipated methods for assessing risk of bias of individual studies, including whether this will be done at the outcome or study level, or both; state how this information will be used in data synthesis	29
Data synthesis	15a	Describe criteria under which study data will be quantitatively synthesised	30
	15b	If data are appropriate for quantitative synthesis, describe planned summary measures, methods of handling data and methods of combining data from studies, including any planned exploration of consistency (such as I^2 , Kendall's τ)	N/A
	15c	Describe any proposed additional analyses (such as sensitivity or subgroup analyses, meta-regression)	N/A
	15d	If quantitative synthesis is not appropriate, describe the type of summary planned	30
Meta-bias(es)	16	Specify any planned assessment of meta-bias(es) (such as publication bias across studies, selective reporting within studies)	
Confidence in cumulative evidence	17	Describe how the strength of the body of evidence will be assessed (such as GRADE)	19

*** It is strongly recommended that this checklist be read in conjunction with the PRISMA-P Explanation and Elaboration (cite when available) for important clarification on the items. Amendments to a review protocol should be tracked and dated. The copyright for PRISMA-P (including checklist) is held by the PRISMA-P Group and is distributed under a Creative Commons Attribution Licence 4.0.**

From: Shamseer L, Moher D, Clarke M, Ghersi D, Liberati A, Petticrew M, Shekelle P, Stewart L, PRISMA-P Group. Preferred reporting items for systematic review and meta-analysis protocols (PRISMA-P) 2015: elaboration and explanation. BMJ. 2015 Jan 2;349(jan02 1):g7647.